Sisson Project:

Baseline Metal Concentrations in Soil and Biota Technical Report

Prepared for:

Northcliff Resources Ltd.
15th Floor – 1040 W. Georgia Street
Vancouver, British Columbia V6E 4H8

Prepared by:

Stantec Consulting Ltd.
845 Prospect Street
Fredericton, New Brunswick E3B 2T7

Project No. 121810356
June 1, 2012

ABOUT THIS DOCUMENT

This report has been prepared by Stantec Consulting Ltd. (Stantec) for the sole benefit of Northcliff Resources Ltd. (Northcliff). The report may not be relied upon by any other person or entity, other than for its intended purposes, without the express written consent of Stantec and Northcliff.

This report was undertaken exclusively for the purpose outlined herein and is limited to the scope and purpose specifically expressed in this report. This report cannot be used or applied under any circumstances to another location or situation or for any other purpose without further evaluation of the data and related limitations. Any use of this report by a third party, or any reliance on decisions made based upon it, are the responsibility of such third parties. Stantec accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions taken based on this report.

Stantec makes no representation or warranty with respect to this report, other than the work was undertaken by trained professional and technical staff in accordance with generally accepted engineering and scientific practices current at the time the work was performed. Any information or facts provided by others and referred to or used in the preparation of this report should not be construed as legal advice.

This report presents the best professional judgment of Stantec personnel available at the time of its preparation. Stantec reserves the right to modify the contents of this report, in whole or in part, to reflect any new information that becomes available. If any conditions become apparent that differ significantly from our understanding of conditions as presented in this report, we request that we be notified immediately to reassess the observations and any conclusions provided herein.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

1.0 INTRODUCTION

This document is the Baseline Metal Concentrations in Soil and Biota Technical Report prepared in support of the Environmental Impact Assessment (EIA) of the Sisson Project (the Project), proposed by Northcliff Resources Ltd. (Northcliff) northwest of Fredericton, New Brunswick.

The Project consists of a conventional open pit tungsten and molybdenum mine, an ore processing plant, and associated facilities and infrastructure located on provincial Crown land approximately 10 km southwest of the community of Napadogan, New Brunswick, and approximately 60 km directly northwest of the city of Fredericton (Figure 1.1).

1.1 PURPOSE OF THIS TECHNICAL REPORT

The construction and operation of a mine and processing facility has the potential to raise concerns related to public health and potential environmental effects, especially with regard to potential risks to human health and the environment. To address these concerns, a key component of the EIA will be to study and report on such potential risks to human health and the environment by completing a human health and ecological risk assessment (HHERA).

Prior to evaluating Project or cumulative environmental effects, it is necessary to quantitatively establish the existing (baseline) environmental conditions within specific spatial boundaries relating to the Project. In some instances the baseline concentration of a substance in the local environment may already pose a risk to receptors due to geology or other factors, in which case it is important for the HHERA and EIA to clearly assess the incremental Project-related environmental effects in the context of the existing environment while determining significance of environmental effects in the EIA. For the purposes of this Technical Report, baseline refers to chemical concentrations that may be present in the existing environment as a result of both natural and existing anthropogenic sources, consistent with standard practice (US EPA 2002), and is an estimate of a reasonable upper limit value for the average metal concentration in the medium determined for each exposure unit (US EPA 1989).

This Technical Report describes the sampling and analysis work conducted by Stantec to establish concentrations of selected trace metals in soil and biota near the Project that can be used to establish a pre-construction baseline, such that the potential environmental effects of the Project and cumulative environmental effects can be assessed as part of the EIA for the Project. This Technical Report includes the sampling and analysis of soil, vegetation (*i.e.,* new growth popular and grasses), blueberry, small mammals, invertebrates, and fish. Additionally, baseline sampling and analysis of fish tissue (among other media) for trace metal concentrations was conducted as part of the Aquatic Environment program. Though reported separately as part of the Baseline Aquatic Environment Technical Report (Stantec 2012a), the results of baseline sampling of fish tissue are also reproduced in this Technical Report, for completeness.

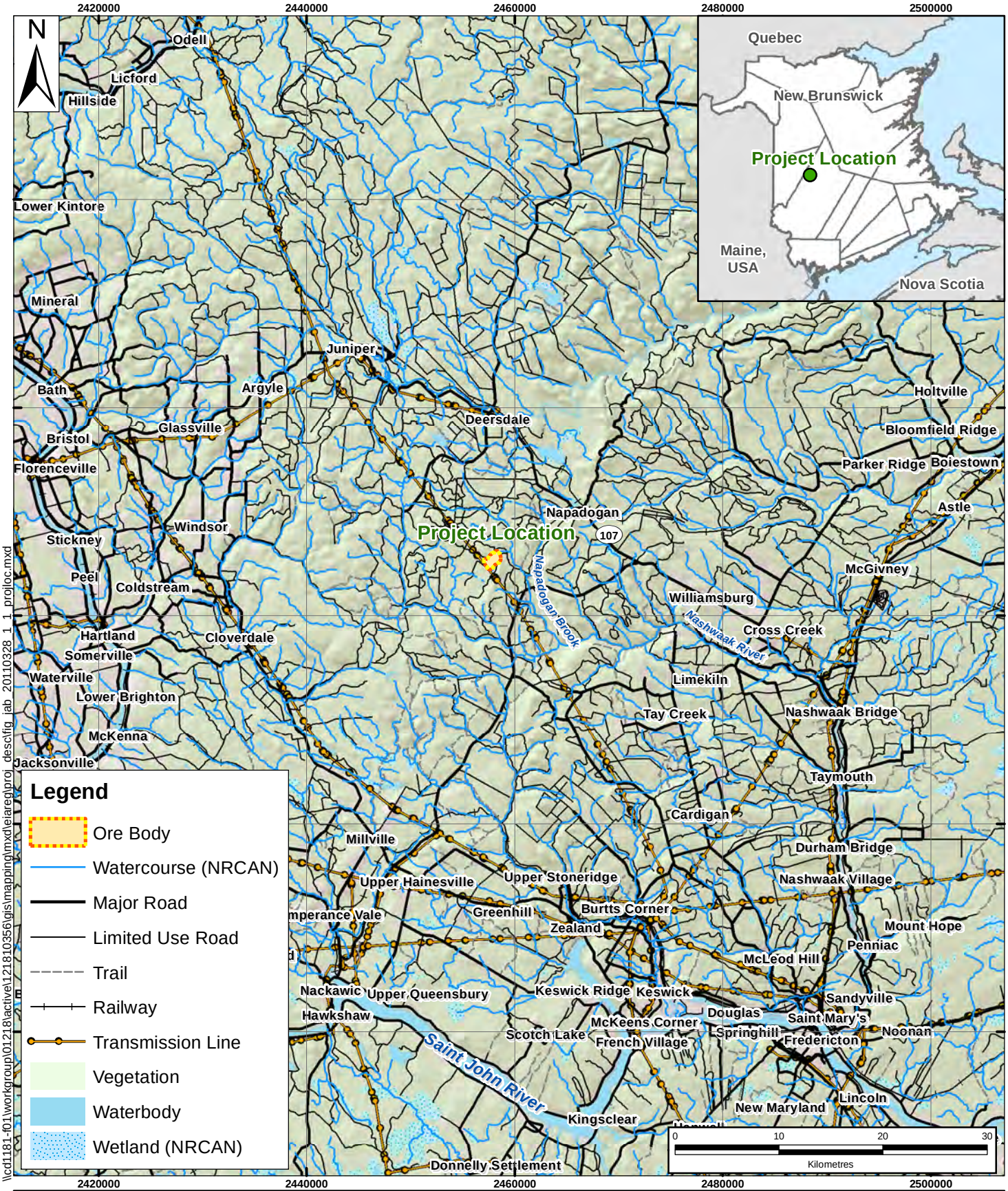
1.2 ORGANIZATION OF THIS TECHNICAL REPORT

The remainder of this Technical Report documents the scope, methodology, and results of the baseline soil and biota sampling program, and is presented in four major sections, as follows.

- Section 2.0 summarizes the methodology used to collect, prepare, sample, and analyze the data collected.
- Section 3.0 summarizes the results of the sampling program.
- Section 4.0 summarizes the field and laboratory quality assurance and quality control (QA/QC) procedures used to ensure the integrity of the data.
- Section 5.0 provides references consulted as part of the work.

Additional supporting documentation and information is presented in the appendices, as follows.

- Appendix A provides data analysis of samples.
- Appendix B provides the outputs of the statistical analysis software (ProUCL, a software package developed by the United States Environmental Protection Agency) that were used to determine baseline trace metal concentrations.
- Appendix C provides the laboratory reports from the analytical laboratory (the Research and Productivity Council, or RPC).
- Appendix D provides figures depicting the measured concentrations of each trace metal in the area near the Project.
- Appendix E provides figures depicting the measured concentrations of each trace metal (corrected for loss on ignition) in the area near the Project.
- Appendix F presents the trace metal concentration data for the fish collected as part of the Aquatic Environmental Technical Report (Stantec 2012a) that will serve as an input to the HHERA.
- Appendix G provides quality assurance/quality control (QA/QC) data from the laboratory analysis.
- Finally, Appendix H provides a list of acronyms and units.



\\cd1181-f01\workgroup\01218\active\121810356\gis\mapping\mxd\eiaregproj_desc\fig_jab_20110328_1_1_projloc.mxd

NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Project Location

Sisson Project

Napadogan, N.B.

Client: Northcliff Resources Ltd.

Scale:	Project No.:	Data Sources:	Fig. No.:
1:500,000	121810356	SNB NRCAN, ESRI	1.1

Date: (dd/mm/yyyy)	Dwn. By:	Appd. By:
26/01/2012	JAB	DLM

Stantec

Map: NAD83 CSRS NB Double Stereographic

2.0 METHODOLOGY

The methodology employed for the baseline soil and biota sampling program discussed in this Technical Report is described in this section.

2.1 SCOPE

Section 4.8.5 of the Terms of Reference for the EIA of the Project (Stantec 2012b) identified the specific scope of the baseline soil and biota sampling program that would be conducted in support of characterizing baseline concentrations of trace metals in soil and biota as follows.

> "The HHERA will be based primarily on the baseline data with regard to air quality, water quality, fish tissue quality, soil quality, vegetation (edible plants), and wildlife. These data will be collected as part of the baseline studies for other VECs or from literature sources and will comprise characterization of:
>
> - background levels of metals substances in soils;
> - background levels of metals in surface water;
> - metal concentrations in fish tissue;
> - metal concentrations in vegetation;
> - metal concentrations in small mammals; and
> - existing air quality conditions in the Project area."

Additionally, Section 4.8.5.1 of the Terms of Reference provided further clarification of the scope of the baseline soil and biota sampling program, as follows.

> "A baseline sampling program will be carried out in the PDA to provide information on existing conditions to support the HHERA. Based on the current land use in the area, country foods that are expected to be consumed from the area include fish, game, and berries. Baseline sampling of fish tissue for standard trace metal concentrations (including lead, arsenic, tungsten, molybdenum, zinc, copper, antimony, and aluminum) is currently included as part of the Aquatic Environment program described previously. Small mammal samples will be collected from up to 10 sites in the PDA and tissues will be analyzed for standard trace metal concentrations. These will be collected during the summer sampling program, coinciding with up to 50 proposed soil sampling locations. The small mammal tissues are considered a conservative representation of potential metal concentrations in larger game. Based on previous field programs in New Brunswick that included trapping small mammals, meadow voles and/or shrews are the most likely species to be collected, as available.
>
> Blueberries are expected to occur in the general area, and field crews will identify blueberry patches during the course of completing the other baseline programs. Sampling of the distinct blueberry patches will then be completed when the blueberries are in season. While the actual number of

blueberry patches cannot be confirmed at this time, ideally five to ten blueberry samples would be collected and analyzed for standard trace metal concentrations."

2.2 SPATIAL BOUNDARIES

The spatial boundaries for the characterization of the existing soil and biota conditions discussed in this Technical Report are based on the following terms as defined in the Terms of Reference for the EIA of the Project (Stantec 2012b).

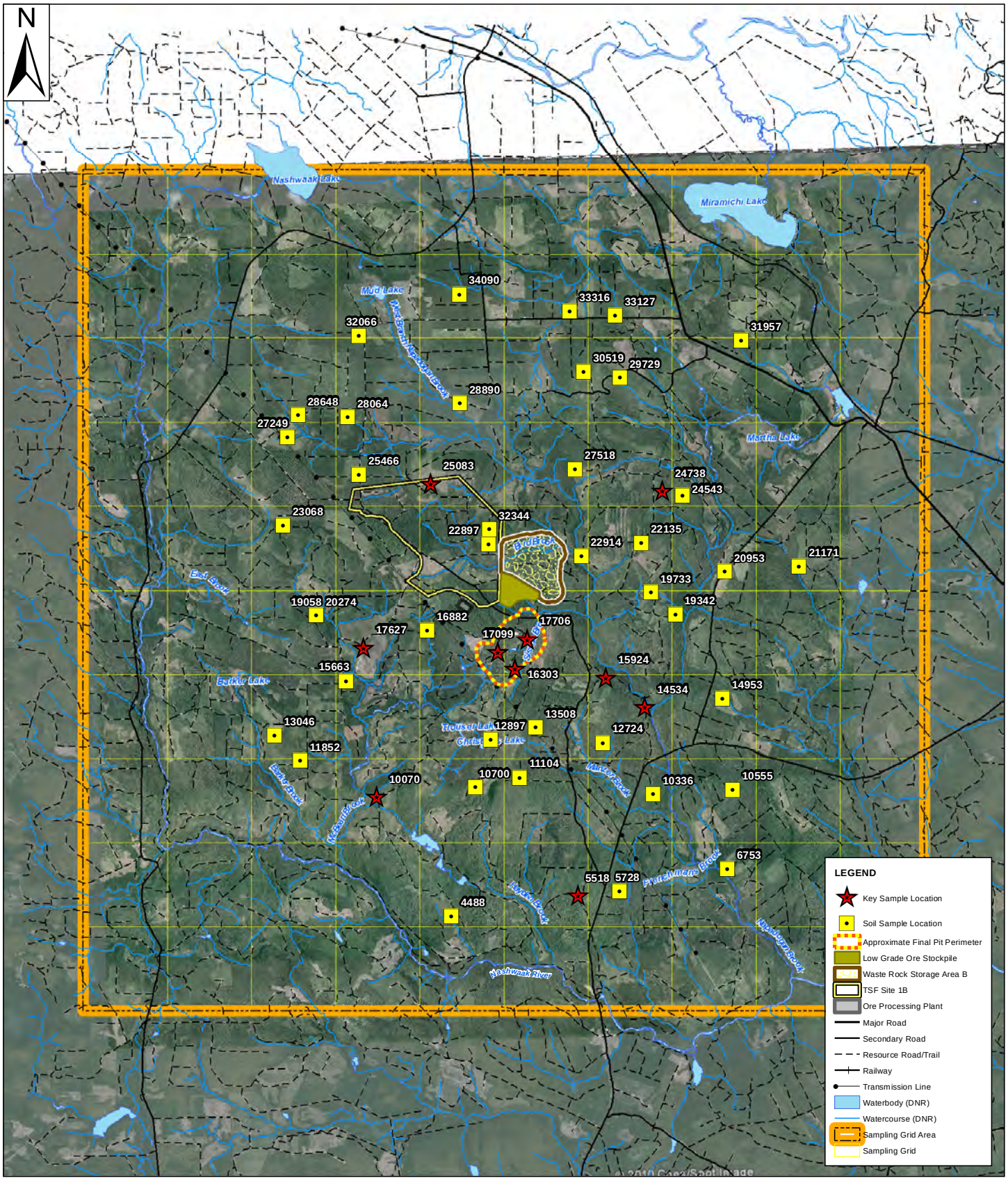
- The **Project Development Area (PDA)** is the most basic and immediate area of the Project. The PDA is defined as the area of physical disturbance associated with the construction and operation of the Project. For this Project, the PDA consists of an area of approximately 1,200 ha that includes the area of physical disturbance associated with the open pit, processing facility, storage areas, and tailings storage facility. The PDA also includes access roads and a transmission line, the specific area of which will be determined in the EIA Report.

- The **Local Assessment Area (LAA)** for this Technical Report includes the PDA as well as the additional area surrounding the PDA within which trace metal concentrations in soil and biota may change as a result of the Project, which resulted in the development of the sampling grid for this Technical Report as shown in Figure 2.1.

The baseline sampling program was carried out within the LAA. Soil and Key sampling locations (defined below) were determined based on a grid of squares, 2 km by 2 km in size, superimposed on the LAA. Soil and Key sampling locations were randomly selected within each grid block. In some cases, site conditions (*e.g.,* rock outcrops) made accessing the randomly selected sample location very difficult. When this occurred, a new sampling location within the same grid block, representative of the local area, was selected in the field. Sampling locations, including the grid, are shown in Figure 2.1.

In general terms, the LAA is located on Crown land that has been and continues to be logged on a regular basis. Other than this forestry activity and some recreational activity, including hunting, fishing, and all-terrain vehicle (ATV) use, there is little additional land use in the LAA.

As part the Baseline Aquatic Environment Technical Report (Stantec 2012a), fish were collected from Bird Brook, McBean Brook, Sisson Brook, and West Branch Napadogan Brook; fish tissue were analyzed for trace metal concentrations. Though reported separately in Stantec (2012a), the results of these analyses are also included in this report as they will be considered in the HHERA for the Project, since fish may be consumed by both humans and ecological receptors. Bird Brook, McBean Brook, Sisson Brook, and West Branch Napadogan Brook are included in the LAA.



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Sampling Locations

Sisson Project

Napadogan, N.B.

Client: Northcliff Resources Ltd.

Scale: NTS

0 0.5 1 1.5

Kilometres

Project No.: 121810356

Date: (dd/mm/yyyy) 02/02/2012

Dwn. By: JAB

Appd. By: DM

Data Sources:
NBDNR, SNB
NHN, NB Aquatic
Data Warehouse
Imagery Provided By:
NBDNR
Google Earth Pro

Fig. No.: 2.1

Stantec

2.3 APPROACH

The general approach taken as part of the work described in this report was to:

- identify possible trace metals of potential concern;
- identify and sample the various media of interest; and
- analyze the results, and determine baseline concentrations of each contaminant of potential concern in various environmental media (based on statistical analysis of the analytical results) for use as a background value for the HHERA.

Mining operations (including the removal and processing of the ore) associated with metallic minerals could potentially release chemicals to which humans and ecological receptors may be exposed. Metals associated with the ore body and surrounding bedrock rock are chemicals of potential concern, and are ubiquitous in nature. Emissions of criteria air contaminants may also be released; however, these particular contaminants are volatile and therefore do not readily partition to soil or biota. Baseline air quality is being assessed separately. As a result, the focus of this baseline soil and biota sampling program was on trace metals. Given the relatively undeveloped nature of the area of the Project, no other contaminants would be expected to be present in appreciable concentrations so as to cause a concern with respect to its background concentration in environmental media.

The following sections provide an overview of the approach used to establish the baseline conditions for soil and biota.

2.3.1 Identification of Trace Metals of Potential Concern

Based on the nature of the Project (a tungsten and molybdenum mine), the known composition of soils in central New Brunswick, and the trace metals of primary toxicological concern, the following trace metals are expected to be given primary consideration in HHERA modelling:

- arsenic (As);
- cadmium (Cd);
- lead (Pb);
- mercury (Hg);
- molybdenum (Mo); and
- tungsten (W).

As a full history of the conditions in the area is not available, for the purpose of this Technical Report, samples were analyzed for a suite of trace metals, including:

- Aluminum (Al);
- Antimony (Sb);
- Copper (Cu);
- Iron (Fe);
- Selenium (Se);
- Silver (Ag);

- Arsenic (As);
- Barium (Ba);
- Beryllium (Be);
- Bismuth (Bi);
- Boron (B);
- Cadmium (Cd);
- Calcium (Ca);
- Chromium (Cr) (total);
- Cobalt (Co);
- Lead (Pb);
- Lithium (Li);
- Magnesium (Mg);
- Manganese (Mn);
- Mercury (Hg);
- Molybdenum (Mo);
- Nickel (Ni);
- Potassium (K);
- Rubidium (Rb);
- Sodium (Na);
- Strontium (Sr);
- Tellurium (Te);
- Thallium (Th);
- Tin (Sn);
- Tungsten (W);
- Uranium (U);
- Vanadium (V); and
- Zinc (Zn).

2.3.2 Sample Media of Interest

The US EPA (2005) has provided guidance on evaluating human health environmental effects caused by air contaminant emissions and other releases from proposed facilities at the design stage. The guidance identifies a number of media that are to be included in a HHERA. These same media were targeted as media of interest for the baseline soil and biota sampling program described herein. The following lists the media of interest and the rationale for inclusion in the baseline sampling program.

- **Soil:** Soil is one of the most important of the media considered. Both human and ecological receptors are exposed directly to soil (*e.g.,* through inhalation or dermal contact); also, the models used for HHERA prediction rely heavily on the soil concentrations to predict concentrations of potential contaminants in various other media. In addition, existing soil concentrations represent the current conditions associated with any historical deposition.

- **Forage (*i.e.,* grass):** Forage is considered to be green herbaceous vegetation, *i.e.,* the current year's growth from non-woody plants such as grasses and wildflowers. Forage ingestion is a direct pathway for many ecological receptors.

- **Browse (*i.e.,* poplar tips):** Browse is considered to be the current year's woody growth from shrubs and trees, such as willows, alders, birches, poplars, and conifers. Browse ingestion is a direct pathway for many ecological receptors.

- **Terrestrial Invertebrates:** Terrestrial invertebrates, such as worms and slugs, are exposed directly to the soil as well as forming an exposure pathway for ingestion by other ecological receptors.

- **Small Mammals:** Small mammals such as mice, voles, and shrews, are exposed directly to soil and forage/browse media as well as forming an exposure pathway through their ingestion by other predatory ecological receptors.

- **Wild Berries:** Wild berries were selected as media of interest as ingestion of the fruit is an exposure pathway for both human and ecological receptors.

- **Fish (brook trout):** Fish ingestion is an exposure pathway for both human and ecological receptors.

Air, water, and sediment were also considered one of the media of interest for the HHERA. Sampling to establish baseline concentrations of metals in these media was completed as part of separate studies (Stantec 2012a and Stantec 2012c).

2.4 SAMPLING PROGRAM

The different media selected for analysis were grouped by occurrence into sampling locations as follows:

- soil sites – only soil was sampled; and

- key sites - soil, forage, browse, small mammals, terrestrial invertebrates, and wild berries (as available) were sampled.

Fish were sampled as part of the Aquatic Environment Technical Report and were analyzed for trace metal concentrations (Stantec 2012a). Sampling methodology for fish (brook trout) is not described in detail herein, but rather in Stantec (2012a). Measured trace metal concentrations for whole fish and fish carcasses (*i.e.,* the portion of the fish that humans consume, with the head, entrails and kidneys removed), are provided in Appendix F.

As indicated above, Key sampling locations (10 in total) include sampling of multiple media. Additional Soil sampling locations (40 in total) were selected to supplement the soil samples collected at the Key locations, thus providing better coverage of the LAA (designated as Soil sites). The locations of the Soil and Key sampling sites are shown on Figure 2.1, and their coordinates are provided in Table 2.1. The watercourses from which the fish were sampled are also shown in Figure 2.1.

Table 2.1 Sample Locations

Sample Identifier	Sample Location Type	Sample Location Coordinates (Datum: NAD 83 CSRS UTM Zone 19)	
		Easting	Northing
4488	Soil	648750	5130250
5518	Key	651756	5130751
5728	Soil	652750	5130850
6753	Soil	655311	5131382
10070	Key	646975	5133105
10336	Soil	653550	5133150
10555	Soil	655446	5133262
10700	Soil	649322	5133320
11104	Soil	560376	5133552
11852	Soil	645150	5133950
12724	Soil	652357	5134376
12897	Soil	649690	5134456
13046	Soil	644550	5134550

Table 2.1 Sample Locations

Sample Identifier	Sample Location Type	Sample Location Coordinates (Datum: NAD 83 CSRS UTM Zone 19)	
		Easting	Northing
13508	Soil	650752	5134742
14534	Key	653350	5135237
14953	Soil	655205	5135424
15663	Soil	646253	5135850
15924	Key	652425	5135939
16303	Key	650262	5136151
16882	Soil	648179	5137052
17099	Key	649854	5136551
17267	Key	646650	5136650
17706	Key	650548	5136852
19058	Soil	645533	5137405
19342	Soil	654077	5137430
19733	Soil	653503	5137953
20274	Soil	645533	5137405
20953	Soil	655250	5138450
21171	Soil	657022	5138568
22135	Soil	653274	5139131
22897	Soil	649642	5139094
22914	Soil	651842	5138820
23048	Soil	644750	5139550
24543	Soil	654250	5140250
24738	Key	653765	5140381
25083	Key	648250	5140550
25466	Soil	646552	5140752
27249	Soil	644849	5141647
27518	Soil	651693	5140883
28064	Soil	646280	5142117
28648	Soil	645106	5142167
28890	Soil	648950	5142450
29729	Soil	652768	5143057
30519	Soil	651901	5143201
31957	Soil	655650	5143950
32066	Soil	646553	5144053
32344	Soil	649650	5139450
33127	Soil	652650	5144547
33316	Soil	651565	5144641
34090	Soil	648937	5145048

2.5 SAMPLE COLLECTION

Stantec field technicians, in teams of two, collected field samples during September and October 2011 at the various sampling locations. Standard operating procedures (SOPs) were followed (copies of which are available upon request from Stantec). Field notes were recorded on sample collection field

sheets describing the location, local biophysical environment, weight of sample, description of sample, equipment used, and weather conditions at the time of sample collection.

2.5.1 Soil

Five 100 g (or larger) surface soil sub-samples were collected at Soil sites and composited on-site to generate one composite surface soil sample for each sampling location. For each sub-sample, the root mat was removed prior to collecting a sample of the soil. The root mat was typically 0-10 cm thick. The maximum depth from which the soil sample was collected was approximately 30 cm.

2.5.2 Forage and Browse

Grass and poplar tip (*i.e.,* current year's growth) samples were collected at Key sites by hand using scissors within an approximate 10 m radius from the corresponding soil sampling location.

2.5.3 Small Mammals

Up to 20 snap traps were baited with peanut butter and left at each Key site for at least 24 hours. Any animals captured were collected as individual samples.

2.5.4 Terrestrial Invertebrates

Two types of terrestrial invertebrates were collected at Key sites: slugs and earthworms. To collect slugs, newspapers were thoroughly wet with water, then spread over the ground and left for at least 24 hours. Slugs were then collected from the underside of the newspaper. If slugs were seen elsewhere at the sampling site, they were collected by hand and added to the sample.

Earthworms were located by using a shovel to overturn soil, then searching the soil. Earthworms spotted were collected by hand.

Invertebrate samples were rinsed with water in the field to remove loose soil and were depurated separately by placement on moist paper towels for 48 hours to allow for clearance of soil particles from the gut, in order to better represent trace metal concentrations in the invertebrate tissue.

2.5.5 Wild Berries

Scissors were used to collect wild berry samples at Key sites (if present) within an approximate 10 m radius of the corresponding soil sampling location. If more than one type of wild berry was present at a Key site, a sample was collected of each berry type.

2.5.6 Fish

Fish were collected as part of the Aquatic Environment program using a backpack electrofisher. Brook trout at least 9 cm in length were collected and sent for analysis.

2.6 LABORATORY ANALYSIS AND DATA ANALYSIS

Laboratory analyses of the collected samples were conducted by the Research and Productivity Council (RPC) in Fredericton, New Brunswick. RPC is accredited by the Standards Council of Canada (SCC). Standard methods for the laboratory analyses were used, including those of the United States Environmental Protection Agency (US EPA) and other reputable organizations. A rigorous quality assurance/quality control (QA/QC) program was used to ensure the integrity of the results, as summarized in Section 4.0 of this Technical Report.

The laboratory results were subjected to rigorous statistical data analysis techniques, detailed in the sub-sections that follow.

2.6.1 Statistical Analysis

Laboratory data results were used to determine the baseline concentrations of the chemical parameters analyzed in the various media. Laboratory duplicates were not included in the establishment of the baseline concentrations. Non-detectable values were carried forward in the statistical analysis at half the laboratory estimated limit of quantification (EQL) value, sometimes referred to as the reportable detection limit (RDL), according to standard practice.

ProUCL version 4.00.05, a software package developed by the US EPA, was used to calculate an upper confidence limit (UCL) of the mean per trace metal for each sample type. The results of the statistical analyses are provided in Appendix B. For samples where the metal concentration is less than the detection limit, a value of half of the detection limit was carried forward in the statistical analysis. For some sampled media, there were not enough samples collected, or enough samples with trace metal concentrations above the detection limit to produce ProUCL results. Because of this, the following procedure was used to estimate baseline values when results from ProUCL were not obtained.

- If a trace metal was not detected in any of the samples, the baseline concentration was based on one-half of the EQL.
- If a metal was detected in at least one sample, but there were not enough samples above the detection limit for ProUCL to produce a result, the baseline concentration was the maximum detected value, unless otherwise noted.
- If ProUCL recommended more than one potential UCL, the highest UCL value was selected.

Stantec has applied this approach to other baseline sampling programs for HHERA. The use of UCLs or maximums is generally considered as conservative approaches for estimating potential exposures for the purposes of completing human health or ecological risk assessments (Health Canada 2009).

2.7 QUALITY ASSURANCE/QUALITY CONTROL

Quality control for the collection, transport, and analysis of the samples was an important part of the study. As noted in Section 2.5, Project-specific SOPs were established to clearly describe the methods used to collect the samples; based on these, field sheets were completed to document the sample

collection, and sample chain of custody forms were completed to ensure the integrity of the sample handling. RPC has documented methods and internal protocols for the sample analysis.

To confirm the adequacy of these measures and the reproducibility of the results, a number of quality assurance (QA)/quality control (QC) samples were analyzed. These samples included method blanks, certified reference materials, laboratory duplicates, and field duplicates. Descriptions of these QA/QC samples and the purpose for each are provided in Table 2.2. In total, the number of laboratory QA/QC samples was greater than 14% of the total number of samples. The number and types of field QA/QC samples are shown in Appendix G.

Table 2.2 QA/QC Description

QA/QC Procedure	Description	Purpose
Method Blanks	Reagent blanks are analyzed in the same way for each sample. The reagent (*i.e.,* all chemicals and solutions used in sample analysis except for the sample itself) is exposed to glassware, equipment, solvents, reagents, and internal standards that are used during the analysis of other samples.	Determines bias due to the potential presence of impurities in the laboratory environment.
Certified Reference Materials (CRM)	Reference materials with known chemical concentrations are analyzed to determine recovery rates relative to the known concentration.	Confirms the accuracy and effectiveness of analytical techniques and methodologies.
Laboratory Duplicates	Samples that were taken from one location in the field and split into two portions in the lab. The fact that the two samples are duplicates is known to the lab. The two portions are analyzed separately using identical procedures.	Used to measure precision or reproducibility of data.
Field Duplicates	Samples which were split or divided in the field, depending on the analysis to be conducted. Each sample was then carried through the remaining steps in the measurement process. These split samples were submitted to the same laboratory for analysis.	Used to measure precision of reproducibility of data. Precision (percent difference from the mean) should be ± 40%.

The assessment of laboratory and field duplicates is based on the relative percent difference (RPD). The formula used to determine the RPD from the mean between two samples, the original and the duplicate, is the absolute value of the following:

$$RPD = 100\% \times \frac{C_{original} - C_{dup}}{\frac{1}{2}(C_{original} + C_{dup})}$$

Where:

RPD	=	relative percent difference;
$C_{original}$	=	concentration in the original sample; and
C_{dup}	=	concentration in the duplicate.

If a parameter was not detected in one of the duplicates but was detected in the other, the concentration in the undetected one was set to ½ EQL of the parameter to evaluate the RPD.

A summary of the QA/QC results is presented in Section 4.0, and detailed calculations are provided in Appendix G.

3.0 SUMMARY OF RESULTS

Descriptions of the Key and Soil sampling locations, the media obtained for analysis (*e.g.*, soil, forage, small mammals), and resulting baseline concentrations of trace metals in each media are provided in the following subsections. Media sampled at the Key sampling locations included: soil, forage (grass), browse (poplar tips), small mammals (mice, shrews, and voles), terrestrial invertebrates (slugs and earthworms), and wild berries. The locations of all Key and Soil sampling locations, and the watercourses from which fish were sampled, were previously shown in Figure 2.1.

Copies of the laboratory certificates are available from Stantec upon request, while tabular summaries of the analytical results, the statistical calculations, and copies of the laboratory results provided by RPC are provided in Appendix C.

3.1 DESCRIPTION OF SAMPLING LOCATIONS

The LAA is dominated by Crown land that has a variety of uses that occur at the discretion of the provincial government. With the exception of the proposed transmission line to be built to service the Project (with specific routing to be determined), the Project is located entirely on Crown land. The majority of land in and around the LAA has been forested routinely for many decades. Timber is presently being harvested in the vicinity of the Project, and logging vehicles frequently travel to, from, and through the LAA.

In addition to the forestry activity that occurs throughout the LAA, recreational land uses include primarily hunting, trapping, fishing, and ATV and snowmobile riding.

The majority of land within the LAA is forested at various stages of development. The sampling locations appeared to be similar. None of the locations were obviously influenced by industrial activity other than forestry, and no obvious signs of contamination or substantive anthropogenic influence were observed.

Fish samples were obtained from Bird Brook, Sisson Brook, McBean Brook, and West Branch Napadogan Brook. Samples were also obtained from East Branch Napadogan Brook; however, as these were reference samples, they are not discussed herein.

3.2 SOIL

One composite soil sample was collected from each of the 40 Soil sites and 10 Key sites. One additional soil site was added in the field to take advantage of a patch of wild berries found by the field technicians. All soil samples were analyzed for metals and loss on ignition at 550°C. Fifty-one soil samples were collected in total as samples were collected from each of the ten Key sites, 40 Soil sites, and the field-added soil site. Soil samples were air dried by RPC, then sieved at 2 mm prior to analysis. A summary of the trace metals concentrations in soil is provided in Table 3.1.

Table 3.1 Baseline Concentrations for Trace Metals in Soil

Trace Metal	Units	Number of Soil Samples Analyzed	Number of Soil Samples in Which Trace Metal Was Detected	Concentration of Trace Metal in Soil			
				Minimum Detected (mg/kg)	Maximum Detected (mg/kg)	Baseline Concentration of Trace Metal in Soil (mg/kg)	Baseline Concentration Selected based on:
Aluminum (Al)	mg/kg	51	51	766	24,700	10,442	95% Student's-t UCL
Antimony (Sb)	mg/kg	51	51	0.1	1.1	0.267	95% KM (% Bootstrap) UCL
Arsenic (As)	mg/kg	51	51	1	103	20.88	95% KM (Chebyshev) UCL
Barium (Ba)	mg/kg	51	51	7	299	68.37	95% Chebyshev (Mean, Sd) UCL
Beryllium (Be)	mg/kg	51	37	0.1	1.4	0.425	95% KM (BCA) UCL
Bismuth (Bi)	mg/kg	51	10	1	3	1.281	95% KM (t) UCL
Boron (B)	mg/kg	51	51	1	4	2.35	95% KM (Chebyshev) UCL
Cadmium (Cd)	mg/kg	51	51	0.02	6.21	0.898	95% Chebyshev (Mean, Sd) UCL
Calcium (Ca)	mg/kg	51	51	80	22,800	1,995	95% H-UCL
Chromium (Cr) (total)	mg/kg	51	51	1	43	13.57	95% KM (Chebyshev) UCL
Cobalt (Co)	mg/kg	51	51	0.2	22.5	6.502	95% H-UCL
Copper (Cu)	mg/kg	51	51	1	62	13.86	95% KM (Chebyshev) UCL
Iron (Fe)	mg/kg	51	51	880	36,800	16,943	95% Approximate Gamma UCL
Lead (Pb)	mg/kg	51	51	3.6	48.8	19.39	95% H-UCL
Lithium (Li)	mg/kg	51	51	0.3	35.6	10.34	95% Approximate Gamma UCL
Magnesium (Mg)	mg/kg	51	51	100	6,980	1,798	95% Approximate Gamma UCL
Manganese (Mn)	mg/kg	51	51	13	6,120	1,114	95% Chebyshev (Mean, Sd) UCL
Mercury (Hg)	mg/kg	51	51	0.02	0.4	0.143	95% Chebyshev (Mean, Sd) UCL
Molybdenum (Mo)	mg/kg	51	48	0.1	16.5	2.874	95% KM (Chebyshev) UCL
Nickel (Ni)	mg/kg	51	50	1	34	11.66	95% KM (Chebyshev) UCL
Potassium (K)	mg/kg	51	51	90	1,390	517.6	95% Approximate Gamma UCL
Rubidium (Rb)	mg/kg	51	51	0.7	31	9.981	95% Approximate Gamma UCL
Selenium (Se)	mg/kg	51	4	1	2	1.092	95% KM (t) UCL
Silver (Ag)	mg/kg	51	18	0.1	1.1	0.182	95% KM (% Bootstrap) UCL
Sodium (Na)	mg/kg	51	6	50	250	104.5	95% KM (% Bootstrap) UCL
Strontium (Sr)	mg/kg	51	51	1	165	25.28	95% Chebyshev (Mean, Sd) UCL

Table 3.1 Baseline Concentrations for Trace Metals in Soil

Trace Metal	Units	Number of Soil Samples Analyzed	Number of Soil Samples in Which Trace Metal Was Detected	Concentration of Trace Metal in Soil			
				Minimum Detected (mg/kg)	Maximum Detected (mg/kg)	Baseline Concentration of Trace Metal in Soil (mg/kg)	Baseline Concentration Selected based on:
Tellurium (Te)	mg/kg	51	0	0.1	0.1	0.05	½ EQL
Thallium (Th)	mg/kg	51	26	0.1	0.3	0.16	95% KM (t) UCL
Tin (Sn)	mg/kg	51	0	0.1	0.1	0.05	½ EQL
Tungsten (W)	mg/kg	51	31	0.1	8.4	1.262	95% KM (Chebyshev) UCL
Uranium (U)	mg/kg	51	51	0.2	3.2	1.189	95% H-UCL
Vanadium (V)	mg/kg	51	51	2	115	34.69	95% Student's-t UCL
Zinc (Zn)	mg/kg	51	51	4	118	36.98	95% Approximate Gamma UCL

Notes:
Where one or more samples, but not all samples, had concentrations below the detection limit for a particular trace metal, the minimum reported value is the detection limit. Where all samples had concentrations below the detection limit for a particular trace metal, the minimum and maximum reported values are the detection limit.

Legend:
UCL = Upper Confidence Limit
Sd = standard deviation
95% Student's-t UCL = UCL based upon the Student's t-distribution
95% KM (% Bootstrap) UCL = UCL based upon Kaplan-Meier estimates using the percentile bootstrap method
95% KM (Chebyshev) UCL = UCL based upon Kaplan-Meier estimates using the Chebyshev inequality
95% Chebyshev (Mean, Sd) UCL = Chebyshev inequality-based UCL using sample mean and standard deviation
95% KM (BCA) UCL = UCL based upon Kaplan-Meier estimates using bias-corrected accelerated bootstrap method
95% KM (t) UCL = UCL based upon Kaplan-Meier estimates using the Student's t-distribution cutoff value
95% H-UCL = UCL based upon Land's H-statistic
95% Approximate Gamma UCL = Approximate gamma UCL using chi-square approximation
½ EQL = one-half of the laboratory estimated limit of quantification

Tellurium and tin were not detected in any of the soil samples, as indicated in Table 3.1. Selenium was detected in four soil samples; sodium was detected in six soil samples; and bismuth was detected in 10 soil samples. All other trace metal parameters tested were detected in at least 18 of the 51 soil samples.

The measured trace metal concentrations in soil are presented graphically in Appendix D. A separate figure is provided for each trace metal. A map of the bedrock geology of the LAA is also provided in Appendix D, as underlying geology has the potential to influence the metal content of overlying soils.

The organic content of the soils sampled varied considerably (*i.e.,* from 4.9 to 91%), as demonstrated by the losses on ignition at 550°C presented in Table 3.2.

Table 3.2 Soil Loss on Ignition at 550°C

Soil Sampling Location	Loss on Ignition at 550°C (%)	Soil Sampling Location	Loss on Ignition at 550°C (%)
06753-SS-1	8.3	21171-SS-1	22.2
10070-SS-1	7	22135-SS-1	36.5
10336-SS-1	15.7	22897-N-SS-1	9.9
10555-SS-1	14.7	22897-SS-1	7.3
10700-SS-1	24.9	22914-SS-1	13.5
11104-SS-1	4.9	23068-SS-1	16.2
11852-SS-1	10.2	24543-SS-1	42.9
12724-SS-1	19	24738-SS-1	6.4
12724-SS-1	10.3	25083-SS-1	21.1
12897-SS-1	16.6	25466-SS-1	11.3
13046-SS-1	9.7	27249-SS-1	91
13508-SS-1	14.7	27518-SS-1	36.9
14534-SS-1	44.3	28064-SS-1	4.8
14953-SS-1	72.7	28648-SS-1	87.6
15663-SS-1	25.1	28890-SS-1	20.9
15924-SS-1	26	29729-SS-1	8.4
16303-SS-1	11.3	30519-SS-1	26.1
16882-SS-1	49.7	31957-SS-1	9.8
17099-SS-1	11.1	32066-SS-1	8.0
17627-SS-1	14.8	32344-SS-1	13
17706-SS-1	13.1	33127-SS-1	7.1
19058-SS-1	13.3	33316-SS-1	5.1
19342-SS-1	58.7	34090-SS-1	39.3
19733-SS-1	27.2	4488-SS-1	21.9
20274-SS-1	23.4	5518-SS-1	31.4
20953-SS-1	13.2	5728-SS-1	17.2
21171-SS-1	22.2		

The organic content of a soil sample can influence the measured trace metal concentration. As metals are generally found in highest concentrations in the mineral portion of the soil, and not in the organic content, the reported trace metal concentration in a soil sample that is highly organic may not contribute to an accurate understanding of the mineralization of an area. As such, trace metal concentrations in soil were corrected for loss on ignition, and therefore corrected for varying organic content. These corrected soil metal concentrations are presented graphically in Appendix E, and a map of the bedrock geology of the area was provided in Appendix D. These corrected soil values were not used in the determination of baseline concentrations because soil ingestion by human or ecological receptors is calculated on the basis of the whole soil, and not the ashed soil.

3.3 FORAGE (GRASS)

Grass samples were analyzed from seven of the Key sites. Grass was not present in sufficient quantities for a sample to be collected at three Key sites (*i.e.,* sites 15924, 17009 and 25083) and therefore a grass sample was not obtained from these sites. All grass samples were analyzed for trace metals. A summary of the trace metals concentrations in forage (grass) is provided in Table 3.3.

Table 3.3 Baseline Concentrations for Trace Metals in Forage (Grass)

Trace Metal	Units	Number of Forage Samples Analyzed	Number of Forage Samples in Which Trace Metal Was Detected	Concentration of Trace Metal in Forage (Grass)			
				Minimum Detected (mg/kg)	Maximum Detected (mg/kg)	Baseline Concentration of Trace Metal in Forage (mg/kg)	Baseline Concentration in Forage Selected Based on:
Aluminum (Al)	mg/kg	8	8	2.8	83.7	52.44	95% Approximate Gamma UCL
Antimony (Sb)	mg/kg	8	1	0.005	0.025	0.025	Maximum value
Arsenic (As)	mg/kg	8	5	0.03	0.06	0.0513	95% KM (% Bootstrap) UCL
Barium (Ba)	mg/kg	8	8	6.39	24.6	17.73	95% Student's-t UCL
Beryllium (Be)	mg/kg	8	2	0.002	0.009	0.00563	95% KM (t) UCL
Bismuth (Bi)	mg/kg	8	0	0.05	0.05	0.025	½ EQL
Boron (B)	mg/kg	8	8	0.7	2.4	1.807	95% Student's-t UCL
Cadmium (Cd)	mg/kg	8	8	0.005	0.113	0.0783	95% Student's-t UCL
Calcium (Ca)	mg/kg	8	8	664	2,040	1,451	95% Student's-t UCL
Chromium (Cr) (total)	mg/kg	8	8	0.09	0.39	0.31	95% Student's-t UCL
Cobalt (Co)	mg/kg	8	7	0.01	0.21	0.127	95% KM (t) UCL
Copper (Cu)	mg/kg	8	8	1.43	3.94	3.33	95% Student's-t UCL
Iron (Fe)	mg/kg	8	8	16	77	50.11	95% Student's-t UCL
Lead (Pb)	mg/kg	8	8	0.052	0.728	0.661	95% H-UCL
Lithium (Li)	mg/kg	8	5	0.01	0.04	0.0263	95% KM (% Bootstrap) UCL
Magnesium (Mg)	mg/kg	8	8	228	638	514.6	95% Student's-t UCL
Manganese (Mn)	mg/kg	8	8	108	1210	655.7	95% Approximate Gamma UCL
Mercury (Hg)	mg/kg	8	8	0.01	0.03	0.0272	95% Student's-t UCL
Molybdenum (Mo)	mg/kg	8	8	0.04	1.06	0.579	95% Student's-t UCL
Nickel (Ni)	mg/kg	8	8	0.13	0.97	0.609	95% Student's-t UCL
Potassium (K)	mg/kg	8	8	2,110	5,690	4,936	95% Student's-t UCL
Rubidium (Rb)	mg/kg	8	8	4.73	48	32.36	95% Student's-t UCL
Selenium (Se)	mg/kg	8	4	0.05	0.16	0.0975	95% KM (% Bootstrap) UCL
Silver (Ag)	mg/kg	8	4	0.002	0.138	0.0598	95% KM (% Bootstrap) UCL
Sodium (Na)	mg/kg	8	8	4	7	5.879	95% Student's-t UCL
Strontium (Sr)	mg/kg	8	8	2.79	10.3	7.991	95% Student's-t UCL
Tellurium (Te)	mg/kg	8	0	0.005	0.005	0.0025	½ EQL
Thallium (Th)	mg/kg	8	4	0.002	0.012	0.0085	95% KM (% Bootstrap) UCL

Table 3.3 Baseline Concentrations for Trace Metals in Forage (Grass)

Trace Metal	Units	Number of Forage Samples Analyzed	Number of Forage Samples in Which Trace Metal Was Detected	Concentration of Trace Metal in Forage (Grass)			
				Minimum Detected (mg/kg)	Maximum Detected (mg/kg)	Baseline Concentration of Trace Metal in Forage (mg/kg)	Baseline Concentration in Forage Selected Based on:
Tin (Sn)	mg/kg	8	5	0.01	0.05	0.0283	95% KM (t) UCL
Tungsten (W)	mg/kg	8	3	0.005	0.055	0.055	95% KM (% Bootstrap) UCL
Uranium (U)	mg/kg	8	1	0.002	0.004	0.004	Maximum Value
Vanadium (V)	mg/kg	8	6	0.01	0.18	0.135	95% KM (Chebyshev) UCL
Zinc (Zn)	mg/kg	8	8	7.93	30.8	21.69	95% Student's-t UCL

Notes:
Where one or more samples, but not all samples, had concentrations below the detection limit for a particular trace metal, the minimum reported value is the detection limit. Where all samples had concentrations below the detection limit for a particular trace metal, the minimum and maximum reported values are the detection limit.

Legend:
UCL = Upper Confidence Limit
Sd = standard deviation
95% Student's-t UCL = UCL based upon the Student's t-distribution
95% KM (% Bootstrap) UCL = UCL based upon Kaplan-Meier estimates using the percentile bootstrap method
95% KM (Chebyshev) UCL = UCL based upon Kaplan-Meier estimates using the Chebyshev inequality
95% Chebyshev (Mean, Sd) UCL = Chebyshev inequality-based UCL using sample mean and standard deviation
95% KM (BCA) UCL = UCL based upon Kaplan-Meier estimates using bias-corrected accelerated bootstrap method
95% KM (t) UCL = UCL based upon Kaplan-Meier estimates using the Student's t-distribution cutoff value
95% H-UCL = UCL based upon Land's H-statistic
95% Approximate Gamma UCL = Approximate gamma UCL using chi-square approximation
½ EQL = one-half of the laboratory estimated limit of quantification

Concentrations of bismuth and tellurium were less than the detection limits in all samples, as indicated in Table 3.3. Antimony and uranium were detected in only one sample each; beryllium was detected in only two samples, and tungsten was detected in only three samples. All other trace metal parameters were detected in four or more of the samples.

3.4 BROWSE (POPLAR TIPS)

Samples of the new growth of poplar tips were collected from eight of the Key sites. No poplar trees, or other similar trees such as birch, were present at or in the immediate vicinity of the remaining two Key locations (*i.e.,* 14534 and 25083). The poplar tip samples were analyzed for trace metals. A summary of the trace metals concentrations in browse (poplar tips) is provided in Table 3.4.

Table 3.4 Baseline Concentrations for Trace Metals in Browse (Poplar Tips)

Trace Metal	Units	Number of Browse Samples Analyzed	Number of Browse Samples in Which Trace Metal Was Detected	Concentration of Trace Metal in Browse (Poplar Tips)			
				Minimum Detected (mg/kg)	Maximum Detected (mg/kg)	Baseline Concentration of Trace Metal in Browse (mg/kg)	Baseline Concentration in Forage Selected Based on:
Aluminum (Al)	mg/kg	8	8	4.9	36.9	24.25	95% Student's-t UCL
Antimony (Sb)	mg/kg	8	2	0.005	0.005	0.005	Maximum value
Arsenic (As)	mg/kg	8	3	0.02	0.06	0.0371	95% KM (t) UCL
Barium (Ba)	mg/kg	8	8	10.1	49.8	36.44	95% Student's-t UCL
Beryllium (Be)	mg/kg	8	3	0.002	0.04	0.0196	95% KM (t) UCL
Bismuth (Bi)	mg/kg	8	0	0.05	0.05	0.025	½ EQL
Boron (B)	mg/kg	8	8	6.9	13.5	11.38	95% Student's-t UCL
Cadmium (Cd)	mg/kg	8	8	0.131	0.874	0.671	95% Student's-t UCL
Calcium (Ca)	mg/kg	8	8	1,570	4,860	3,240	95% Modified-t UCL
Chromium (Cr) (total)	mg/kg	8	5	0.05	0.12	0.0888	95% KM (% Bootstrap) UCL
Cobalt (Co)	mg/kg	8	8	0.02	3.14	2.24	95% Approximate Gamma UCL
Copper (Cu)	mg/kg	8	8	1.79	4.67	3.709	95% Student's-t UCL
Iron (Fe)	mg/kg	8	8	14	70	47.13	95% Student's-t UCL
Lead (Pb)	mg/kg	8	8	0.008	0.337	0.218	95% Student's-t UCL
Lithium (Li)	mg/kg	8	3	0.01	0.03	0.0179	95% KM (t) UCL
Magnesium (Mg)	mg/kg	8	8	410	961	762.2	95% Student's-t UCL
Manganese (Mn)	mg/kg	8	8	148	1210	962.7	95% Student's-t UCL
Mercury (Hg)	mg/kg	8	7	0.01	0.03	0.0235	95% KM (t) UCL
Molybdenum (Mo)	mg/kg	8	4	0.01	0.11	0.0501	95% KM (t) UCL
Nickel (Ni)	mg/kg	8	8	0.5	2.98	2.226	95% Chebyshev (Mean, Sd) UCL
Potassium (K)	mg/kg	8	8	1,990	3,960	3,191	95% Student's-t UCL
Rubidium (Rb)	mg/kg	8	8	5.33	33.5	24.52	95% Student's-t UCL
Selenium (Se)	mg/kg	8	1	0.05	0.1	0.1	Maximum Value
Silver (Ag)	mg/kg	8	3	0.002	0.008	0.00438	95% KM (t) UCL
Sodium (Na)	mg/kg	8	8	4	16	11	95% Student's-t UCL
Strontium (Sr)	mg/kg	8	8	5.88	35.1	19.37	95% Approximate Gamma UCL

Table 3.4 Baseline Concentrations for Trace Metals in Browse (Poplar Tips)

Trace Metal	Units	Number of Browse Samples Analyzed	Number of Browse Samples in Which Trace Metal Was Detected	Concentration of Trace Metal in Browse (Poplar Tips)			
				Minimum Detected (mg/kg)	Maximum Detected (mg/kg)	Baseline Concentration of Trace Metal in Browse (mg/kg)	Baseline Concentration in Forage Selected Based on:
Tellurium (Te)	mg/kg	8	0	0.005	0.005	0.0025	½ EQL
Thallium (Th)	mg/kg	8	5	0.003	0.01	0.00625	95% KM (% Bootstrap) UCL
Tin (Sn)	mg/kg	8	3	0.04	0.05	0.044	95% KM (t) UCL
Tungsten (W)	mg/kg	8	1	0.005	0.148	0.148	Maximum value
Uranium (U)	mg/kg	8	1	0.002	0.002	0.002	Maximum Value
Vanadium (V)	mg/kg	8	6	0.01	0.07	0.07	Maximum value
Zinc (Zn)	mg/kg	8	8	40.1	278	176.2	95% Approximate Gamma UCL

Notes:
Where one or more samples, but not all samples, had concentrations below the detection limit for a particular trace metal, the minimum reported value is the detection limit. Where all samples had concentrations below the detection limit for a particular trace metal, the minimum and maximum reported values are the detection limit.

Legend:
UCL = Upper Confidence Limit
Sd = standard deviation
95% Student's-t UCL = UCL based upon the Student's t-distribution
95% KM (% Bootstrap) UCL = UCL based upon Kaplan-Meier estimates using the percentile bootstrap method
95% KM (Chebyshev) UCL = UCL based upon Kaplan-Meier estimates using the Chebyshev inequality
95% Chebyshev (Mean, Sd) UCL = Chebyshev inequality-based UCL using sample mean and standard deviation
95% KM (BCA) UCL = UCL based upon Kaplan-Meier estimates using bias-corrected accelerated bootstrap method
95% KM (t) UCL = UCL based upon Kaplan-Meier estimates using the Student's t-distribution cutoff value
95% H-UCL = UCL based upon Land's H-statistic
95% Approximate Gamma UCL = Approximate gamma UCL using chi-square approximation
½ EQL = one-half of the laboratory estimated limit of quantification

The concentration of bismuth was less than the detection limits in all of the poplar tip samples. All other metals were detected in at least one of the poplar tip samples, as indicated in Table 3.4.

3.5 SMALL MAMMALS

Small mammals were collected at each Key site. Snap traps were set at each site, and left for one or more days. Mice, voles and shrews were collected. Thirty individual animals were selected for analysis to provide coverage of the Terrestrial sample sites, and representation of the three species (*i.e.,* woodland jumping mouse, deer mouse, red backed vole, and northern short-tailed shrew). Small mammal samples were analyzed for trace metals. A summary of the trace metals concentrations in small mammals is provided in Table 3.5.

Table 3.5 Baseline Concentrations for Trace Metals in Small Mammals

Trace Metal	Units	Number of Small Mammal Samples Analyzed	Number of Small Mammal Samples in Which Trace Metal Was Detected	Concentration of Trace Metal in Small Mammals			
				Minimum Detected (mg/kg)	Maximum Detected (mg/kg)	Baseline Concentration of Trace Metal in Small Mammals (mg/kg)	Baseline Concentration in Small Mammals Selected Based on:
Aluminum (Al)	mg/kg	30	30	1	26	8.356	95% Approximate Gamma UCL
Antimony (Sb)	mg/kg	30	3	0.005	0.022	0.00766	95% KM (t) UCL
Arsenic (As)	mg/kg	30	24	0.02	0.15	0.049	95% KM (BCA) UCL
Barium (Ba)	mg/kg	30	30	0.67	11.2	3.905	95% H-UCL
Beryllium (Be)	mg/kg	30	0	0.002	0.002	0.001	½ EQL
Bismuth (Bi)	mg/kg	30	1	0.05	0.16	0.16	Maximum value
Boron (B)	mg/kg	30	28	0.1	1.7	0.724	95% KM (Chebyshev) UCL
Cadmium (Cd)	mg/kg	30	30	0.006	0.648	0.17	95% Approximate Gamma UCL
Calcium (Ca)	mg/kg	30	30	5,540	16,100	10,118	95% Student's-t UCL
Chromium (Cr) (total)	mg/kg	30	26	0.05	1.14	0.311	95% KM (Chebyshev) UCL
Cobalt (Co)	mg/kg	30	26	0.01	0.1	0.0352	95% KM (Chebyshev) UCL
Copper (Cu)	mg/kg	30	30	2.32	5.2	3.819	95% Student's-t UCL
Iron (Fe)	mg/kg	30	30	63	191	105.2	95% Approximate Gamma UCL
Lead (Pb)	mg/kg	30	27	0.024	0.427	0.182	95% Approximate Gamma UCL
Lithium (Li)	mg/kg	30	7	0.01	0.03	0.0123	95% KM (t) UCL
Magnesium (Mg)	mg/kg	30	30	308	574	402	95% Approximate Gamma UCL
Manganese (Mn)	mg/kg	30	30	2.97	191	33.15	95% H-UCL
Mercury (Hg)	mg/kg	30	16	0.01	0.04	0.0188	95% KM (t) UCL
Molybdenum (Mo)	mg/kg	30	30	0.04	0.24	0.147	95% Student's-t UCL
Nickel (Ni)	mg/kg	30	29	0.05	0.58	0.211	95% KM (Chebyshev) UCL
Potassium (K)	mg/kg	30	30	2,630	3,680	3,200	95% Student's-t UCL
Rubidium (Rb)	mg/kg	30	30	12.3	131	52.81	95% Approximate Gamma UCL
Selenium (Se)	mg/kg	30	30	0.05	0.71	0.526	95% Chebyshev (Mean, Sd) UCL
Silver (Ag)	mg/kg	30	26	0.003	0.228	0.0865	97.5% KM (Chebyshev) UCL
Sodium (Na)	mg/kg	30	30	851	1,450	1,256	95% Student's-t UCL

Table 3.5 Baseline Concentrations for Trace Metals in Small Mammals

Trace Metal	Units	Number of Small Mammal Samples Analyzed	Number of Small Mammal Samples in Which Trace Metal Was Detected	Concentration of Trace Metal in Small Mammals			
				Minimum Detected (mg/kg)	Maximum Detected (mg/kg)	Baseline Concentration of Trace Metal in Small Mammals (mg/kg)	Baseline Concentration in Small Mammals Selected Based on:
Strontium (Sr)	mg/kg	30	30	1.47	12.7	5.408	95% Approximate Gamma UCL
Tellurium (Te)	mg/kg	30	0	0.005	0.005	0.0025	½ EQL
Thallium (Th)	mg/kg	30	26	0.002	0.097	0.0233	95% KM (BCA) UCL
Tin (Sn)	mg/kg	30	4	0.01	0.13	0.0647	95% KM (% Bootstrap) UCL
Tungsten (W)	mg/kg	30	12	0.005	0.029	0.00948	95% KM (t) UCL
Uranium (U)	mg/kg	30	0	0.002	0.002	0.001	½ EQL
Vanadium (V)	mg/kg	30	19	0.01	0.08	0.0243	95% KM (BCA) UCL
Zinc (Zn)	mg/kg	30	30	19.9	41.2	31.49	95% Student's-t UCL

Notes:
Where one or more samples, but not all samples, had concentrations below the detection limit for a particular trace metal, the minimum reported value is the detection limit. Where all samples had concentrations below the detection limit for a particular trace metal, the minimum and maximum reported values are the detection limit.

Legend:
UCL = Upper Confidence Limit
Sd = standard deviation
95% Student's-t UCL = UCL based upon the Student's t-distribution
95% KM (% Bootstrap) UCL = UCL based upon Kaplan-Meier estimates using the percentile bootstrap method
95% KM (Chebyshev) UCL = UCL based upon Kaplan-Meier estimates using the Chebyshev inequality
95% Chebyshev (Mean, Sd) UCL = Chebyshev inequality-based UCL using sample mean and standard deviation
95% KM (BCA) UCL = UCL based upon Kaplan-Meier estimates using bias-corrected accelerated bootstrap method
95% KM (t) UCL = UCL based upon Kaplan-Meier estimates using the Student's t-distribution cutoff value
95% H-UCL = UCL based upon Land's H-statistic
95% Approximate Gamma UCL = Approximate gamma UCL using chi-square approximation
½ EQL = one-half of the laboratory estimated limit of quantification

Concentrations of beryllium, tellurium, and uranium in each of the small mammal samples were less than the detection limits, and bismuth was detected in only one sample, as indicated in Table 3.5. All other trace metal parameters were detected in at least four of the small mammal samples.

3.6 TERRESTRIAL INVERTEBRATES (SLUGS)

Terrestrial invertebrate (slug) samples were obtained at six Key sampling locations (5518, 14534, 15924, 16303, 17627, and 24738). Slug samples could not be located at the remaining Key sites. All six samples were submitted for metals analysis. A summary of the trace metals concentrations in slugs is provided in Table 3.6.

Table 3.6 Baseline Concentrations for Trace Metals in Terrestrial Invertebrates (Slugs)

Trace Metal	Units	Number of Slug Samples Analyzed	Number of Slug Samples in Which Trace Metal Was Detected	Concentration of Trace Metal in Terrestrial Invertebrates (Slugs)			
				Minimum Detected (mg/kg)	Maximum Detected (mg/kg)	Baseline Concentration of Trace Metal in Slugs (mg/kg)	Baseline Concentration in Slugs Selected Based on:
Aluminum (Al)	mg/kg	7	7	2	9.6	6.938	95% Student's-t UCL
Antimony (Sb)	mg/kg	7	0	0.005	0.005	0.0025	½ EQL
Arsenic (As)	mg/kg	7	6	0.02	0.7	0.583	95% KM (Chebyshev) UCL
Barium (Ba)	mg/kg	7	7	15	64.6	48.91	95% Student's-t UCL
Beryllium (Be)	mg/kg	7	0	0.002	0.002	0.001	½ EQL
Bismuth (Bi)	mg/kg	7	0	0.05	0.05	0.025	½ EQL
Boron (B)	mg/kg	7	7	1	4.8	3.383	95% Student's-t UCL
Cadmium (Cd)	mg/kg	7	7	1.16	6.53	4.614	95% Student's-t UCL
Calcium (Ca)	mg/kg	7	7	2,180	6,340	5,380	95% Student's-t UCL
Chromium (Cr) (total)	mg/kg	7	1	0.05	0.08	0.08	Maximum value
Cobalt (Co)	mg/kg	7	7	0.01	0.19	0.136	95% Approximate Gamma UCL
Copper (Cu)	mg/kg	7	7	9	16.9	13.66	95% Student's-t UCL
Iron (Fe)	mg/kg	7	7	24	36	31.49	95% Student's-t UCL
Lead (Pb)	mg/kg	7	7	0.085	0.207	0.155	95% Student's-t UCL
Lithium (Li)	mg/kg	7	2	0.01	0.01	0.01	Maximum value
Magnesium (Mg)	mg/kg	7	7	413	747	625.9	95% Student's-t UCL
Manganese (Mn)	mg/kg	7	7	1,050	4,100	3,327	95% Student's-t UCL
Mercury (Hg)	mg/kg	7	7	0.01	0.05	0.0401	95% Student's-t UCL
Molybdenum (Mo)	mg/kg	7	7	0.04	0.18	0.145	95% Student's-t UCL
Nickel (Ni)	mg/kg	7	6	0.05	0.18	0.131	95% KM (t) UCL
Potassium (K)	mg/kg	7	7	984	1,290	1,170	95% Student's-t UCL
Rubidium (Rb)	mg/kg	7	7	8.69	16.6	14.3	95% Student's-t UCL
Selenium (Se)	mg/kg	7	7	0.06	0.48	0.32	95% Approximate Gamma UCL
Silver (Ag)	mg/kg	7	7	0.29	9.74	7.552	95% Approximate Gamma UCL
Sodium (Na)	mg/kg	7	7	387	529	494.2	95% Student's-t UCL

Table 3.6 Baseline Concentrations for Trace Metals in Terrestrial Invertebrates (Slugs)

Trace Metal	Units	Number of Slug Samples Analyzed	Number of Slug Samples in Which Trace Metal Was Detected	Concentration of Trace Metal in Terrestrial Invertebrates (Slugs)			
				Minimum Detected (mg/kg)	Maximum Detected (mg/kg)	Baseline Concentration of Trace Metal in Slugs (mg/kg)	Baseline Concentration in Slugs Selected Based on:
Strontium (Sr)	mg/kg	7	7	7.42	17.6	13.66	95% Student's-t UCL
Tellurium (Te)	mg/kg	7	0	0.005	0.005	0.0025	½ EQL
Thallium (Th)	mg/kg	7	7	0.004	0.066	0.0462	95% Student's-t UCL
Tin (Sn)	mg/kg	7	0	0.01	0.01	0.005	½ EQL
Tungsten (W)	mg/kg	7	1	0.005	0.007	0.007	Maximum value
Uranium (U)	mg/kg	7	0	0.002	0.002	0.001	½ EQL
Vanadium (V)	mg/kg	7	2	0.01	0.02	0.0151	95% KM (t) UCL
Zinc (Zn)	mg/kg	7	7	45.5	218	183.5	95% Chebyshev (Mean, Sd) UCL

Notes:
Where one or more samples, but not all samples, had concentrations below the detection limit for a particular trace metal, the minimum reported value is the detection limit. Where all samples had concentrations below the detection limit for a particular trace metal, the minimum and maximum reported values are the detection limit.

Legend:
UCL = Upper Confidence Limit
Sd = standard deviation
95% Student's-t UCL = UCL based upon the Student's t-distribution
95% KM (% Bootstrap) UCL = UCL based upon Kaplan-Meier estimates using the percentile bootstrap method
95% KM (Chebyshev) UCL = UCL based upon Kaplan-Meier estimates using the Chebyshev inequality
95% Chebyshev (Mean, Sd) UCL = Chebyshev inequality-based UCL using sample mean and standard deviation
95% KM (BCA) UCL = UCL based upon Kaplan-Meier estimates using bias-corrected accelerated bootstrap method
95% KM (t) UCL = UCL based upon Kaplan-Meier estimates using the Student's t-distribution cutoff value
95% H-UCL = UCL based upon Land's H-statistic
95% Approximate Gamma UCL = Approximate gamma UCL using chi-square approximation
½ EQL = one-half of the laboratory estimated limit of quantification

Many of the slugs collected were on or near the snap traps (co-located with the slug sampling sites to trap small mammals) and appeared to have been feeding on the peanut butter used as bait for small mammals.

Concentrations of antimony, beryllium, bismuth, tellurium, tin and uranium were less than the detection limits in all of the samples. All other trace metal parameters tested were detected in at least one of the terrestrial invertebrate samples, as indicated in Table 3.6.

3.7 TERRESTRIAL INVERTEBRATES (EARTHWORMS)

Terrestrial invertebrate (earthworm) samples were obtained at two Key sampling locations (14534, and 15924). Earthworm samples could not be located at the remaining Key sites. Both samples were submitted for metals analysis. A summary of the trace metals concentrations in earthworms is provided in Table 3.7

Table 3.7 Baseline Concentrations for Trace Metals in Terrestrial Invertebrates (Earthworms)

Trace Metal	Units	Number of Earthworm Samples Analyzed	Concentration of Trace Metal in Terrestrial Invertebrates (Earthworms)		
			Sample 1 Site 15924 (mg/kg)*	Sample 2 Site 14534 (mg/kg)*	Baseline Concentration of Trace Metal in Earthworms (mg/kg)
Aluminum (Al)	mg/kg	2	781.0	91.9	781
Antimony (Sb)	mg/kg	2	0.022	0.044	0.044
Arsenic (As)	mg/kg	2	2.53	1.17	2.53
Barium (Ba)	mg/kg	2	4.69	3.78	4.69
Beryllium (Be)	mg/kg	2	0.021	0.006	0.021
Bismuth (Bi)	mg/kg	2	< 0.05	0.11	0.11
Boron (B)	mg/kg	2	0.2	< 0.1	0.2
Cadmium (Cd)	mg/kg	2	7.20	13.7	13.7
Calcium (Ca)	mg/kg	2	475	407	475
Chromium (Cr) (total)	mg/kg	2	1.31	0.24	1.31
Cobalt (Co)	mg/kg	2	1.23	1.67	1.67
Copper (Cu)	mg/kg	2	2.25	1.14	2.25
Iron (Fe)	mg/kg	2	931	195	931
Lead (Pb)	mg/kg	2	15.7	8.56	15.7
Lithium (Li)	mg/kg	2	0.77	0.15	0.77
Magnesium (Mg)	mg/kg	2	344.0	146.0	344
Manganese (Mn)	mg/kg	2	31.5	149.0	149
Mercury (Hg)	mg/kg	2	0.07	0.15	0.15
Molybdenum (Mo)	mg/kg	2	0.14	0.31	0.31
Nickel (Ni)	mg/kg	2	0.85	0.46	0.85
Potassium (K)	mg/kg	2	1,490	1,340	1,490
Rubidium (Rb)	mg/kg	2	2.93	2.13	2.93
Selenium (Se)	mg/kg	2	3.04	4.83	4.83
Silver (Ag)	mg/kg	2	0.163	0.259	0.259
Sodium (Na)	mg/kg	2	830	1,030	1,030
Strontium (Sr)	mg/kg	2	1.38	1.49	1.49
Tellurium (Te)	mg/kg	2	0.013	0.015	0.015
Thallium (Th)	mg/kg	2	0.017	0.020	0.02
Tin (Sn)	mg/kg	2	0.02	0.01	0.02
Tungsten (W)	mg/kg	2	0.063	0.015	0.063
Uranium (U)	mg/kg	2	0.058	0.054	0.058
Vanadium (V)	mg/kg	2	1.81	0.35	1.81
Zinc (Zn)	mg/kg	2	75.1	136.0	136

Notes:
* The metal concentrations in values beginning with "<" were below the detection limit, which is the value reported.

All trace metal parameters tested were detected in both samples, with two exceptions. The concentration of bismuth was below the detection limit in one sample, and the concentration of boron was below the detection limit in the other.

As only two samples were collected, the statistical analysis conducted on the trace metal concentrations for the other media was not possible for earthworms. Instead, Table 3.7 presents the

measured metal concentrations in each of the two earthworm samples. The baseline concentration is the maximum detected value from the two samples.

3.8 WILD BERRIES

Berries were not abundant in the LAA during the field sampling program, and were not found at the majority of sampling locations. At every Soil and Key sampling location, the area was searched for wild berries of any species, and if any were located, a berry sample was collected in addition to the soil sample. Sampled berries were primarily bunch bush berries, with one sample each of hog berries and hobble bush berries.

Samples were collected from seven sampling locations. Specifically, samples were collected from three terrestrial sampling locations (14534, 16303, and 17627) and four soil sampling locations (14953, 15663, 22897, and 27518). Three samples were collected from site 14534 as bunch berries, hog bush berries, and hobble bush berries were all found at the site. In total, 9 samples were collected and analysed. The nine berry samples were analyzed for trace metals. A summary of the trace metals concentrations in wild berries is provided in Table 3.8.

Table 3.8 Baseline Concentrations for Trace Metals in Wild Berries

Trace Metal	Units	Number of Wild Berry Samples Analyzed	Number of Wild Berry Samples in Which Trace Metal Was Detected	Concentration of Trace Metal in Wild Berries			
				Minimum Detected (mg/kg)	Maximum Detected (mg/kg)	Baseline Concentration of Trace Metal in Wild Berries (mg/kg)	Baseline Concentration in Wild Berries Selected Based on:
Aluminum (Al)	mg/kg	9	9	2.6	68.2	34.95	95% H-UCL
Antimony (Sb)	mg/kg	9	0	0.005	0.005	0.0025	½ EQL
Arsenic (As)	mg/kg	9	1	0.002	0.006	0.006	Maximum value
Barium (Ba)	mg/kg	9	3.28	2.68	20.9	18.31	95% Chebyshev (Mean, Sd) UCL
Beryllium (Be)	mg/kg	9	1	0.002	0.003	0.003	Maximum value
Bismuth (Bi)	mg/kg	9	0	0.05	0.05	0.025	½ EQL
Boron (B)	mg/kg	9	9	0.9	2	1.764	95% Student's-t UCL
Cadmium (Cd)	mg/kg	9	9	0.004	0.413	1.133	95% Hall's Bootstrap UCL
Calcium (Ca)	mg/kg	9	9	684	1,610	1,097	95% Modified-t UCL
Chromium (Cr) (total)	mg/kg	9	2	0.05	0.09	0.0655	95% KM (t) UCL
Cobalt (Co)	mg/kg	9	3	0.01	0.02	0.0135	95% KM (t) UCL
Copper (Cu)	mg/kg	9	9	0.23	1.35	0.766	95% Approximate Gamma UCL
Iron (Fe)	mg/kg	9	9	3	54	34.29	95% Chebyshev (Mean, Sd) UCL
Lead (Pb)	mg/kg	9	3	0.005	0.079	0.079	95% KM (% Bootstrap) UCL
Lithium (Li)	mg/kg	9	1	0.01	0.05	0.05	Maximum value
Magnesium (Mg)	mg/kg	9	9	176	425	298.1	95% Modified-t UCL
Manganese (Mn)	mg/kg	9	9	3.45	98.6	169.9	95% Hall's

Table 3.8 Baseline Concentrations for Trace Metals in Wild Berries

Trace Metal	Units	Number of Wild Berry Samples Analyzed	Number of Wild Berry Samples in Which Trace Metal Was Detected	Concentration of Trace Metal in Wild Berries			
				Minimum Detected (mg/kg)	Maximum Detected (mg/kg)	Baseline Concentration of Trace Metal in Wild Berries (mg/kg)	Baseline Concentration in Wild Berries Selected Based on:
							Bootstrap UCL
Mercury (Hg)	mg/kg	9	0	0.01	0.01	0.005	½ EQL
Molybdenum (Mo)	mg/kg	9	6	0.01	0.12	0.05	95% KM (BCA) UCL
Nickel (Ni)	mg/kg	9	9	0.08	0.29	0.227	95% Student's-t UCL
Potassium (K)	mg/kg	9	9	323	2530	1855	95% Student's-t UCL
Rubidium (Rb)	mg/kg	9	9	1.27	26.3	21.65	95% Student's-t UCL
Selenium (Se)	mg/kg	9	0	0.05	0.05	0.025	½ EQL
Silver (Ag)	mg/kg	9	1	0.002	0.003	0.003	Maximum value
Sodium (Na)	mg/kg	9	6	2	6	4.222	95% KM (% Bootstrap) UCL
Strontium (Sr)	mg/kg	9	9	2.19	10.1	6.319	95% Approximate Gamma UCL
Tellurium (Te)	mg/kg	9	0	0.005	0.005	0.0025	½ EQL
Thallium (Th)	mg/kg	9	1	0.002	0.004	0.004	Maximum value
Tin (Sn)	mg/kg	9	0	0.01	0.01	0.005	½ EQL
Tungsten (W)	mg/kg	9	1	0.005	0.517	0.005	½ EQL (maximum value considered an outlier)
Uranium (U)	mg/kg	9	1	0.002	0.002	0.002	Maximum value
Vanadium (V)	mg/kg	9	2	0.01	0.11	0.11	Maximum value
Zinc (Zn)	mg/kg	9	9	0.88	8.59	5.84	95% Chebyshev (Mean, Sd) UCL

Notes:
Where one or more samples, but not all samples, had concentrations below the detection limit for a particular trace metal, the minimum reported value is the detection limit. Where all samples had concentrations below the detection limit for a particular trace metal, the minimum and maximum reported values are the detection limit.

Legend:
UCL = Upper Confidence Limit
Sd = standard deviation
95% Student's-t UCL = UCL based upon the Student's t-distribution
95% KM (% Bootstrap) UCL = UCL based upon Kaplan-Meier estimates using the percentile bootstrap method
95% KM (Chebyshev) UCL = UCL based upon Kaplan-Meier estimates using the Chebyshev inequality
95% Chebyshev (Mean, Sd) UCL = Chebyshev inequality-based UCL using sample mean and standard deviation
95% KM (BCA) UCL = UCL based upon Kaplan-Meier estimates using bias-corrected accelerated bootstrap method
95% KM (t) UCL = UCL based upon Kaplan-Meier estimates using the Student's t-distribution cutoff value
95% H-UCL = UCL based upon Land's H-statistic
95% Approximate Gamma UCL = Approximate gamma UCL using chi-square approximation
½ EQL = one-half of the laboratory estimated limit of quantification

Concentrations of antimony, bismuth, mercury, selenium, tellurium, and tin were less than the detection limits in all of the wild berry samples, as indicated in Table 3.8. Several trace metals were detected in only one sample. The sample from site 16303 had many trace metals concentrations higher than those observed in the other samples.

3.9 FISH (BROOK TROUT)

Brook Trout were collected as part of the Aquatic Environment Technical Report (Stantec 2012a), and will also be considered in the HHERA for the Project. Fish were collected using a backpack electrofisher from Bird Brook, Sisson Brook, McBean Brook, and West Branch Napadogan Brook. Trace metal concentrations in fish were analyzed for the whole fish and for the portion eaten by humans (*i.e.,* with head, entrails, and kidneys removed).

Only fish greater than 9 cm in length were collected. Prior to laboratory analysis, the viscera were removed to allow for separate analysis. Metal concentrations and baselines are reported for the whole fish, as is a potential ecological exposure pathway, and for the carcass (*i.e*., with the head, entrails, and kidneys removed) as a potential human exposure pathway. Data and baseline concentrations are presented for fish carcasses and whole fish for each of the four watercourses separately, as well as for all fish collected in Tables 3.9 to 3.18. Detailed results and statistical analyses for the fish samples are presented in Appendix F.

Table 3.9 Baseline Concentrations for Trace Metals in Fish Carcasses – Bird Brook

Trace Metal	Units	Number of Fish Samples Analyzed	Number of Fish Samples in Which Trace Metal Was Detected	Concentration of Trace Metal in Fish (Fish Carcasses) in Bird Brook			
				Minimum Detected (mg/kg)	Maximum Detected (mg/kg)	Baseline Concentration of Trace Metal in Fish (mg/kg)	Baseline Concentration in Fish Selected Based on:
Aluminum (Al)	mg/kg	20	20	0.39	7.82	2.774	95% Chebyshev (Mean, Sd) UCL
Antimony (Sb)	mg/kg	20	2	0.0025	0.017	0.00485	95% Modified-t UCL
Arsenic (As)	mg/kg	20	18	0.025	0.4	0.188	95% Approximate Gamma UCL
Barium (Ba)	mg/kg	20	20	0.13	0.7	0.414	95% Student's-t UCL
Beryllium (Be)	mg/kg	20	0	0.0025	0.0025	0.0025	½ EQL
Bismuth (Bi)	mg/kg	20	1	0.025	0.28	0.0933	95% Chebyshev (Mean, Sd) UCL
Boron (B)	mg/kg	20	0	0.025	0.025	0.025	½ EQL
Cadmium (Cd)	mg/kg	20	20	0.002	0.0205	0.0124	95% Student's-t UCL
Calcium (Ca)	mg/kg	20	20	1,810	7,230	4,701	95% Student's-t UCL
Chromium (Cr) (total)	mg/kg	20	3	0.025	0.15	0.0727	95% Chebyshev (Mean, Sd) UCL
Cobalt (Co)	mg/kg	20	20	0.017	0.074	0.0431	95% Student's-t UCL
Copper (Cu)	mg/kg	20	20	0.29	0.46	0.383	95% Student's-t UCL
Iron (Fe)	mg/kg	20	20	3	10	5.984	95% Approximate Gamma UCL
Lead (Pb)	mg/kg	20	20	0.006	0.035	0.0217	95% Student's-t UCL

Table 3.9 Baseline Concentrations for Trace Metals in Fish Carcasses – Bird Brook

Trace Metal	Units	Number of Fish Samples Analyzed	Number of Fish Samples in Which Trace Metal Was Detected	Concentration of Trace Metal in Fish (Fish Carcasses) in Bird Brook			
				Minimum Detected (mg/kg)	Maximum Detected (mg/kg)	Baseline Concentration of Trace Metal in Fish (mg/kg)	Baseline Concentration in Fish Selected Based on:
Lithium (Li)	mg/kg	20	18	0.0025	0.02	0.00868	95% Modified-t UCL
Magnesium (Mg)	mg/kg	20	20	284	360	338.3	95% Student's-t UCL
Manganese (Mn)	mg/kg	20	20	1.32	9.81	4.187	95% Approximate Gamma UCL
Mercury (Hg)	mg/kg	20	20	0.09	0.27	0.172	95% H-UCL
Molybdenum (Mo)	mg/kg	20	18	0.0025	0.013	0.0072	95% Modified-t UCL
Nickel (Ni)	mg/kg	20	0	0.025	0.025	0.025	½ EQL
Potassium (K)	mg/kg	20	20	3,810	4,240	4,093	95% Student's-t UCL
Rubidium (Rb)	mg/kg	20	20	5.5	13.6	11.27	95% Student's-t UCL
Selenium (Se)	mg/kg	20	20	0.15	0.55	0.361	95% Student's-t UCL
Silver (Ag)	mg/kg	20	0	0.0025	0.0025	0.0025	½ EQL
Sodium (Na)	mg/kg	20	20	565	746	674.6	95% Student's-t UCL
Strontium (Sr)	mg/kg	20	20	3.13	14	8.897	95% Student's-t UCL
Tellurium (Te)	mg/kg	20	0	0.0025	0.0025	0.0025	½ EQL
Thallium (Th)	mg/kg	20	19	0.0025	0.011	0.00964	95% Student's-t UCL
Tin (Sn)	mg/kg	20	19	0.0025	0.019	0.0115	95% Approximate Gamma UCL
Tungsten (W)	mg/kg	20	7	0.0025	0.012	0.00809	95% Chebyshev (Mean, Sd) UCL
Uranium (U)	mg/kg	20	0	0.0025	0.0025	0.0025	½ EQL
Vanadium (V)	mg/kg	20	0	0.025	0.025	0.025	½ EQL
Zinc (Zn)	mg/kg	20	20	11.3	22	16.59	95% Student's-t UCL

Notes:
Where one or more samples, but not all samples, had concentrations below the detection limit for a particular trace metal, the minimum reported value is the detection limit. Where all samples had concentrations below the detection limit for a particular trace metal, the minimum and maximum reported values are the detection limit.

Legend:
UCL = Upper Confidence Limit
Sd = standard deviation
95% Student's-t UCL = UCL based upon the Student's t-distribution
95% KM (% Bootstrap) UCL = UCL based upon Kaplan-Meier estimates using the percentile bootstrap method
95% KM (Chebyshev) UCL = UCL based upon Kaplan-Meier estimates using the Chebyshev inequality
95% Chebyshev (Mean, Sd) UCL = Chebyshev inequality-based UCL using sample mean and standard deviation
95% KM (BCA) UCL = UCL based upon Kaplan-Meier estimates using bias-corrected accelerated bootstrap method
95% KM (t) UCL = UCL based upon Kaplan-Meier estimates using the Student's t-distribution cutoff value
95% H-UCL = UCL based upon Land's H-statistic
95% Approximate Gamma UCL = Approximate gamma UCL using chi-square approximation
½ EQL = one-half of the laboratory estimated limit of quantification

Table 3.10 Baseline Concentrations for Trace Metals in Whole Fish – Bird Brook

Trace Metal	Units	Number of Fish Samples Analyzed*	Concentration of Trace Metal in Fish (Whole Fish) in Bird Brook			
			Minimum Detected (mg/kg)	Maximum Detected (mg/kg)	Baseline Concentration of Trace Metal in Fish (mg/kg)	Baseline Concentration in Fish Selected Based on:
Aluminum (Al)	mg/kg	19	1.14	63.16	32.24	95% Chebyshev (Mean, Sd) UCL
Antimony (Sb)	mg/kg	19	0.00254	0.0117	0.0043	95% Modified-t UCL
Arsenic (As)	mg/kg	19	0.0318	0.363	0.196	95% Student's-t UCL
Barium (Ba)	mg/kg	19	0.212	0.93	0.621	95% Student's-t UCL
Beryllium (Be)	mg/kg	19	0.00253	0.00538	0.00332	95% Modified-t UCL
Bismuth (Bi)	mg/kg	19	0.0253	0.187	0.0535	95% Modified-t UCL
Boron (B)	mg/kg	19	0.0253	0.0514	0.0309	95% Modified-t UCL
Cadmium (Cd)	mg/kg	19	0.012	0.108	0.0607	95% Student's-t UCL
Calcium (Ca)	mg/kg	19	3,143	8,011	6,594	95% Student's-t UCL
Chromium (Cr) (total)	mg/kg	19	0.0257	1.011	0.259	95% H-UCL
Cobalt (Co)	mg/kg	19	0.0318	0.123	0.0789	95% Student's-t UCL
Copper (Cu)	mg/kg	19	0.551	1.116	0.828	95% Student's-t UCL
Iron (Fe)	mg/kg	19	12.66	42.87	23.57	95% Modified-t UCL
Lead (Pb)	mg/kg	19	0.0115	0.1	0.0583	95% Approximate Gamma UCL
Lithium (Li)	mg/kg	19	0.00673	0.087	0.0477	95% Chebyshev (Mean, Sd) UCL
Magnesium (Mg)	mg/kg	19	280.1	345.8	330.6	95% Approximate Gamma UCL
Manganese (Mn)	mg/kg	19	1.974	16.14	7.939	95% Approximate Gamma UCL
Mercury (Hg)	mg/kg	19	0.0853	0.242	0.159	95% Approximate Gamma UCL
Molybdenum (Mo)	mg/kg	19	0.00985	0.0206	0.0159	95% Student's-t UCL
Nickel (Ni)	mg/kg	19	0.0253	0.0734	0.0366	95% Modified-t UCL
Potassium (K)	mg/kg	19	3,335	3,761	3,639	95% Student's-t UCL
Rubidium (Rb)	mg/kg	19	5.091	12.48	10.35	95% Student's-t UCL
Selenium (Se)	mg/kg	19	0.18	0.587	0.4	95% Student's-t UCL
Silver (Ag)	mg/kg	19	0.00751	0.0399	0.0225	95% Student's-t UCL
Sodium (Na)	mg/kg	19	795.3	1,057	997.8	95% Student's-t UCL
Strontium (Sr)	mg/kg	19	5.319	15.53	12.73	95% Student's-t UCL
Tellurium (Te)	mg/kg	19	0.00253	0.00268	0.0026	95% Student's-t UCL
Thallium (Th)	mg/kg	19	0.00419	0.0148	0.012	95% Student's-t UCL
Tin (Sn)	mg/kg	19	0.00593	0.0224	0.0138	95% Student's-t UCL
Tungsten (W)	mg/kg	19	0.00263	0.0224	0.018	95% Chebyshev (Mean, Sd) UCL
Uranium (U)	mg/kg	19	0.00253	0.0125	0.00704	95% Chebyshev (Mean, Sd) UCL

Table 3.10 Baseline Concentrations for Trace Metals in Whole Fish – Bird Brook

Trace Metal	Units	Number of Fish Samples Analyzed*	Concentration of Trace Metal in Fish (Whole Fish) in Bird Brook			
			Minimum Detected (mg/kg)	Maximum Detected (mg/kg)	Baseline Concentration of Trace Metal in Fish (mg/kg)	Baseline Concentration in Fish Selected Based on:
Vanadium (V)	mg/kg	19	0.0253	0.0929	0.0465	95% Modified-t UCL
Zinc (Zn)	mg/kg	19	16.65	31.32	26.07	95% Student's-t UCL

Notes:
Fish carcasses, viscera (without the liver), and liver were analyzed separately. To determine the trace metal concentrations for the whole fish, a weighted average of the three components was conducted. Trace metals may have been detected in concentrations above the detection limit in one or more of the three fish components, but not in other components. For this reason, the number of detected samples is not reported. Concentrations below the detection limit were carried through the statistical analysis at one half the detection limit.

* One fish collected from Bird Brook showed anomalously high aluminum and iron concentrations in the viscera, likely due to a relatively large amount of sediment in the stomach. This fish was not included in the statistical analyses.

Legend:
UCL = Upper Confidence Limit
Sd = standard deviation
95% Student's-t UCL = UCL based upon the Student's t-distribution
95% KM (% Bootstrap) UCL = UCL based upon Kaplan-Meier estimates using the percentile bootstrap method
95% KM (Chebyshev) UCL = UCL based upon Kaplan-Meier estimates using the Chebyshev inequality
95% Chebyshev (Mean, Sd) UCL = Chebyshev inequality-based UCL using sample mean and standard deviation
95% KM (BCA) UCL = UCL based upon Kaplan-Meier estimates using bias-corrected accelerated bootstrap method
95% KM (t) UCL = UCL based upon Kaplan-Meier estimates using the Student's t-distribution cutoff value
95% H-UCL = UCL based upon Land's H-statistic
95% Approximate Gamma UCL = Approximate gamma UCL using chi-square approximation
½ EQL = one-half of the laboratory estimated limit of quantification

Table 3.11 Baseline Concentrations for Trace Metals in Fish Carcasses – Sisson Brook

Trace Metal	Units	Number of Fish Samples Analyzed	Number of Fish Samples in Which Trace Metal Was Detected	Concentration of Trace Metal in Fish (Fish Carcasses) in Sisson Brook			
				Minimum Detected (mg/kg)	Maximum Detected (mg/kg)	Baseline Concentration of Trace Metal in Fish (mg/kg)	Baseline Concentration in Fish Selected Based on:
Aluminum (Al)	mg/kg	20	20	0.24	1.38	0.862	95% Approximate Gamma UCL
Antimony (Sb)	mg/kg	20	5	0.0025	0.019	0.00774	95% Chebyshev (Mean, Sd) UCL
Arsenic (As)	mg/kg	20	18	0.025	0.235	0.154	95% Student's-t UCL
Barium (Ba)	mg/kg	20	20	0.19	0.55	0.337	95% Approximate Gamma UCL
Beryllium (Be)	mg/kg	20	0	0.0025	0.0025	0.0025	½ EQL
Bismuth (Bi)	mg/kg	20	1	0.025	0.2	0.0503	95% Modified-t UCL
Boron (B)	mg/kg	20	0	0.025	0.025	0.025	½ EQL
Cadmium (Cd)	mg/kg	20	20	0.0045	0.0291	0.0192	95% Approximate Gamma UCL
Calcium (Ca)	mg/kg	20	20	2880	5390	4544	95% Student's-t UCL
Chromium (Cr) (total)	mg/kg	20	1	0.025	0.05	0.0286	95% Modified-t UCL
Cobalt (Co)	mg/kg	20	20	0.007	0.157	0.061	95% Approximate Gamma UCL
Copper (Cu)	mg/kg	20	20	0.31	0.55	0.435	95% Student's-t UCL
Iron (Fe)	mg/kg	20	20	3	7	5.313	95% Student's-t UCL

Table 3.11 Baseline Concentrations for Trace Metals in Fish Carcasses – Sisson Brook

Trace Metal	Units	Number of Fish Samples Analyzed	Number of Fish Samples in Which Trace Metal Was Detected	Concentration of Trace Metal in Fish (Fish Carcasses) in Sisson Brook			
				Minimum Detected (mg/kg)	Maximum Detected (mg/kg)	Baseline Concentration of Trace Metal in Fish (mg/kg)	Baseline Concentration in Fish Selected Based on:
Lead (Pb)	mg/kg	20	19	0.00475	0.032	0.0162	95% Approximate Gamma UCL
Lithium (Li)	mg/kg	20	10	0.0025	0.007	0.00491	95% Modified-t UCL
Magnesium (Mg)	mg/kg	20	20	280	366	333.8	95% Student's-t UCL
Manganese (Mn)	mg/kg	20	20	1.74	5.18	3.353	95% Student's-t UCL
Mercury (Hg)	mg/kg	20	20	0.09	0.19	0.142	95% Student's-t UCL
Molybdenum (Mo)	mg/kg	20	20	0.006	0.026	0.0141	95% Approximate Gamma UCL
Nickel (Ni)	mg/kg	20	1	0.025	0.06	0.0301	95% Modified-t UCL
Potassium (K)	mg/kg	20	20	3710	4050	3945	95% Student's-t UCL
Rubidium (Rb)	mg/kg	20	20	9.13	17.3	14.38	95% Student's-t UCL
Selenium (Se)	mg/kg	20	20	0.17	0.4	0.334	95% Student's-t UCL
Silver (Ag)	mg/kg	20	0	0.0025	0.0025	0.0025	½ EQL
Sodium (Na)	mg/kg	20	20	550	846	668.4	95% Approximate Gamma UCL
Strontium (Sr)	mg/kg	20	20	5.65	15.5	10.73	95% Student's-t UCL
Tellurium (Te)	mg/kg	20	0	0.0025	0.0025	0.0025	½ EQL
Thallium (Th)	mg/kg	20	20	0.008	0.048	0.0206	95% Approximate Gamma UCL
Tin (Sn)	mg/kg	20	12	0.0025	0.457	0.129	95% Chebyshev (Mean, Sd) UCL
Tungsten (W)	mg/kg	20	20	0.024	0.124	0.0611	95% Approximate Gamma UCL
Uranium (U)	mg/kg	20	0	0.0025	0.0025	0.0025	½ EQL
Vanadium (V)	mg/kg	20	0	0.025	0.025	0.025	½ EQL
Zinc (Zn)	mg/kg	20	20	10.3	14.9	13.25	95% Student's-t UCL

Notes:
Where one or more samples, but not all samples, had concentrations below the detection limit for a particular trace metal, the minimum reported value is the detection limit. Where all samples had concentrations below the detection limit for a particular trace metal, the minimum and maximum reported values are the detection limit.

Legend:
UCL = Upper Confidence Limit
Sd = standard deviation
95% Student's-t UCL = UCL based upon the Student's t-distribution
95% KM (% Bootstrap) UCL = UCL based upon Kaplan-Meier estimates using the percentile bootstrap method
95% KM (Chebyshev) UCL = UCL based upon Kaplan-Meier estimates using the Chebyshev inequality
95% Chebyshev (Mean, Sd) UCL = Chebyshev inequality-based UCL using sample mean and standard deviation
95% KM (BCA) UCL = UCL based upon Kaplan-Meier estimates using bias-corrected accelerated bootstrap method
95% KM (t) UCL = UCL based upon Kaplan-Meier estimates using the Student's t-distribution cutoff value
95% H-UCL = UCL based upon Land's H-statistic
95% Approximate Gamma UCL = Approximate gamma UCL using chi-square approximation
½ EQL = one-half of the laboratory estimated limit of quantification

Table 3.12 Baseline Concentrations for Trace Metals in Whole Fish – Sisson Brook

Trace Metal	Units	Number of Fish Samples Analyzed*	Concentration of Trace Metal in Fish (Whole Fish) in Sisson Brook			
			Minimum Detected (mg/kg)	Maximum Detected (mg/kg)	Baseline Concentration of Trace Metal in Fish (mg/kg)	Baseline Concentration in Fish Selected Based on:
Aluminum (Al)	mg/kg	18	0.476	44.27	16.18	95% Chebyshev (Mean, Sd) UCL
Antimony (Sb)	mg/kg	18	0.00255	0.015	0.00641	95% Approximate Gamma UCL
Arsenic (As)	mg/kg	18	0.0258	0.393	0.192	95% Student's-t UCL
Barium (Ba)	mg/kg	18	0.338	0.678	0.507	95% Student's-t UCL
Beryllium (Be)	mg/kg	18	0.00251	0.0042	0.00283	95% Modified-t UCL
Bismuth (Bi)	mg/kg	18	0.0251	0.139	0.0772	95% Chebyshev (Mean, Sd) UCL
Boron (B)	mg/kg	18	0.0251	0.0269	0.0258	95% Student's-t UCL
Cadmium (Cd)	mg/kg	18	0.0239	0.175	0.137	95% Chebyshev (Mean, Sd) UCL
Calcium (Ca)	mg/kg	18	4,995	7,762	6,925	95% Student's-t UCL
Chromium (Cr) (total)	mg/kg	18	0.0255	0.151	0.0527	95% Modified-t UCL
Cobalt (Co)	mg/kg	18	0.0118	0.162	0.0893	95% Student's-t UCL
Copper (Cu)	mg/kg	18	0.579	1.408	0.927	95% Approximate Gamma UCL
Iron (Fe)	mg/kg	18	10.65	47.14	20.77	95% Modified-t UCL
Lead (Pb)	mg/kg	18	0.00806	0.0451	0.0227	95% Approximate Gamma UCL
Lithium (Li)	mg/kg	18	0.00405	0.0556	0.0227	95% Chebyshev (Mean, Sd) UCL
Magnesium (Mg)	mg/kg	18	286.8	349.4	328.6	95% Student's-t UCL
Manganese (Mn)	mg/kg	18	3.437	8.522	6.475	95% Student's-t UCL
Mercury (Hg)	mg/kg	18	0.0811	0.17	0.126	95% Approximate Gamma UCL
Molybdenum (Mo)	mg/kg	18	0.0184	0.0971	0.0497	95% H-UCL
Nickel (Ni)	mg/kg	18	0.0251	0.0566	0.037	95% Modified-t UCL
Potassium (K)	mg/kg	18	3,117	3,590	3,442	95% Student's-t UCL
Rubidium (Rb)	mg/kg	18	8.265	14.67	12.75	95% Student's-t UCL
Selenium (Se)	mg/kg	18	0.188	0.437	0.381	95% Student's-t UCL
Silver (Ag)	mg/kg	18	0.00555	0.0159	0.0121	95% Student's-t UCL
Sodium (Na)	mg/kg	18	904.7	1,186	1,015	95% Approximate Gamma UCL
Strontium (Sr)	mg/kg	18	9.587	20.78	16.43	95% Student's-t UCL
Tellurium (Te)	mg/kg	18	0.00251	0.00269	0.00258	95% Student's-t UCL
Thallium (Th)	mg/kg	18	0.00933	0.0308	0.0215	95% Student's-t UCL
Tin (Sn)	mg/kg	18	0.00626	0.296	0.1	95% Chebyshev (Mean, Sd) UCL
Tungsten (W)	mg/kg	18	0.0388	0.214	0.118	95% Approximate Gamma UCL
Uranium (U)	mg/kg	18	0.00251	0.00493	0.00297	95% Modified-t UCL

Table 3.12 Baseline Concentrations for Trace Metals in Whole Fish – Sisson Brook

Trace Metal	Units	Number of Fish Samples Analyzed*	Concentration of Trace Metal in Fish (Whole Fish) in Sisson Brook			
			Minimum Detected (mg/kg)	Maximum Detected (mg/kg)	Baseline Concentration of Trace Metal in Fish (mg/kg)	Baseline Concentration in Fish Selected Based on:
Vanadium (V)	mg/kg	18	0.0251	0.093	0.0381	95% Modified-t UCL
Zinc (Zn)	mg/kg	18	19.17	26.54	24.23	95% Student's-t UCL

Notes:
Fish carcasses, viscera (without the liver), and liver were analyzed separately. To determine the trace metal concentrations for the whole fish, a weighted average of the three components was conducted. Trace metals may have been detected in concentrations above the detection limit in one or more of the three fish components, but not in other components. For this reason, the number of detected samples is not reported. Concentrations below the detection limit were carried through the statistical analysis at one half the detection limit.

* Two fish collected from Sisson Brook showed anomalously high aluminum and iron concentrations in the viscera, likely due to a relatively large amount of sediment in the stomachs. These fish were not included in the statistical analyses.

Legend:
UCL = Upper Confidence Limit
Sd = standard deviation
95% Student's-t UCL = UCL based upon the Student's t-distribution
95% KM (% Bootstrap) UCL = UCL based upon Kaplan-Meier estimates using the percentile bootstrap method
95% KM (Chebyshev) UCL = UCL based upon Kaplan-Meier estimates using the Chebyshev inequality
95% Chebyshev (Mean, Sd) UCL = Chebyshev inequality-based UCL using sample mean and standard deviation
95% KM (BCA) UCL = UCL based upon Kaplan-Meier estimates using bias-corrected accelerated bootstrap method
95% KM (t) UCL = UCL based upon Kaplan-Meier estimates using the Student's t-distribution cutoff value
95% H-UCL = UCL based upon Land's H-statistic
95% Approximate Gamma UCL = Approximate gamma UCL using chi-square approximation
½ EQL = one-half of the laboratory estimated limit of quantification

Table 3.13 Baseline Concentrations for Trace Metals in Fish Carcasses – McBean Brook

Trace Metal	Units	Number of Fish Samples Analyzed	Number of Fish Samples in Which Trace Metal Was Detected	Concentration of Trace Metal in Fish (Fish Carcasses) in McBean Brook			
				Minimum Detected (mg/kg)	Maximum Detected (mg/kg)	Baseline Concentration of Trace Metal in Fish (mg/kg)	Baseline Concentration in Fish Selected Based on:
Aluminum (Al)	mg/kg	10	10	0.21	0.79	0.609	95% Student's-t UCL
Antimony (Sb)	mg/kg	10	2	0.0025	0.017	0.0106	95% Chebyshev (Mean, Sd) UCL
Arsenic (As)	mg/kg	10	7	0.025	0.09	0.0701	95% Student's-t UCL
Barium (Ba)	mg/kg	10	10	0.12	0.41	0.299	95% Student's-t UCL
Beryllium (Be)	mg/kg	10	0	0.0025	0.0025	0.0025	½ EQL
Bismuth (Bi)	mg/kg	10	1	0.025	0.2	0.119	95% Chebyshev (Mean, Sd) UCL
Boron (B)	mg/kg	10	0	0.025	0.025	0.025	½ EQL
Cadmium (Cd)	mg/kg	10	10	0.0034	0.0214	0.0152	95% Student's-t UCL
Calcium (Ca)	mg/kg	10	10	1,920	5,980	4,521	95% Student's-t UCL
Chromium (Cr) (total)	mg/kg	10	0	0.025	0.025	0.025	½ EQL
Cobalt (Co)	mg/kg	10	10	0.014	0.05	0.0379	95% Student's-t UCL
Copper (Cu)	mg/kg	10	10	0.27	0.46	0.372	95% Student's-t UCL
Iron (Fe)	mg/kg	10	10	3	5	4.583	95% Student's-t UCL
Lead (Pb)	mg/kg	10	10	0.01	0.046	0.0278	95% Student's-t UCL
Lithium (Li)	mg/kg	10	6	0.0025	0.007	0.00581	95% Student's-t UCL

Table 3.13 Baseline Concentrations for Trace Metals in Fish Carcasses – McBean Brook

Trace Metal	Units	Number of Fish Samples Analyzed	Number of Fish Samples in Which Trace Metal Was Detected	Concentration of Trace Metal in Fish (Fish Carcasses) in McBean Brook			
				Minimum Detected (mg/kg)	Maximum Detected (mg/kg)	Baseline Concentration of Trace Metal in Fish (mg/kg)	Baseline Concentration in Fish Selected Based on:
Magnesium (Mg)	mg/kg	10	10	268	355	334.1	95% Student's-t UCL
Manganese (Mn)	mg/kg	10	10	1.83	5.07	4.066	95% Approximate Gamma UCL
Mercury (Hg)	mg/kg	10	10	0.06	0.16	0.123	95% Student's-t UCL
Molybdenum (Mo)	mg/kg	10	5	0.0025	0.02	0.0167	95% Chebyshev (Mean, Sd) UCL
Nickel (Ni)	mg/kg	10	0	0.025	0.025	0.025	½ EQL
Potassium (K)	mg/kg	10	10	3,800	4,200	4,032	95% Student's-t UCL
Rubidium (Rb)	mg/kg	10	10	7.14	13.1	10.57	95% Student's-t UCL
Selenium (Se)	mg/kg	10	10	0.175	0.31	0.268	95% Student's-t UCL
Silver (Ag)	mg/kg	10	0	0.0025	0.0025	0.0025	½ EQL
Sodium (Na)	mg/kg	10	10	535	728	651.3	95% Student's-t UCL
Strontium (Sr)	mg/kg	10	10	3.14	14.1	8.977	95% Student's-t UCL
Tellurium (Te)	mg/kg	10	0	0.0025	0.0025	0.0025	½ EQL
Thallium (Th)	mg/kg	10	10	0.005	0.013	0.0103	95% Student's-t UCL
Tin (Sn)	mg/kg	10	5	0.0025	0.019	0.0123	95% Approximate Gamma UCL
Tungsten (W)	mg/kg	10	3	0.0025	0.052	0.0347	95% Chebyshev (Mean, Sd) UCL
Uranium (U)	mg/kg	10	0	0.0025	0.0025	0.0025	½ EQL
Vanadium (V)	mg/kg	10	0	0.025	0.025	0.025	½ EQL
Zinc (Zn)	mg/kg	10	10	10.1	18.1	15.58	95% Student's-t UCL

Notes:
Where one or more samples, but not all samples, had concentrations below the detection limit for a particular trace metal, the minimum reported value is the detection limit. Where all samples had concentrations below the detection limit for a particular trace metal, the minimum and maximum reported values are the detection limit.

Legend:
UCL = Upper Confidence Limit
Sd = standard deviation
95% Student's-t UCL = UCL based upon the Student's t-distribution
95% KM (% Bootstrap) UCL = UCL based upon Kaplan-Meier estimates using the percentile bootstrap method
95% KM (Chebyshev) UCL = UCL based upon Kaplan-Meier estimates using the Chebyshev inequality
95% Chebyshev (Mean, Sd) UCL = Chebyshev inequality-based UCL using sample mean and standard deviation
95% KM (BCA) UCL = UCL based upon Kaplan-Meier estimates using bias-corrected accelerated bootstrap method
95% KM (t) UCL = UCL based upon Kaplan-Meier estimates using the Student's t-distribution cutoff value
95% H-UCL = UCL based upon Land's H-statistic
95% Approximate Gamma UCL = Approximate gamma UCL using chi-square approximation
½ EQL = one-half of the laboratory estimated limit of quantification

Table 3.14 Baseline Concentrations for Trace Metals in Whole Fish – McBean Brook

Trace Metal	Units	Number of Fish Samples Analyzed	Concentration of Trace Metal in Fish (Whole Fish) in McBean Brook			
			Minimum Detected (mg/kg)	Maximum Detected (mg/kg)	Baseline Concentration of Trace Metal in Fish (mg/kg)	Baseline Concentration in Fish Selected Based on:
Aluminum (Al)	mg/kg	10	1.05	55.94	32.65	95% Chebyshev (Mean, Sd) UCL
Antimony (Sb)	mg/kg	10	0.00255	0.0129	0.0086	95% Chebyshev (Mean, Sd) UCL
Arsenic (As)	mg/kg	10	0.0342	0.094	0.0781	95% Student's-t UCL
Barium (Ba)	mg/kg	10	0.28	0.582	0.485	95% Student's-t UCL
Beryllium (Be)	mg/kg	10	0.00255	0.00367	0.00292	95% Modified-t UCL
Bismuth (Bi)	mg/kg	10	0.0255	0.151	0.0976	95% Chebyshev (Mean, Sd) UCL
Boron (B)	mg/kg	10	0.0255	0.0367	0.0292	95% Modified-t UCL
Cadmium (Cd)	mg/kg	10	0.0252	0.103	0.0774	95% Student's-t UCL
Calcium (Ca)	mg/kg	10	5,160	8,188	7,062	95% Student's-t UCL
Chromium (Cr) (total)	mg/kg	10	0.0256	0.354	0.249	95% Chebyshev (Mean, Sd) UCL
Cobalt (Co)	mg/kg	10	0.0289	0.0972	0.0713	95% Student's-t UCL
Copper (Cu)	mg/kg	10	0.489	0.915	0.768	95% Student's-t UCL
Iron (Fe)	mg/kg	10	11.19	52.58	25.92	95% Modified-t UCL
Lead (Pb)	mg/kg	10	0.0259	0.0649	0.0451	95% Student's-t UCL
Lithium (Li)	mg/kg	10	0.00595	0.0798	0.0489	95% Chebyshev (Mean, Sd) UCL
Magnesium (Mg)	mg/kg	10	295.4	352.8	333.9	95% Student's-t UCL
Manganese (Mn)	mg/kg	10	4.191	23.41	12.05	95% Approximate Gamma UCL
Mercury (Hg)	mg/kg	10	0.0542	0.143	0.11	95% Student's-t UCL
Molybdenum (Mo)	mg/kg	10	0.0118	0.108	0.0461	95% Approximate Gamma UCL
Nickel (Ni)	mg/kg	10	0.0256	0.0845	0.0462	95% Modified-t UCL
Potassium (K)	mg/kg	10	3,383	3,789	3,569	95% Approximate Gamma UCL
Rubidium (Rb)	mg/kg	10	6.377	12.3	9.785	95% Student's-t UCL
Selenium (Se)	mg/kg	10	0.213	0.337	0.298	95% Student's-t UCL
Silver (Ag)	mg/kg	10	0.00524	0.0134	0.0112	95% Student's-t UCL
Sodium (Na)	mg/kg	10	802	1,109	993.1	95% Student's-t UCL
Strontium (Sr)	mg/kg	10	7.702	17.95	13.05	95% Student's-t UCL
Tellurium (Te)	mg/kg	10	0.00255	0.00266	0.00262	95% Approximate Gamma UCL
Thallium (Th)	mg/kg	10	0.00638	0.015	0.0123	95% Student's-t UCL
Tin (Sn)	mg/kg	10	0.00424	0.0169	0.012	95% Student's-t UCL
Tungsten (W)	mg/kg	10	0.00576	0.0659	0.0354	95% Approximate Gamma UCL
Uranium (U)	mg/kg	10	0.00256	0.00941	0.00805	95% Chebyshev (Mean, Sd) UCL

Table 3.14 Baseline Concentrations for Trace Metals in Whole Fish – McBean Brook

Trace Metal	Units	Number of Fish Samples Analyzed	Concentration of Trace Metal in Fish (Whole Fish) in McBean Brook			
			Minimum Detected (mg/kg)	Maximum Detected (mg/kg)	Baseline Concentration of Trace Metal in Fish (mg/kg)	Baseline Concentration in Fish Selected Based on:
Vanadium (V)	mg/kg	10	0.0255	0.0973	0.0522	95% Modified-t UCL
Zinc (Zn)	mg/kg	10	19.04	27.77	24.93	95% Student's-t UCL

Notes:
Where one or more samples, but not all samples, had concentrations below the detection limit for a particular trace metal, the minimum reported value is the detection limit. Where all samples had concentrations below the detection limit for a particular trace metal, the minimum and maximum reported values are the detection limit.

Legend:
UCL = Upper Confidence Limit
Sd = standard deviation
95% Student's-t UCL = UCL based upon the Student's t-distribution
95% KM (% Bootstrap) UCL = UCL based upon Kaplan-Meier estimates using the percentile bootstrap method
95% KM (Chebyshev) UCL = UCL based upon Kaplan-Meier estimates using the Chebyshev inequality
95% Chebyshev (Mean, Sd) UCL = Chebyshev inequality-based UCL using sample mean and standard deviation
95% KM (BCA) UCL = UCL based upon Kaplan-Meier estimates using bias-corrected accelerated bootstrap method
95% KM (t) UCL = UCL based upon Kaplan-Meier estimates using the Student's t-distribution cutoff value
95% H-UCL = UCL based upon Land's H-statistic
95% Approximate Gamma UCL = Approximate gamma UCL using chi-square approximation
½ EQL = one-half of the laboratory estimated limit of quantification

Table 3.15 Baseline Concentrations for Trace Metals in Fish Carcasses – West Branch Napadogan Brook

Trace Metal	Units	Number of Fish Samples Analyzed	Number of Fish Samples in Which Trace Metal Was Detected	Concentration of Trace Metal in Fish (Fish Carcasses) in West Branch Napadogan Brook			
				Minimum Detected (mg/kg)	Maximum Detected (mg/kg)	Baseline Concentration of Trace Metal in Fish (mg/kg)	Baseline Concentration in Fish Selected Based on:
Aluminum (Al)	mg/kg	29	29	0.27	13.2	3.161	95% Chebyshev (Mean, Sd) UCL
Antimony (Sb)	mg/kg	29	3	0.0025	0.0155	0.00429	95% Modified-t UCL
Arsenic (As)	mg/kg	29	21	0.025	1.77	0.89	95% Chebyshev (Mean, Sd) UCL
Barium (Ba)	mg/kg	29	29	0.17	0.63	0.409	95% Student's-t UCL
Beryllium (Be)	mg/kg	29	0	0.0025	0.0025	0.0025	½ EQL
Bismuth (Bi)	mg/kg	29	1	0.025	0.208	0.043	95% Modified-t UCL
Boron (B)	mg/kg	29	0	0.025	0.025	0.025	½ EQL
Cadmium (Cd)	mg/kg	29	29	0.0018	0.0198	0.0112	95% Chebyshev (Mean, Sd) UCL
Calcium (Ca)	mg/kg	29	29	2,530	5,500	4,366	95% Student's-t UCL
Chromium (Cr) (total)	mg/kg	29	2	0.025	0.08	0.0348	95% Modified-t UCL
Cobalt (Co)	mg/kg	29	29	0.01	0.076	0.0401	95% Approximate Gamma UCL
Copper (Cu)	mg/kg	29	29	0.26	0.56	0.406	95% Student's-t UCL
Iron (Fe)	mg/kg	29	29	3	63	15.58	95% Chebyshev (Mean, Sd) UCL

Table 3.15 Baseline Concentrations for Trace Metals in Fish Carcasses – West Branch Napadogan Brook

Trace Metal	Units	Number of Fish Samples Analyzed	Number of Fish Samples in Which Trace Metal Was Detected	Concentration of Trace Metal in Fish (Fish Carcasses) in West Branch Napadogan Brook			
				Minimum Detected (mg/kg)	Maximum Detected (mg/kg)	Baseline Concentration of Trace Metal in Fish (mg/kg)	Baseline Concentration in Fish Selected Based on:
Lead (Pb)	mg/kg	29	22	0.0025	0.0895	0.024	95% Approximate Gamma UCL
Lithium (Li)	mg/kg	29	29	0.005	0.022	0.0132	95% Student's-t UCL
Magnesium (Mg)	mg/kg	29	29	306	360.5	340.9	95% Student's-t UCL
Manganese (Mn)	mg/kg	29	29	1.25	5.57	2.817	95% Approximate Gamma UCL
Mercury (Hg)	mg/kg	29	29	0.06	0.22	0.128	95% Student's-t UCL
Molybdenum (Mo)	mg/kg	29	10	0.0025	0.014	0.00636	95% Chebyshev (Mean, Sd) UCL
Nickel (Ni)	mg/kg	29	1	0.025	0.06	0.0285	95% Modified-t UCL
Potassium (K)	mg/kg	29	29	3,770	4,310	4,168	95% Student's-t UCL
Rubidium (Rb)	mg/kg	29	29	10.7	17.7	15.12	95% Student's-t UCL
Selenium (Se)	mg/kg	29	29	0.16	0.98	0.583	95% Chebyshev (Mean, Sd) UCL
Silver (Ag)	mg/kg	29	0	0.0025	0.0025	0.0025	½ EQL
Sodium (Na)	mg/kg	29	29	483	648.5	596.3	95% Student's-t UCL
Strontium (Sr)	mg/kg	29	29	4.95	10.4	7.856	95% Student's-t UCL
Tellurium (Te)	mg/kg	29	0	0.0025	0.0025	0.0025	½ EQL
Thallium (Th)	mg/kg	29	29	0.005	0.026	0.0141	95% Approximate Gamma UCL
Tin (Sn)	mg/kg	29	16	0.0025	0.013	0.00848	95% Chebyshev (Mean, Sd) UCL
Tungsten (W)	mg/kg	29	2	0.0025	0.012	0.00354	95% Modified-t UCL
Uranium (U)	mg/kg	29	1	0.0025	0.007	0.00295	95% Modified-t UCL
Vanadium (V)	mg/kg	29	0	0.025	0.025	0.025	½ EQL
Zinc (Zn)	mg/kg	29	29	10.4	21.5	16.42	95% Student's-t UCL

Notes:
Where one or more samples, but not all samples, had concentrations below the detection limit for a particular trace metal, the minimum reported value is the detection limit. Where all samples had concentrations below the detection limit for a particular trace metal, the minimum and maximum reported values are the detection limit.

Legend:
UCL = Upper Confidence Limit
Sd = standard deviation
95% Student's-t UCL = UCL based upon the Student's t-distribution
95% KM (% Bootstrap) UCL = UCL based upon Kaplan-Meier estimates using the percentile bootstrap method
95% KM (Chebyshev) UCL = UCL based upon Kaplan-Meier estimates using the Chebyshev inequality
95% Chebyshev (Mean, Sd) UCL = Chebyshev inequality-based UCL using sample mean and standard deviation
95% KM (BCA) UCL = UCL based upon Kaplan-Meier estimates using bias-corrected accelerated bootstrap method
95% KM (t) UCL = UCL based upon Kaplan-Meier estimates using the Student's t-distribution cutoff value
95% H-UCL = UCL based upon Land's H-statistic
95% Approximate Gamma UCL = Approximate gamma UCL using chi-square approximation
½ EQL = one-half of the laboratory estimated limit of quantification

Table 3.16 Baseline Concentrations for Trace Metals in Whole Fish – West Branch Napadogan Brook

Trace Metal	Units	Number of Fish Samples Analyzed	Concentration of Trace Metal in Fish (Whole Fish) in West Branch Napadogan Brook			
			Minimum Detected (mg/kg)	Maximum Detected (mg/kg)	Baseline Concentration of Trace Metal in Fish (mg/kg)	Baseline Concentration in Fish Selected Based on:
Aluminum (Al)	mg/kg	29	0.521	53.16	25.93	95% Chebyshev (Mean, Sd) UCL
Antimony (Sb)	mg/kg	29	0.00252	0.0207	0.00752	95% Chebyshev (Mean, Sd) UCL
Arsenic (As)	mg/kg	29	0.0255	1.341	0.724	95% Chebyshev (Mean, Sd) UCL
Barium (Ba)	mg/kg	29	0.269	0.944	0.659	95% Student's-t UCL
Beryllium (Be)	mg/kg	29	0.00252	0.00993	0.0036	95% Modified-t UCL
Bismuth (Bi)	mg/kg	29	0.0252	0.14	0.0451	95% Modified-t UCL
Boron (B)	mg/kg	29	0.0252	0.0351	0.0266	95% Student's-t UCL
Cadmium (Cd)	mg/kg	29	0.0127	0.152	0.0631	95% Approximate Gamma UCL
Calcium (Ca)	mg/kg	29	4,533	7,483	6,445	95% Student's-t UCL
Chromium (Cr) (total)	mg/kg	29	0.0255	0.245	0.109	95% Chebyshev (Mean, Sd) UCL
Cobalt (Co)	mg/kg	29	0.0154	0.141	0.0786	95% Approximate Gamma UCL
Copper (Cu)	mg/kg	29	0.435	1.224	0.8	95% Approximate Gamma UCL
Iron (Fe)	mg/kg	29	9.766	137.9	46.33	95% Chebyshev (Mean, Sd) UCL
Lead (Pb)	mg/kg	29	0.00647	0.124	0.0494	5% Approximate Gamma UCL
Lithium (Li)	mg/kg	29	0.0109	0.105	0.0463	95% H-UCL
Magnesium (Mg)	mg/kg	29	301.5	351.7	332.5	95% Student's-t UCL
Manganese (Mn)	mg/kg	29	2.429	21.89	7.108	95% Modified-t UCL
Mercury (Hg)	mg/kg	29	0.0504	0.195	0.113	95% Student's-t UCL
Molybdenum (Mo)	mg/kg	29	0.00577	0.026	0.0156	95% Approximate Gamma UCL
Nickel (Ni)	mg/kg	29	0.0252	0.0932	0.0466	95% Modified-t UCL
Potassium (K)	mg/kg	29	3,321	3,853	3,617	95% Student's-t UCL
Rubidium (Rb)	mg/kg	29	9.568	16.59	13.6	95% Student's-t UCL
Selenium (Se)	mg/kg	29	0.203	1.114	0.649	95% Chebyshev (Mean, Sd) UCL
Silver (Ag)	mg/kg	29	0.00558	0.0308	0.0148	95% Approximate Gamma UCL
Sodium (Na)	mg/kg	29	806.9	1,049	968.8	95% Student's-t UCL
Strontium (Sr)	mg/kg	29	7.751	16.46	11.65	95% Student's-t UCL
Tellurium (Te)	mg/kg	29	0.00252	0.00276	0.00259	95% Student's-t UCL
Thallium (Th)	mg/kg	29	0.00779	0.0297	0.0168	95% Modified-t UCL
Tin (Sn)	mg/kg	29	0.00255	0.0416	0.0102	95% Approximate Gamma UCL
Tungsten (W)	mg/kg	29	0.00252	0.022	0.00719	95% Approximate Gamma UCL
Uranium (U)	mg/kg	29	0.00252	0.0191	0.00894	95% Approximate Gamma UCL

Table 3.16 Baseline Concentrations for Trace Metals in Whole Fish – West Branch Napadogan Brook

Trace Metal	Units	Number of Fish Samples Analyzed	Concentration of Trace Metal in Fish (Whole Fish) in West Branch Napadogan Brook			
			Minimum Detected (mg/kg)	Maximum Detected (mg/kg)	Baseline Concentration of Trace Metal in Fish (mg/kg)	Baseline Concentration in Fish Selected Based on:
Vanadium (V)	mg/kg	29	0.0252	0.108	0.0476	95% Modified-t UCL
Zinc (Zn)	mg/kg	29	18.96	32.46	25.8	95% Student's-t UCL

Note:
Where one or more samples, but not all samples, had concentrations below the detection limit for a particular trace metal, the minimum reported value is the detection limit. Where all samples had concentrations below the detection limit for a particular trace metal, the minimum and maximum reported values are the detection limit.

Legend:
UCL = Upper Confidence Limit
Sd = standard deviation
95% Student's-t UCL = UCL based upon the Student's t-distribution
95% KM (% Bootstrap) UCL = UCL based upon Kaplan-Meier estimates using the percentile bootstrap method
95% KM (Chebyshev) UCL = UCL based upon Kaplan-Meier estimates using the Chebyshev inequality
95% Chebyshev (Mean, Sd) UCL = Chebyshev inequality-based UCL using sample mean and standard deviation
95% KM (BCA) UCL = UCL based upon Kaplan-Meier estimates using bias-corrected accelerated bootstrap method
95% KM (t) UCL = UCL based upon Kaplan-Meier estimates using the Student's t-distribution cutoff value
95% H-UCL = UCL based upon Land's H-statistic
95% Approximate Gamma UCL = Approximate gamma UCL using chi-square approximation
½ EQL = one-half of the laboratory estimated limit of quantification

Table 3.17 Baseline Concentrations for Trace Metals in Fish Carcasses – All Fish Collected

Trace Metal	Units	Number of Fish Samples Analyzed	Number of Fish Samples in Which Trace Metal Was Detected	Concentration of Trace Metal in Fish (Fish Carcasses) – All Fish Collected			
				Minimum Detected (mg/kg)	Maximum Detected (mg/kg)	Baseline Concentration of Trace Metal in Fish (mg/kg)	Baseline Concentration in Fish Selected Based on:
Aluminum (Al)	mg/kg	79	79	0.21	13.2	1.807	95% Chebyshev (Mean, Sd) UCL
Antimony (Sb)	mg/kg	79	12	0.0025	0.019	0.00433	95% Modified-t UCL
Arsenic (As)	mg/kg	79	64	0.025	1.77	0.421	95% Chebyshev (Mean, Sd) UCL
Barium (Ba)	mg/kg	79	79	0.12	0.7	0.358	95% Approximate Gamma UCL
Beryllium (Be)	mg/kg	79	0	0.0025	0.0025	0.0025	½ EQL
Bismuth (Bi)	mg/kg	79	4	0.025	0.28	0.0436	95% Modified-t UCL
Boron (B)	mg/kg	79	0	0.025	0.025	0.025	½ EQL
Cadmium (Cd)	mg/kg	79	79	0.0018	0.0291	0.0122	95% Approximate Gamma UCL
Calcium (Ca)	mg/kg	79	79	1,810	7,230	4,318	95% Student's-t UCL
Chromium (Cr) (total)	mg/kg	79	6	0.025	0.15	0.0346	95% Modified-t UCL
Cobalt (Co)	mg/kg	79	79	0.007	0.157	0.0412	95% Approximate Gamma UCL
Copper (Cu)	mg/kg	79	79	0.26	0.56	0.391	95% Student's-t UCL

Table 3.17 Baseline Concentrations for Trace Metals in Fish Carcasses – All Fish Collected

Trace Metal	Units	Number of Fish Samples Analyzed	Number of Fish Samples in Which Trace Metal Was Detected	Concentration of Trace Metal in Fish (Fish Carcasses) – All Fish Collected			
				Minimum Detected (mg/kg)	Maximum Detected (mg/kg)	Baseline Concentration of Trace Metal in Fish (mg/kg)	Baseline Concentration in Fish Selected Based on:
Iron (Fe)	mg/kg	79	79	3	63	6.984	95% Modified-t UCL
Lead (Pb)	mg/kg	79	71	0.0025	0.0895	0.0197	95% Approximate Gamma UCL
Lithium (Li)	mg/kg	79	63	0.0025	0.022	0.0101	95% Chebyshev (Mean, Sd) UCL
Magnesium (Mg)	mg/kg	79	79	268	366	333.3	95% Student's-t UCL
Manganese (Mn)	mg/kg	79	79	1.25	9.81	3.189	95% Modified-t UCL
Mercury (Hg)	mg/kg	79	79	0.06	0.27	0.135	95% Student's-t UCL
Molybdenum (Mo)	mg/kg	79	53	0.0025	0.026	0.0095	95% Chebyshev (Mean, Sd) UCL
Nickel (Ni)	mg/kg	79	2	0.025	0.06	0.027	95% Modified-t UCL
Potassium (K)	mg/kg	79	79	3,710	4,310	4,060	95% Student's-t UCL
Rubidium (Rb)	mg/kg	79	79	5.5	17.7	13.13	95% Student's-t UCL
Selenium (Se)	mg/kg	79	79	0.15	0.98	0.367	95% Modified-t UCL
Silver (Ag)	mg/kg	79	0	0.0025	0.0025	0.0025	½ EQL
Sodium (Na)	mg/kg	79	79	483	846	632.1	95% Student's-t UCL
Strontium (Sr)	mg/kg	79	79	3.13	15.5	8.541	95% Student's-t UCL
Tellurium (Te)	mg/kg	79	0	0.0025	0.0025	0.0025	½ EQL
Thallium (Th)	mg/kg	79	78	0.0025	0.048	0.0134	95% Student's-t UCL
Tin (Sn)	mg/kg	79	52	0.0025	0.457	0.0381	95% Chebyshev (Mean, Sd) UCL
Tungsten (W)	mg/kg	79	32	0.0025	0.124	0.0287	95% Chebyshev (Mean, Sd) UCL
Uranium (U)	mg/kg	79	1	0.0025	0.007	0.00266	95% Modified-t UCL
Vanadium (V)	mg/kg	79	0	0.025	0.025	0.025	½ EQL
Zinc (Zn)	mg/kg	79	79	10.1	22	15.13	95% Student's-t UCL

Notes:
Where one or more samples, but not all samples, had concentrations below the detection limit for a particular trace metal, the minimum reported value is the detection limit. Where all samples had concentrations below the detection limit for a particular trace metal, the minimum and maximum reported values are the detection limit.

Legend:
UCL = Upper Confidence Limit
Sd = standard deviation
95% Student's-t UCL = UCL based upon the Student's t-distribution
95% KM (% Bootstrap) UCL = UCL based upon Kaplan-Meier estimates using the percentile bootstrap method
95% KM (Chebyshev) UCL = UCL based upon Kaplan-Meier estimates using the Chebyshev inequality
95% Chebyshev (Mean, Sd) UCL = Chebyshev inequality-based UCL using sample mean and standard deviation
95% KM (BCA) UCL = UCL based upon Kaplan-Meier estimates using bias-corrected accelerated bootstrap method
95% KM (t) UCL = UCL based upon Kaplan-Meier estimates using the Student's t-distribution cutoff value
95% H-UCL = UCL based upon Land's H-statistic
95% Approximate Gamma UCL = Approximate gamma UCL using chi-square approximation
½ EQL = one-half of the laboratory estimated limit of quantification

Table 3.18 Baseline Concentrations for Trace Metals in Whole Fish – All Fish Collected

Trace Metal	Units	Number of Fish Samples Analyzed	Concentration of Trace Metal in Fish (Whole Fish) – All Fish Collected			
			Minimum Detected (mg/kg)	Maximum Detected (mg/kg)	Baseline Concentration of Trace Metal in Fish (mg/kg)	Baseline Concentration in Fish Selected Based on:
Aluminum (Al)	mg/kg	76	0.476	63.16	18.85	95% Chebyshev (Mean, Sd) UCL
Antimony (Sb)	mg/kg	76	0.00252	0.0207	0.0059	95% Chebyshev (Mean, Sd) UCL
Arsenic (As)	mg/kg	76	0.0255	1.341	0.376	95% Chebyshev (Mean, Sd) UCL
Barium (Ba)	mg/kg	76	0.212	0.944	0.564	95% Approximate Gamma UCL
Beryllium (Be)	mg/kg	76	0.00251	0.00993	0.00312	95% Modified-t UCL
Bismuth (Bi)	mg/kg	76	0.0251	0.187	0.0549	95% Chebyshev (Mean, Sd) UCL
Boron (B)	mg/kg	76	0.0251	0.0514	0.0274	95% Modified-t UCL
Cadmium (Cd)	mg/kg	76	0.012	0.175	0.0677	95% Approximate Gamma UCL
Calcium (Ca)	mg/kg	76	3,143	8,188	6,503	95% Student's-t UCL
Chromium (Cr) (total)	mg/kg	76	0.0255	1.011	0.158	95% Chebyshev (Mean, Sd) UCL
Cobalt (Co)	mg/kg	76	0.0118	0.162	0.0737	95% Approximate Gamma UCL
Copper (Cu)	mg/kg	76	0.435	1.408	0.797	95% Approximate Gamma UCL
Iron (Fe)	mg/kg	76	9.766	137.9	29.93	95% Chebyshev (Mean, Sd) UCL
Lead (Pb)	mg/kg	76	0.00647	0.124	0.041	95% Approximate Gamma UCL
Lithium (Li)	mg/kg	76	0.00405	0.105	0.0365	95% Chebyshev (Mean, Sd) UCL
Magnesium (Mg)	mg/kg	76	280.1	352.8	327.9	95% Student's-t UCL
Manganese (Mn)	mg/kg	76	1.974	23.41	7.023	95% Modified-t UCL
Mercury (Hg)	mg/kg	76	0.0504	0.242	0.121	95% Student's-t UCL
Molybdenum (Mo)	mg/kg	76	0.00577	0.108	0.0313	95% Chebyshev (Mean, Sd) UCL
Nickel (Ni)	mg/kg	76	0.0251	0.0932	0.0388	95% Modified-t UCL
Potassium (K)	mg/kg	76	3,117	3,853	3,555	95% Student's-t UCL
Rubidium (Rb)	mg/kg	76	5.091	16.59	11.83	95% Student's-t UCL
Selenium (Se)	mg/kg	76	0.18	1.114	0.412	95% Modified-t UCL
Silver (Ag)	mg/kg	76	0.00524	0.0399	0.0148	95% Student's-t UCL
Sodium (Na)	mg/kg	76	795.3	1,186	975.2	95% Student's-t UCL
Strontium (Sr)	mg/kg	76	5.319	20.78	12.81	95% Student's-t UCL
Tellurium (Te)	mg/kg	76	0.00251	0.00276	0.00258	95% Student's-t UCL
Thallium (Th)	mg/kg	76	0.00419	0.0308	0.0154	95% Student's-t UCL
Tin (Sn)	mg/kg	76	0.00255	0.296	0.0317	95% Chebyshev (Mean, Sd) UCL
Tungsten (W)	mg/kg	76	0.00252	0.214	0.0533	95% Chebyshev (Mean, Sd) UCL
Uranium (U)	mg/kg	76	0.00251	0.0191	0.00702	95% Chebyshev (Mean, Sd) UCL

Table 3.18 Baseline Concentrations for Trace Metals in Whole Fish – All Fish Collected

Trace Metal	Units	Number of Fish Samples Analyzed	Concentration of Trace Metal in Fish (Whole Fish) – All Fish Collected			
			Minimum Detected (mg/kg)	Maximum Detected (mg/kg)	Baseline Concentration of Trace Metal in Fish (mg/kg)	Baseline Concentration in Fish Selected Based on:
Vanadium (V)	mg/kg	76	0.0251	0.108	0.0414	95% Modified-t UCL
Zinc (Zn)	mg/kg	76	16.65	32.46	24.78	95% Student's-t UCL

Notes:
Where one or more samples, but not all samples, had concentrations below the detection limit for a particular trace metal, the minimum reported value is one half the detection limit. Where all samples had concentrations below the detection limit for a particular trace metal, the minimum and maximum reported values are one half the detection limit.

* Two fish collected from Sisson Brook and one from Bird Brook showed anomalously high aluminum and iron concentrations in the viscera, likely due to a relatively large amount of sediment in the stomachs. These fish were not included in the statistical analyses.

Legend:
UCL = Upper Confidence Limit
Sd = standard deviation
95% Student's-t UCL = UCL based upon the Student's t-distribution
95% KM (% Bootstrap) UCL = UCL based upon Kaplan-Meier estimates using the percentile bootstrap method
95% KM (Chebyshev) UCL = UCL based upon Kaplan-Meier estimates using the Chebyshev inequality
95% Chebyshev (Mean, Sd) UCL = Chebyshev inequality-based UCL using sample mean and standard deviation
95% KM (BCA) UCL = UCL based upon Kaplan-Meier estimates using bias-corrected accelerated bootstrap method
95% KM (t) UCL = UCL based upon Kaplan-Meier estimates using the Student's t-distribution cutoff value
95% H-UCL = UCL based upon Land's H-statistic
95% Approximate Gamma UCL = Approximate gamma UCL using chi-square approximation
½ EQL = one-half of the laboratory estimated limit of quantification

4.0 QUALITY ASSURANCE/QUALITY CONTROL

The following section presents a detailed assessment of the QA/QC program results for the baseline soil and biota sampling program for media collected from Key and Soil sampling locations.

The QA/QC sampling was conducted on approximately 10% of parameters that were analyzed. QA/QC included the collected of field duplicates and several QA/QC analyses conducted by the laboratory. Field duplicate samples were collected out on approximately 10% of all samples collected from Soil and Key sites. A summary of results from the field duplicates and deviation from the mean are included in Appendix G.

4.1 METHOD BLANKS

A review of the method blank analysis indicated that the data quality objectives were generally met and that detectable concentrations of several trace metal analyses in one or more method blanks did not substantially affect the baseline concentrations.

The presence of trace metals in the blanks indicates the potential for analytical results to be biased high. The percent compliance for trace metal parameters in method blanks for all media samples excluding soil was 95.3%. Three trace metals were detected in more than one blank sample. Antimony was detected in four of nine blank samples; however, as antimony was not detected in the vast majority of samples, there does not appear to have been any bias of the results. Low concentrations of manganese and zinc were detected in three blank samples; however, manganese and zinc concentrations measured in the multi-media samples were several orders of magnitude larger than the concentrations detected in the blanks. Therefore, interpretation of the results does not appear to be biased. A more detailed analysis of the method blank samples is provided in Appendix G. Based on the compliance (*i.e.*, greater than 95%) and the relatively low measured concentrations in the blanks, the data are considered acceptable for the purposes of establishing the baseline concentrations.

The percent compliance for trace metal parameters in method blanks for soil samples was 91.9%. Aluminum was detected in two of the three soil method blanks. The detected concentration in both of these samples was at the detection limit of 1 mg/kg; however, measured aluminum concentrations in soil samples were much higher than the detection limit (generally greater than 1,000 mg/kg, and often greater than 10,000 mg/kg), so its presence in the blanks does not affect the baseline estimates. Antimony was detected in two of the three soil method blank samples at concentrations of 0.1 and 0.2 mg/kg. Measured antimony concentrations in the soil samples were generally close to or below the detection limit of 0.1 mg/kg. As such, there is some uncertainty regarding the presence of antimony in some of the soil samples; however, the baseline concentration of 0.267 mg/kg incorporates the maximum measured concentration of 1.1 mg/kg. The uncertainty associated with the low level detections is not expected to substantially affect the outcomes of the HHERA. Tin was detected in all three of the soil method blanks; however, as tin was not detected in any of the soil samples, this does not appear to have biased the baseline concentrations.

4.2 LABORATORY DUPLICATES

The relative percent difference (RPD) from the mean between some of the metals duplicates exceeded 40%. A review of the various samples involved was completed and the effects of these exceedances on the analytical results are summarized below.

Duplicate results associated with most of the metal analytes were within the expected RPD from the mean. The RPD was less than 40% for over 95% of the lab duplicates analysed. Of the 564 lab duplicate analyses conducted, 33 had a RPD greater than 40%. This indicated that the data was acceptable for this Technical Report and as input to the HHERA. A review of the laboratory duplicate results is presented in Table 4.1 with more detail provided in Appendix G.

Table 4.1 Laboratory Duplicates Not in Compliance with the Expected Relative Percent Difference (RPD) from the Mean

Metal	Number of Laboratory Duplicates	Number of Non-Compliances	Percent Non-Compliance
Aluminum	17	0	0.00%
Antimony	17	4	23.53%
Arsenic	17	1	5.88%
Barium	17	2	11.76%
Beryllium	17	1	5.88%
Bismuth	17	2	11.76%
Boron	17	0	0.00%
Cadmium	17	0	0.00%
Calcium	17	2	11.76%
Chromium	17	4	23.53%
Cobalt	17	0	0.00%
Copper	17	0	0.00%
Iron	17	0	0.00%
Lead	17	2	11.76%
Lithium	17	0	0.00%
Magnesium	17	0	0.00%
Manganese	17	0	0.00%
Mercury	17	0	0.00%
Molybdenum	17	2	11.76%
Nickel	17	0	0.00%
Potassium	17	0	0.00%
Rubidium	17	0	0.00%
Selenium	17	1	5.88%
Silver	17	2	11.76%
Sodium	17	1	5.88%
Strontium	17	2	11.76%
Tellurium	17	0	0.00%
Thallium	17	2	11.76%
Tin	17	1	5.88%
Tungsten	17	1	5.88%
Uranium	17	0	0.00%
Vanadium	17	3	17.65%
Zinc	17	0	0.00%

4.3 FIELD DUPLICATES

The RPD from the mean was calculated for those parameters where both samples had concentrations greater than five times the detection limit. Some of the field duplicates exceeded the expected amount of 40%. One soil field duplicate sample (28064-SS-0) was generally not consistent with the original sample, with the average RPD from the mean exceeding 40% in two thirds of the analyses. Overall, 134 field duplicate analyses were conducted, and 17 (12.7%) of those analyses represented RPD from the mean of more than 40%. If analyses conducted on sample 28064-SS-0 are excluded, however, only 8.2% of the field duplicate samples had an RPD from the mean greater than 40%, which represents 91.8% compliance. The precision of all results are considered acceptable for use in establishing a baseline concentration. A more detailed review of the field duplicate results is presented in Appendix G.

4.4 CERTIFIED REFERENCE MATERIALS

Twelve certified reference materials were analyzed for non-soil media and three were analyzed for soil. As indicated on the laboratory certificates, no recovery issues were identified by the laboratory, demonstrating that the laboratory methods and techniques were sufficiently accurate and effective.

5.0 REFERENCES

Health Canada. 2009. Federal Contaminated Site Risk Assessment in Canada, Part I: Guidance on Human Health Preliminary Quantitative Risk Assessment (PQRA), Version 2.0 - Draft.

Stantec. 2012a. Sisson Project: Baseline Aquatic Environment Technical Report. Prepared for Northcliff Resources Ltd. by Stantec Consulting Ltd., Fredericton, New Brunswick. June 1, 2012.

Stantec. 2012b. Sisson Project: Final Terms of Reference for an Environmental Impact Assessment. Prepared for Northcliff Resources Ltd. by Stantec Consulting Ltd., Fredericton, New Brunswick. April 16, 2012.

Stantec. 2012c. Sisson Project: Baseline Ambient Air Quality Technical Report. Prepared for Northcliff Resources Ltd. by Stantec Consulting Ltd., Fredericton, New Brunswick. June 1, 2012.

US EPA. 1989. Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part A) Interim Final. EPA/540/1-89/002.

US EPA 2002. Guidance for Comparing Background and Chemical Concentrations in Soil for CERCLA Sites. EPA 540-R-01-003. Office of Solid Waste and Emergency Response (9285.7-41). September 2002.

US EPA. 2005. Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities - Final. EPA 530-R-05-006. Office of Solid Waste and Emergency Response (5305W). September 2005.

Appendix A

Trace Metal Concentrations in Samples from Key and Soil Sites

Table A.1 Tabulated Soil Results for ProUCL

Client Sample ID:	Aluminum	d_Aluminun	Antimony	d_Antimony	Arsenic	d_Arsenic	Barium	d_Barium	Beryllium	d_Beryllium	Bismuth	d_Bismuth	Boron	d_Boron	Cadmium	d_Cadmium	Calcium	d_Calcium	Chromium
27249-SS-1	766	1	0.5	1	2	1	11	1	0.1	1	1	0	3	1	0.68	1	22800	1	2
10700-SS-1	8000	1	0.1	0	3	1	27	1	0.1	0	1	0	2	1	0.14	1	940	1	15
28648-SS-1	1270	1	0.3	1	1	1	11	1	1.3	1	1	1	1	1	0.07	1	3150	1	2
22914-SS-1	6900	1	0.2	1	38	1	150	1	1.2	1	1	0	1	1	6.21	1	1360	1	10
22135-SS-1	6000	1	0.1	0	9	1	19	1	0.2	1	1	0	2	1	0.2	1	900	1	6
32066-SS-1	4560	1	0.1	0	1	0	9	1	1.1	1	1	0	1	0	0.08	1	110	1	2
23068-SS-1	3170	1	0.2	1	3	1	18	1	0.1	0	1	0	2	1	0.07	1	630	1	3
10070-SS-1	17800	1	0.1	0	6	1	20	1	0.4	1	1	0	1	1	0.05	1	510	1	21
27518-SS-1	5900	1	0.1	0	1	1	13	1	0.1	1	1	0	1	1	0.06	1	160	1	5
33316-SS-1	4220	1	0.1	0	1	1	7	1	0.1	0	1	0	2	1	0.02	1	80	1	2
25083-SS-1	3020	1	0.1	0	2	1	10	1	0.1	0	1	0	2	1	0.11	1	420	1	2
10336-SS-1	6240	1	0.1	0	10	1	15	1	0.1	1	1	0	2	1	0.11	1	330	1	7
14534-SS-1	7640	1	0.1	0	9	1	122	1	0.3	1	1	0	1	1	1.9	1	1880	1	16
17627-SS-1	11500	1	0.1	1	3	1	12	1	0.2	1	1	1	2	1	0.07	1	200	1	5
33127-SS-1	7420	1	0.1	0	5	1	28	1	0.5	1	1	0	1	0	0.09	1	840	1	6
32344-SS-1	9300	1	0.1	0	8	1	19	1	0.2	1	1	0	2	1	0.12	1	490	1	14
11104-SS-1	21700	1	0.1	0	103	1	61	1	0.8	1	3	1	1	0	0.35	1	1110	1	25
17706-SS-1	8590	1	0.1	0	3	1	14	1	0.2	1	1	0	2	1	0.09	1	170	1	9
12897-SS-1	5910	1	0.1	0	2	1	9	1	0.2	1	1	0	1	0	0.54	1	2640	1	6
16303-SS-1	3600	1	0.1	0	2	1	11	1	0.1	0	1	1	3	1	0.08	1	290	1	5
15924-SS-1	19400	1	1.1	1	50	1	65	1	0.6	1	1	0	1	1	0.24	1	720	1	41
17099-SS-1	10000	1	0.3	1	10	1	14	1	0.2	1	3	1	2	1	0.1	1	130	1	9
5518-SS-1	20300	1	0.2	1	10	1	31	1	0.9	1	1	1	3	1	0.32	1	860	1	19
22897-N-SS-1	15400	1	0.1	0	4	1	20	1	0.5	1	1	0	1	1	0.07	1	590	1	9
19733-SS-1	8320	1	1	1	25	1	35	1	0.1	1	1	0	2	1	0.17	1	600	1	14
11852-SS-1	22400	1	0.1	0	4	1	29	1	0.5	1	1	0	2	1	0.12	1	310	1	14
10555-SS-1	3130	1	0.7	1	2	1	100	1	0.1	1	1	0	3	1	0.55	1	2460	1	3
24543-SS-1	10600	1	0.4	1	12	1	299	1	0.5	1	1	0	4	1	1.52	1	5150	1	17
31957-SS-1	15900	1	0.1	0	26	1	15	1	0.5	1	1	0	1	1	0.12	1	190	1	15
15663-SS-1	4680	1	0.1	0	3	1	12	1	0.1	0	1	0	2	1	0.06	1	220	1	7
34090-SS-1	6330	1	0.2	1	4	1	40	1	0.4	1	1	0	1	1	0.25	1	8250	1	8
19342-SS-1	4440	1	0.3	1	4	1	73	1	0.1	0	1	0	3	1	0.11	1	1340	1	7
30519-SS-1	12200	1	0.1	0	7	1	45	1	0.9	1	1	0	3	1	0.18	1	970	1	14
19058-SS-1	2700	1	0.1	1	2	1	12	1	0.1	0	1	0	2	1	0.07	1	240	1	3
29729-SS-1	11300	1	0.1	0	15	1	21	1	0.3	1	1	0	1	1	0.08	1	230	1	16
21171-SS-1	4850	1	0.2	1	6	1	34	1	0.1	0	1	0	2	1	0.23	1	1230	1	7
13046-SS-1	2300	1	0.3	1	2	1	15	1	0.1	0	1	1	2	1	0.09	1	440	1	3
4488-SS-1	12400	1	0.1	1	3	1	30	1	0.4	1	1	0	1	0	0.29	1	4820	1	17
20274-SS-1	9500	1	0.2	1	4	1	16	1	0.2	1	1	0	2	1	0.09	1	310	1	10
16882-SS-1	4400	1	0.1	0	7	1	30	1	0.1	0	1	0	2	1	0.19	1	900	1	3
25466-SS-1	5060	1	0.1	0	2	1	15	1	0.2	1	1	0	2	1	0.1	1	270	1	3
06753-SS-1	7730	1	0.3	1	9	1	12	1	0.1	1	1	0	3	1	0.07	1	280	1	8
14953-SS-1	9130	1	0.3	1	5	1	49	1	0.1	0	1	0	1	1	0.24	1	2500	1	27
24738-SS-1	4240	1	0.2	1	6	1	35	1	0.1	1	1	0	3	1	0.09	1	530	1	5
5728-SS-1	24700	1	0.3	1	19	1	140	1	1.4	1	2	1	2	1	0.4	1	2490	1	28
13508-ss-max	22900	1	0.1	0	38	1	52	1	0.6	1	3	1	2	1	0.27	1	960	1	27
12724-ss-max	12100	1	0.1	0	30	1	27	1	0.2	1	2	1	3	1	0.22	1	290	1	15
20953-SS-max	11100	1	0.2	1	6	1	48	1	0.2	1	1	0	2	1	0.23	1	1460	1	43
22897-SS-max	11400	1	0.1	0	6	1	25	1	0.5	1	1	0	1	1	0.08	1	650	1	7
28890-SS-max	5410	1	0.2	1	2	1	11	1	0.1	0	1	0	2	1	0.1	1	520	1	3
28064-SS-max	1610	1	0.1	0	2	1	15	1	0.1	0	1	0	2	1	0.08	1	570	1	1

Notes: concentrations are presented in mg/kg

d_(metal) indicates whether the metal was detected in the sample at a concentration above the detection limit, where 1 indicates a detected value, and 0 inidcates a concentration below the dection limit

Table A.1 Tabulated Soil Results for ProUCL

Client Sample ID:	d_Chromiun	Cobalt	d_Cobalt	Copper	d_Copper	Iron	d_Iron	Lead	d_Lead	Lithium	d_Lithium	Magnesium	_Magnesiur	Manganese	_Manganes	Mercury	d_Mercury	Molybdenun	_Molybdenu
27249-SS-1	1	0.6	1	3	1	1600	1	46.2	1	0.6	1	1050	1	1160	1	0.21	1	4.4	1
10700-SS-1	1	6	1	7	1	13000	1	11.7	1	3.4	1	1800	1	53	1	0.06	1	0.1	0
28648-SS-1	1	0.2	1	2	1	880	1	3.6	1	0.3	1	510	1	13	1	0.21	1	1.5	1
22914-SS-1	1	22.5	1	8	1	18600	1	48.8	1	6.9	1	1000	1	3530	1	0.06	1	2.6	1
22135-SS-1	1	2.8	1	8	1	14800	1	16.6	1	2.1	1	860	1	47	1	0.07	1	0.5	1
32066-SS-1	1	0.4	1	1	1	1680	1	6.7	1	1.8	1	210	1	20	1	0.04	1	0.1	0
23068-SS-1	1	0.5	1	2	1	5580	1	10.9	1	0.7	1	200	1	20	1	0.06	1	0.2	1
10070-SS-1	1	4.3	1	6	1	25700	1	10.9	1	20	1	3300	1	180	1	0.06	1	0.5	1
27518-SS-1	1	0.8	1	3	1	4140	1	9.3	1	2.4	1	570	1	35	1	0.09	1	0.2	1
33316-SS-1	1	1.7	1	1	1	3350	1	4.5	1	3.1	1	210	1	124	1	0.02	1	0.1	0
25083-SS-1	1	0.2	1	2	1	3830	1	10.7	1	1.4	1	160	1	45	1	0.08	1	0.1	1
10336-SS-1	1	1.1	1	5	1	10700	1	11.6	1	3.7	1	760	1	48	1	0.06	1	0.2	1
14534-SS-1	1	22.2	1	14	1	20700	1	39.5	1	11.9	1	1430	1	3520	1	0.17	1	3.3	1
17627-SS-1	1	0.9	1	2	1	12200	1	8.5	1	4.3	1	550	1	57	1	0.1	1	0.2	1
33127-SS-1	1	2.5	1	3	1	10700	1	9.1	1	13.5	1	1320	1	226	1	0.03	1	0.4	1
32344-SS-1	1	2.1	1	4	1	17700	1	16.1	1	8.7	1	1240	1	113	1	0.06	1	0.2	1
11104-SS-1	1	14	1	62	1	28700	1	30.2	1	22.8	1	5880	1	534	1	0.02	1	1.7	1
17706-SS-1	1	1.4	1	3	1	11100	1	8.7	1	7.7	1	970	1	69	1	0.07	1	0.6	1
12897-SS-1	1	2.2	1	4	1	5800	1	6.7	1	6.9	1	2300	1	94	1	0.02	1	0.3	1
16303-SS-1	1	0.6	1	3	1	7250	1	15.5	1	1.3	1	280	1	47	1	0.05	1	4.4	1
15924-SS-1	1	10.8	1	27	1	32800	1	35.5	1	23.9	1	6980	1	667	1	0.06	1	2	1
17099-SS-1	1	1.8	1	4	1	13000	1	11	1	7.8	1	880	1	71	1	0.07	1	0.6	1
5518-SS-1	1	12.3	1	9	1	17600	1	40.6	1	8.4	1	1120	1	1170	1	0.33	1	1.6	1
22897-N-SS-1	1	2.9	1	5	1	13200	1	9.1	1	13.4	1	1920	1	154	1	0.06	1	0.2	1
19733-SS-1	1	2.7	1	10	1	31100	1	20.5	1	5.2	1	2250	1	94	1	0.08	1	7.8	1
11852-SS-1	1	3.1	1	4	1	20400	1	13.2	1	18.5	1	1870	1	571	1	0.11	1	0.5	1
10555-SS-1	1	0.9	1	7	1	3810	1	48.3	1	0.6	1	440	1	118	1	0.27	1	0.7	1
24543-SS-1	1	21.4	1	24	1	27600	1	15.8	1	11.4	1	1150	1	6120	1	0.15	1	16.5	1
31957-SS-1	1	3.7	1	18	1	30100	1	13.8	1	11.6	1	1310	1	110	1	0.07	1	1.3	1
15663-SS-1	1	1.2	1	2	1	8280	1	6.1	1	2	1	820	1	57	1	0.4	1	0.2	1
34090-SS-1	1	1.3	1	2	1	4390	1	17.5	1	15.4	1	1060	1	43	1	0.13	1	1.2	1
19342-SS-1	1	1	1	5	1	8790	1	13.5	1	2	1	620	1	76	1	0.1	1	0.5	1
30519-SS-1	1	9.4	1	5	1	10600	1	18.3	1	23.2	1	1760	1	408	1	0.1	1	0.5	1
19058-SS-1	1	0.6	1	2	1	6280	1	13.9	1	0.6	1	220	1	23	1	0.08	1	0.2	1
29729-SS-1	1	2.1	1	8	1	36800	1	13.1	1	6.8	1	1110	1	236	1	0.09	1	0.3	1
21171-SS-1	1	1.1	1	6	1	14600	1	20.2	1	2.3	1	440	1	72	1	0.14	1	0.4	1
13046-SS-1	1	0.5	1	2	1	4220	1	6	1	0.4	1	150	1	13	1	0.04	1	0.4	1
4488-SS-1	1	5.5	1	8	1	12500	1	10.9	1	12.9	1	3840	1	149	1	0.1	1	1.1	1
20274-SS-1	1	2.1	1	4	1	11600	1	10.1	1	8.6	1	1200	1	90	1	0.06	1	0.3	1
16882-SS-1	1	0.4	1	3	1	10600	1	11.1	1	1	1	240	1	50	1	0.07	1	0.3	1
25466-SS-1	1	1	1	2	1	5490	1	10.1	1	4.1	1	310	1	69	1	0.06	1	0.1	1
06753-SS-1	1	1.1	1	3	1	15400	1	9.3	1	3.3	1	520	1	69	1	0.07	1	0.3	1
14953-SS-1	1	2.2	1	8	1	27800	1	13.7	1	7.3	1	1450	1	98	1	0.13	1	0.4	1
24738-SS-1	1	1.2	1	5	1	8460	1	20.4	1	3	1	410	1	92	1	0.11	1	0.3	1
5728-SS-1	1	11.8	1	16	1	27000	1	25.9	1	35.6	1	5560	1	1410	1	0.11	1	1.4	1
13508-ss-max	1	6	1	33	1	23700	1	26.4	1	19.5	1	3320	1	514	1	0.09	1	3.2	1
12724-ss-max	1	2.2	1	7	1	26900	1	22.4	1	10.3	1	1290	1	256	1	0.1	1	0.6	1
20953-SS-max	1	5.2	1	11	1	28200	1	10.5	1	10.2	1	3510	1	258	1	0.07	1	0.3	1
22897-SS-max	1	3.5	1	4	1	11600	1	13.2	1	14.4	1	2040	1	146	1	0.04	1	0.3	1
28890-SS-max	1	0.2	1	1	0	3670	1	5.8	1	2.2	1	160	1	13	1	0.12	1	0.4	1
28064-SS-max	1	0.3	1	1	1	1760	1	11.1	1	0.8	1	100	1	21	1	0.05	1	0.1	1

Notes: concentrations are presented in mg/kg

d_(metal) indicates whether the metal was detected in the sample at a concentration above the detection limit, where 1 indicates a detected value, and 0 inidcates a concentration below the dection limit

Table A.1 Tabulated Soil Results for ProUCL

Client Sample ID:	Nickel	d_Nickel	Potassium	d_Potassium	Rubidium	d_Rubidium	Selenium	d_Selenium	Silver	d_Silver	Sodium	d_Sodium	Strontium	d_Strontium	Tellurium	d_Tellurium	Thallium	d_Thallium	Tin
27249-SS-1	2	1	160	1	1.3	1	1	1	0.1	1	90	1	165	1	0.1	0	0.1	0	0.1
10700-SS-1	10	1	450	1	4.7	1	1	0	0.1	0	50	0	8	1	0.1	0	0.1	0	0.1
28648-SS-1	1	1	90	1	0.7	1	1	0	0.1	0	50	1	23	1	0.1	0	0.1	0	0.1
22914-SS-1	34	1	360	1	11.1	1	1	0	0.1	0	50	0	14	1	0.1	0	0.3	1	0.1
22135-SS-1	4	1	500	1	5.8	1	1	0	0.5	1	50	0	11	1	0.1	0	0.1	1	0.1
32066-SS-1	1	1	250	1	10.4	1	1	0	0.1	0	50	0	2	1	0.1	0	0.1	0	0.1
23068-SS-1	2	1	190	1	3.2	1	1	0	0.1	0	50	0	5	1	0.1	0	0.1	1	0.1
10070-SS-1	14	1	720	1	12.5	1	1	0	0.1	0	50	0	2	1	0.1	0	0.1	1	0.1
27518-SS-1	2	1	560	1	10.7	1	1	0	0.1	1	50	0	2	1	0.1	0	0.1	1	0.1
33316-SS-1	1	1	160	1	4.5	1	1	0	0.1	0	50	0	1	1	0.1	0	0.1	0	0.1
25083-SS-1	1	1	140	1	2.1	1	1	0	0.1	0	50	0	3	1	0.1	0	0.1	0	0.1
10336-SS-1	3	1	190	1	3.5	1	1	0	0.1	0	50	0	5	1	0.1	0	0.1	0	0.1
14534-SS-1	13	1	530	1	6.9	1	1	0	0.1	1	50	0	16	1	0.1	0	0.2	1	0.1
17627-SS-1	2	1	310	1	7.9	1	1	0	0.1	1	50	0	2	1	0.1	0	0.1	0	0.1
33127-SS-1	5	1	630	1	15.9	1	1	0	0.1	0	50	0	4	1	0.1	0	0.1	1	0.1
32344-SS-1	7	1	390	1	8.6	1	1	0	0.2	1	50	0	3	1	0.1	0	0.1	1	0.1
11104-SS-1	24	1	1390	1	20.3	1	1	0	0.1	0	50	0	7	1	0.1	0	0.2	1	0.1
17706-SS-1	4	1	340	1	5.7	1	1	0	0.2	1	50	0	2	1	0.1	0	0.1	0	0.1
12897-SS-1	5	1	250	1	3.5	1	1	0	0.1	0	250	1	20	1	0.1	0	0.1	0	0.1
16303-SS-1	2	1	160	1	3.1	1	1	0	0.1	0	50	0	2	1	0.1	0	0.1	1	0.1
15924-SS-1	25	1	1220	1	18.4	1	1	0	0.1	0	50	0	5	1	0.1	0	0.3	1	0.1
17099-SS-1	4	1	380	1	8	1	1	0	0.2	1	50	0	2	1	0.1	0	0.1	1	0.1
5518-SS-1	6	1	720	1	12.9	1	2	1	1.1	1	220	1	7	1	0.1	0	0.2	1	0.1
22897-N-SS-1	6	1	960	1	15.6	1	1	0	0.1	0	50	0	2	1	0.1	0	0.1	1	0.1
19733-SS-1	7	1	320	1	4.6	1	1	0	0.2	1	50	0	6	1	0.1	0	0.2	1	0.1
11852-SS-1	8	1	580	1	15	1	1	0	0.1	0	50	0	2	1	0.1	0	0.2	1	0.1
10555-SS-1	4	1	370	1	3	1	1	0	0.3	1	50	0	21	1	0.1	0	0.1	0	0.1
24543-SS-1	31	1	380	1	5.7	1	2	1	0.1	1	50	0	30	1	0.1	0	0.3	1	0.1
31957-SS-1	8	1	440	1	15.9	1	1	0	0.2	1	50	0	3	1	0.1	0	0.3	1	0.1
15663-SS-1	3	1	530	1	5.3	1	1	0	0.1	0	50	0	2	1	0.1	0	0.1	0	0.1
34090-SS-1	3	1	670	1	10.4	1	1	0	0.1	1	80	1	37	1	0.1	0	0.2	1	0.1
19342-SS-1	4	1	250	1	2.4	1	1	0	0.1	0	50	0	10	1	0.1	0	0.1	0	0.1
30519-SS-1	11	1	670	1	12.4	1	1	0	0.1	0	50	0	6	1	0.1	0	0.2	1	0.1
19058-SS-1	1	1	180	1	2.1	1	1	0	0.1	0	50	0	2	1	0.1	0	0.1	0	0.1
29729-SS-1	5	1	630	1	12.1	1	1	0	0.1	0	50	0	2	1	0.1	0	0.2	1	0.1
21171-SS-1	4	1	320	1	4.2	1	1	0	0.1	0	50	0	7	1	0.1	0	0.1	0	0.1
13046-SS-1	1	1	200	1	3.3	1	1	0	0.1	0	50	0	4	1	0.1	0	0.1	0	0.1
4488-SS-1	9	1	320	1	3.9	1	1	1	0.1	0	230	1	27	1	0.1	0	0.1	0	0.1
20274-SS-1	6	1	390	1	6.6	1	1	0	0.1	0	50	0	3	1	0.1	0	0.1	0	0.1
16882-SS-1	1	1	180	1	2.2	1	1	0	0.1	1	50	0	8	1	0.1	0	0.1	0	0.1
25466-SS-1	3	1	250	1	6.1	1	1	0	0.1	0	50	0	2	1	0.1	0	0.1	0	0.1
06753-SS-1	2	1	170	1	4.9	1	1	0	0.1	0	50	0	3	1	0.1	0	0.1	0	0.1
14953-SS-1	6	1	260	1	2.5	1	1	0	0.1	0	50	0	18	1	0.1	0	0.1	0	0.1
24738-SS-1	4	1	290	1	3.7	1	1	0	0.1	0	50	0	4	1	0.1	0	0.1	0	0.1
5728-SS-1	19	1	1320	1	31	1	1	0	0.2	1	50	0	16	1	0.1	0	0.3	1	0.1
13508-ss-max	16	1	630	1	25.3	1	1	0	0.1	1	50	0	7	1	0.1	0	0.3	1	0.1
12724-ss-max	6	1	420	1	10.8	1	1	0	0.1	1	50	0	3	1	0.1	0	0.2	1	0.1
20953-SS-max	10	1	430	1	9	1	1	0	0.1	0	50	0	12	1	0.1	0	0.1	1	0.1
22897-SS-max	6	1	1060	1	17.9	1	1	0	0.1	0	50	0	3	1	0.1	0	0.2	1	0.1
28890-SS-max	1	0	190	1	3.5	1	1	0	0.1	0	50	0	4	1	0.1	0	0.1	0	0.1
28064-SS-max	1	1	210	1	2.9	1	1	0	0.1	0	50	0	4	1	0.1	0	0.1	0	0.1

Notes: concentrations are presented in mg/kg

d_(metal) indicates whether the metal was detected in the sample at a concentration above the detection limit, where 1 indicates a detected value, and 0 inidcates a concentration below the dection limit

Table A.1 Tabulated Soil Results for ProUCL

Client Sample ID:	d_Tin	Tungsten	d_Tungsten	Uranium	d_Uranium	Vanadium	d_Vanadium	Zinc	d_Zinc
27249-SS-1	0	0.2	1	0.5	1	6	1	37	1
10700-SS-1	0	0.1	0	0.4	1	44	1	17	1
28648-SS-1	0	0.1	0	3.2	1	2	1	10	1
22914-SS-1	0	0.1	1	0.9	1	29	1	100	1
22135-SS-1	0	0.1	0	0.6	1	46	1	21	1
32066-SS-1	0	0.1	0	1.4	1	5	1	5	1
23068-SS-1	0	0.2	1	0.5	1	17	1	8	1
10070-SS-1	0	0.1	0	0.8	1	46	1	26	1
27518-SS-1	0	0.1	0	0.8	1	13	1	9	1
33316-SS-1	0	0.1	0	0.7	1	5	1	4	1
25083-SS-1	0	0.1	0	0.4	1	7	1	11	1
10336-SS-1	0	0.2	1	0.5	1	32	1	14	1
14534-SS-1	0	0.1	1	0.5	1	51	1	95	1
17627-SS-1	0	0.1	0	0.6	1	23	1	10	1
33127-SS-1	0	0.1	0	1.4	1	12	1	27	1
32344-SS-1	0	0.1	0	0.7	1	39	1	21	1
11104-SS-1	0	3.3	1	2.8	1	44	1	88	1
17706-SS-1	0	0.2	1	0.8	1	21	1	16	1
12897-SS-1	0	0.7	1	0.6	1	12	1	29	1
16303-SS-1	0	3.2	1	0.6	1	39	1	9	1
15924-SS-1	0	0.3	1	1	1	65	1	88	1
17099-SS-1	0	0.3	1	0.9	1	27	1	15	1
5518-SS-1	0	0.4	1	2.5	1	35	1	34	1
22897-N-SS-1	0	0.1	1	1.4	1	19	1	24	1
19733-SS-1	0	0.3	1	1	1	48	1	24	1
11852-SS-1	0	0.1	0	1.6	1	25	1	49	1
10555-SS-1	0	0.2	1	0.2	1	10	1	60	1
24543-SS-1	0	0.1	0	1.9	1	59	1	118	1
31957-SS-1	0	0.1	0	1.4	1	37	1	21	1
15663-SS-1	0	0.1	1	0.5	1	30	1	11	1
34090-SS-1	0	0.2	1	2.5	1	7	1	14	1
19342-SS-1	0	0.2	1	0.5	1	23	1	17	1
30519-SS-1	0	0.2	1	1.1	1	24	1	43	1
19058-SS-1	0	0.2	1	0.3	1	17	1	7	1
29729-SS-1	0	0.1	0	1.1	1	52	1	20	1
21171-SS-1	0	0.4	1	0.4	1	31	1	33	1
13046-SS-1	0	0.1	1	0.3	1	20	1	13	1
4488-SS-1	0	0.2	1	2.1	1	33	1	34	1
20274-SS-1	0	0.2	1	0.7	1	21	1	19	1
16882-SS-1	0	0.2	1	0.4	1	27	1	23	1
25466-SS-1	0	0.1	0	0.8	1	9	1	10	1
06753-SS-1	0	0.1	0	0.4	1	45	1	11	1
14953-SS-1	0	0.1	1	0.3	1	64	1	37	1
24738-SS-1	0	0.1	0	0.5	1	13	1	11	1
5728-SS-1	0	0.9	1	3	1	46	1	89	1
13508-ss-max	0	8.4	1	1	1	44	1	57	1
12724-ss-max	0	0.4	1	0.8	1	50	1	25	1
20953-SS-max	0	0.1	0	0.5	1	115	1	41	1
22897-SS-max	0	0.1	1	1.4	1	16	1	28	1
28890-SS-max	0	0.1	0	0.7	1	8	1	10	1
28064-SS-max	0	0.2	1	0.9	1	6	1	8	1

Notes: concentrations are presented in mg/kg

d_(metal) indicates whether the metal was detected in the sample at a concentration above the detection limit, wher

Table A.2 Tabulated Loss on Ignition - Soil

Sample ID:	Loss @ 550°C (%)
13508-SS-0	16.4
Lab Duplicate	16.4
13508-SS-1	14.7
27249-SS-1	91.0
10700-SS-1	24.9
12724-SS-1	19.0
28648-SS-1	87.6
22914-SS-1	13.5
22135-SS-1	36.5
12724-SS-1	10.3
28064-SS-0	16.9
28064-SS-1	4.8
32066-SS-1	8.0
23068-SS-1	16.2
10070-SS-1	7.0
27518-SS-1	36.9
33316-SS-1	5.1
25083-SS-1	21.1
10336-SS-1	15.7
20953-SS-0	17.6
14534-SS-1	44.3
Lab Duplicate	46.6
17627-SS-1	14.8
33127-SS-1	7.1
32344-SS-1	13.0
11104-SS-1	4.9
22897-SS-0	10.8
17706-SS-1	13.1
12897-SS-1	16.6
16303-SS-1	11.3

Sample ID:	Loss @ 550°C (%)
15924-SS-1	26.0
17099-SS-1	11.1
5518-SS-1	31.4
22897-SS-1	7.3
22897-N-SS-1	9.9
19733-SS-1	27.2
11852-SS-1	10.2
10555-SS-1	14.7
24543-SS-1	42.9
31957-SS-1	9.8
15663-SS-1	25.1
28890-SS-0	20.9
Lab Duplicate	17.4
34090-SS-1	39.3
19342-SS-1	58.7
30519-SS-1	26.1
19058-SS-1	13.3
29729-SS-1	8.4
21171-SS-1	22.2
13046-SS-1	9.7
4488-SS-1	21.9
20274-SS-1	23.4
16882-SS-1	49.7
25466-SS-1	11.3
28890-SS-1	20.9
06753-SS-1	8.3
20953-SS-1	13.2
14953-SS-1	72.7
24738-SS-1	6.4
5728-SS-1	17.2

Reporting Limit (RL) = 0.1

Table A.3 Tabulated Grass Sample Results for ProUCL

Sample ID	Aluminum	d_Aluminum	Antimony	d_Antimony	Arsenic	d_Arsenic	Barium	d_Barium	Beryllium	d_Beryllium	Bismuth	d_Bismuth	Boron	d_Boron
5518-GS-1	3.1	1	0.005	0	0.02	0	14.1	1	0.002	0	0.05	0	0.7	1
16303-GS-1	9.1	1	0.005	0	0.02	0	6.39	1	0.002	0	0.05	0	1.3	1
14534-GS-1	2.8	1	0.005	0	0.05	1	9.31	1	0.002	0	0.05	0	0.7	1
14534-GS-2	11.7	1	0.005	0	0.05	1	9.22	1	0.002	0	0.05	0	1.1	1
10070-GS-1	5.3	1	0.025	1	0.06	1	21.1	1	0.002	0	0.05	0	1.7	1
24738-GS-1	22.6	1	0.005	0	0.02	0	10.7	1	0.002	0	0.05	0	1.9	1
17627-GS-1	83.7	1	0.005	0	0.04	1	24.6	1	0.009	1	0.05	0	2.4	1
17706-GS-1	33.4	1	0.005	0	0.03	1	12.8	1	0.003	1	0.05	0	1.5	1

Notes: concentrations are presented in mg/kg

d_(metal) indicates whether the metal was detected in the sample at a concentration above the detection limit, where 1 indicates a detected value, and 0 inidcates a concentration below the dection limit

Table A.3 Tabulated Grass Sample Results for ProUCL

Sample ID	Cadmium	d_Cadmium	Calcium	d_Calcium	Chromium	d_Chromium	Cobalt	d_Cobalt	Copper	d_Copper	Iron	d_Iron	Lead	d_Lead
5518-GS-1	0.006	1	1060	1	0.25	1	0.05	1	1.67	1	22	1	0.052	1
16303-GS-1	0.057	1	664	1	0.09	1	0.01	1	3.77	1	20	1	0.063	1
14534-GS-1	0.005	1	1100	1	0.39	1	0.17	1	1.43	1	16	1	0.076	1
14534-GS-2	0.024	1	1520	1	0.29	1	0.21	1	2.09	1	34	1	0.102	1
10070-GS-1	0.005	1	987	1	0.18	1	0.01	0	1.77	1	34	1	0.125	1
24738-GS-1	0.112	1	877	1	0.17	1	0.01	1	2.56	1	27	1	0.111	1
17627-GS-1	0.113	1	2040	1	0.29	1	0.1	1	3.94	1	77	1	0.728	1
17706-GS-1	0.06	1	1070	1	0.31	1	0.03	1	3.78	1	58	1	0.427	1

Notes: concentrations are presented in mg/kg

d_(metal) indicates whether the metal was detected in the sample at a concentration above the detection limit, where 1 indicates a detected value, and 0 inidcates a concentration below the dection limit

Table A.3 Tabulated Grass Sample Results for ProUCL

Sample ID	Lithium	d_Lithium	Magnesium	d_Magnesium	Manganese	d_Manganese	Mercury	d_Mercury	Molybdenum	d_Molybdenum	Nickel	d_Nickel	Potassium
5518-GS-1	0.01	0	485	1	108	1	0.02	1	0.11	1	0.14	1	4830
16303-GS-1	0.01	0	425	1	187	1	0.03	1	1.06	1	0.97	1	4760
14534-GS-1	0.01	1	425	1	211	1	0.02	1	0.27	1	0.19	1	3040
14534-GS-2	0.02	1	415	1	262	1	0.02	1	0.38	1	0.29	1	5690
10070-GS-1	0.01	0	228	1	133	1	0.01	1	0.39	1	0.13	1	2110
24738-GS-1	0.01	1	378	1	384	1	0.03	1	0.04	1	0.37	1	4440
17627-GS-1	0.04	1	500	1	1210	1	0.03	1	0.24	1	0.79	1	3430
17706-GS-1	0.03	1	638	1	339	1	0.02	1	0.46	1	0.32	1	4870

Notes: concentrations are presented in mg/kg

d_(metal) indicates whether the metal was detected in the sample at a concentration above the detection limit, where 1 indicates a detected value, and 0 inidcates a concentration below the dection limit

Table A.3 Tabulated Grass Sample Results for ProUCL

Sample ID	d_Potassium	Rubidium	d_Rubidium	Selenium	d_Selenium	Silver	d_Silver	Sodium	d_Sodium	Strontium	d_Strontium	Tellurium	d_Tellurium	Thallium
5518-GS-1	1	19.2	1	0.16	1	0.002	0	4	1	6.39	1	0.005	0	0.002
16303-GS-1	1	48	1	0.05	0	0.005	1	4	1	2.79	1	0.005	0	0.008
14534-GS-1	1	15.3	1	0.05	0	0.002	0	6	1	6.45	1	0.005	0	0.002
14534-GS-2	1	22	1	0.06	1	0.002	0	6	1	8.09	1	0.005	0	0.002
10070-GS-1	1	4.73	1	0.05	1	0.002	0	5	1	10.3	1	0.005	0	0.002
24738-GS-1	1	13.1	1	0.05	0	0.008	1	5	1	3.1	1	0.005	0	0.002
17627-GS-1	1	27.9	1	0.05	0	0.138	1	7	1	8.3	1	0.005	0	0.012
17706-GS-1	1	35.4	1	0.07	1	0.032	1	4	1	4.13	1	0.005	0	0.005

Notes: concentrations are presented in mg/kg

d_(metal) indicates whether the metal was detected in the sample at a concentration above the detection limit, where 1 indicates a detected value, and 0 inidcates a concentration below the dection limit

Table A.3 Tabulated Grass Sample Results for ProUCL

Sample ID	d_Thallium	Tin	d_Tin	Tungsten	d_Tungsten	Uranium	d_Uranium	Vanadium	d_Vanadium	Zinc	d_Zinc
5518-GS-1	0	0.01	0	0.005	0	0.002	0	0.01	0	8.38	1
16303-GS-1	1	0.01	1	0.055	1	0.002	0	0.01	1	16	1
14534-GS-1	0	0.01	0	0.005	0	0.002	0	0.01	0	7.93	1
14534-GS-2	1	0.01	0	0.005	0	0.002	0	0.03	1	9.51	1
10070-GS-1	0	0.02	1	0.016	1	0.002	0	0.01	1	30.8	1
24738-GS-1	0	0.02	1	0.005	0	0.002	0	0.04	1	14.1	1
17627-GS-1	1	0.02	1	0.005	0	0.004	1	0.18	1	26.9	1
17706-GS-1	1	0.05	1	0.018	1	0.002	0	0.06	1	14.2	1

Notes: concentrations are presented in mg/kg

d_(metal) indicates whether the metal was detected in the sample at a concentration above the detection limit, where 1 indicates a detected value, and 0 inidcates a concentration below the dection limit

Table A.4 Tabulated Poplar Tip Results for ProUCL

Client Sample ID:	Aluminum	d_Aluminum	Antimony	d_Antimony	Arsenic	d_Arsenic	Barium	d_Barium	Beryllium	d_Beryllium	Bismuth	d_Bismuth	Boron	d_Boron	Cadmium	d_Cadmium
5518-PP-1	5	1	0.005	0	0.02	0	34.9	1	0.002	0	0.05	0	7.7	1	0.681	1
16303-PP-1	27.9	1	0.005	0	0.06	1	11.5	1	0.002	0	0.05	0	13.5	1	0.237	1
15924-PP-1	9.3	1	0.005	1	0.02	0	49.8	1	0.002	1	0.05	0	7.1	1	0.752	1
10070-PP-1	25	1	0.005	0	0.02	1	10.1	1	0.019	1	0.05	0	6.9	1	0.131	1
17627-PP-1	10.2	1	0.005	0	0.02	0	24.5	1	0.002	0	0.05	0	13.5	1	0.548	1
17706-PP-1	4.9	1	0.005	0	0.02	0	24.9	1	0.002	0	0.05	0	10.9	1	0.393	1
17099-PP-1	36.9	1	0.005	0	0.03	1	39.3	1	0.04	1	0.05	0	9.2	1	0.874	1
24738-PP-max	10.3	1	0.005	1	0.02	0	24.1	1	0.002	0	0.05	0	7.2	1	0.358	1

Notes: concentrations are presented in mg/kg
d_(metal) indicates whether the metal was detected in the sample at a concentration above the detection limit, where 1 indicates a detected value, and 0 inidcates a concentration below the dection limit

Table A.4 Tabulated Poplar Tip Results for ProUCL

Client Sample ID:	Calcium	d_Calcium	Chromium	d_Chromium	Cobalt	d_Cobalt	Copper	d_Copper	Iron	d_Iron	Lead	d_Lead	Lithium	d_Lithium	Magnesium	d_Magnesium
5518-PP-1	2150	1	0.05	0	0.09	1	2.63	1	14	1	0.133	1	0.01	0	452	1
16303-PP-1	2170	1	0.09	1	0.04	1	4.67	1	42	1	0.337	1	0.03	1	584	1
15924-PP-1	2440	1	0.07	1	0.11	1	3.19	1	17	1	0.261	1	0.01	1	846	1
10070-PP-1	2420	1	0.05	1	1.34	1	1.79	1	58	1	0.008	1	0.01	0	677	1
17627-PP-1	2350	1	0.07	1	0.17	1	2.38	1	22	1	0.153	1	0.01	1	541	1
17706-PP-1	1570	1	0.05	0	0.32	1	2.22	1	17	1	0.056	1	0.01	0	617	1
17099-PP-1	4860	1	0.05	0	3.14	1	4.45	1	70	1	0.088	1	0.01	0	961	1
24738-PP-max	2330	1	0.12	1	0.02	1	2.77	1	23	1	0.134	1	0.01	0	410	1

Notes: concentrations are presented in mg/kg
d_(metal) indicates whether the metal was detected in the sample at a concentration above the detection limit, where 1 indicates a detected value, and 0 inidcates a concentration below the dection limit

Table A.4 Tabulated Poplar Tip Results for ProUCL

Client Sample ID:	Manganese	d_Manganese	Mercury	d_Mercury	Molybdenum	d_Molybdenum	Nickel	d_Nickel	Potassium	d_Potassium	Rubidium	d_Rubidium	Selenium	d_Selenium	Silver	d_Silver
5518-PP-1	515	1	0.02	1	0.01	0	0.57	1	2230	1	13.3	1	0.05	0	0.002	0
16303-PP-1	1080	1	0.03	1	0.11	1	0.58	1	3640	1	33.5	1	0.05	0	0.002	1
15924-PP-1	178	1	0.03	1	0.01	0	0.76	1	2580	1	10.6	1	0.05	0	0.002	0
10070-PP-1	148	1	0.01	1	0.01	1	0.79	1	2380	1	5.33	1	0.1	1	0.002	0
17627-PP-1	893	1	0.01	1	0.01	0	0.58	1	1990	1	16	1	0.05	0	0.002	1
17706-PP-1	995	1	0.01	0	0.02	1	0.82	1	2320	1	26.7	1	0.05	0	0.002	0
17099-PP-1	473	1	0.01	1	0.02	1	2.98	1	3960	1	26.1	1	0.05	0	0.008	1
24738-PP-max	1210	1	0.02	1	0.01	0	0.5	1	2660	1	13.1	1	0.05	0	0.002	0

Notes: concentrations are presented in mg/kg
d_(metal) indicates whether the metal was detected in the sample at a concentration above the detection limit, where 1 indicates a detected value, and 0 inidcates a concentration below the dection limit

Table A.4 Tabulated Poplar Tip Results for ProUCL

Client Sample ID:	Sodium	d_Sodium	Strontium	d_Strontium	Tellurium	d_Tellurium	Thallium	d_Thallium	Tin	d_Tin	Tungsten	d_Tungsten	Uranium	d_Uranium	Vanadium	d_Vanadium
5518-PP-1	10	1	11.1	1	0.005	0	0.003	1	0.01	0	0.005	0	0.002	0	0.02	1
16303-PP-1	16	1	5.9	1	0.005	0	0.01	1	0.04	1	0.148	1	0.002	1	0.07	1
15924-PP-1	12	1	12.5	1	0.005	0	0.005	1	0.04	1	0.005	0	0.002	0	0.02	1
10070-PP-1	4	1	9.74	1	0.005	0	0.002	0	0.01	0	0.005	0	0.002	0	0.01	0
17627-PP-1	8	1	8.62	1	0.005	0	0.005	1	0.01	0	0.005	0	0.002	0	0.02	1
17706-PP-1	4	1	5.88	1	0.005	0	0.002	0	0.01	0	0.005	0	0.002	0	0.01	1
17099-PP-1	6	1	35.1	1	0.005	0	0.002	0	0.01	0	0.005	0	0.002	0	0.01	0
24738-PP-max	5	1	6.2	1	0.005	0	0.003	1	0.05	1	0.005	0	0.002	0	0.02	1

Notes: concentrations are presented in mg/kg
d_(metal) indicates whether the metal was detected in the sample at a concentration above the detection limit, where 1 indicates a detected value, and 0 inidcates a concentration below the dection limit

Table A.4 Tabulated Poplar Tip Results for ProUCL

Client Sample ID:	Zinc	d_Zinc
5518-PP-1	157	1
16303-PP-1	68.9	1
15924-PP-1	101	1
10070-PP-1	76.8	1
17627-PP-1	97	1
17706-PP-1	89.8	1
17099-PP-1	278	1
24738-PP-max	40.1	1

Notes: concentrations are presented in mg/kg
d_(metal) indicates whether the metal was detected in the sample at a concentration above the detection limit, where 1 indicates a detected value, and 0 inidcates a concentration below the dection limit

Table A.5 Tabulated Small Mammal Results for ProUCL

Sample ID:	Aluminum	d_Aluminum	Antimony	d_Antimony	Arsenic	d_Arsenic	Barium	d_Barium	Beryllium	d_Beryllium	Bismuth	d_Bismuth	Boron	d_Boron	Cadmium	d_Cadmium	Calcium	d_Calcium	Chromium	d_Chromium
5518-MM-1	26	1	0.005	0	0.03	1	3.1	1	0.002	0	0.05	0	0.3	1	0.024	1	9850	1	1.14	1
5518-MM-8	10.3	1	0.005	0	0.15	1	0.67	1	0.002	0	0.05	0	0.1	1	0.209	1	7120	1	0.13	1
16303-MM-1	2	1	0.022	1	0.03	1	1.65	1	0.002	0	0.16	1	1.3	1	0.102	1	6070	1	0.06	1
16303-MM-2	1.3	1	0.006	1	0.02	1	1.38	1	0.002	0	0.05	0	0.6	1	0.029	1	11800	1	0.05	0
16303-MM-3	5.4	1	0.005	0	0.04	1	1.07	1	0.002	0	0.05	0	0.2	1	0.404	1	7660	1	0.07	1
16303-MM-4	19.3	1	0.005	0	0.03	1	2.95	1	0.002	0	0.05	0	0.2	1	0.023	1	13300	1	0.08	1
16303-MM-8	4.8	1	0.005	0	0.03	1	1.6	1	0.002	0	0.05	0	0.1	1	0.052	1	10200	1	0.06	1
16303-MM-9	4.7	1	0.005	0	0.03	1	1.57	1	0.002	0	0.05	0	0.1	0	0.192	1	7580	1	0.35	1
16303-MM-10	3.3	1	0.005	0	0.03	1	2.31	1	0.002	0	0.05	0	0.1	0	0.146	1	11000	1	0.12	1
16303-MM-11	3.8	1	0.005	0	0.04	1	1.53	1	0.002	0	0.05	0	0.1	1	0.183	1	8440	1	0.07	1
25083-MM-1	2.9	1	0.005	0	0.03	1	11.2	1	0.002	0	0.05	0	0.2	1	0.123	1	10700	1	0.11	1
25083-MM-3	2.7	1	0.005	0	0.03	1	7.85	1	0.002	0	0.05	0	0.1	1	0.101	1	6530	1	0.05	0
15924-MM-5	9.3	1	0.005	0	0.02	1	2.36	1	0.002	0	0.05	0	1.1	1	0.038	1	9110	1	0.09	1
15924-MM-6	3.8	1	0.005	0	0.02	1	9.41	1	0.002	0	0.05	0	1.7	1	0.143	1	8810	1	0.11	1
15924-MM-8	3.5	1	0.005	0	0.02	1	2.02	1	0.002	0	0.05	0	0.5	1	0.041	1	6400	1	0.05	1
14534-MM-2	13.8	1	0.005	0	0.02	0	3.27	1	0.002	0	0.05	0	0.9	1	0.01	1	10100	1	0.08	1
14534-MM-4	2.5	1	0.007	1	0.08	1	1.62	1	0.002	0	0.05	0	0.1	1	0.342	1	10100	1	0.09	1
14534-MM-12	6.3	1	0.005	0	0.02	1	1.93	1	0.002	0	0.05	0	0.3	1	0.022	1	9130	1	0.07	1
14534-MM-14	7.7	1	0.005	0	0.08	1	1.68	1	0.002	0	0.05	0	0.2	1	0.648	1	13500	1	0.09	1
10070-MM-1	2.8	1	0.005	0	0.1	1	1.46	1	0.002	0	0.05	0	0.1	1	0.059	1	5570	1	0.06	1
24738-MM-3	1.3	1	0.005	0	0.07	1	1.8	1	0.002	0	0.05	0	0.4	1	0.107	1	10700	1	0.14	1
24738-MM-4	2.9	1	0.005	0	0.02	0	2.58	1	0.002	0	0.05	0	0.9	1	0.006	1	5540	1	0.52	1
24738-MM-5	1	1	0.005	0	0.02	0	2.66	1	0.002	0	0.05	0	0.6	1	0.035	1	9300	1	0.07	1
24738-MM-7	2.4	1	0.005	0	0.02	0	5.43	1	0.002	0	0.05	0	0.6	1	0.032	1	8350	1	0.1	1
24738-MM-8	7.1	1	0.005	0	0.04	1	4.26	1	0.002	0	0.05	0	0.1	1	0.108	1	10700	1	0.14	1
24738-MM-9	2.6	1	0.005	0	0.07	1	2.4	1	0.002	0	0.05	0	0.1	1	0.152	1	7400	1	0.15	1
17627-MM-1	2.9	1	0.005	0	0.02	0	4.17	1	0.002	0	0.05	0	0.2	1	0.085	1	8740	1	0.07	1
17706-MM-2	13.3	1	0.005	0	0.02	0	2.55	1	0.002	0	0.05	0	0.2	1	0.015	1	9880	1	0.05	0
17099-MM-2	17.7	1	0.005	0	0.02	1	4.74	1	0.002	0	0.05	0	0.3	1	0.052	1	16100	1	0.05	0
17099-MM-4	4.3	1	0.005	0	0.05	1	2.22	1	0.002	0	0.05	0	0.3	1	0.187	1	11200	1	0.05	1

Notes: concentrations are presented in mg/kg
d_(metal) indicates whether the metal was detected in the sample at a concentration above the detection limit, where 1 indicates a detected value, and 0 inidcates a concentration below the dection limit

Table A.5 Tabulated Small Mammal Results for ProUCL

Sample ID:	Cobalt	d_Cobalt	Copper	d_Copper	Iron	d_Iron	Lead	d_Lead	Lithium	d_Lithium	Magnesium	_Magnesiur	Manganese	_Manganes	Mercury	d_Mercury	Molybdenun	Molybdenu	Nickel	d_Nickel
5518-MM-1	0.02	1	3.78	1	140	1	0.161	1	0.03	1	374	1	8.23	1	0.01	0	0.1	1	0.12	1
5518-MM-8	0.04	1	3.29	1	97	1	0.17	1	0.01	1	312	1	12.7	1	0.04	1	0.18	1	0.06	1
16303-MM-1	0.02	1	5.2	1	81	1	0.156	1	0.01	0	308	1	24.5	1	0.01	0	0.14	1	0.05	1
16303-MM-2	0.01	1	4.81	1	118	1	0.095	1	0.01	0	330	1	10.5	1	0.02	1	0.12	1	0.09	1
16303-MM-3	0.02	1	3.64	1	101	1	0.161	1	0.01	0	341	1	8.55	1	0.01	1	0.16	1	0.09	1
16303-MM-4	0.01	1	3.45	1	115	1	0.08	1	0.01	1	451	1	15.3	1	0.01	0	0.12	1	0.1	1
16303-MM-8	0.01	1	3.95	1	84	1	0.161	1	0.01	0	356	1	13.2	1	0.02	1	0.14	1	0.06	1
16303-MM-9	0.03	1	3.9	1	90	1	0.217	1	0.01	0	377	1	9.77	1	0.01	0	0.21	1	0.12	1
16303-MM-10	0.02	1	3.63	1	100	1	0.308	1	0.01	0	396	1	38.6	1	0.01	1	0.16	1	0.08	1
16303-MM-11	0.02	1	4.68	1	89	1	0.091	1	0.01	0	381	1	7.66	1	0.02	1	0.17	1	0.06	1
25083-MM-1	0.01	1	3.34	1	80	1	0.166	1	0.01	0	402	1	4.21	1	0.04	1	0.15	1	0.1	1
25083-MM-3	0.01	0	2.32	1	112	1	0.129	1	0.01	0	313	1	5.41	1	0.03	1	0.1	1	0.06	1
15924-MM-5	0.01	1	3.26	1	75	1	0.205	1	0.01	0	360	1	4.29	1	0.01	0	0.11	1	0.09	1
15924-MM-6	0.02	1	4.39	1	69	1	0.138	1	0.01	0	574	1	43.7	1	0.01	0	0.08	1	0.58	1
15924-MM-8	0.02	1	3.76	1	73	1	0.061	1	0.01	0	345	1	10	1	0.01	0	0.06	1	0.15	1
14534-MM-2	0.01	1	3.09	1	75	1	0.056	1	0.01	0	447	1	20.1	1	0.01	0	0.04	1	0.25	1
14534-MM-4	0.03	1	2.77	1	138	1	0.295	1	0.01	0	364	1	2.97	1	0.02	1	0.15	1	0.07	1
14534-MM-12	0.03	1	3.91	1	80	1	0.212	1	0.01	0	375	1	4.35	1	0.01	0	0.12	1	0.16	1
14534-MM-14	0.1	1	2.91	1	191	1	0.427	1	0.01	1	397	1	24.7	1	0.02	1	0.18	1	0.08	1
10070-MM-1	0.01	1	3.92	1	83	1	0.045	1	0.01	0	333	1	191	1	0.01	1	0.15	1	0.05	0
24738-MM-3	0.02	1	3.91	1	109	1	0.076	1	0.01	0	421	1	11.1	1	0.02	1	0.12	1	0.12	1
24738-MM-4	0.01	0	4.08	1	92	1	0.052	1	0.01	0	336	1	27.4	1	0.01	0	0.06	1	0.28	1
24738-MM-5	0.01	0	2.32	1	63	1	0.024	1	0.01	0	389	1	15.9	1	0.01	0	0.13	1	0.21	1
24738-MM-7	0.01	0	3.79	1	92	1	0.05	1	0.01	0	412	1	13.3	1	0.01	0	0.12	1	0.23	1
24738-MM-8	0.03	1	3.5	1	109	1	0.07	1	0.01	0	403	1	108	1	0.02	1	0.17	1	0.06	1
24738-MM-9	0.02	1	3.27	1	93	1	0.135	1	0.01	0	368	1	21.5	1	0.02	1	0.15	1	0.06	1
17627-MM-1	0.04	1	3.22	1	76	1	0.214	1	0.01	1	361	1	34.8	1	0.01	1	0.16	1	0.11	1
17706-MM-2	0.01	1	3.34	1	90	1	0.076	1	0.01	1	392	1	4.08	1	0.01	0	0.11	1	0.1	1
17099-MM-2	0.02	1	3.82	1	87	1	0.174	1	0.02	1	525	1	12.1	1	0.01	0	0.1	1	0.14	1
17099-MM-4	0.02	1	3.32	1	119	1	0.248	1	0.01	0	386	1	8.82	1	0.03	1	0.24	1	0.09	1

Notes: concentrations are presented in mg/kg
d_(metal) indicates whether the metal was detected in the sample at a concentration above the detection limit, where 1 indicates a detected value, and 0 inidcates a concentration below the dection limit

Table A.5 Tabulated Small Mammal Results for ProUCL

Sample ID:	Potassium	d_Potassium	Rubidium	d_Rubidium	Selenium	d_Selenium	Silver	d_Silver	Sodium	d_Sodium	Strontium	d_Strontium	Tellurium	d_Tellurium	Thallium	d_Thallium	Tin	d_Tin	Tungsten	d_Tungsten
5518-MM-1	3190	1	54.8	1	0.13	1	0.005	1	1100	1	6.71	1	0.005	0	0.097	1	0.01	0	0.005	0
5518-MM-8	3020	1	29.5	1	0.71	1	0.003	1	1260	1	2.18	1	0.005	0	0.013	1	0.01	0	0.005	0
16303-MM-1	2860	1	21.1	1	0.49	1	0.032	1	1140	1	2.4	1	0.005	0	0.032	1	0.02	1	0.008	1
16303-MM-2	2910	1	14.4	1	0.42	1	0.006	1	1220	1	2.62	1	0.005	0	0.024	1	0.01	0	0.005	1
16303-MM-3	3220	1	27.4	1	0.62	1	0.016	1	1310	1	2.69	1	0.005	0	0.031	1	0.01	0	0.007	1
16303-MM-4	3090	1	53.5	1	0.12	1	0.005	1	1170	1	8.8	1	0.005	0	0.012	1	0.01	0	0.023	1
16303-MM-8	3240	1	20.7	1	0.56	1	0.023	1	1360	1	2.62	1	0.005	0	0.033	1	0.06	1	0.007	1
16303-MM-9	3290	1	36.7	1	0.61	1	0.015	1	1190	1	2.32	1	0.005	0	0.023	1	0.05	1	0.029	1
16303-MM-10	3260	1	28.5	1	0.62	1	0.006	1	1300	1	4.55	1	0.005	0	0.017	1	0.01	0	0.012	1
16303-MM-11	3230	1	27.1	1	0.56	1	0.033	1	1360	1	3.51	1	0.005	0	0.022	1	0.01	0	0.017	1
25083-MM-1	3640	1	70.7	1	0.33	1	0.228	1	1130	1	3.94	1	0.005	0	0.025	1	0.13	1	0.005	0
25083-MM-3	3190	1	74.6	1	0.34	1	0.055	1	1180	1	1.47	1	0.005	0	0.019	1	0.01	0	0.005	0
15924-MM-5	2630	1	22.1	1	0.08	1	0.004	1	1320	1	5.66	1	0.005	0	0.002	1	0.01	0	0.005	0
15924-MM-6	3140	1	49.2	1	0.08	1	0.003	1	1140	1	7.08	1	0.005	0	0.002	0	0.01	0	0.005	0
15924-MM-8	2930	1	54.8	1	0.11	1	0.004	1	978	1	4.06	1	0.005	0	0.003	1	0.01	0	0.005	0
14534-MM-2	3160	1	20.1	1	0.05	1	0.004	1	1000	1	7.72	1	0.005	0	0.002	0	0.01	0	0.005	0
14534-MM-4	2900	1	21.9	1	0.61	1	0.003	1	1420	1	3.23	1	0.005	0	0.012	1	0.01	0	0.005	0
14534-MM-12	3170	1	23.2	1	0.11	1	0.002	0	1020	1	7.76	1	0.005	0	0.002	0	0.01	0	0.005	0
14534-MM-14	3000	1	35.4	1	0.64	1	0.02	1	1380	1	4.42	1	0.005	0	0.012	1	0.01	0	0.005	0
10070-MM-1	3030	1	59.3	1	0.44	1	0.068	1	1220	1	2.05	1	0.005	0	0.033	1	0.01	0	0.005	0
24738-MM-3	3070	1	12.3	1	0.56	1	0.009	1	1260	1	3.97	1	0.005	0	0.006	1	0.01	0	0.005	1
24738-MM-4	2760	1	35	1	0.06	1	0.002	0	851	1	2.54	1	0.005	0	0.021	1	0.01	0	0.005	0
24738-MM-5	2700	1	33.3	1	0.12	1	0.002	0	1050	1	1.87	1	0.005	0	0.003	1	0.01	0	0.005	0
24738-MM-7	3680	1	28.2	1	0.06	1	0.002	0	1250	1	5.7	1	0.005	0	0.002	0	0.01	0	0.005	0
24738-MM-8	3230	1	15.7	1	0.53	1	0.008	1	1360	1	3.3	1	0.005	0	0.007	1	0.01	0	0.005	0
24738-MM-9	3260	1	20.4	1	0.49	1	0.006	1	1360	1	2.87	1	0.005	0	0.011	1	0.01	0	0.005	1
17627-MM-1	3530	1	110	1	0.26	1	0.189	1	1160	1	3.69	1	0.005	0	0.021	1	0.01	0	0.005	0
17706-MM-2	3200	1	68.9	1	0.08	1	0.004	1	1190	1	9.92	1	0.005	0	0.006	1	0.01	0	0.015	1
17099-MM-2	3200	1	95.7	1	0.07	1	0.02	1	1240	1	12.7	1	0.005	0	0.007	1	0.01	0	0.005	1
17099-MM-4	3020	1	131	1	0.41	1	0.029	1	1450	1	3.8	1	0.005	0	0.017	1	0.01	0	0.005	0

Notes: concentrations are presented in mg/kg
d_(metal) indicates whether the metal was detected in the sample at a concentration above the detection limit, where 1 indicates a detected value, and 0 inidcates a concentration below the dection limit

Table A.5 Tabulated Small Mammal Results for ProUCL

Sample ID:	Uranium	d_Uranium	Vanadium	d_Vanadium	Zinc	d_Zinc
5518-MM-1	0.002	0	0.05	1	33.7	1
5518-MM-8	0.002	0	0.03	1	32.4	1
16303-MM-1	0.002	0	0.01	0	27.4	1
16303-MM-2	0.002	0	0.01	0	28.5	1
16303-MM-3	0.002	0	0.01	1	30.2	1
16303-MM-4	0.002	0	0.04	1	33.7	1
16303-MM-8	0.002	0	0.01	1	31.5	1
16303-MM-9	0.002	0	0.01	1	34.3	1
16303-MM-10	0.002	0	0.01	0	33.9	1
16303-MM-11	0.002	0	0.01	1	33.6	1
25083-MM-1	0.002	0	0.01	0	29.6	1
25083-MM-3	0.002	0	0.01	0	26.5	1
15924-MM-5	0.002	0	0.03	1	26.1	1
15924-MM-6	0.002	0	0.01	0	32.4	1
15924-MM-8	0.002	0	0.01	1	28.5	1
14534-MM-2	0.002	0	0.08	1	27.2	1
14534-MM-4	0.002	0	0.01	1	26.1	1
14534-MM-12	0.002	0	0.03	1	32.4	1
14534-MM-14	0.002	0	0.04	1	41.2	1
10070-MM-1	0.002	0	0.01	1	21.9	1
24738-MM-3	0.002	0	0.01	0	32.2	1
24738-MM-4	0.002	0	0.01	1	19.9	1
24738-MM-5	0.002	0	0.01	0	23.8	1
24738-MM-7	0.002	0	0.01	0	30.2	1
24738-MM-8	0.002	0	0.01	1	33	1
24738-MM-9	0.002	0	0.01	0	30.5	1
17627-MM-1	0.002	0	0.01	0	29.1	1
17706-MM-2	0.002	0	0.03	1	29	1
17099-MM-2	0.002	0	0.04	1	38	1
17099-MM-4	0.002	0	0.01	1	26.3	1

Notes: concentrations are presented in mg/kg
d_(metal) indicates whether the metal was detected in the sample at a concentration above the detection limit, where 1 indicates a detected value, and 0 inidcates a concentration below the dection limit

Table A.6 Tabulated Slug Sample Results for ProUCL

Sample ID:	Aluminum	d_Aluminum	Antimony	d_Antimony	Arsenic	d_Arsenic	Barium	d_Barium	Beryllium	d_Beryllium	Bismuth	d_Bismuth	Boron	d_Boron	Cadmium	d_Cadmium	Calcium	d_Calcium	Chromium	d_Chromium
5518-SG-1	2.7	1	0.005	0	0.16	1	35.5	1	0.002	0	0.05	0	4.8	1	4.3	1	4450	1	0.05	0
16303-SG-2	2	1	0.005	0	0.23	1	64.6	1	0.002	0	0.05	0	1.6	1	3.3	1	3570	1	0.05	0
15924-SG-1	9.6	1	0.005	0	0.7	1	32.2	1	0.002	0	0.05	0	1.8	1	6.53	1	2180	1	0.05	0
14534-SG-01	7.7	1	0.005	0	0.09	1	48.4	1	0.002	0	0.05	0	3.4	1	3.63	1	3300	1	0.05	0
24738-SG-1	2.6	1	0.005	0	0.04	1	36.2	1	0.002	0	0.05	0	2.7	1	2.25	1	6340	1	0.05	0
17627-SG-1	5.9	1	0.005	0	0.04	1	30.9	1	0.002	0	0.05	0	1.6	1	1.16	1	6010	1	0.08	1
17099-SG-1	2.5	1	0.005	0	0.02	0	15	1	0.002	0	0.05	0	1	1	2	1	4200	1	0.05	0

Notes: concentrations are presented in mg/kg

d_(metal) indicates whether the metal was detected in the sample at a concentration above the detection limit, where 1 indicates a detected value, and 0 inidcates a concentration below the dection limit

Table A.6 Tabulated Slug Sample Results for ProUCL

Sample ID:	Cobalt	d_Cobalt	Copper	d_Copper	Iron	d_Iron	Lead	d_Lead	Lithium	d_Lithium	Magnesium	_Magnesiur	Manganese	_Manganes	Mercury	d_Mercury	Molybdenun	_Molybdenu	Nickel	d_Nickel
5518-SG-1	0.19	1	12.6	1	26	1	0.107	1	0.01	0	572	1	2370	1	0.01	1	0.18	1	0.11	1
16303-SG-2	0.02	1	16.9	1	24	1	0.098	1	0.01	1	413	1	4100	1	0.04	1	0.13	1	0.05	0
15924-SG-1	0.07	1	10.9	1	30	1	0.156	1	0.01	0	423	1	1050	1	0.05	1	0.1	1	0.18	1
14534-SG-01	0.05	1	11.4	1	36	1	0.207	1	0.01	0	496	1	1640	1	0.04	1	0.12	1	0.12	1
24738-SG-1	0.01	1	10.1	1	29	1	0.085	1	0.01	0	747	1	3840	1	0.01	1	0.07	1	0.06	1
17627-SG-1	0.02	1	11.7	1	28	1	0.109	1	0.01	0	638	1	2340	1	0.03	1	0.14	1	0.09	1
17099-SG-1	0.06	1	9	1	28	1	0.095	1	0.01	1	455	1	2280	1	0.02	1	0.04	1	0.07	1

Notes: concentrations are presented in mg/kg

d_(metal) indicates whether the metal was detected in the sample at a concentration above the detection limit, where 1 indicates a detected value, and 0 inidcates a concentration below the dection limit

Table A.6 Tabulated Slug Sample Results for ProUCL

Sample ID:	Potassium	d_Potassium	Rubidium	d_Rubidium	Selenium	d_Selenium	Silver	d_Silver	Sodium	d_Sodium	Strontium	d_Strontium	Tellurium	d_Tellurium	Thallium	d_Thallium	Tin	d_Tin	Tungsten	d_Tungsten
5518-SG-1	1170	1	10	1	0.11	1	0.29	1	529	1	17.6	1	0.005	0	0.066	1	0.01	0	0.005	0
16303-SG-2	1050	1	13.6	1	0.48	1	9.74	1	387	1	8.79	1	0.005	0	0.06	1	0.01	0	0.007	1
15924-SG-1	1080	1	9.75	1	0.2	1	1.7	1	420	1	7.42	1	0.005	0	0.015	1	0.01	0	0.005	0
14534-SG-01	1070	1	13	1	0.17	1	1.15	1	521	1	10.7	1	0.005	0	0.011	1	0.01	0	0.005	0
24738-SG-1	1290	1	8.69	1	0.06	1	0.58	1	426	1	11.6	1	0.005	0	0.004	1	0.01	0	0.005	0
17627-SG-1	1010	1	16.6	1	0.15	1	4.81	1	423	1	12.2	1	0.005	0	0.028	1	0.01	0	0.005	0
17099-SG-1	984	1	13.9	1	0.1	1	0.96	1	473	1	10.7	1	0.005	0	0.008	1	0.01	0	0.005	0

Notes: concentrations are presented in mg/kg

d_(metal) indicates whether the metal was detected in the sample at a concentration above the detection limit, where 1 indicates a detected value, and 0 inidcates a concentration below the dection limit

Table A.6 Tabulated Slug Sample Results for ProUCL

Sample ID:	Uranium	d_Uranium	Vanadium	d_Vanadium	Zinc	d_Zinc
5518-SG-1	0.002	0	0.01	0	218	1
16303-SG-2	0.002	0	0.01	0	72.2	1
15924-SG-1	0.002	0	0.01	1	67.3	1
14534-SG-01	0.002	0	0.02	1	69.1	1
24738-SG-1	0.002	0	0.01	0	75	1
17627-SG-1	0.002	0	0.01	0	45.5	1
17099-SG-1	0.002	0	0.01	0	46.9	1

Notes: concentrations are presented in mg/kg

d_(metal) indicates whether the metal was detected in the sample at a concentration above the detection limit, where 1 indicates a detected value, and 0 inidcates a concentration below the dection limit

Table A.7 Tabulated Earth Worm Sample Results for ProUCL

Sample ID:	Aluminum	d_Aluminum	Antimony	d_Antimony	Arsenic	d_Arsenic	Barium	d_Barium	Beryllium	d_Beryllium	Bismuth	d_Bismuth	Boron	d_Boron	Cadmium	d_Cadmium	Calcium
15924-EW-1	781	1	0.022	1	2.53	1	4.69	1	0.021	1	0.05	0	0.2	1	7.2	1	475
14534-EW-1	91.9	1	0.044	1	1.17	1	3.78	1	0.006	1	0.11	1	0.1	0	13.7	1	407

Notes: concentrations are presented in mg/kg

d_(metal) indicates whether the metal was detected in the sample at a concentration above the detection limit, where 1 indicates a detected value, and 0 inidcates a concentration below the dection limit

Table A.7 Tabulated Earth Worm Sample Results for ProUCL

Sample ID:	d_Calcium	Chromium	d_Chromium	Cobalt	d_Cobalt	Copper	d_Copper	Iron	d_Iron	Lead	d_Lead	Lithium	d_Lithium	Magnesium	d_Magnesium	Manganese	d_Manganese
15924-EW-1	1	1.31	1	1.23	1	2.25	1	931	1	15.7	1	0.77	1	344	1	31.5	1
14534-EW-1	1	0.24	1	1.67	1	1.14	1	195	1	8.56	1	0.15	1	146	1	149	1

Notes: concentrations are presented in mg/kg

d_(metal) indicates whether the metal was detected in the sample at a concentration above the detection limit, where 1 indicates a detected value, and 0 inidcates a concentration below the dection limit

Table A.7 Tabulated Earth Worm Sample Results for ProUCL

Sample ID:	Mercury	d_Mercury	Molybdenum	d_Molybdenun	Nickel	d_Nickel	Potassium	d_Potassium	Rubidium	d_Rubidium	Selenium	d_Selenium	Silver	d_Silver	Sodium	d_Sodium	Strontium
15924-EW-1	0.07	1	0.14	1	0.85	1	1490	1	2.93	1	3.04	1	0.163	1	830	1	1.38
14534-EW-1	0.15	1	0.31	1	0.46	1	1340	1	2.13	1	4.83	1	0.259	1	1030	1	1.49

Notes: concentrations are presented in mg/kg
d_(metal) indicates whether the metal was detected in the sample at a concentration above the detection limit, where 1 indicates a detected value, and 0 inidcates a concentration below the dection limit

Table A.7 Tabulated Earth Worm Sample Results for ProUCL

Sample ID:	d_Strontium	Tellurium	d_Tellurium	Thallium	d_Thallium	Tin	d_Tin	Tungsten	d_Tungsten	Uranium	d_Uranium	Vanadium	d_Vanadium	Zinc	d_Zinc
15924-EW-1	1	0.013	1	0.017	1	0.02	1	0.063	1	0.058	1	1.81	1	75.1	1
14534-EW-1	1	0.015	1	0.02	1	0.01	1	0.015	1	0.054	1	0.35	1	136	1

Notes: concentrations are presented in mg/kg

d_(metal) indicates whether the metal was detected in the sample at a concentration above the detection limit, where 1 indicates a detected value, and 0 inidcates a concentration below the dection limit

Table A.8 Tabulated Berry Results for ProUCL

Sample ID	Aluminum mg/kg	d_Aluminum mg/kg	Antimony mg/kg	d_Antimony mg/kg	Arsenic mg/kg	d_Arsenic mg/kg	Barium mg/kg	d_Barium mg/kg	Beryllium mg/kg	d_Beryllium mg/kg	Bismuth mg/kg
16303-BB-1	68.2	1	0.005	0	0.06	1	4.90	1	0.003	1	0.05
14534-BB-1	5.2	1	0.005	0	0.02	0	4.95	1	0.002	0	0.05
14534-BB-2	2.6	1	0.005	0	0.02	0	19.8	1	0.002	0	0.05
14534-BB-3	4.8	1	0.005	0	0.02	0	20.9	1	0.002	0	0.05
17627-BB-1	6.2	1	0.005	0	0.02	0	4.32	1	0.002	0	0.05
27518-BB-1	14.3	1	0.005	0	0.02	0	6.90	1	0.002	0	0.05
14953-BB-max	8.3	1	0.005	0	0.02	0	3.28	1	0.002	0	0.05
15663-BB-1	6.0	1	0.005	0	0.02	0	3.35	1	0.002	0	0.05
22897-N-BB-1	3.3	1	0.005	0	0.02	0	3.40	1	0.002	0	0.05

Notes: concentrations are presented in mg/kg
d_(metal) indicates whether the metal was detected in the sample at a concentration above the detection limit, where 1 indicates a detected value, and 0 inidcates a concentration below the dection limit

Table A.8 Tabulated Berry Results for ProUCL

Sample ID	d_Bismuth mg/kg	Boron mg/kg	d_Boron mg/kg	Cadmium mg/kg	d_Cadmium mg/kg	Calcium mg/kg	d_Calcium mg/kg	Chromium mg/kg	d_Chromium mg/kg	Cobalt mg/kg	d_Cobalt mg/kg
16303-BB-1	0	1.7	1	0.013	1	854	1	0.09	1	0.02	1
14534-BB-1	0	1.7	1	0.007	1	828	1	0.05	0	0.01	0
14534-BB-2	0	2	1	0.413	1	795	1	0.05	1	0.01	1
14534-BB-3	0	1	1	0.19	1	1610	1	0.05	0	0.01	0
17627-BB-1	0	1.7	1	0.011	1	875	1	0.05	0	0.01	0
27518-BB-1	0	1.4	1	0.012	1	863	1	0.05	0	0.01	1
14953-BB-max	0	2	1	0.016	1	889	1	0.05	0	0.01	0
15663-BB-1	0	0.9	1	0.007	1	684	1	0.05	0	0.01	0
22897-N-BB-1	0	1.2	1	0.004	1	865	1	0.05	0	0.01	0

Notes: concentrations are presented in mg/kg
d_(metal) indicates whether the metal was detected in the sample at a concentration above the detection limit, where 1 indicates a detected value, and 0 inidcates a concentration below the dection limit

Table A.8 Tabulated Berry Results for ProUCL

Sample ID	Copper mg/kg	d_Copper mg/kg	Iron mg/kg	d_Iron mg/kg	Lead mg/kg	d_Lead mg/kg	Lithium mg/kg	d_Lithium mg/kg	Magnesium mg/kg	d_Magnesium mg/kg	Manganese mg/kg
16303-BB-1	0.59	1	54	1	0.062	1	0.05	1	188	1	8.72
14534-BB-1	0.5	1	6	1	0.005	0	0.01	0	191	1	3.69
14534-BB-2	1.35	1	5	1	0.005	0	0.01	0	353	1	53
14534-BB-3	0.37	1	3	1	0.079	1	0.01	0	425	1	98.6
17627-BB-1	0.34	1	5	1	0.005	0	0.01	0	206	1	6.39
27518-BB-1	0.31	1	9	1	0.005	0	0.01	0	232	1	6.61
14953-BB-max	0.68	1	5	1	0.024	0	0.01	0	205	1	10.2
15663-BB-1	0.23	1	3	1	0.019	1	0.01	0	176	1	3.45
22897-N-BB-1	0.28	1	3	1	0.005	0	0.01	0	198	1	3.48

Notes: concentrations are presented in mg/kg
d_(metal) indicates whether the metal was detected in the sample at a concentration above the detection limit, where 1 indicates a detected value, and 0 inidcates a concentration below the dection limit

Table A.8 Tabulated Berry Results for ProUCL

Sample ID	d_Manganese mg/kg	Mercury mg/kg	d_Mercury mg/kg	Molybdenum mg/kg	d_Molybdenum mg/kg	Nickel mg/kg	d_Nickel mg/kg	Potassium mg/kg	d_Potassium mg/kg	Rubidium mg/kg	d_Rubidium mg/kg
16303-BB-1	1	0.01	0	0.12	1	0.27	1	1610	1	22.6	1
14534-BB-1	1	0.01	0	0.01	1	0.29	1	1590	1	17.4	1
14534-BB-2	1	0.01	0	0.02	1	0.2	1	2530	1	18	1
14534-BB-3	1	0.01	0	0.01	0	0.08	1	323	1	1.27	1
17627-BB-1	1	0.01	0	0.02	1	0.2	1	1700	1	26.3	1
27518-BB-1	1	0.01	0	0.01	0	0.17	1	1770	1	24.3	1
14953-BB-max	1	0.01	0	0.03	1	0.19	1	1600	1	12.8	1
15663-BB-1	1	0.01	0	0.01	0	0.16	1	909	1	15.7	1
22897-N-BB-1	1	0.01	0	0.01	1	0.08	1	1250	1	15	1

Notes: concentrations are presented in mg/kg
d_(metal) indicates whether the metal was detected in the sample at a concentration above the detection limit, where 1 indicates a detected value, and 0 inidcates a concentration below the dection limit

Table A.8 Tabulated Berry Results for ProUCL

Sample ID	Selenium mg/kg	d_Selenium mg/kg	Silver mg/kg	d_Silver mg/kg	Sodium mg/kg	d_Sodium mg/kg	Strontium mg/kg	d_Strontium mg/kg	Tellurium mg/kg	d_Tellurium mg/kg	Thallium mg/kg
16303-BB-1	0.05	0	0.003	1	3	1	3.98	1	0.005	0	0.002
14534-BB-1	0.05	0	0.002	0	6	1	3.87	1	0.005	0	0.002
14534-BB-2	0.05	0	0.002	0	5	1	5.01	1	0.005	0	0.004
14534-BB-3	0.05	0	0.002	0	2	0	10.1	1	0.005	0	0.002
17627-BB-1	0.05	0	0.002	0	2	0	4.45	1	0.005	0	0.002
27518-BB-1	0.05	0	0.002	0	2	1	5.45	1	0.005	0	0.002
14953-BB-max	0.05	0	0.002	0	3	1	3.09	1	0.005	0	0.002
15663-BB-1	0.05	0	0.002	0	2	0	4.5	1	0.005	0	0.002
22897-N-BB-1	0.05	0	0.002	0	2	0	2.19	1	0.005	0	0.002

Notes: concentrations are presented in mg/kg
d_(metal) indicates whether the metal was detected in the sample at a concentration above the detection limit, where 1 indicates a detected value, and 0 inidcates a concentration below the dection limit

Table A.8 Tabulated Berry Results for ProUCL

Sample ID	d_Thallium mg/kg	Tin mg/kg	d_Tin mg/kg	Tungsten mg/kg	d_Tungsten mg/kg	Uranium mg/kg	d_Uranium mg/kg	Vanadium mg/kg	d_Vanadium mg/kg	Zinc mg/kg	d_Zinc mg/kg
16303-BB-1	0	0.01	0	0.517	1	0.002	1	0.11	1	1.66	1
14534-BB-1	0	0.01	0	0.005	0	0.002	0	0.01	0	1.23	1
14534-BB-2	1	0.01	0	0.005	0	0.002	0	0.01	0	2.95	1
14534-BB-3	0	0.01	0	0.005	0	0.002	0	0.01	0	8.59	1
17627-BB-1	0	0.01	0	0.005	0	0.002	0	0.01	0	1.24	1
27518-BB-1	0	0.01	0	0.005	0	0.002	0	0.02	1	1.51	1
14953-BB-max	0	0.01	0	0.005	0	0.002	0	0.01	0	1.62	1
15663-BB-1	0	0.01	0	0.005	0	0.002	0	0.01	0	0.88	1
22897-N-BB-1	0	0.01	0	0.005	0	0.002	0	0.01	0	1.16	1

Notes: concentrations are presented in mg/kg
d_(metal) indicates whether the metal was detected in the sample at a concentration above the detection limit, where 1 indicates a detected value, and 0 inidcates a concentration below the dection limit

Appendix B

ProUCL Outputs for Samples from Key and Soil Sites

ProUCL Outputs: Soil

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	U:\121810356\1_environmental\4_field_data\3_hhera\6_reporting\soil.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Aluminum

General Statistics

Number of Valid Observations	51	Number of Distinct Observations	51

Raw Statistics		Log-transformed Statistics	
Minimum	766	Minimum of Log Data	6.641
Maximum	24700	Maximum of Log Data	10.11
Mean	9009	Mean of log Data	8.861
Median	7640	SD of log Data	0.758
SD	6109		
Coefficient of Variation	0.678		
Skewness	1.033		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Lilliefors Test Statistic	0.12	Lilliefors Test Statistic	0.0727
Lilliefors Critical Value	0.124	Lilliefors Critical Value	0.124
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	10442	95% H-UCL	11732
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	14112
95% Adjusted-CLT UCL (Chen-1995)	10548	97.5% Chebyshev (MVUE) UCL	16182
95% Modified-t UCL (Johnson-1978)	10463	99% Chebyshev (MVUE) UCL	20249

Gamma Distribution Test		Data Distribution
k star (bias corrected)	2.075	Data appear Normal at 5% Significance Level
Theta Star	4341	
MLE of Mean	9009	
MLE of Standard Deviation	6253	
nu star	211.7	

Approximate Chi Square Value (.05)	179
Adjusted Level of Significance	0.0453
Adjusted Chi Square Value	178.1
Anderson-Darling Test Statistic	0.216
Anderson-Darling 5% Critical Value	0.762
Kolmogorov-Smirnov Test Statistic	0.0591
Kolmogorov-Smirnov 5% Critical Value	0.126

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	10653
95% Adjusted Gamma UCL	10705

Potential UCL to Use

Use 95% Student's-t UCL 10442

Nonparametric Statistics

95% CLT UCL	10416
95% Jackknife UCL	10442
95% Standard Bootstrap UCL	10415
95% Bootstrap-t UCL	10561
95% Hall's Bootstrap UCL	10618
95% Percentile Bootstrap UCL	10333
95% BCA Bootstrap UCL	10603
95% Chebyshev(Mean, Sd) UCL	12737
97.5% Chebyshev(Mean, Sd) UCL	14351
99% Chebyshev(Mean, Sd) UCL	17520

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Antimony

General Statistics

Number of Valid Data	51	Number of Detected Data	24
Number of Distinct Detected Data	8	Number of Non-Detect Data	27
		Percent Non-Detects	52.94%

Raw Statistics

Minimum Detected	0.1
Maximum Detected	1.1
Mean of Detected	0.329
SD of Detected	0.258
Minimum Non-Detect	0.1
Maximum Non-Detect	0.1

Log-transformed Statistics

Minimum Detected	-2.303
Maximum Detected	0.0953
Mean of Detected	-1.32
SD of Detected	0.625
Minimum Non-Detect	-2.303
Maximum Non-Detect	-2.303

UCL Statistics

Normal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.703
5% Shapiro Wilk Critical Value	0.916

Data not Normal at 5% Significance Level

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.894
5% Shapiro Wilk Critical Value	0.916

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method

Mean	0.181
SD	0.224
95% DL/2 (t) UCL	0.234

Maximum Likelihood Estimate(MLE) Method

Mean	0.0452
SD	0.359
95% MLE (t) UCL	0.129
95% MLE (Tiku) UCL	0.153

Assuming Lognormal Distribution

DL/2 Substitution Method

Mean	-2.207
SD	0.945
95% H-Stat (DL/2) UCL	0.232

Log ROS Method

Mean in Log Scale	-2.236
SD in Log Scale	1.07
Mean in Original Scale	0.184
SD in Original Scale	0.224
95% t UCL	0.237
95% Percentile Bootstrap UCL	0.236
95% BCA Bootstrap UCL	0.249

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	2.253
Theta Star	0.146
nu star	108.2
A-D Test Statistic	1.522
5% A-D Critical Value	0.753
K-S Test Statistic	0.753
5% K-S Critical Value	0.18

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data

Minimum	1E-12
Maximum	1.1
Mean	0.347

Data Distribution Test with Detected Values Only

Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

Kaplan-Meier (KM) Method

Mean	0.208
SD	0.208
SE of Mean	0.0297
95% KM (t) UCL	0.258
95% KM (z) UCL	0.257
95% KM (jackknife) UCL	0.257
95% KM (bootstrap t) UCL	0.283
95% KM (BCA) UCL	0.275
95% KM (Percentile Bootstrap) UCL	0.267

Median	0.3	95% KM (Chebyshev) UCL	0.337
SD	0.224	97.5% KM (Chebyshev) UCL	0.393
k star	0.777	99% KM (Chebyshev) UCL	0.503
Theta star	0.447		
Nu star	79.28	**Potential UCLs to Use**	
AppChi2	59.76	95% KM (t) UCL	0.258
95% Gamma Approximate UCL	0.461	95% KM (% Bootstrap) UCL	0.267
95% Adjusted Gamma UCL	0.464		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Arsenic

General Statistics

Number of Valid Data	51	Number of Detected Data	50
Number of Distinct Detected Data	19	Number of Non-Detect Data	1
		Percent Non-Detects	1.96%

Raw Statistics

Minimum Detected	1
Maximum Detected	103
Mean of Detected	10.72
SD of Detected	17.08
Minimum Non-Detect	1
Maximum Non-Detect	1

Log-transformed Statistics

Minimum Detected	0
Maximum Detected	4.635
Mean of Detected	1.719
SD of Detected	1.064
Minimum Non-Detect	0
Maximum Non-Detect	0

UCL Statistics

Normal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.56
5% Shapiro Wilk Critical Value	0.947

Data not Normal at 5% Significance Level

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.944
5% Shapiro Wilk Critical Value	0.947

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method

Mean	10.52
SD	16.97
95% DL/2 (t) UCL	14.5

Maximum Likelihood Estimate(MLE) Method

Mean	10.32
SD	17.02
95% MLE (t) UCL	14.31
95% MLE (Tiku) UCL	13.93

Assuming Lognormal Distribution

DL/2 Substitution Method

Mean	1.672
SD	1.106
95% H-Stat (DL/2) UCL	14.31

Log ROS Method

Mean in Log Scale	1.665
SD in Log Scale	1.121
Mean in Original Scale	10.52
SD in Original Scale	16.97
95% t UCL	14.5
95% Percentile Bootstrap UCL	14.5
95% BCA Bootstrap UCL	16.14

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	0.855
Theta Star	12.54
nu star	85.5
A-D Test Statistic	2.435
5% A-D Critical Value	0.786
K-S Test Statistic	0.786
5% K-S Critical Value	0.13

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data

Minimum	1E-12
Maximum	103
Mean	10.51

Data Distribution Test with Detected Values Only

Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

Kaplan-Meier (KM) Method

Mean	10.53
SD	16.8
SE of Mean	2.376
95% KM (t) UCL	14.51
95% KM (z) UCL	14.44
95% KM (jackknife) UCL	14.51
95% KM (bootstrap t) UCL	16.97
95% KM (BCA) UCL	14.65
95% KM (Percentile Bootstrap) UCL	14.75

Median	5	95% KM (Chebyshev) UCL	20.88
SD	16.97	97.5% KM (Chebyshev) UCL	25.37
k star	0.504	99% KM (Chebyshev) UCL	34.17
Theta star	20.84		
Nu star	51.44	**Potential UCLs to Use**	
AppChi2	35.97	95% KM (Chebyshev) UCL	20.88
95% Gamma Approximate UCL	15.03		
95% Adjusted Gamma UCL	15.19		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Barium

General Statistics

Number of Valid Observations	51	Number of Distinct Observations	34

Raw Statistics

Minimum	7
Maximum	299
Mean	38.25
Median	20
SD	49.34
Coefficient of Variation	1.29
Skewness	3.579

Log-transformed Statistics

Minimum of Log Data	1.946
Maximum of Log Data	5.7
Mean of log Data	3.223
SD of log Data	0.83

Relevant UCL Statistics

Normal Distribution Test

Lilliefors Test Statistic	0.271
Lilliefors Critical Value	0.124

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Lilliefors Test Statistic	0.125
Lilliefors Critical Value	0.124

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	49.83

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	53.32
95% Modified-t UCL (Johnson-1978)	50.41

Assuming Lognormal Distribution

95% H-UCL	45.57
95% Chebyshev (MVUE) UCL	55.22
97.5% Chebyshev (MVUE) UCL	63.92
99% Chebyshev (MVUE) UCL	81

Gamma Distribution Test

k star (bias corrected)	1.264
Theta Star	30.27
MLE of Mean	38.25
MLE of Standard Deviation	34.03
nu star	128.9
Approximate Chi Square Value (.05)	103.7
Adjusted Level of Significance	0.0453
Adjusted Chi Square Value	103
Anderson-Darling Test Statistic	2.587
Anderson-Darling 5% Critical Value	0.772
Kolmogorov-Smirnov Test Statistic	0.168
Kolmogorov-Smirnov 5% Critical Value	0.127

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	47.56
95% Adjusted Gamma UCL	47.87

Data Distribution

Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

95% CLT UCL	49.62
95% Jackknife UCL	49.83
95% Standard Bootstrap UCL	49.67
95% Bootstrap-t UCL	59.3
95% Hall's Bootstrap UCL	63.29
95% Percentile Bootstrap UCL	50.67
95% BCA Bootstrap UCL	54.69
95% Chebyshev(Mean, Sd) UCL	68.37
97.5% Chebyshev(Mean, Sd) UCL	81.4
99% Chebyshev(Mean, Sd) UCL	107

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 68.37

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Beryllium

General Statistics

Number of Valid Data	51	Number of Detected Data	37
Number of Distinct Detected Data	12	Number of Non-Detect Data	14
		Percent Non-Detects	27.45%

Raw Statistics

Minimum Detected	0.1
Maximum Detected	1.4
Mean of Detected	0.441
SD of Detected	0.362
Minimum Non-Detect	0.1
Maximum Non-Detect	0.1

Log-transformed Statistics

Minimum Detected	-2.303
Maximum Detected	0.336
Mean of Detected	-1.138
SD of Detected	0.82
Minimum Non-Detect	-2.303
Maximum Non-Detect	-2.303

UCL Statistics

Normal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.824
5% Shapiro Wilk Critical Value	0.936

Data not Normal at 5% Significance Level

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.917
5% Shapiro Wilk Critical Value	0.936

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method

Mean	0.333
SD	0.354
95% DL/2 (t) UCL	0.416

Maximum Likelihood Estimate(MLE) Method

Mean	0.267
SD	0.432
95% MLE (t) UCL	0.369
95% MLE (Tiku) UCL	0.372

Assuming Lognormal Distribution

DL/2 Substitution Method

Mean	-1.648
SD	1.089
95% H-Stat (DL/2) UCL	0.504

Log ROS Method

Mean in Log Scale	-1.667
SD in Log Scale	1.143
Mean in Original Scale	0.334
SD in Original Scale	0.354
95% t UCL	0.417
95% Percentile Bootstrap UCL	0.416
95% BCA Bootstrap UCL	0.421

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	1.597
Theta Star	0.276
nu star	118.2
A-D Test Statistic	1.026
5% A-D Critical Value	0.763
K-S Test Statistic	0.763
5% K-S Critical Value	0.147

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data

Minimum	1E-12
Maximum	1.4
Mean	0.355

Data Distribution Test with Detected Values Only

Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

Kaplan-Meier (KM) Method

Mean	0.347
SD	0.34
SE of Mean	0.0483
95% KM (t) UCL	0.428
95% KM (z) UCL	0.427
95% KM (jackknife) UCL	0.428
95% KM (bootstrap t) UCL	0.44
95% KM (BCA) UCL	0.425
95% KM (Percentile Bootstrap) UCL	0.431

Median	0.2	95% KM (Chebyshev) UCL	0.558
SD	0.343	97.5% KM (Chebyshev) UCL	0.649
k star	0.292	99% KM (Chebyshev) UCL	0.828
Theta star	1.217		
Nu star	29.74	**Potential UCLs to Use**	
AppChi2	18.29	95% KM (BCA) UCL	0.425
95% Gamma Approximate UCL	0.577		
95% Adjusted Gamma UCL	0.585		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Bismuth

General Statistics

Number of Valid Data	51	Number of Detected Data	10
Number of Distinct Detected Data	3	Number of Non-Detect Data	41
		Percent Non-Detects	80.39%

Raw Statistics

Minimum Detected	1
Maximum Detected	3
Mean of Detected	1.8
SD of Detected	0.919
Minimum Non-Detect	1
Maximum Non-Detect	1

Log-transformed Statistics

Minimum Detected	0
Maximum Detected	1.099
Mean of Detected	0.468
SD of Detected	0.515
Minimum Non-Detect	0
Maximum Non-Detect	0

Warning: There are only 3 Distinct Detected Values in this data set

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

UCL Statistics

Normal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.756
5% Shapiro Wilk Critical Value	0.842

Data not Normal at 5% Significance Level

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.751
5% Shapiro Wilk Critical Value	0.842

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method	
Mean	0.755
SD	0.651
95% DL/2 (t) UCL	0.908
Maximum Likelihood Estimate(MLE) Method	N/A

MLE yields a negative mean

Assuming Lognormal Distribution

DL/2 Substitution Method	
Mean	-0.465
SD	0.514
95% H-Stat (DL/2) UCL	0.822
Log ROS Method	
Mean in Log Scale	-1.221
SD in Log Scale	1.184
Mean in Original Scale	0.572
SD in Original Scale	0.749
95% t UCL	0.748
95% Percentile Bootstrap UCL	0.748
95% BCA Bootstrap UCL	0.769

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	3.106
Theta Star	0.58
nu star	62.11

Data Distribution Test with Detected Values Only

Data do not follow a Discernable Distribution (0.05)

A-D Test Statistic	1.163
5% A-D Critical Value	0.729
K-S Test Statistic	0.729
5% K-S Critical Value	0.268

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	0.356
Maximum	5.694
Mean	3.427
Median	3.567
SD	1.553
k star	3.282
Theta star	1.044
Nu star	334.8
AppChi2	293.4
95% Gamma Approximate UCL	3.91
95% Adjusted Gamma UCL	3.925

Note: DL/2 is not a recommended method.

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	1.157
SD	0.5
SE of Mean	0.0738
95% KM (t) UCL	1.281
95% KM (z) UCL	1.278
95% KM (jackknife) UCL	N/A
95% KM (bootstrap t) UCL	N/A
95% KM (BCA) UCL	N/A
95% KM (Percentile Bootstrap) UCL	N/A
95% KM (Chebyshev) UCL	1.478
97.5% KM (Chebyshev) UCL	1.618
99% KM (Chebyshev) UCL	1.891

Potential UCLs to Use

95% KM (t) UCL	1.281
95% KM (% Bootstrap) UCL	N/A

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Boron

General Statistics

Number of Valid Data	51	Number of Detected Data	46
Number of Distinct Detected Data	4	Number of Non-Detect Data	5
		Percent Non-Detects	9.80%

Raw Statistics

Minimum Detected	1
Maximum Detected	4
Mean of Detected	1.978
SD of Detected	0.745
Minimum Non-Detect	1
Maximum Non-Detect	1

Log-transformed Statistics

Minimum Detected	0
Maximum Detected	1.386
Mean of Detected	0.607
SD of Detected	0.405
Minimum Non-Detect	0
Maximum Non-Detect	0

Warning: There are only 4 Distinct Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.829
5% Shapiro Wilk Critical Value	0.945

Data not Normal at 5% Significance Level

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.799
5% Shapiro Wilk Critical Value	0.945

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method

Mean	1.833
SD	0.835
95% DL/2 (t) UCL	2.029

Maximum Likelihood Estimate(MLE) Method

Mean	1.84
SD	0.823
95% MLE (t) UCL	2.034
95% MLE (Tiku) UCL	2.031

Assuming Lognormal Distribution

DL/2 Substitution Method

Mean	0.479
SD	0.548
95% H-Stat (DL/2) UCL	2.175

Log ROS Method

Mean in Log Scale	0.523
SD in Log Scale	0.463
Mean in Original Scale	1.862
SD in Original Scale	0.793
95% t UCL	2.048
95% Percentile Bootstrap UCL	2.039
95% BCA Bootstrap UCL	2.052

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	6.357
Theta Star	0.311
nu star	584.9

Data Distribution Test with Detected Values Only

Data do not follow a Discernable Distribution (0.05)

A-D Test Statistic	3.934
5% A-D Critical Value	0.752
K-S Test Statistic	0.752
5% K-S Critical Value	0.131

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	0.24
Maximum	4
Mean	1.849
Median	2
SD	0.814
k star	4.14
Theta star	0.447
Nu star	422.3
AppChi2	375.6
95% Gamma Approximate UCL	2.079
95% Adjusted Gamma UCL	2.086

Note: DL/2 is not a recommended method.

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	1.882
SD	0.758
SE of Mean	0.107
95% KM (t) UCL	2.062
95% KM (z) UCL	2.059
95% KM (jackknife) UCL	2.062
95% KM (bootstrap t) UCL	2.071
95% KM (BCA) UCL	2.039
95% KM (Percentile Bootstrap) UCL	2.059
95% KM (Chebyshev) UCL	2.35
97.5% KM (Chebyshev) UCL	2.552
99% KM (Chebyshev) UCL	2.95

Potential UCLs to Use

95% KM (Chebyshev) UCL	2.35

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Cadmium

General Statistics

Number of Valid Observations	51	Number of Distinct Observations	29

Raw Statistics

Minimum	0.02
Maximum	6.21
Mean	0.348
Median	0.11
SD	0.901
Coefficient of Variation	2.586
Skewness	5.866

Log-transformed Statistics

Minimum of Log Data	-3.912
Maximum of Log Data	1.826
Mean of log Data	-1.859
SD of log Data	1.003

Relevant UCL Statistics

Normal Distribution Test

Lilliefors Test Statistic	0.362
Lilliefors Critical Value	0.124

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Lilliefors Test Statistic	0.171
Lilliefors Critical Value	0.124

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	0.56

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	0.667
95% Modified-t UCL (Johnson-1978)	0.577

Assuming Lognormal Distribution

95% H-UCL	0.357
95% Chebyshev (MVUE) UCL	0.437
97.5% Chebyshev (MVUE) UCL	0.516
99% Chebyshev (MVUE) UCL	0.672

Gamma Distribution Test

k star (bias corrected)	0.714
Theta Star	0.488
MLE of Mean	0.348
MLE of Standard Deviation	0.412
nu star	72.79
Approximate Chi Square Value (.05)	54.14
Adjusted Level of Significance	0.0453
Adjusted Chi Square Value	53.67
Anderson-Darling Test Statistic	5.335
Anderson-Darling 5% Critical Value	0.794
Kolmogorov-Smirnov Test Statistic	0.234
Kolmogorov-Smirnov 5% Critical Value	0.129

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.468
95% Adjusted Gamma UCL	0.473

Data Distribution

Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

95% CLT UCL	0.556
95% Jackknife UCL	0.56
95% Standard Bootstrap UCL	0.559
95% Bootstrap-t UCL	1.064
95% Hall's Bootstrap UCL	1.224
95% Percentile Bootstrap UCL	0.589
95% BCA Bootstrap UCL	0.786
95% Chebyshev(Mean, Sd) UCL	0.898
97.5% Chebyshev(Mean, Sd) UCL	1.136
99% Chebyshev(Mean, Sd) UCL	1.604

Potential UCL to Use — Use 95% Chebyshev (Mean, Sd) UCL 0.898

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Calcium

General Statistics

Number of Valid Observations	51	Number of Distinct Observations	48

Raw Statistics

Minimum	80
Maximum	22800
Mean	1559
Median	600
SD	3382
Coefficient of Variation	2.17
Skewness	5.339

Log-transformed Statistics

Minimum of Log Data	4.382
Maximum of Log Data	10.03
Mean of log Data	6.531
SD of log Data	1.153

Relevant UCL Statistics

Normal Distribution Test

Lilliefors Test Statistic	0.331
Lilliefors Critical Value	0.124

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Lilliefors Test Statistic	0.0879
Lilliefors Critical Value	0.124

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	2352

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	2716
95% Modified-t UCL (Johnson-1978)	2411

Assuming Lognormal Distribution

95% H-UCL	1995
95% Chebyshev (MVUE) UCL	2430
97.5% Chebyshev (MVUE) UCL	2917
99% Chebyshev (MVUE) UCL	3872

Gamma Distribution Test

k star (bias corrected)	0.702
Theta Star	2220
MLE of Mean	1559
MLE of Standard Deviation	1860
nu star	71.61
Approximate Chi Square Value (.05)	53.13
Adjusted Level of Significance	0.0453
Adjusted Chi Square Value	52.67
Anderson-Darling Test Statistic	2.562
Anderson-Darling 5% Critical Value	0.795
Kolmogorov-Smirnov Test Statistic	0.194
Kolmogorov-Smirnov 5% Critical Value	0.129

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	2101
95% Adjusted Gamma UCL	2119

Data Distribution

Data appear Lognormal at 5% Significance Level

Nonparametric Statistics

95% CLT UCL	2337
95% Jackknife UCL	2352
95% Standard Bootstrap UCL	2320
95% Bootstrap-t UCL	3560
95% Hall's Bootstrap UCL	5315
95% Percentile Bootstrap UCL	2445
95% BCA Bootstrap UCL	2972
95% Chebyshev(Mean, Sd) UCL	3623
97.5% Chebyshev(Mean, Sd) UCL	4516
99% Chebyshev(Mean, Sd) UCL	6270

Potential UCL to Use

Use 95% H-UCL 1995

ProUCL computes and outputs H-statistic based UCLs for historical reasons only.

H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.

It is therefore recommended to avoid the use of H-statistic based 95% UCLs.

Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations	51	Number of Distinct Observations	20

Raw Statistics

Minimum	1
Maximum	43
Mean	11.1
Median	8
SD	9.565
Coefficient of Variation	0.862
Skewness	1.591

Log-transformed Statistics

Minimum of Log Data	0
Maximum of Log Data	3.761
Mean of log Data	2.05
SD of log Data	0.889

Relevant UCL Statistics

Normal Distribution Test

Lilliefors Test Statistic	0.175
Lilliefors Critical Value	0.124

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Lilliefors Test Statistic	0.119
Lilliefors Critical Value	0.124

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	13.34

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	13.62
95% Modified-t UCL (Johnson-1978)	13.39

Assuming Lognormal Distribution

95% H-UCL	15.2
95% Chebyshev (MVUE) UCL	18.5
97.5% Chebyshev (MVUE) UCL	21.57
99% Chebyshev (MVUE) UCL	27.6

Gamma Distribution Test

k star (bias corrected)	1.469
Theta Star	7.553
MLE of Mean	11.1
MLE of Standard Deviation	9.156
nu star	149.9
Approximate Chi Square Value (.05)	122.6
Adjusted Level of Significance	0.0453
Adjusted Chi Square Value	121.9
Anderson-Darling Test Statistic	0.547
Anderson-Darling 5% Critical Value	0.767
Kolmogorov-Smirnov Test Statistic	0.108
Kolmogorov-Smirnov 5% Critical Value	0.126

Data appear Gamma Distributed at 5% Significance Level

Data Distribution

Data appear Gamma Distributed at 5% Significance Level

Nonparametric Statistics

95% CLT UCL	13.3
95% Jackknife UCL	13.34
95% Standard Bootstrap UCL	13.36
95% Bootstrap-t UCL	13.74
95% Hall's Bootstrap UCL	13.68
95% Percentile Bootstrap UCL	13.29
95% BCA Bootstrap UCL	13.73
95% Chebyshev(Mean, Sd) UCL	16.94
97.5% Chebyshev(Mean, Sd) UCL	19.46
99% Chebyshev(Mean, Sd) UCL	24.42

Assuming Gamma Distribution

95% Approximate Gamma UCL	13.57
95% Adjusted Gamma UCL	13.65

Potential UCL to Use

Use 95% Approximate Gamma UCL 13.57

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cobalt

General Statistics

Number of Valid Observations	51	Number of Distinct Observations	35

Raw Statistics

Minimum	0.2
Maximum	22.5
Mean	4.049
Median	2.1
SD	5.614
Coefficient of Variation	1.387
Skewness	2.241

Log-transformed Statistics

Minimum of Log Data	-1.609
Maximum of Log Data	3.114
Mean of log Data	0.654
SD of log Data	1.239

Relevant UCL Statistics

Normal Distribution Test

Lilliefors Test Statistic	0.273
Lilliefors Critical Value	0.124

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Lilliefors Test Statistic	0.0646
Lilliefors Critical Value	0.124

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	5.367

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	5.606
95% Modified-t UCL (Johnson-1978)	5.408

Assuming Lognormal Distribution

95% H-UCL	6.502
95% Chebyshev (MVUE) UCL	7.861
97.5% Chebyshev (MVUE) UCL	9.514
99% Chebyshev (MVUE) UCL	12.76

Gamma Distribution Test

k star (bias corrected)	0.764
Theta Star	5.303
MLE of Mean	4.049
MLE of Standard Deviation	4.634
nu star	77.88
Approximate Chi Square Value (.05)	58.55
Adjusted Level of Significance	0.0453
Adjusted Chi Square Value	58.07
Anderson-Darling Test Statistic	1.504
Anderson-Darling 5% Critical Value	0.791
Kolmogorov-Smirnov Test Statistic	0.149
Kolmogorov-Smirnov 5% Critical Value	0.129

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	5.386
95% Adjusted Gamma UCL	5.431

Data Distribution

Data appear Lognormal at 5% Significance Level

Nonparametric Statistics

95% CLT UCL	5.342
95% Jackknife UCL	5.367
95% Standard Bootstrap UCL	5.364
95% Bootstrap-t UCL	5.918
95% Hall's Bootstrap UCL	5.528
95% Percentile Bootstrap UCL	5.408
95% BCA Bootstrap UCL	5.576
95% Chebyshev(Mean, Sd) UCL	7.476
97.5% Chebyshev(Mean, Sd) UCL	8.959
99% Chebyshev(Mean, Sd) UCL	11.87

Potential UCL to Use	Use 95% H-UCL 6.502

ProUCL computes and outputs H-statistic based UCLs for historical reasons only.

H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.

It is therefore recommended to avoid the use of H-statistic based 95% UCLs.

Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Copper

General Statistics

Number of Valid Data	51	Number of Detected Data	50
Number of Distinct Detected Data	18	Number of Non-Detect Data	1
		Percent Non-Detects	1.96%

Raw Statistics

Minimum Detected	1
Maximum Detected	62
Mean of Detected	7.76
SD of Detected	10.27
Minimum Non-Detect	1
Maximum Non-Detect	1

Log-transformed Statistics

Minimum Detected	0
Maximum Detected	4.127
Mean of Detected	1.588
SD of Detected	0.9
Minimum Non-Detect	0
Maximum Non-Detect	0

UCL Statistics

Normal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.594
5% Shapiro Wilk Critical Value	0.947

Data not Normal at 5% Significance Level

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.958
5% Shapiro Wilk Critical Value	0.947

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method

Mean	7.618
SD	10.22
95% DL/2 (t) UCL	10.02

Maximum Likelihood Estimate(MLE) Method

Mean	7.506
SD	10.25
95% MLE (t) UCL	9.911
95% MLE (Tiku) UCL	9.698

Assuming Lognormal Distribution

DL/2 Substitution Method

Mean	1.543
SD	0.946
95% H-Stat (DL/2) UCL	9.896

Log ROS Method

Mean in Log Scale	1.543
SD in Log Scale	0.948
Mean in Original Scale	7.617
SD in Original Scale	10.22
95% t UCL	10.01
95% Percentile Bootstrap UCL	10.07
95% BCA Bootstrap UCL	10.99

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	1.165
Theta Star	6.663
nu star	116.5
A-D Test Statistic	1.866
5% A-D Critical Value	0.774
K-S Test Statistic	0.774
5% K-S Critical Value	0.128

Data not Gamma Distributed at 5% Significance Level

Data Distribution Test with Detected Values Only

Data appear Lognormal at 5% Significance Level

Nonparametric Statistics

Kaplan-Meier (KM) Method

Mean	7.627
SD	10.11
SE of Mean	1.43
95% KM (t) UCL	10.02

Assuming Gamma Distribution	
Gamma ROS Statistics using Extrapolated Data	
Minimum	1E-12
Maximum	62
Mean	7.608
Median	4
SD	10.22
k star	0.585
Theta star	12.99
Nu star	59.72
AppChi2	42.95
95% Gamma Approximate UCL	10.58
95% Adjusted Gamma UCL	10.68

95% KM (z) UCL	9.979
95% KM (jackknife) UCL	10.02
95% KM (bootstrap t) UCL	11.88
95% KM (BCA) UCL	10.02
95% KM (Percentile Bootstrap) UCL	10.18
95% KM (Chebyshev) UCL	13.86
97.5% KM (Chebyshev) UCL	16.56
99% KM (Chebyshev) UCL	21.86
Potential UCLs to Use	
95% KM (Chebyshev) UCL	13.86

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Iron

General Statistics

Number of Valid Observations 51

Number of Distinct Observations 47

Raw Statistics

Minimum	880
Maximum	36800
Mean	14044
Median	11600
SD	9737
Coefficient of Variation	0.693
Skewness	0.621

Log-transformed Statistics

Minimum of Log Data	6.78
Maximum of Log Data	10.51
Mean of log Data	9.241
SD of log Data	0.888

Relevant UCL Statistics

Normal Distribution Test

Lilliefors Test Statistic	0.142
Lilliefors Critical Value	0.124

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Lilliefors Test Statistic	0.14
Lilliefors Critical Value	0.124

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	16329

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	16414
95% Modified-t UCL (Johnson-1978)	16349

Assuming Lognormal Distribution

95% H-UCL	20155
95% Chebyshev (MVUE) UCL	24533
97.5% Chebyshev (MVUE) UCL	28599
99% Chebyshev (MVUE) UCL	36586

Gamma Distribution Test

k star (bias corrected)	1.674
Theta Star	8387
MLE of Mean	14044
MLE of Standard Deviation	10853
nu star	170.8
Approximate Chi Square Value (.05)	141.6
Adjusted Level of Significance	0.0453
Adjusted Chi Square Value	140.8
Anderson-Darling Test Statistic	0.45
Anderson-Darling 5% Critical Value	0.765
Kolmogorov-Smirnov Test Statistic	0.0882
Kolmogorov-Smirnov 5% Critical Value	0.126

Data appear Gamma Distributed at 5% Significance Level

Data Distribution

Data appear Gamma Distributed at 5% Significance Level

Nonparametric Statistics

95% CLT UCL	16287
95% Jackknife UCL	16329
95% Standard Bootstrap UCL	16283
95% Bootstrap-t UCL	16536
95% Hall's Bootstrap UCL	16402
95% Percentile Bootstrap UCL	16237
95% BCA Bootstrap UCL	16410
95% Chebyshev(Mean, Sd) UCL	19987
97.5% Chebyshev(Mean, Sd) UCL	22559
99% Chebyshev(Mean, Sd) UCL	27610

Assuming Gamma Distribution

95% Approximate Gamma UCL	16943
95% Adjusted Gamma UCL	17036

Potential UCL to Use

Use 95% Approximate Gamma UCL 16943

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Lead

General Statistics

Number of Valid Observations	51	Number of Distinct Observations	43

Raw Statistics

Minimum	3.6
Maximum	48.8
Mean	16.53
Median	13.1
SD	11.39
Coefficient of Variation	0.689
Skewness	1.621

Log-transformed Statistics

Minimum of Log Data	1.281
Maximum of Log Data	3.888
Mean of log Data	2.617
SD of log Data	0.603

Relevant UCL Statistics

Normal Distribution Test

Lilliefors Test Statistic	0.219
Lilliefors Critical Value	0.124

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Lilliefors Test Statistic	0.118
Lilliefors Critical Value	0.124

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	19.2

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	19.54
95% Modified-t UCL (Johnson-1978)	19.26

Assuming Lognormal Distribution

95% H-UCL	19.39
95% Chebyshev (MVUE) UCL	22.8
97.5% Chebyshev (MVUE) UCL	25.59
99% Chebyshev (MVUE) UCL	31.07

Gamma Distribution Test

k star (bias corrected)	2.658
Theta Star	6.218
MLE of Mean	16.53
MLE of Standard Deviation	10.14
nu star	271.2
Approximate Chi Square Value (.05)	234
Adjusted Level of Significance	0.0453
Adjusted Chi Square Value	233
Anderson-Darling Test Statistic	1.426
Anderson-Darling 5% Critical Value	0.758
Kolmogorov-Smirnov Test Statistic	0.159
Kolmogorov-Smirnov 5% Critical Value	0.125

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	19.15
95% Adjusted Gamma UCL	19.24

Data Distribution

Data appear Lognormal at 5% Significance Level

Nonparametric Statistics

95% CLT UCL	19.15
95% Jackknife UCL	19.2
95% Standard Bootstrap UCL	19.1
95% Bootstrap-t UCL	19.77
95% Hall's Bootstrap UCL	19.5
95% Percentile Bootstrap UCL	19.26
95% BCA Bootstrap UCL	19.46
95% Chebyshev(Mean, Sd) UCL	23.48
97.5% Chebyshev(Mean, Sd) UCL	26.49
99% Chebyshev(Mean, Sd) UCL	32.4

Potential UCL to Use

Use 95% H-UCL 19.39

ProUCL computes and outputs H-statistic based UCLs for historical reasons only.

H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.

It is therefore recommended to avoid the use of H-statistic based 95% UCLs.

Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Lithium

General Statistics

Number of Valid Observations 51

Number of Distinct Observations 47

Raw Statistics

Minimum	0.3
Maximum	35.6
Mean	8.043
Median	6.8
SD	7.746
Coefficient of Variation	0.963
Skewness	1.398

Log-transformed Statistics

Minimum of Log Data	-1.204
Maximum of Log Data	3.572
Mean of log Data	1.518
SD of log Data	1.212

Relevant UCL Statistics

Normal Distribution Test

Lilliefors Test Statistic	0.159
Lilliefors Critical Value	0.124

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Lilliefors Test Statistic	0.139
Lilliefors Critical Value	0.124

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	9.861

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	10.05
95% Modified-t UCL (Johnson-1978)	9.896

Assuming Lognormal Distribution

95% H-UCL	14.69
95% Chebyshev (MVUE) UCL	17.81
97.5% Chebyshev (MVUE) UCL	21.5
99% Chebyshev (MVUE) UCL	28.75

Gamma Distribution Test

k star (bias corrected)	0.97
Theta Star	8.291
MLE of Mean	8.043
MLE of Standard Deviation	8.166
nu star	98.96
Approximate Chi Square Value (.05)	77.01
Adjusted Level of Significance	0.0453
Adjusted Chi Square Value	76.44
Anderson-Darling Test Statistic	0.366
Anderson-Darling 5% Critical Value	0.779
Kolmogorov-Smirnov Test Statistic	0.079
Kolmogorov-Smirnov 5% Critical Value	0.128

Data appear Gamma Distributed at 5% Significance Level

Data Distribution

Data appear Gamma Distributed at 5% Significance Level

Nonparametric Statistics

95% CLT UCL	9.827
95% Jackknife UCL	9.861
95% Standard Bootstrap UCL	9.813
95% Bootstrap-t UCL	10.08
95% Hall's Bootstrap UCL	10.19
95% Percentile Bootstrap UCL	9.855
95% BCA Bootstrap UCL	10.12
95% Chebyshev(Mean, Sd) UCL	12.77
97.5% Chebyshev(Mean, Sd) UCL	14.82
99% Chebyshev(Mean, Sd) UCL	18.83

Assuming Gamma Distribution

95% Approximate Gamma UCL	10.34
95% Adjusted Gamma UCL	10.41

Potential UCL to Use

Use 95% Approximate Gamma UCL 10.34

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Magnesium

General Statistics

Number of Valid Observations 51

Number of Distinct Observations 48

Raw Statistics

Minimum	100
Maximum	6980
Mean	1425
Median	1050
SD	1505
Coefficient of Variation	1.057
Skewness	2.083

Log-transformed Statistics

Minimum of Log Data	4.605
Maximum of Log Data	8.851
Mean of log Data	6.777
SD of log Data	1.036

Relevant UCL Statistics

Normal Distribution Test

Lilliefors Test Statistic	0.219
Lilliefors Critical Value	0.124

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Lilliefors Test Statistic	0.0875
Lilliefors Critical Value	0.124

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	1778

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	1837
95% Modified-t UCL (Johnson-1978)	1788

Assuming Lognormal Distribution

95% H-UCL	2116
95% Chebyshev (MVUE) UCL	2588
97.5% Chebyshev (MVUE) UCL	3068
99% Chebyshev (MVUE) UCL	4012

Gamma Distribution Test

k star (bias corrected)	1.115
Theta Star	1277
MLE of Mean	1425
MLE of Standard Deviation	1349
nu star	113.7
Approximate Chi Square Value (.05)	90.12
Adjusted Level of Significance	0.0453
Adjusted Chi Square Value	89.51
Anderson-Darling Test Statistic	0.54
Anderson-Darling 5% Critical Value	0.776
Kolmogorov-Smirnov Test Statistic	0.096
Kolmogorov-Smirnov 5% Critical Value	0.127

Data appear Gamma Distributed at 5% Significance Level

Data Distribution

Data appear Gamma Distributed at 5% Significance Level

Nonparametric Statistics

95% CLT UCL	1771
95% Jackknife UCL	1778
95% Standard Bootstrap UCL	1762
95% Bootstrap-t UCL	1906
95% Hall's Bootstrap UCL	1828
95% Percentile Bootstrap UCL	1774
95% BCA Bootstrap UCL	1827
95% Chebyshev(Mean, Sd) UCL	2343
97.5% Chebyshev(Mean, Sd) UCL	2741
99% Chebyshev(Mean, Sd) UCL	3522

Assuming Gamma Distribution

95% Approximate Gamma UCL	1798
95% Adjusted Gamma UCL	1810

Potential UCL to Use

Use 95% Approximate Gamma UCL 1798

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations	51	Number of Distinct Observations	43

Raw Statistics

Minimum	13
Maximum	6120
Mean	454.4
Median	94
SD	1081
Coefficient of Variation	2.38
Skewness	3.939

Log-transformed Statistics

Minimum of Log Data	2.565
Maximum of Log Data	8.719
Mean of log Data	4.82
SD of log Data	1.455

Relevant UCL Statistics

Normal Distribution Test

Lilliefors Test Statistic	0.356
Lilliefors Critical Value	0.124

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Lilliefors Test Statistic	0.127
Lilliefors Critical Value	0.124

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	708.1

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	792.7
95% Modified-t UCL (Johnson-1978)	722

Assuming Lognormal Distribution

95% H-UCL	639.2
95% Chebyshev (MVUE) UCL	744.4
97.5% Chebyshev (MVUE) UCL	918
99% Chebyshev (MVUE) UCL	1259

Gamma Distribution Test

k star (bias corrected)	0.475
Theta Star	957.1
MLE of Mean	454.4
MLE of Standard Deviation	659.5
nu star	48.42
Approximate Chi Square Value (.05)	33.45
Adjusted Level of Significance	0.0453
Adjusted Chi Square Value	33.09
Anderson-Darling Test Statistic	4.174
Anderson-Darling 5% Critical Value	0.817
Kolmogorov-Smirnov Test Statistic	0.243
Kolmogorov-Smirnov 5% Critical Value	0.131

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	657.8
95% Adjusted Gamma UCL	665

Data Distribution

Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

95% CLT UCL	703.4
95% Jackknife UCL	708.1
95% Standard Bootstrap UCL	707.1
95% Bootstrap-t UCL	921.3
95% Hall's Bootstrap UCL	771.8
95% Percentile Bootstrap UCL	743.4
95% BCA Bootstrap UCL	762.7
95% Chebyshev(Mean, Sd) UCL	1114
97.5% Chebyshev(Mean, Sd) UCL	1400
99% Chebyshev(Mean, Sd) UCL	1961

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 1114

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations 51

Number of Distinct Observations 19

Raw Statistics

Minimum	0.02
Maximum	0.4
Mean	0.098
Median	0.07
SD	0.0736
Coefficient of Variation	0.751
Skewness	2.363

Log-transformed Statistics

Minimum of Log Data	-3.912
Maximum of Log Data	-0.916
Mean of log Data	-2.527
SD of log Data	0.633

Relevant UCL Statistics

Normal Distribution Test

Lilliefors Test Statistic	0.22
Lilliefors Critical Value	0.124

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Lilliefors Test Statistic	0.149
Lilliefors Critical Value	0.124

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	0.115

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	0.119
95% Modified-t UCL (Johnson-1978)	0.116

Assuming Lognormal Distribution

95% H-UCL	0.116
95% Chebyshev (MVUE) UCL	0.138
97.5% Chebyshev (MVUE) UCL	0.155
99% Chebyshev (MVUE) UCL	0.19

Gamma Distribution Test

k star (bias corrected)	2.461
Theta Star	0.0398
MLE of Mean	0.098
MLE of Standard Deviation	0.0625
nu star	251
Approximate Chi Square Value (.05)	215.3
Adjusted Level of Significance	0.0453
Adjusted Chi Square Value	214.4
Anderson-Darling Test Statistic	1.268
Anderson-Darling 5% Critical Value	0.759
Kolmogorov-Smirnov Test Statistic	0.131
Kolmogorov-Smirnov 5% Critical Value	0.125

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.114
95% Adjusted Gamma UCL	0.115

Data Distribution

Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

95% CLT UCL	0.115
95% Jackknife UCL	0.115
95% Standard Bootstrap UCL	0.116
95% Bootstrap-t UCL	0.123
95% Hall's Bootstrap UCL	0.122
95% Percentile Bootstrap UCL	0.116
95% BCA Bootstrap UCL	0.119
95% Chebyshev(Mean, Sd) UCL	0.143
97.5% Chebyshev(Mean, Sd) UCL	0.162
99% Chebyshev(Mean, Sd) UCL	0.201

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 0.143

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Molybdenum

General Statistics

Number of Valid Data	51	Number of Detected Data	48
Number of Distinct Detected Data	21	Number of Non-Detect Data	3
		Percent Non-Detects	5.88%

Raw Statistics

Minimum Detected	0.1
Maximum Detected	16.5
Mean of Detected	1.36
SD of Detected	2.664
Minimum Non-Detect	0.1
Maximum Non-Detect	0.1

Log-transformed Statistics

Minimum Detected	-2.303
Maximum Detected	2.803
Mean of Detected	-0.526
SD of Detected	1.167
Minimum Non-Detect	-2.303
Maximum Non-Detect	-2.303

UCL Statistics

Normal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.483
5% Shapiro Wilk Critical Value	0.947

Data not Normal at 5% Significance Level

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.927
5% Shapiro Wilk Critical Value	0.947

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method

Mean	1.283
SD	2.602
95% DL/2 (t) UCL	1.894

Maximum Likelihood Estimate(MLE) Method

Mean	1.181
SD	2.679
95% MLE (t) UCL	1.81
95% MLE (Tiku) UCL	1.753

Assuming Lognormal Distribution

DL/2 Substitution Method

Mean	-0.671
SD	1.274
95% H-Stat (DL/2) UCL	1.842

Log ROS Method

Mean in Log Scale	-0.687
SD in Log Scale	1.307
Mean in Original Scale	1.283
SD in Original Scale	2.602
95% t UCL	1.893
95% Percentile Bootstrap UCL	1.932
95% BCA Bootstrap UCL	2.247

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	0.691
Theta Star	1.97
nu star	66.3
A-D Test Statistic	3.134
5% A-D Critical Value	0.794
K-S Test Statistic	0.794
5% K-S Critical Value	0.133

Data not Gamma Distributed at 5% Significance Level

Data Distribution Test with Detected Values Only

Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

Kaplan-Meier (KM) Method

Mean	1.286
SD	2.575
SE of Mean	0.364
95% KM (t) UCL	1.897

Assuming Gamma Distribution	
Gamma ROS Statistics using Extrapolated Data	
Minimum	1E-12
Maximum	16.5
Mean	1.28
Median	0.4
SD	2.603
k star	0.288
Theta star	4.441
Nu star	29.41
AppChi2	18.03
95% Gamma Approximate UCL	2.089
95% Adjusted Gamma UCL	2.119

Note: DL/2 is not a recommended method.

95% KM (z) UCL	1.886
95% KM (jackknife) UCL	1.896
95% KM (bootstrap t) UCL	2.549
95% KM (BCA) UCL	1.914
95% KM (Percentile Bootstrap) UCL	1.918
95% KM (Chebyshev) UCL	2.874
97.5% KM (Chebyshev) UCL	3.561
99% KM (Chebyshev) UCL	4.911
Potential UCLs to Use	
95% KM (Chebyshev) UCL	2.874

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Data	51	Number of Detected Data	50
Number of Distinct Detected Data	19	Number of Non-Detect Data	1
		Percent Non-Detects	1.96%

Raw Statistics

Minimum Detected	1
Maximum Detected	34
Mean of Detected	7.14
SD of Detected	7.627
Minimum Non-Detect	1
Maximum Non-Detect	1

Log-transformed Statistics

Minimum Detected	0
Maximum Detected	3.526
Mean of Detected	1.507
SD of Detected	0.975
Minimum Non-Detect	0
Maximum Non-Detect	0

UCL Statistics

Normal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.738
5% Shapiro Wilk Critical Value	0.947

Data not Normal at 5% Significance Level

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.945
5% Shapiro Wilk Critical Value	0.947

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method

Mean	7.01
SD	7.607
95% DL/2 (t) UCL	8.795

Maximum Likelihood Estimate(MLE) Method

Mean	6.934
SD	7.633
95% MLE (t) UCL	8.725
95% MLE (Tiku) UCL	8.591

Assuming Lognormal Distribution

DL/2 Substitution Method

Mean	1.464
SD	1.013
95% H-Stat (DL/2) UCL	10.07

Log ROS Method

Mean in Log Scale	1.458
SD in Log Scale	1.028
Mean in Original Scale	7.007
SD in Original Scale	7.609
95% t UCL	8.793
95% Percentile Bootstrap UCL	8.832
95% BCA Bootstrap UCL	9.157

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	1.17
Theta Star	6.102
nu star	117
A-D Test Statistic	0.962
5% A-D Critical Value	0.774
K-S Test Statistic	0.774
5% K-S Critical Value	0.128

Data not Gamma Distributed at 5% Significance Level

Data Distribution Test with Detected Values Only

Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

Kaplan-Meier (KM) Method

Mean	7.02
SD	7.524
SE of Mean	1.064
95% KM (t) UCL	8.803

Assuming Gamma Distribution	
Gamma ROS Statistics using Extrapolated Data	
Minimum	1E-12
Maximum	34
Mean	7
Median	4
SD	7.616
k star	0.587
Theta star	11.92
Nu star	59.92
AppChi2	43.12
95% Gamma Approximate UCL	9.727
95% Adjusted Gamma UCL	9.822

95% KM (z) UCL	8.77
95% KM (jackknife) UCL	8.803
95% KM (bootstrap t) UCL	9.496
95% KM (BCA) UCL	8.882
95% KM (Percentile Bootstrap) UCL	8.765
95% KM (Chebyshev) UCL	11.66
97.5% KM (Chebyshev) UCL	13.67
99% KM (Chebyshev) UCL	17.61
Potential UCLs to Use	
95% KM (Chebyshev) UCL	11.66

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Potassium

General Statistics

Number of Valid Observations 51

Number of Distinct Observations 34

Raw Statistics

Minimum	90
Maximum	1390
Mean	445.3
Median	370
SD	303.7
Coefficient of Variation	0.682
Skewness	1.564

Log-transformed Statistics

Minimum of Log Data	4.5
Maximum of Log Data	7.237
Mean of log Data	5.902
SD of log Data	0.628

Relevant UCL Statistics

Normal Distribution Test

Lilliefors Test Statistic	0.16
Lilliefors Critical Value	0.124

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Lilliefors Test Statistic	0.0672
Lilliefors Critical Value	0.124

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL 516.6

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	525.2
95% Modified-t UCL (Johnson-1978)	518.1

Assuming Lognormal Distribution

95% H-UCL	530.4
95% Chebyshev (MVUE) UCL	626.5
97.5% Chebyshev (MVUE) UCL	705.7
99% Chebyshev (MVUE) UCL	861.3

Gamma Distribution Test

k star (bias corrected)	2.55
Theta Star	174.6
MLE of Mean	445.3
MLE of Standard Deviation	278.9
nu star	260.1
Approximate Chi Square Value (.05)	223.8
Adjusted Level of Significance	0.0453
Adjusted Chi Square Value	222.8
Anderson-Darling Test Statistic	0.64
Anderson-Darling 5% Critical Value	0.759
Kolmogorov-Smirnov Test Statistic	0.0908
Kolmogorov-Smirnov 5% Critical Value	0.125

Data appear Gamma Distributed at 5% Significance Level

Data Distribution

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	517.6
95% Adjusted Gamma UCL	519.9

Nonparametric Statistics

95% CLT UCL	515.2
95% Jackknife UCL	516.6
95% Standard Bootstrap UCL	514.3
95% Bootstrap-t UCL	530.8
95% Hall's Bootstrap UCL	526.4
95% Percentile Bootstrap UCL	518.8
95% BCA Bootstrap UCL	527.1
95% Chebyshev(Mean, Sd) UCL	630.6
97.5% Chebyshev(Mean, Sd) UCL	710.8
99% Chebyshev(Mean, Sd) UCL	868.4

Potential UCL to Use

Use 95% Approximate Gamma UCL 517.6

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Rubidium

General Statistics

Number of Valid Observations 51

Number of Distinct Observations 45

Raw Statistics

Minimum	0.7
Maximum	31
Mean	8.314
Median	5.8
SD	6.477
Coefficient of Variation	0.779
Skewness	1.428

Log-transformed Statistics

Minimum of Log Data	-0.357
Maximum of Log Data	3.434
Mean of log Data	1.825
SD of log Data	0.803

Relevant UCL Statistics

Normal Distribution Test

Lilliefors Test Statistic	0.163
Lilliefors Critical Value	0.124

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Lilliefors Test Statistic	0.093
Lilliefors Critical Value	0.124

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	9.834

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	9.999
95% Modified-t UCL (Johnson-1978)	9.864

Assuming Lognormal Distribution

95% H-UCL	10.89
95% Chebyshev (MVUE) UCL	13.16
97.5% Chebyshev (MVUE) UCL	15.18
99% Chebyshev (MVUE) UCL	19.15

Gamma Distribution Test

k star (bias corrected)	1.76
Theta Star	4.723
MLE of Mean	8.314
MLE of Standard Deviation	6.266
nu star	179.5
Approximate Chi Square Value (.05)	149.5
Adjusted Level of Significance	0.0453
Adjusted Chi Square Value	148.8
Anderson-Darling Test Statistic	0.486
Anderson-Darling 5% Critical Value	0.764
Kolmogorov-Smirnov Test Statistic	0.0928
Kolmogorov-Smirnov 5% Critical Value	0.126

Data appear Gamma Distributed at 5% Significance Level

Data Distribution

Data appear Gamma Distributed at 5% Significance Level

Nonparametric Statistics

95% CLT UCL	9.806
95% Jackknife UCL	9.834
95% Standard Bootstrap UCL	9.765
95% Bootstrap-t UCL	10.03
95% Hall's Bootstrap UCL	10.03
95% Percentile Bootstrap UCL	9.835
95% BCA Bootstrap UCL	10
95% Chebyshev(Mean, Sd) UCL	12.27
97.5% Chebyshev(Mean, Sd) UCL	13.98
99% Chebyshev(Mean, Sd) UCL	17.34

Assuming Gamma Distribution

95% Approximate Gamma UCL	9.981
95% Adjusted Gamma UCL	10.03

Potential UCL to Use

Use 95% Approximate Gamma UCL 9.981

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Selenium

General Statistics

Number of Valid Data	51	Number of Detected Data	4
Number of Distinct Detected Data	2	Number of Non-Detect Data	47
		Percent Non-Detects	92.16%

Raw Statistics

Minimum Detected	1
Maximum Detected	2
Mean of Detected	1.5
SD of Detected	0.577
Minimum Non-Detect	1
Maximum Non-Detect	1

Log-transformed Statistics

Minimum Detected	0
Maximum Detected	0.693
Mean of Detected	0.347
SD of Detected	0.4
Minimum Non-Detect	0
Maximum Non-Detect	0

Warning: Data set has only 2 Distinct Detected Values.

This may not be adequate enough to compute meaningful and reliable test statistics and estimates.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

UCL Statistics

Normal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.731
5% Shapiro Wilk Critical Value	0.748

Data not Normal at 5% Significance Level

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.731
5% Shapiro Wilk Critical Value	0.748

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method	
Mean	0.578
SD	0.306
95% DL/2 (t) UCL	0.65
Maximum Likelihood Estimate(MLE) Method	N/A

MLE yields a negative mean

Assuming Lognormal Distribution

DL/2 Substitution Method	
Mean	-0.612
SD	0.299
95% H-Stat (DL/2) UCL	0.61
Log ROS Method	
Mean in Log Scale	-1.991
SD in Log Scale	1.243
Mean in Original Scale	0.285
SD in Original Scale	0.42
95% t UCL	0.384
95% Percentile Bootstrap UCL	0.393
95% BCA Bootstrap UCL	0.411

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	2.33
Theta Star	0.644
nu star	18.64
A-D Test Statistic	0.718
5% A-D Critical Value	0.658
K-S Test Statistic	0.658
5% K-S Critical Value	0.395

Data follow Appr. Gamma Distribution at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	0.861
Maximum	7.378
Mean	4.685
Median	5.025
SD	1.93
k star	3.986
Theta star	1.176
Nu star	406.6
AppChi2	360.8
95% Gamma Approximate UCL	5.279
95% Adjusted Gamma UCL	N/A

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only

Data Follow Appr. Gamma Distribution at 5% Significance Level

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	1.039
SD	0.194
SE of Mean	0.0314
95% KM (t) UCL	1.092
95% KM (z) UCL	1.091
95% KM (jackknife) UCL	N/A
95% KM (bootstrap t) UCL	N/A
95% KM (BCA) UCL	N/A
95% KM (Percentile Bootstrap) UCL	N/A
95% KM (Chebyshev) UCL	1.176
97.5% KM (Chebyshev) UCL	1.235
99% KM (Chebyshev) UCL	1.351

Potential UCLs to Use

95% KM (t) UCL	1.092

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Data	51	Number of Detected Data	18
Number of Distinct Detected Data	5	Number of Non-Detect Data	33
		Percent Non-Detects	64.71%

Raw Statistics

Minimum Detected	0.1
Maximum Detected	1.1
Mean of Detected	0.222
SD of Detected	0.241
Minimum Non-Detect	0.1
Maximum Non-Detect	0.1

Log-transformed Statistics

Minimum Detected	-2.303
Maximum Detected	0.0953
Mean of Detected	-1.788
SD of Detected	0.671
Minimum Non-Detect	-2.303
Maximum Non-Detect	-2.303

UCL Statistics

Normal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.542
5% Shapiro Wilk Critical Value	0.897

Data not Normal at 5% Significance Level

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.76
5% Shapiro Wilk Critical Value	0.897

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method

Mean	0.111
SD	0.163
95% DL/2 (t) UCL	0.149

Maximum Likelihood Estimate(MLE) Method N/A

MLE yields a negative mean

Assuming Lognormal Distribution

DL/2 Substitution Method

Mean	-2.569
SD	0.702
95% H-Stat (DL/2) UCL	0.12

Log ROS Method

Mean in Log Scale	-3.15
SD in Log Scale	1.278
Mean in Original Scale	0.0959
SD in Original Scale	0.17
95% t UCL	0.136
95% Percentile Bootstrap UCL	0.14
95% BCA Bootstrap UCL	0.155

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	1.63
Theta Star	0.136
nu star	58.68
A-D Test Statistic	2.029
5% A-D Critical Value	0.753
K-S Test Statistic	0.753
5% K-S Critical Value	0.206

Data not Gamma Distributed at 5% Significance Level

Data Distribution Test with Detected Values Only

Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

Kaplan-Meier (KM) Method

Mean	0.143
SD	0.151
SE of Mean	0.0218
95% KM (t) UCL	0.18

Assuming Gamma Distribution	
Gamma ROS Statistics using Extrapolated Data	
Minimum	1E-12
Maximum	1.1
Mean	0.329
Median	0.277
SD	0.236
k star	0.491
Theta star	0.671
Nu star	50.06
AppChi2	34.82
95% Gamma Approximate UCL	0.474
95% Adjusted Gamma UCL	0.479

95% KM (z) UCL	0.179
95% KM (jackknife) UCL	0.179
95% KM (bootstrap t) UCL	0.257
95% KM (BCA) UCL	0.182
95% KM (Percentile Bootstrap) UCL	0.182
95% KM (Chebyshev) UCL	0.238
97.5% KM (Chebyshev) UCL	0.279
99% KM (Chebyshev) UCL	0.36
Potential UCLs to Use	
95% KM (t) UCL	0.18
95% KM (% Bootstrap) UCL	0.182

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Sodium

General Statistics

Number of Valid Data	51	Number of Detected Data	6
Number of Distinct Detected Data	6	Number of Non-Detect Data	45
		Percent Non-Detects	88.24%

Raw Statistics

Minimum Detected	50
Maximum Detected	250
Mean of Detected	153.3
SD of Detected	89.14
Minimum Non-Detect	50
Maximum Non-Detect	50

Log-transformed Statistics

Minimum Detected	3.912
Maximum Detected	5.521
Mean of Detected	4.858
SD of Detected	0.68
Minimum Non-Detect	3.912
Maximum Non-Detect	3.912

Warning: There are only 6 Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.834
5% Shapiro Wilk Critical Value	0.788

Data appear Normal at 5% Significance Level

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.859
5% Shapiro Wilk Critical Value	0.788

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method	
Mean	40.1
SD	50.38
95% DL/2 (t) UCL	51.92
Maximum Likelihood Estimate(MLE) Method	N/A

MLE yields a negative mean

Assuming Lognormal Distribution

DL/2 Substitution Method	
Mean	3.412
SD	0.575
95% H-Stat (DL/2) UCL	41.84
Log ROS Method	
Mean in Log Scale	1.715
SD in Log Scale	1.857
Mean in Original Scale	25.86
SD in Original Scale	55.8
95% t UCL	38.95
95% Percentile Bootstrap UCL	39.68
95% BCA Bootstrap UCL	43.75

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	1.62
Theta Star	94.67
nu star	19.44

Data Distribution Test with Detected Values Only

Data appear Normal at 5% Significance Level

A-D Test Statistic	0.559
5% A-D Critical Value	0.701
K-S Test Statistic	0.701
5% K-S Critical Value	0.335

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	30.97
Maximum	1122
Mean	607.6
Median	637.3
SD	334.2
k star	1.991
Theta star	305.2
Nu star	203.1
AppChi2	171.1
95% Gamma Approximate UCL	721.2
95% Adjusted Gamma UCL	724.8

Note: DL/2 is not a recommended method.

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	62.16
SD	43.45
SE of Mean	6.664
95% KM (t) UCL	73.33
95% KM (z) UCL	73.12
95% KM (jackknife) UCL	81.62
95% KM (bootstrap t) UCL	73.58
95% KM (BCA) UCL	220.6
95% KM (Percentile Bootstrap) UCL	104.5
95% KM (Chebyshev) UCL	91.21
97.5% KM (Chebyshev) UCL	103.8
99% KM (Chebyshev) UCL	128.5

Potential UCLs to Use

95% KM (t) UCL	73.33
95% KM (Percentile Bootstrap) UCL	104.5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Strontium

General Statistics

Number of Valid Observations 51

Number of Distinct Observations 21

Raw Statistics

Minimum	1
Maximum	165
Mean	10.96
Median	4
SD	23.46
Coefficient of Variation	2.141
Skewness	5.915

Log-transformed Statistics

Minimum of Log Data	0
Maximum of Log Data	5.106
Mean of log Data	1.703
SD of log Data	1.02

Relevant UCL Statistics

Normal Distribution Test

Lilliefors Test Statistic	0.336
Lilliefors Critical Value	0.124

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Lilliefors Test Statistic	0.141
Lilliefors Critical Value	0.124

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	16.47

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	19.27
95% Modified-t UCL (Johnson-1978)	16.92

Assuming Lognormal Distribution

95% H-UCL	12.91
95% Chebyshev (MVUE) UCL	15.78
97.5% Chebyshev (MVUE) UCL	18.68
99% Chebyshev (MVUE) UCL	24.37

Gamma Distribution Test

k star (bias corrected)	0.814
Theta Star	13.46
MLE of Mean	10.96
MLE of Standard Deviation	12.15
nu star	83.05
Approximate Chi Square Value (.05)	63.05
Adjusted Level of Significance	0.0453
Adjusted Chi Square Value	62.54
Anderson-Darling Test Statistic	3.082
Anderson-Darling 5% Critical Value	0.788
Kolmogorov-Smirnov Test Statistic	0.19
Kolmogorov-Smirnov 5% Critical Value	0.129

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	14.44
95% Adjusted Gamma UCL	14.56

Data Distribution

Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

95% CLT UCL	16.37
95% Jackknife UCL	16.47
95% Standard Bootstrap UCL	16.23
95% Bootstrap-t UCL	25.78
95% Hall's Bootstrap UCL	36.32
95% Percentile Bootstrap UCL	16.98
95% BCA Bootstrap UCL	20.18
95% Chebyshev(Mean, Sd) UCL	25.28
97.5% Chebyshev(Mean, Sd) UCL	31.48
99% Chebyshev(Mean, Sd) UCL	43.65

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 25.28

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Tellurium

General Statistics

Number of Valid Data	51	Number of Detected Data	0
Number of Distinct Detected Data	0	Number of Non-Detect Data	51
		Percent Non-Detects	100.00%

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!

Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Tellurium was not processed!

Thallium

General Statistics

Number of Valid Data	51	Number of Detected Data	26
Number of Distinct Detected Data	3	Number of Non-Detect Data	25
		Percent Non-Detects	49.02%

Raw Statistics

Minimum Detected	0.1
Maximum Detected	0.3
Mean of Detected	0.185
SD of Detected	0.0784
Minimum Non-Detect	0.1
Maximum Non-Detect	0.1

Log-transformed Statistics

Minimum Detected	-2.303
Maximum Detected	-1.204
Mean of Detected	-1.782
SD of Detected	0.448
Minimum Non-Detect	-2.303
Maximum Non-Detect	-2.303

Warning: There are only 3 Distinct Detected Values in this data set

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

UCL Statistics

Normal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.797
5% Shapiro Wilk Critical Value	0.92

Data not Normal at 5% Significance Level

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.782
5% Shapiro Wilk Critical Value	0.92

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method

Mean	0.119
SD	0.0877
95% DL/2 (t) UCL	0.139

Maximum Likelihood Estimate(MLE) Method

Mean	0.0977
SD	0.115
95% MLE (t) UCL	0.125
95% MLE (Tiku) UCL	0.131

Assuming Lognormal Distribution

DL/2 Substitution Method

Mean	-2.377
SD	0.69
95% H-Stat (DL/2) UCL	0.143

Log ROS Method

Mean in Log Scale	-2.333
SD in Log Scale	0.704
Mean in Original Scale	0.123
SD in Original Scale	0.0856
95% t UCL	0.143
95% Percentile Bootstrap UCL	0.143
95% BCA Bootstrap UCL	0.144

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	4.925
Theta Star	0.0375
nu star	256.1
A-D Test Statistic	2.288
5% A-D Critical Value	0.746
K-S Test Statistic	0.746
5% K-S Critical Value	0.172

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	0.0216
Maximum	0.3
Mean	0.183
Median	0.2
SD	0.0722
k star	4.788
Theta star	0.0382
Nu star	488.3
AppChi2	438.1
95% Gamma Approximate UCL	0.204
95% Adjusted Gamma UCL	0.204

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only

Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	0.143
SD	0.0693
SE of Mean	0.0099
95% KM (t) UCL	0.16
95% KM (z) UCL	0.159
95% KM (jackknife) UCL	N/A
95% KM (bootstrap t) UCL	N/A
95% KM (BCA) UCL	N/A
95% KM (Percentile Bootstrap) UCL	N/A
95% KM (Chebyshev) UCL	0.186
97.5% KM (Chebyshev) UCL	0.205
99% KM (Chebyshev) UCL	0.242

Potential UCLs to Use

95% KM (t) UCL	0.16
95% KM (% Bootstrap) UCL	N/A

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Tin

General Statistics

Number of Valid Data	51	Number of Detected Data	0
Number of Distinct Detected Data	0	Number of Non-Detect Data	51
		Percent Non-Detects	100.00%

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!

Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Tin was not processed!

Tungsten

General Statistics

Number of Valid Data	51	Number of Detected Data	31
Number of Distinct Detected Data	9	Number of Non-Detect Data	20
		Percent Non-Detects	39.22%

Raw Statistics

Minimum Detected	0.1
Maximum Detected	8.4
Mean of Detected	0.706
SD of Detected	1.621
Minimum Non-Detect	0.1
Maximum Non-Detect	0.1

Log-transformed Statistics

Minimum Detected	-2.303
Maximum Detected	2.128
Mean of Detected	-1.27
SD of Detected	1.081
Minimum Non-Detect	-2.303
Maximum Non-Detect	-2.303

UCL Statistics

Normal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.402
5% Shapiro Wilk Critical Value	0.929

Data not Normal at 5% Significance Level

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.773
5% Shapiro Wilk Critical Value	0.929

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method	
Mean	0.449
SD	1.297
95% DL/2 (t) UCL	0.753
Maximum Likelihood Estimate(MLE) Method	N/A

MLE yields a negative mean

Assuming Lognormal Distribution

DL/2 Substitution Method	
Mean	-1.947
SD	1.194
95% H-Stat (DL/2) UCL	0.445
Log ROS Method	
Mean in Log Scale	-2.287
SD in Log Scale	1.61
Mean in Original Scale	0.44
SD in Original Scale	1.3
95% t UCL	0.745
95% Percentile Bootstrap UCL	0.775
95% BCA Bootstrap UCL	0.938

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	0.618
Theta Star	1.143
nu star	38.31
A-D Test Statistic	4.737
5% A-D Critical Value	0.796
K-S Test Statistic	0.796
5% K-S Critical Value	0.165

Data not Gamma Distributed at 5% Significance Level

Data Distribution Test with Detected Values Only

Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	0.469
SD	1.278
SE of Mean	0.182
95% KM (t) UCL	0.774

Assuming Gamma Distribution	
Gamma ROS Statistics using Extrapolated Data	
Minimum	1E-12
Maximum	8.4
Mean	0.519
Median	0.2
SD	1.292
k star	0.141
Theta star	3.689
Nu star	14.35
AppChi2	6.81
95% Gamma Approximate UCL	1.093
95% Adjusted Gamma UCL	1.118

Note: DL/2 is not a recommended method.

95% KM (z) UCL	0.768
95% KM (jackknife) UCL	0.772
95% KM (bootstrap t) UCL	1.213
95% KM (BCA) UCL	0.812
95% KM (Percentile Bootstrap) UCL	0.79
95% KM (Chebyshev) UCL	1.262
97.5% KM (Chebyshev) UCL	1.605
99% KM (Chebyshev) UCL	2.279
Potential UCLs to Use	
95% KM (Chebyshev) UCL	1.262

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Uranium

General Statistics

Number of Valid Observations	51	Number of Distinct Observations	18

Raw Statistics

Minimum	0.2
Maximum	3.2
Mean	0.996
Median	0.8
SD	0.734
Coefficient of Variation	0.737
Skewness	1.587

Log-transformed Statistics

Minimum of Log Data	-1.609
Maximum of Log Data	1.163
Mean of log Data	-0.224
SD of log Data	0.653

Relevant UCL Statistics

Normal Distribution Test

Lilliefors Test Statistic	0.204
Lilliefors Critical Value	0.124

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Lilliefors Test Statistic	0.0973
Lilliefors Critical Value	0.124

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	1.168

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	1.189
95% Modified-t UCL (Johnson-1978)	1.172

Assuming Lognormal Distribution

95% H-UCL	1.189
95% Chebyshev (MVUE) UCL	1.41
97.5% Chebyshev (MVUE) UCL	1.594
99% Chebyshev (MVUE) UCL	1.956

Gamma Distribution Test

k star (bias corrected)	2.301
Theta Star	0.433
MLE of Mean	0.996
MLE of Standard Deviation	0.657
nu star	234.7
Approximate Chi Square Value (.05)	200.2
Adjusted Level of Significance	0.0453
Adjusted Chi Square Value	199.3
Anderson-Darling Test Statistic	1.19
Anderson-Darling 5% Critical Value	0.76
Kolmogorov-Smirnov Test Statistic	0.132
Kolmogorov-Smirnov 5% Critical Value	0.126

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	1.168
95% Adjusted Gamma UCL	1.173

Data Distribution

Data appear Lognormal at 5% Significance Level

Nonparametric Statistics

95% CLT UCL	1.165
95% Jackknife UCL	1.168
95% Standard Bootstrap UCL	1.159
95% Bootstrap-t UCL	1.2
95% Hall's Bootstrap UCL	1.2
95% Percentile Bootstrap UCL	1.171
95% BCA Bootstrap UCL	1.196
95% Chebyshev(Mean, Sd) UCL	1.444
97.5% Chebyshev(Mean, Sd) UCL	1.638
99% Chebyshev(Mean, Sd) UCL	2.018

Potential UCL to Use

Use 95% H-UCL 1.189

ProUCL computes and outputs H-statistic based UCLs for historical reasons only.

H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.

It is therefore recommended to avoid the use of H-statistic based 95% UCLs.

Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Vanadium

General Statistics

Number of Valid Observations	51	Number of Distinct Observations	37

Raw Statistics

Minimum	2
Maximum	115
Mean	29.78
Median	27
SD	20.89
Coefficient of Variation	0.701
Skewness	1.434

Log-transformed Statistics

Minimum of Log Data	0.693
Maximum of Log Data	4.745
Mean of log Data	3.116
SD of log Data	0.828

Relevant UCL Statistics

Normal Distribution Test

Lilliefors Test Statistic	0.0981
Lilliefors Critical Value	0.124

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Lilliefors Test Statistic	0.0976
Lilliefors Critical Value	0.124

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL 34.69

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	35.22
95% Modified-t UCL (Johnson-1978)	34.78

Assuming Lognormal Distribution

95% H-UCL	40.83
95% Chebyshev (MVUE) UCL	49.47
97.5% Chebyshev (MVUE) UCL	57.24
99% Chebyshev (MVUE) UCL	72.51

Gamma Distribution Test

k star (bias corrected)	1.848
Theta Star	16.12
MLE of Mean	29.78
MLE of Standard Deviation	21.91
nu star	188.5
Approximate Chi Square Value (.05)	157.7
Adjusted Level of Significance	0.0453
Adjusted Chi Square Value	156.9
Anderson-Darling Test Statistic	0.403
Anderson-Darling 5% Critical Value	0.763
Kolmogorov-Smirnov Test Statistic	0.0868
Kolmogorov-Smirnov 5% Critical Value	0.126

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	35.59
95% Adjusted Gamma UCL	35.78

Data Distribution

Data appear Normal at 5% Significance Level

Nonparametric Statistics

95% CLT UCL	34.6
95% Jackknife UCL	34.69
95% Standard Bootstrap UCL	34.61
95% Bootstrap-t UCL	35.71
95% Hall's Bootstrap UCL	36.21
95% Percentile Bootstrap UCL	34.65
95% BCA Bootstrap UCL	34.94
95% Chebyshev(Mean, Sd) UCL	42.53
97.5% Chebyshev(Mean, Sd) UCL	48.05
99% Chebyshev(Mean, Sd) UCL	58.89

Potential UCL to Use — Use 95% Student's-t UCL 34.69

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Zinc

General Statistics

Number of Valid Observations	51	Number of Distinct Observations	35

Raw Statistics

Minimum	4
Maximum	118
Mean	30.41
Median	21
SD	27.72
Coefficient of Variation	0.911
Skewness	1.693

Log-transformed Statistics

Minimum of Log Data	1.386
Maximum of Log Data	4.771
Mean of log Data	3.078
SD of log Data	0.816

Relevant UCL Statistics

Normal Distribution Test

Lilliefors Test Statistic	0.207
Lilliefors Critical Value	0.124

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Lilliefors Test Statistic	0.0917
Lilliefors Critical Value	0.124

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	36.92

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	37.78
95% Modified-t UCL (Johnson-1978)	37.07

Assuming Lognormal Distribution

95% H-UCL	38.73
95% Chebyshev (MVUE) UCL	46.88
97.5% Chebyshev (MVUE) UCL	54.17
99% Chebyshev (MVUE) UCL	68.48

Gamma Distribution Test

k star (bias corrected)	1.548
Theta Star	19.65
MLE of Mean	30.41
MLE of Standard Deviation	24.44
nu star	157.9
Approximate Chi Square Value (.05)	129.8
Adjusted Level of Significance	0.0453
Adjusted Chi Square Value	129.1
Anderson-Darling Test Statistic	1.189
Anderson-Darling 5% Critical Value	0.766
Kolmogorov-Smirnov Test Statistic	0.105
Kolmogorov-Smirnov 5% Critical Value	0.126

Data follow Appr. Gamma Distribution at 5% Significance Level

Data Distribution

Data Follow Appr. Gamma Distribution at 5% Significance Level

Nonparametric Statistics

95% CLT UCL	36.8
95% Jackknife UCL	36.92
95% Standard Bootstrap UCL	36.82
95% Bootstrap-t UCL	38.35
95% Hall's Bootstrap UCL	37.75
95% Percentile Bootstrap UCL	37.35
95% BCA Bootstrap UCL	38.2
95% Chebyshev(Mean, Sd) UCL	47.33
97.5% Chebyshev(Mean, Sd) UCL	54.65
99% Chebyshev(Mean, Sd) UCL	69.03

Assuming Gamma Distribution

95% Approximate Gamma UCL	36.98
95% Adjusted Gamma UCL	37.19

Potential UCL to Use

Use 95% Approximate Gamma UCL 36.98

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

ProUCL Outputs: Grass

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	U:\121810356\1_environmental\4_field_data\3_hhera\6_reporting\grass.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Aluminum mg/kg

General Statistics

Number of Valid Observations	8	Number of Distinct Observations	8

Raw Statistics

Minimum	2.8
Maximum	83.7
Mean	21.46
Median	10.4
SD	27.29
Coefficient of Variation	1.271
Skewness	2.091

Log-transformed Statistics

Minimum of Log Data	1.03
Maximum of Log Data	4.427
Mean of log Data	2.444
SD of log Data	1.189

Warning: There are only 8 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.731
Shapiro Wilk Critical Value	0.818

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.955
Shapiro Wilk Critical Value	0.818

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	39.74

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	44.95
95% Modified-t UCL (Johnson-1978)	40.93

Assuming Lognormal Distribution

95% H-UCL	135.3
95% Chebyshev (MVUE) UCL	59.11
97.5% Chebyshev (MVUE) UCL	75.77
99% Chebyshev (MVUE) UCL	108.5

Gamma Distribution Test

k star (bias corrected)	0.668
Theta Star	32.15
MLE of Mean	21.46
MLE of Standard Deviation	26.27
nu star	10.68
Approximate Chi Square Value (.05)	4.372
Adjusted Level of Significance	0.0195
Adjusted Chi Square Value	3.41

Data Distribution

Data appear Gamma Distributed at 5% Significance Level

Nonparametric Statistics

95% CLT UCL	37.33
95% Jackknife UCL	39.74
95% Standard Bootstrap UCL	36.02

Anderson-Darling Test Statistic	0.342
Anderson-Darling 5% Critical Value	0.738
Kolmogorov-Smirnov Test Statistic	0.193
Kolmogorov-Smirnov 5% Critical Value	0.302

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	52.44
95% Adjusted Gamma UCL	67.23

95% Bootstrap-t UCL	74.18
95% Hall's Bootstrap UCL	97.48
95% Percentile Bootstrap UCL	38.13
95% BCA Bootstrap UCL	44.71
95% Chebyshev(Mean, Sd) UCL	63.51
97.5% Chebyshev(Mean, Sd) UCL	81.71
99% Chebyshev(Mean, Sd) UCL	117.5

Potential UCL to Use — Use 95% Approximate Gamma UCL 52.44

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Antimony mg/kg

General Statistics

Number of Valid Data	8	Number of Detected Data	1
Number of Distinct Detected Data	1	Number of Non-Detect Data	7
		Percent Non-Detects	87.50%

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Antimony mg/kg was not processed!

Arsenic mg/kg

General Statistics

Number of Valid Data	8	Number of Detected Data	5
Number of Distinct Detected Data	4	Number of Non-Detect Data	3
		Percent Non-Detects	37.50%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.03	Minimum Detected	-3.507
Maximum Detected	0.06	Maximum Detected	-2.813
Mean of Detected	0.046	Mean of Detected	-3.106
SD of Detected	0.0114	SD of Detected	0.266
Minimum Non-Detect	0.02	Minimum Non-Detect	-3.912
Maximum Non-Detect	0.02	Maximum Non-Detect	-3.912

Warning: There are only 4 Distinct Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.961	Shapiro Wilk Test Statistic	0.935
5% Shapiro Wilk Critical Value	0.762	5% Shapiro Wilk Critical Value	0.762
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.0325	Mean	-3.668
SD	0.0205	SD	0.802
95% DL/2 (t) UCL	0.0463	95% H-Stat (DL/2) UCL	0.0861
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	0.0309	Mean in Log Scale	-3.373
SD	0.0223	SD in Log Scale	0.431
95% MLE (t) UCL	0.0458	Mean in Original Scale	0.0371
95% MLE (Tiku) UCL	0.0477	SD in Original Scale	0.0152
		95% t UCL	0.0472
		95% Percentile Bootstrap UCL	0.0451
		95% BCA Bootstrap UCL	0.0453

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	7.621	Data appear Normal at 5% Significance Level	
Theta Star	0.00604		
nu star	76.21		
A-D Test Statistic	0.3	Nonparametric Statistics	
5% A-D Critical Value	0.679	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.679	Mean	0.04
5% K-S Critical Value	0.357	SD	0.0112

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	0.03
Maximum	0.06
Mean	0.0434
Median	0.0428
SD	0.0101
k star	13.03
Theta star	0.00333
Nu star	208.4
AppChi2	176
95% Gamma Approximate UCL	0.0514
95% Adjusted Gamma UCL	0.0537

SE of Mean	0.00442
95% KM (t) UCL	0.0484
95% KM (z) UCL	0.0473
95% KM (jackknife) UCL	0.0486
95% KM (bootstrap t) UCL	0.0477
95% KM (BCA) UCL	0.0525
95% KM (Percentile Bootstrap) UCL	0.0513
95% KM (Chebyshev) UCL	0.0593
97.5% KM (Chebyshev) UCL	0.0676
99% KM (Chebyshev) UCL	0.084

Potential UCLs to Use

95% KM (t) UCL	0.0484
95% KM (Percentile Bootstrap) UCL	0.0513

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Barium mg/kg

General Statistics

Number of Valid Observations	8	Number of Distinct Observations	8

Raw Statistics

Minimum	6.39
Maximum	24.6
Mean	13.53
Median	11.75
SD	6.28
Coefficient of Variation	0.464
Skewness	0.962

Log-transformed Statistics

Minimum of Log Data	1.855
Maximum of Log Data	3.203
Mean of log Data	2.516
SD of log Data	0.447

Warning: There are only 8 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.896
Shapiro Wilk Critical Value	0.818

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.961
Shapiro Wilk Critical Value	0.818

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	17.73

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	17.99
95% Modified-t UCL (Johnson-1978)	17.86

Assuming Lognormal Distribution

95% H-UCL	20.07
95% Chebyshev (MVUE) UCL	22.88
97.5% Chebyshev (MVUE) UCL	26.93
99% Chebyshev (MVUE) UCL	34.91

Gamma Distribution Test

k star (bias corrected)	3.692
Theta Star	3.664
MLE of Mean	13.53
MLE of Standard Deviation	7.04
nu star	59.07
Approximate Chi Square Value (.05)	42.4
Adjusted Level of Significance	0.0195
Adjusted Chi Square Value	38.85
Anderson-Darling Test Statistic	0.301
Anderson-Darling 5% Critical Value	0.718
Kolmogorov-Smirnov Test Statistic	0.156
Kolmogorov-Smirnov 5% Critical Value	0.295

Data appear Gamma Distributed at 5% Significance Level

Data Distribution

Data appear Normal at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	18.85
95% Adjusted Gamma UCL	20.57

Nonparametric Statistics

95% CLT UCL	17.18
95% Jackknife UCL	17.73
95% Standard Bootstrap UCL	16.97
95% Bootstrap-t UCL	20.54
95% Hall's Bootstrap UCL	29.33
95% Percentile Bootstrap UCL	16.85
95% BCA Bootstrap UCL	17.36
95% Chebyshev(Mean, Sd) UCL	23.21
97.5% Chebyshev(Mean, Sd) UCL	27.39
99% Chebyshev(Mean, Sd) UCL	35.62

Potential UCL to Use	Use 95% Student's-t UCL 17.73

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Beryllium mg/kg

General Statistics

Number of Valid Data	8	Number of Detected Data	2
Number of Distinct Detected Data	2	Number of Non-Detect Data	6
		Percent Non-Detects	75.00%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.003	Minimum Detected	-5.809
Maximum Detected	0.009	Maximum Detected	-4.711
Mean of Detected	0.006	Mean of Detected	-5.26
SD of Detected	0.00424	SD of Detected	0.777
Minimum Non-Detect	0.002	Minimum Non-Detect	-6.215
Maximum Non-Detect	0.002	Maximum Non-Detect	-6.215

Warning: Data set has only 2 Distinct Detected Values.

This may not be adequate enough to compute meaningful and reliable test statistics and estimates.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	N/A	Shapiro Wilk Test Statistic	N/A
5% Shapiro Wilk Critical Value	N/A	5% Shapiro Wilk Critical Value	N/A
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.00225	Mean	-6.496
SD	0.00282	SD	0.817
95% DL/2 (t) UCL	0.00414	95% H-Stat (DL/2) UCL	0.00531
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	N/A
		SD in Log Scale	N/A
		Mean in Original Scale	N/A
		SD in Original Scale	N/A
		95% t UCL	N/A
		95% Percentile Bootstrap UCL	N/A
		95% BCA Bootstrap UCL	N/A

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	N/A
Theta Star	N/A
nu star	N/A
A-D Test Statistic	N/A
5% A-D Critical Value	N/A
K-S Test Statistic	N/A
5% K-S Critical Value	N/A

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	N/A
Maximum	N/A
Mean	N/A
Median	N/A
SD	N/A
k star	N/A
Theta star	N/A
Nu star	N/A
AppChi2	N/A
95% Gamma Approximate UCL	N/A
95% Adjusted Gamma UCL	N/A

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only

Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	0.00375
SD	0.00198
SE of Mean	0.0009922
95% KM (t) UCL	0.00563
95% KM (z) UCL	0.00538
95% KM (jackknife) UCL	N/A
95% KM (bootstrap t) UCL	N/A
95% KM (BCA) UCL	N/A
95% KM (Percentile Bootstrap) UCL	N/A
95% KM (Chebyshev) UCL	0.00807
97.5% KM (Chebyshev) UCL	0.00995
99% KM (Chebyshev) UCL	0.0136

Potential UCLs to Use

95% KM (t) UCL	0.00563
95% KM (% Bootstrap) UCL	N/A

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Bismuth mg/kg

General Statistics

Number of Valid Data	8	Number of Detected Data	0
Number of Distinct Detected Data	0	Number of Non-Detect Data	8
		Percent Non-Detects	100.00%

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!

Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Bismuth mg/kg was not processed!

Boron mg/kg

General Statistics

Number of Valid Observations 8

Number of Distinct Observations 7

Raw Statistics

Minimum	0.7
Maximum	2.4
Mean	1.413
Median	1.4
SD	0.589
Coefficient of Variation	0.417
Skewness	0.324

Log-transformed Statistics

Minimum of Log Data	-0.357
Maximum of Log Data	0.875
Mean of log Data	0.262
SD of log Data	0.448

Warning: There are only 8 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.957
Shapiro Wilk Critical Value	0.818

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.933
Shapiro Wilk Critical Value	0.818

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	1.807

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	1.781
95% Modified-t UCL (Johnson-1978)	1.811

Assuming Lognormal Distribution

95% H-UCL	2.111
95% Chebyshev (MVUE) UCL	2.406
97.5% Chebyshev (MVUE) UCL	2.833
99% Chebyshev (MVUE) UCL	3.673

Gamma Distribution Test

k star (bias corrected)	3.943
Theta Star	0.358
MLE of Mean	1.413
MLE of Standard Deviation	0.711
nu star	63.09
Approximate Chi Square Value (.05)	45.82
Adjusted Level of Significance	0.0195
Adjusted Chi Square Value	42.12
Anderson-Darling Test Statistic	0.244
Anderson-Darling 5% Critical Value	0.718
Kolmogorov-Smirnov Test Statistic	0.172
Kolmogorov-Smirnov 5% Critical Value	0.295

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	1.945
95% Adjusted Gamma UCL	2.116

Potential UCL to Use

Data Distribution

Data appear Normal at 5% Significance Level

Nonparametric Statistics

95% CLT UCL	1.755
95% Jackknife UCL	1.807
95% Standard Bootstrap UCL	1.731
95% Bootstrap-t UCL	1.803
95% Hall's Bootstrap UCL	1.829
95% Percentile Bootstrap UCL	1.738
95% BCA Bootstrap UCL	1.763
95% Chebyshev(Mean, Sd) UCL	2.32
97.5% Chebyshev(Mean, Sd) UCL	2.713
99% Chebyshev(Mean, Sd) UCL	3.485

Use 95% Student's-t UCL 1.807

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cadmium mg/kg

General Statistics

Number of Valid Observations 8

Number of Distinct Observations 7

Raw Statistics

Minimum	0.005
Maximum	0.113
Mean	0.0478
Median	0.0405
SD	0.0456
Coefficient of Variation	0.956
Skewness	0.607

Log-transformed Statistics

Minimum of Log Data	-5.298
Maximum of Log Data	-2.18
Mean of log Data	-3.686
SD of log Data	1.373

Warning: There are only 8 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.837
Shapiro Wilk Critical Value	0.818

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.836
Shapiro Wilk Critical Value	0.818

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	0.0783

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	0.078
95% Modified-t UCL (Johnson-1978)	0.0789

Assuming Lognormal Distribution

95% H-UCL	0.629
95% Chebyshev (MVUE) UCL	0.169
97.5% Chebyshev (MVUE) UCL	0.218
99% Chebyshev (MVUE) UCL	0.316

Gamma Distribution Test

k star (bias corrected)	0.65
Theta Star	0.0735
MLE of Mean	0.0478
MLE of Standard Deviation	0.0592
nu star	10.4
Approximate Chi Square Value (.05)	4.191
Adjusted Level of Significance	0.0195
Adjusted Chi Square Value	3.254
Anderson-Darling Test Statistic	0.543
Anderson-Darling 5% Critical Value	0.739
Kolmogorov-Smirnov Test Statistic	0.238
Kolmogorov-Smirnov 5% Critical Value	0.302

Data appear Gamma Distributed at 5% Significance Level

Data Distribution

Data appear Normal at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.118
95% Adjusted Gamma UCL	0.153

Nonparametric Statistics

95% CLT UCL	0.0743
95% Jackknife UCL	0.0783
95% Standard Bootstrap UCL	0.0727
95% Bootstrap-t UCL	0.0857
95% Hall's Bootstrap UCL	0.0823
95% Percentile Bootstrap UCL	0.0725
95% BCA Bootstrap UCL	0.0748
95% Chebyshev(Mean, Sd) UCL	0.118
97.5% Chebyshev(Mean, Sd) UCL	0.149
99% Chebyshev(Mean, Sd) UCL	0.208

Potential UCL to Use	Use 95% Student's-t UCL 0.0783

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Calcium mg/kg

General Statistics

Number of Valid Observations	8	Number of Distinct Observations	8

Raw Statistics

Minimum	664
Maximum	2040
Mean	1165
Median	1065
SD	427.9
Coefficient of Variation	0.367
Skewness	1.357

Log-transformed Statistics

Minimum of Log Data	6.498
Maximum of Log Data	7.621
Mean of log Data	7.008
SD of log Data	0.339

Warning: There are only 8 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.871
Shapiro Wilk Critical Value	0.818

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.945
Shapiro Wilk Critical Value	0.818

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	1451

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	1491
95% Modified-t UCL (Johnson-1978)	1463

Assuming Lognormal Distribution

95% H-UCL	1534
95% Chebyshev (MVUE) UCL	1772
97.5% Chebyshev (MVUE) UCL	2037
99% Chebyshev (MVUE) UCL	2556

Gamma Distribution Test

k star (bias corrected)	6.124
Theta Star	190.2
MLE of Mean	1165
MLE of Standard Deviation	470.7
nu star	97.99
Approximate Chi Square Value (.05)	76.16
Adjusted Level of Significance	0.0195
Adjusted Chi Square Value	71.3
Anderson-Darling Test Statistic	0.414
Anderson-Darling 5% Critical Value	0.715
Kolmogorov-Smirnov Test Statistic	0.277
Kolmogorov-Smirnov 5% Critical Value	0.294

Data appear Gamma Distributed at 5% Significance Level

Data Distribution

Data appear Normal at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	1499
95% Adjusted Gamma UCL	1601

Nonparametric Statistics

95% CLT UCL	1414
95% Jackknife UCL	1451
95% Standard Bootstrap UCL	1398
95% Bootstrap-t UCL	1746
95% Hall's Bootstrap UCL	3334
95% Percentile Bootstrap UCL	1417
95% BCA Bootstrap UCL	1459
95% Chebyshev(Mean, Sd) UCL	1824
97.5% Chebyshev(Mean, Sd) UCL	2109
99% Chebyshev(Mean, Sd) UCL	2670

Potential UCL to Use Use 95% Student's-t UCL 1451

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium mg/kg

General Statistics

Number of Valid Observations 8

Number of Distinct Observations 7

Raw Statistics

Minimum	0.09
Maximum	0.39
Mean	0.246
Median	0.27
SD	0.095
Coefficient of Variation	0.386
Skewness	-0.256

Log-transformed Statistics

Minimum of Log Data	-2.408
Maximum of Log Data	-0.942
Mean of log Data	-1.484
SD of log Data	0.465

Warning: There are only 8 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.968
Shapiro Wilk Critical Value	0.818

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.903
Shapiro Wilk Critical Value	0.818

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	0.31

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	0.298
95% Modified-t UCL (Johnson-1978)	0.309

Assuming Lognormal Distribution

95% H-UCL	0.378
95% Chebyshev (MVUE) UCL	0.429
97.5% Chebyshev (MVUE) UCL	0.507
99% Chebyshev (MVUE) UCL	0.66

Gamma Distribution Test

k star (bias corrected)	3.982
Theta Star	0.0618
MLE of Mean	0.246
MLE of Standard Deviation	0.123
nu star	63.72
Approximate Chi Square Value (.05)	46.35
Adjusted Level of Significance	0.0195
Adjusted Chi Square Value	42.63
Anderson-Darling Test Statistic	0.349
Anderson-Darling 5% Critical Value	0.718
Kolmogorov-Smirnov Test Statistic	0.21
Kolmogorov-Smirnov 5% Critical Value	0.295

Data appear Gamma Distributed at 5% Significance Level

Data Distribution

Data appear Normal at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.338
95% Adjusted Gamma UCL	0.368

Nonparametric Statistics

95% CLT UCL	0.302
95% Jackknife UCL	0.31
95% Standard Bootstrap UCL	0.3
95% Bootstrap-t UCL	0.306
95% Hall's Bootstrap UCL	0.299
95% Percentile Bootstrap UCL	0.296
95% BCA Bootstrap UCL	0.295
95% Chebyshev(Mean, Sd) UCL	0.393
97.5% Chebyshev(Mean, Sd) UCL	0.456
99% Chebyshev(Mean, Sd) UCL	0.58

Potential UCL to Use	Use 95% Student's-t UCL 0.31

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cobalt mg/kg

General Statistics

Number of Valid Data	8	Number of Detected Data	7
Number of Distinct Detected Data	6	Number of Non-Detect Data	1
		Percent Non-Detects	12.50%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.01	Minimum Detected	-4.605
Maximum Detected	0.21	Maximum Detected	-1.561
Mean of Detected	0.0829	Mean of Detected	-3.05
SD of Detected	0.0801	SD of Detected	1.256
Minimum Non-Detect	0.01	Minimum Non-Detect	-4.605
Maximum Non-Detect	0.01	Maximum Non-Detect	-4.605

Warning: There are only 7 Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.869	Shapiro Wilk Test Statistic	0.905
5% Shapiro Wilk Critical Value	0.803	5% Shapiro Wilk Critical Value	0.803
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.0731	Mean	-3.331
SD	0.0791	SD	1.408
95% DL/2 (t) UCL	0.126	95% H-Stat (DL/2) UCL	1.052
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	0.0678	Mean in Log Scale	-3.437
SD	0.0813	SD in Log Scale	1.598
95% MLE (t) UCL	0.122	Mean in Original Scale	0.0728
95% MLE (Tiku) UCL	0.121	SD in Original Scale	0.0795
		95% t UCL	0.126
		95% Percentile Bootstrap UCL	0.118
		95% BCA Bootstrap UCL	0.124

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.683	Data appear Normal at 5% Significance Level	
Theta Star	0.121		
nu star	9.566		
A-D Test Statistic	0.311	Nonparametric Statistics	
5% A-D Critical Value	0.727	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.727	Mean	0.0738
5% K-S Critical Value	0.319	SD	0.0735

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	1E-12
Maximum	0.21
Mean	0.0725
Median	0.04
SD	0.0798
k star	0.214
Theta star	0.339
Nu star	3.423
AppChi2	0.508
95% Gamma Approximate UCL	0.489
95% Adjusted Gamma UCL	0.832

SE of Mean	0.0281
95% KM (t) UCL	0.127
95% KM (z) UCL	0.12
95% KM (jackknife) UCL	0.126
95% KM (bootstrap t) UCL	0.17
95% KM (BCA) UCL	0.116
95% KM (Percentile Bootstrap) UCL	0.12
95% KM (Chebyshev) UCL	0.196
97.5% KM (Chebyshev) UCL	0.249
99% KM (Chebyshev) UCL	0.353

Potential UCLs to Use

95% KM (t) UCL	0.127
95% KM (Percentile Bootstrap) UCL	0.12

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Copper mg/kg

General Statistics

Number of Valid Observations	8	Number of Distinct Observations	8

Raw Statistics

Minimum	1.43
Maximum	3.94
Mean	2.626
Median	2.325
SD	1.051
Coefficient of Variation	0.4
Skewness	0.317

Log-transformed Statistics

Minimum of Log Data	0.358
Maximum of Log Data	1.371
Mean of log Data	0.893
SD of log Data	0.409

Warning: There are only 8 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.848
Shapiro Wilk Critical Value	0.818

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.881
Shapiro Wilk Critical Value	0.818

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	3.33

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	3.282
95% Modified-t UCL (Johnson-1978)	3.337

Assuming Lognormal Distribution

95% H-UCL	3.735
95% Chebyshev (MVUE) UCL	4.293
97.5% Chebyshev (MVUE) UCL	5.014
99% Chebyshev (MVUE) UCL	6.43

Gamma Distribution Test

k star (bias corrected)	4.511
Theta Star	0.582
MLE of Mean	2.626
MLE of Standard Deviation	1.236
nu star	72.18
Approximate Chi Square Value (.05)	53.62
Adjusted Level of Significance	0.0195
Adjusted Chi Square Value	49.59
Anderson-Darling Test Statistic	0.534
Anderson-Darling 5% Critical Value	0.717
Kolmogorov-Smirnov Test Statistic	0.249
Kolmogorov-Smirnov 5% Critical Value	0.295

Data appear Gamma Distributed at 5% Significance Level

Data Distribution

Data appear Normal at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	3.535
95% Adjusted Gamma UCL	3.822

Nonparametric Statistics

95% CLT UCL	3.238
95% Jackknife UCL	3.33
95% Standard Bootstrap UCL	3.198
95% Bootstrap-t UCL	3.391
95% Hall's Bootstrap UCL	3.077
95% Percentile Bootstrap UCL	3.19
95% BCA Bootstrap UCL	3.26
95% Chebyshev(Mean, Sd) UCL	4.246
97.5% Chebyshev(Mean, Sd) UCL	4.947
99% Chebyshev(Mean, Sd) UCL	6.324

Potential UCL to Use	Use 95% Student's-t UCL 3.33

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Iron mg/kg

General Statistics

Number of Valid Observations	8	Number of Distinct Observations	7

Raw Statistics

Minimum	16
Maximum	77
Mean	36
Median	30.5
SD	21.06
Coefficient of Variation	0.585
Skewness	1.304

Log-transformed Statistics

Minimum of Log Data	2.773
Maximum of Log Data	4.344
Mean of log Data	3.452
SD of log Data	0.535

Warning: There are only 8 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.851
Shapiro Wilk Critical Value	0.818

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.947
Shapiro Wilk Critical Value	0.818

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	50.11

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	51.92
95% Modified-t UCL (Johnson-1978)	50.68

Assuming Lognormal Distribution

95% H-UCL	59.28
95% Chebyshev (MVUE) UCL	65.43
97.5% Chebyshev (MVUE) UCL	78.29
99% Chebyshev (MVUE) UCL	103.6

Gamma Distribution Test

k star (bias corrected)	2.55
Theta Star	14.12
MLE of Mean	36
MLE of Standard Deviation	22.54
nu star	40.8
Approximate Chi Square Value (.05)	27.16
Adjusted Level of Significance	0.0195
Adjusted Chi Square Value	24.38
Anderson-Darling Test Statistic	0.366
Anderson-Darling 5% Critical Value	0.719
Kolmogorov-Smirnov Test Statistic	0.227
Kolmogorov-Smirnov 5% Critical Value	0.295

Data appear Gamma Distributed at 5% Significance Level

Data Distribution

Data appear Normal at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	54.07
95% Adjusted Gamma UCL	60.24

Nonparametric Statistics

95% CLT UCL	48.25
95% Jackknife UCL	50.11
95% Standard Bootstrap UCL	47.36
95% Bootstrap-t UCL	66.48
95% Hall's Bootstrap UCL	128.5
95% Percentile Bootstrap UCL	48.63
95% BCA Bootstrap UCL	49.88
95% Chebyshev(Mean, Sd) UCL	68.46
97.5% Chebyshev(Mean, Sd) UCL	82.51
99% Chebyshev(Mean, Sd) UCL	110.1

Potential UCL to Use	Use 95% Student's-t UCL 50.11

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Lead mg/kg

General Statistics

Number of Valid Observations 8

Number of Distinct Observations 8

Raw Statistics

Minimum	0.052
Maximum	0.728
Mean	0.211
Median	0.107
SD	0.242
Coefficient of Variation	1.148
Skewness	1.84

Log-transformed Statistics

Minimum of Log Data	-2.957
Maximum of Log Data	-0.317
Mean of log Data	-2.003
SD of log Data	0.934

Warning: There are only 8 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.696
Shapiro Wilk Critical Value	0.818

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.861
Shapiro Wilk Critical Value	0.818

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	0.372

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	0.41
95% Modified-t UCL (Johnson-1978)	0.382

Assuming Lognormal Distribution

95% H-UCL	0.661
95% Chebyshev (MVUE) UCL	0.481
97.5% Chebyshev (MVUE) UCL	0.605
99% Chebyshev (MVUE) UCL	0.848

Gamma Distribution Test

k star (bias corrected)	0.873
Theta Star	0.241
MLE of Mean	0.211
MLE of Standard Deviation	0.225
nu star	13.97
Approximate Chi Square Value (.05)	6.553
Adjusted Level of Significance	0.0195
Adjusted Chi Square Value	5.323
Anderson-Darling Test Statistic	0.818
Anderson-Darling 5% Critical Value	0.732
Kolmogorov-Smirnov Test Statistic	0.341
Kolmogorov-Smirnov 5% Critical Value	0.3

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.449
95% Adjusted Gamma UCL	0.553

Data Distribution

Data appear Lognormal at 5% Significance Level

Nonparametric Statistics

95% CLT UCL	0.351
95% Jackknife UCL	0.372
95% Standard Bootstrap UCL	0.339
95% Bootstrap-t UCL	1.4
95% Hall's Bootstrap UCL	1.387
95% Percentile Bootstrap UCL	0.365
95% BCA Bootstrap UCL	0.402
95% Chebyshev(Mean, Sd) UCL	0.583
97.5% Chebyshev(Mean, Sd) UCL	0.744
99% Chebyshev(Mean, Sd) UCL	1.06

Potential UCL to Use	Use 95% H-UCL 0.661

ProUCL computes and outputs H-statistic based UCLs for historical reasons only.

H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.

It is therefore recommended to avoid the use of H-statistic based 95% UCLs.

Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Lithium mg/kg

General Statistics

Number of Valid Data	8	Number of Detected Data	5
Number of Distinct Detected Data	4	Number of Non-Detect Data	3
		Percent Non-Detects	37.50%

Raw Statistics

Minimum Detected	0.01
Maximum Detected	0.04
Mean of Detected	0.022
SD of Detected	0.013
Minimum Non-Detect	0.01
Maximum Non-Detect	0.01

Log-transformed Statistics

Minimum Detected	-4.605
Maximum Detected	-3.219
Mean of Detected	-3.97
SD of Detected	0.63
Minimum Non-Detect	-4.605
Maximum Non-Detect	-4.605

Warning: There are only 4 Distinct Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.902
5% Shapiro Wilk Critical Value	0.762

Data appear Normal at 5% Significance Level

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.886
5% Shapiro Wilk Critical Value	0.762

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method

Mean	0.0156
SD	0.0132
95% DL/2 (t) UCL	0.0245

Maximum Likelihood Estimate(MLE) Method

Mean	0.0133
SD	0.0155
95% MLE (t) UCL	0.0237
95% MLE (Tiku) UCL	0.0247

Assuming Lognormal Distribution

DL/2 Substitution Method

Mean	-4.468
SD	0.837
95% H-Stat (DL/2) UCL	0.0425

Log ROS Method

Mean in Log Scale	-4.624
SD in Log Scale	1.048
Mean in Original Scale	0.0151
SD in Original Scale	0.0138
95% t UCL	0.0243
95% Percentile Bootstrap UCL	0.0228
95% BCA Bootstrap UCL	0.025

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	1.505
Theta Star	0.0146
nu star	15.05
A-D Test Statistic	0.365
5% A-D Critical Value	0.682
K-S Test Statistic	0.682
5% K-S Critical Value	0.359

Data Distribution Test with Detected Values Only

Data appear Normal at 5% Significance Level

Nonparametric Statistics

Kaplan-Meier (KM) Method

Mean	0.0175
SD	0.0109

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	0.00662
Maximum	0.04
Mean	0.0188
Median	0.0169
SD	0.0114
k star	2.151
Theta star	0.00875
Nu star	34.42
AppChi2	22
95% Gamma Approximate UCL	0.0295
95% Adjusted Gamma UCL	0.0332

Note: DL/2 is not a recommended method.

SE of Mean	0.00431
95% KM (t) UCL	0.0257
95% KM (z) UCL	0.0246
95% KM (jackknife) UCL	0.0253
95% KM (bootstrap t) UCL	0.0259
95% KM (BCA) UCL	0.025
95% KM (Percentile Bootstrap) UCL	0.0263
95% KM (Chebyshev) UCL	0.0363
97.5% KM (Chebyshev) UCL	0.0444
99% KM (Chebyshev) UCL	0.0604

Potential UCLs to Use

95% KM (t) UCL	0.0257
95% KM (Percentile Bootstrap) UCL	0.0263

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Magnesium mg/kg

General Statistics

Number of Valid Observations	8	Number of Distinct Observations	7

Raw Statistics

Minimum	228
Maximum	638
Mean	436.8
Median	425
SD	116.3
Coefficient of Variation	0.266
Skewness	-0.0966

Log-transformed Statistics

Minimum of Log Data	5.429
Maximum of Log Data	6.458
Mean of log Data	6.044
SD of log Data	0.295

Warning: There are only 8 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.945
Shapiro Wilk Critical Value	0.818

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.893
Shapiro Wilk Critical Value	0.818

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	514.6

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	502.9
95% Modified-t UCL (Johnson-1978)	514.4

Assuming Lognormal Distribution

95% H-UCL	553.9
95% Chebyshev (MVUE) UCL	638.1
97.5% Chebyshev (MVUE) UCL	724.7
99% Chebyshev (MVUE) UCL	894.8

Gamma Distribution Test

k star (bias corrected)	9.08
Theta Star	48.1
MLE of Mean	436.8
MLE of Standard Deviation	144.9
nu star	145.3
Approximate Chi Square Value (.05)	118.4
Adjusted Level of Significance	0.0195
Adjusted Chi Square Value	112.3
Anderson-Darling Test Statistic	0.426
Anderson-Darling 5% Critical Value	0.716
Kolmogorov-Smirnov Test Statistic	0.209
Kolmogorov-Smirnov 5% Critical Value	0.294

Data appear Gamma Distributed at 5% Significance Level

Data Distribution

Data appear Normal at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	535.8
95% Adjusted Gamma UCL	565.1

Nonparametric Statistics

95% CLT UCL	504.4
95% Jackknife UCL	514.6
95% Standard Bootstrap UCL	498.4
95% Bootstrap-t UCL	513.1
95% Hall's Bootstrap UCL	524.9
95% Percentile Bootstrap UCL	502.5
95% BCA Bootstrap UCL	497.1
95% Chebyshev(Mean, Sd) UCL	615.9
97.5% Chebyshev(Mean, Sd) UCL	693.4
99% Chebyshev(Mean, Sd) UCL	845.7

Potential UCL to Use	Use 95% Student's-t UCL 514.6

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese mg/kg

General Statistics

Number of Valid Observations 8

Number of Distinct Observations 8

Raw Statistics

Minimum	108
Maximum	1210
Mean	354.3
Median	236.5
SD	358.6
Coefficient of Variation	1.012
Skewness	2.448

Log-transformed Statistics

Minimum of Log Data	4.682
Maximum of Log Data	7.098
Mean of log Data	5.575
SD of log Data	0.752

Warning: There are only 8 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.669
Shapiro Wilk Critical Value	0.818

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.925
Shapiro Wilk Critical Value	0.818

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	594.4

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	680
95% Modified-t UCL (Johnson-1978)	612.7

Assuming Lognormal Distribution

95% H-UCL	785.7
95% Chebyshev (MVUE) UCL	731.3
97.5% Chebyshev (MVUE) UCL	902.6
99% Chebyshev (MVUE) UCL	1239

Gamma Distribution Test

k star (bias corrected)	1.235
Theta Star	286.8
MLE of Mean	354.3
MLE of Standard Deviation	318.7
nu star	19.77
Approximate Chi Square Value (.05)	10.68
Adjusted Level of Significance	0.0195
Adjusted Chi Square Value	9.038
Anderson-Darling Test Statistic	0.561
Anderson-Darling 5% Critical Value	0.725
Kolmogorov-Smirnov Test Statistic	0.235
Kolmogorov-Smirnov 5% Critical Value	0.298

Data appear Gamma Distributed at 5% Significance Level

Data Distribution

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	655.7
95% Adjusted Gamma UCL	774.7

Nonparametric Statistics

95% CLT UCL	562.8
95% Jackknife UCL	594.4
95% Standard Bootstrap UCL	552.5
95% Bootstrap-t UCL	1012
95% Hall's Bootstrap UCL	1382
95% Percentile Bootstrap UCL	582.4
95% BCA Bootstrap UCL	707.1
95% Chebyshev(Mean, Sd) UCL	906.8
97.5% Chebyshev(Mean, Sd) UCL	1146
99% Chebyshev(Mean, Sd) UCL	1616

Potential UCL to Use	Use 95% Approximate Gamma UCL 655.7

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury mg/kg

General Statistics

Number of Valid Observations 8

Number of Distinct Observations 3

Raw Statistics

Minimum	0.01
Maximum	0.03
Mean	0.0225
Median	0.02
SD	0.00707
Coefficient of Variation	0.314
Skewness	-0.404

Log-transformed Statistics

Minimum of Log Data	-4.605
Maximum of Log Data	-3.507
Mean of log Data	-3.847
SD of log Data	0.366

Warning: There are only 3 Distinct Values in this data

There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.827
Shapiro Wilk Critical Value	0.818

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.794
Shapiro Wilk Critical Value	0.818

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	0.0272

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	0.0262
95% Modified-t UCL (Johnson-1978)	0.0272

Assuming Lognormal Distribution

95% H-UCL	0.0307
95% Chebyshev (MVUE) UCL	0.0355
97.5% Chebyshev (MVUE) UCL	0.0411
99% Chebyshev (MVUE) UCL	0.052

Gamma Distribution Test

k star (bias corrected)	6.152
Theta Star	0.00366
MLE of Mean	0.0225
MLE of Standard Deviation	0.00907
nu star	98.43
Approximate Chi Square Value (.05)	76.54
Adjusted Level of Significance	0.0195
Adjusted Chi Square Value	71.68
Anderson-Darling Test Statistic	0.774
Anderson-Darling 5% Critical Value	0.715
Kolmogorov-Smirnov Test Statistic	0.276
Kolmogorov-Smirnov 5% Critical Value	0.294

Data follow Appr. Gamma Distribution at 5% Significance Level

Data Distribution

Data appear Normal at 5% Significance Level

Nonparametric Statistics

95% CLT UCL	0.0266
95% Jackknife UCL	0.0272
95% Standard Bootstrap UCL	N/A
95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A
95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A
95% Chebyshev(Mean, Sd) UCL	0.0334
97.5% Chebyshev(Mean, Sd) UCL	0.0381

Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL 0.0474
95% Approximate Gamma UCL 0.0289	
95% Adjusted Gamma UCL 0.0309	
Potential UCL to Use	Use 95% Student's-t UCL 0.0272

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Molybdenum mg/kg

General Statistics

Number of Valid Observations 8

Number of Distinct Observations 8

Raw Statistics

Minimum	0.04
Maximum	1.06
Mean	0.369
Median	0.325
SD	0.314
Coefficient of Variation	0.85
Skewness	1.7

Log-transformed Statistics

Minimum of Log Data	-3.219
Maximum of Log Data	0.0583
Mean of log Data	-1.349
SD of log Data	0.99

Warning: There are only 8 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.84
Shapiro Wilk Critical Value	0.818

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.94
Shapiro Wilk Critical Value	0.818

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	0.579

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	0.622
95% Modified-t UCL (Johnson-1978)	0.59

Assuming Lognormal Distribution

95% H-UCL	1.513
95% Chebyshev (MVUE) UCL	1.001
97.5% Chebyshev (MVUE) UCL	1.264
99% Chebyshev (MVUE) UCL	1.782

Gamma Distribution Test

k star (bias corrected)	1.065
Theta Star	0.346
MLE of Mean	0.369
MLE of Standard Deviation	0.357
nu star	17.03
Approximate Chi Square Value (.05)	8.696
Adjusted Level of Significance	0.0195
Adjusted Chi Square Value	7.24
Anderson-Darling Test Statistic	0.256
Anderson-Darling 5% Critical Value	0.728
Kolmogorov-Smirnov Test Statistic	0.166
Kolmogorov-Smirnov 5% Critical Value	0.299

Data appear Gamma Distributed at 5% Significance Level

Data Distribution

Data appear Normal at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.722
95% Adjusted Gamma UCL	0.867

Nonparametric Statistics

95% CLT UCL	0.551
95% Jackknife UCL	0.579
95% Standard Bootstrap UCL	0.539
95% Bootstrap-t UCL	0.708
95% Hall's Bootstrap UCL	1.439
95% Percentile Bootstrap UCL	0.564
95% BCA Bootstrap UCL	0.599
95% Chebyshev(Mean, Sd) UCL	0.852
97.5% Chebyshev(Mean, Sd) UCL	1.061
99% Chebyshev(Mean, Sd) UCL	1.472

Potential UCL to Use	Use 95% Student's-t UCL 0.579

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel mg/kg

General Statistics

Number of Valid Observations 8

Number of Distinct Observations 8

Raw Statistics

Minimum	0.13
Maximum	0.97
Mean	0.4
Median	0.305
SD	0.312
Coefficient of Variation	0.78
Skewness	1.231

Log-transformed Statistics

Minimum of Log Data	-2.04
Maximum of Log Data	-0.0305
Mean of log Data	-1.163
SD of log Data	0.741

Warning: There are only 8 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.82
Shapiro Wilk Critical Value	0.818

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.926
Shapiro Wilk Critical Value	0.818

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	0.609

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	0.633
95% Modified-t UCL (Johnson-1978)	0.617

Assuming Lognormal Distribution

95% H-UCL	0.906
95% Chebyshev (MVUE) UCL	0.853
97.5% Chebyshev (MVUE) UCL	1.052
99% Chebyshev (MVUE) UCL	1.441

Gamma Distribution Test

k star (bias corrected)	1.445
Theta Star	0.277
MLE of Mean	0.4
MLE of Standard Deviation	0.333
nu star	23.11
Approximate Chi Square Value (.05)	13.18
Adjusted Level of Significance	0.0195
Adjusted Chi Square Value	11.32
Anderson-Darling Test Statistic	0.412
Anderson-Darling 5% Critical Value	0.724
Kolmogorov-Smirnov Test Statistic	0.204
Kolmogorov-Smirnov 5% Critical Value	0.297

Data appear Gamma Distributed at 5% Significance Level

Data Distribution

Data appear Normal at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.702
95% Adjusted Gamma UCL	0.816

Nonparametric Statistics

95% CLT UCL	0.581
95% Jackknife UCL	0.609
95% Standard Bootstrap UCL	0.571
95% Bootstrap-t UCL	0.946
95% Hall's Bootstrap UCL	1.917
95% Percentile Bootstrap UCL	0.583
95% BCA Bootstrap UCL	0.603
95% Chebyshev(Mean, Sd) UCL	0.881
97.5% Chebyshev(Mean, Sd) UCL	1.089
99% Chebyshev(Mean, Sd) UCL	1.497

Potential UCL to Use	Use 95% Student's-t UCL 0.609

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Potassium mg/kg

General Statistics

Number of Valid Observations	8	Number of Distinct Observations	8

Raw Statistics

Minimum	2110
Maximum	5690
Mean	4146
Median	4600
SD	1178
Coefficient of Variation	0.284
Skewness	-0.644

Log-transformed Statistics

Minimum of Log Data	7.654
Maximum of Log Data	8.646
Mean of log Data	8.288
SD of log Data	0.327

Warning: There are only 8 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.931
Shapiro Wilk Critical Value	0.818

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.885
Shapiro Wilk Critical Value	0.818

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	4936

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	4730
95% Modified-t UCL (Johnson-1978)	4920

Assuming Lognormal Distribution

95% H-UCL	5428
95% Chebyshev (MVUE) UCL	6270
97.5% Chebyshev (MVUE) UCL	7181
99% Chebyshev (MVUE) UCL	8972

Gamma Distribution Test

k star (bias corrected)	7.561
Theta Star	548.4
MLE of Mean	4146
MLE of Standard Deviation	1508
nu star	121
Approximate Chi Square Value (.05)	96.58
Adjusted Level of Significance	0.0195
Adjusted Chi Square Value	91.07
Anderson-Darling Test Statistic	0.469
Anderson-Darling 5% Critical Value	0.715
Kolmogorov-Smirnov Test Statistic	0.256
Kolmogorov-Smirnov 5% Critical Value	0.294

Data appear Gamma Distributed at 5% Significance Level

Data Distribution

Data appear Normal at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	5194
95% Adjusted Gamma UCL	5508

Nonparametric Statistics

95% CLT UCL	4832
95% Jackknife UCL	4936
95% Standard Bootstrap UCL	4789
95% Bootstrap-t UCL	4868
95% Hall's Bootstrap UCL	4715
95% Percentile Bootstrap UCL	4773
95% BCA Bootstrap UCL	4684
95% Chebyshev(Mean, Sd) UCL	5962
97.5% Chebyshev(Mean, Sd) UCL	6748
99% Chebyshev(Mean, Sd) UCL	8292

Potential UCL to Use Use 95% Student's-t UCL 4936

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Rubidium mg/kg

General Statistics

Number of Valid Observations 8

Number of Distinct Observations 8

Raw Statistics

Minimum	4.73
Maximum	48
Mean	23.2
Median	20.6
SD	13.67
Coefficient of Variation	0.589
Skewness	0.69

Log-transformed Statistics

Minimum of Log Data	1.554
Maximum of Log Data	3.871
Mean of log Data	2.958
SD of log Data	0.71

Warning: There are only 8 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.968
Shapiro Wilk Critical Value	0.818

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.947
Shapiro Wilk Critical Value	0.818

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	32.36

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	32.42
95% Modified-t UCL (Johnson-1978)	32.56

Assuming Lognormal Distribution

95% H-UCL	51.98
95% Chebyshev (MVUE) UCL	50.5
97.5% Chebyshev (MVUE) UCL	62.01
99% Chebyshev (MVUE) UCL	84.62

Gamma Distribution Test

k star (bias corrected)	1.861
Theta Star	12.47
MLE of Mean	23.2
MLE of Standard Deviation	17.01
nu star	29.78
Approximate Chi Square Value (.05)	18.32
Adjusted Level of Significance	0.0195
Adjusted Chi Square Value	16.09
Anderson-Darling Test Statistic	0.153
Anderson-Darling 5% Critical Value	0.722
Kolmogorov-Smirnov Test Statistic	0.125
Kolmogorov-Smirnov 5% Critical Value	0.296

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	37.72
95% Adjusted Gamma UCL	42.95

Data Distribution

Data appear Normal at 5% Significance Level

Nonparametric Statistics

95% CLT UCL	31.16
95% Jackknife UCL	32.36
95% Standard Bootstrap UCL	30.7
95% Bootstrap-t UCL	35.3
95% Hall's Bootstrap UCL	40.55
95% Percentile Bootstrap UCL	30.82
95% BCA Bootstrap UCL	31.75
95% Chebyshev(Mean, Sd) UCL	44.28
97.5% Chebyshev(Mean, Sd) UCL	53.4
99% Chebyshev(Mean, Sd) UCL	71.31

Potential UCL to Use	Use 95% Student's-t UCL 32.36

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Selenium mg/kg

General Statistics

Number of Valid Data	8	Number of Detected Data	4
Number of Distinct Detected Data	4	Number of Non-Detect Data	4
		Percent Non-Detects	50.00%

Raw Statistics

Minimum Detected	0.05
Maximum Detected	0.16
Mean of Detected	0.085
SD of Detected	0.0507
Minimum Non-Detect	0.05
Maximum Non-Detect	0.05

Log-transformed Statistics

Minimum Detected	-2.996
Maximum Detected	-1.833
Mean of Detected	-2.575
SD of Detected	0.514
Minimum Non-Detect	-2.996
Maximum Non-Detect	-2.996

Warning: There are only 4 Distinct Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.775
5% Shapiro Wilk Critical Value	0.748

Data appear Normal at 5% Significance Level

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.86
5% Shapiro Wilk Critical Value	0.748

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method

Mean	0.055
SD	0.0461
95% DL/2 (t) UCL	0.0859

Maximum Likelihood Estimate(MLE) Method

Mean	0.0429
SD	0.0583
95% MLE (t) UCL	0.082
95% MLE (Tiku) UCL	0.0914

Assuming Lognormal Distribution

DL/2 Substitution Method

Mean	-3.132
SD	0.684
95% H-Stat (DL/2) UCL	0.111

Log ROS Method

Mean in Log Scale	-3.379
SD in Log Scale	0.977
Mean in Original Scale	0.0508
SD in Original Scale	0.0496
95% t UCL	0.084
95% Percentile Bootstrap UCL	0.0822
95% BCA Bootstrap UCL	0.0889

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	1.342
Theta Star	0.0634
nu star	10.73
A-D Test Statistic	0.513
5% A-D Critical Value	0.659
K-S Test Statistic	0.659
5% K-S Critical Value	0.396

Data Distribution Test with Detected Values Only

Data appear Normal at 5% Significance Level

Nonparametric Statistics

Kaplan-Meier (KM) Method

Mean	0.0675
SD	0.0356

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	0.0335
Maximum	0.16
Mean	0.085
Median	0.07
SD	0.0435
k star	2.896
Theta star	0.0294
Nu star	46.33
AppChi2	31.71
95% Gamma Approximate UCL	0.124
95% Adjusted Gamma UCL	N/A

Note: DL/2 is not a recommended method.

SE of Mean	0.0145
95% KM (t) UCL	0.0951
95% KM (z) UCL	0.0914
95% KM (jackknife) UCL	0.0913
95% KM (bootstrap t) UCL	0.138
95% KM (BCA) UCL	0.104
95% KM (Percentile Bootstrap) UCL	0.0975
95% KM (Chebyshev) UCL	0.131
97.5% KM (Chebyshev) UCL	0.158
99% KM (Chebyshev) UCL	0.212

Potential UCLs to Use

95% KM (t) UCL	0.0951
95% KM (Percentile Bootstrap) UCL	0.0975

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Silver mg/kg

General Statistics

Number of Valid Data	8	Number of Detected Data	4
Number of Distinct Detected Data	4	Number of Non-Detect Data	4
		Percent Non-Detects	50.00%

Raw Statistics

Minimum Detected	0.005
Maximum Detected	0.138
Mean of Detected	0.0458
SD of Detected	0.0627
Minimum Non-Detect	0.002
Maximum Non-Detect	0.002

Log-transformed Statistics

Minimum Detected	-5.298
Maximum Detected	-1.981
Mean of Detected	-3.887
SD of Detected	1.496
Minimum Non-Detect	-6.215
Maximum Non-Detect	-6.215

Warning: There are only 4 Distinct Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.773
5% Shapiro Wilk Critical Value	0.748

Data appear Normal at 5% Significance Level

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.941
5% Shapiro Wilk Critical Value	0.748

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method	
Mean	0.0234
SD	0.0475
95% DL/2 (t) UCL	0.0552
Maximum Likelihood Estimate(MLE) Method	N/A

MLE yields a negative mean

Assuming Lognormal Distribution

DL/2 Substitution Method	
Mean	-5.398
SD	1.888
95% H-Stat (DL/2) UCL	1.713
Log ROS Method	
Mean in Log Scale	-6.322
SD in Log Scale	2.946
Mean in Original Scale	0.023
SD in Original Scale	0.0477
95% t UCL	0.055
95% Percentile Bootstrap UCL	0.0538
95% BCA Bootstrap UCL	0.0708

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	0.353
Theta Star	0.13
nu star	2.826
A-D Test Statistic	0.354
5% A-D Critical Value	0.67
K-S Test Statistic	0.67
5% K-S Critical Value	0.405

Data Distribution Test with Detected Values Only

Data appear Normal at 5% Significance Level

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	0.0254
SD	0.0435

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	1E-12
Maximum	0.138
Mean	0.0467
Median	0.0207
SD	0.0563
k star	0.213
Theta star	0.22
Nu star	3.4
AppChi2	0.5
95% Gamma Approximate UCL	0.317
95% Adjusted Gamma UCL	N/A

Note: DL/2 is not a recommended method.

SE of Mean	0.0177
95% KM (t) UCL	0.059
95% KM (z) UCL	0.0546
95% KM (jackknife) UCL	0.0556
95% KM (bootstrap t) UCL	0.11
95% KM (BCA) UCL	0.0719
95% KM (Percentile Bootstrap) UCL	0.0598
95% KM (Chebyshev) UCL	0.103
97.5% KM (Chebyshev) UCL	0.136
99% KM (Chebyshev) UCL	0.202

Potential UCLs to Use

95% KM (t) UCL	0.059
95% KM (Percentile Bootstrap) UCL	0.0598

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Sodium mg/kg

General Statistics

Number of Valid Observations	8	Number of Distinct Observations	4

Raw Statistics

Minimum	4
Maximum	7
Mean	5.125
Median	5
SD	1.126
Coefficient of Variation	0.22
Skewness	0.488

Log-transformed Statistics

Minimum of Log Data	1.386
Maximum of Log Data	1.946
Mean of log Data	1.613
SD of log Data	0.217

Warning: There are only 4 Distinct Values in this data

There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.881
Shapiro Wilk Critical Value	0.818

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.879
Shapiro Wilk Critical Value	0.818

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	5.879

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	5.853
95% Modified-t UCL (Johnson-1978)	5.891

Assuming Lognormal Distribution

95% H-UCL	6.035
95% Chebyshev (MVUE) UCL	6.839
97.5% Chebyshev (MVUE) UCL	7.582
99% Chebyshev (MVUE) UCL	9.04

Gamma Distribution Test

k star (bias corrected)	15.26
Theta Star	0.336
MLE of Mean	5.125
MLE of Standard Deviation	1.312
nu star	244.2
Approximate Chi Square Value (.05)	209
Adjusted Level of Significance	0.0195
Adjusted Chi Square Value	200.7
Anderson-Darling Test Statistic	0.497
Anderson-Darling 5% Critical Value	0.716
Kolmogorov-Smirnov Test Statistic	0.24
Kolmogorov-Smirnov 5% Critical Value	0.294

Data appear Gamma Distributed at 5% Significance Level

Data Distribution

Data appear Normal at 5% Significance Level

Nonparametric Statistics

95% CLT UCL	5.78
95% Jackknife UCL	5.879
95% Standard Bootstrap UCL	5.74
95% Bootstrap-t UCL	6.056
95% Hall's Bootstrap UCL	5.802
95% Percentile Bootstrap UCL	5.75
95% BCA Bootstrap UCL	5.625
95% Chebyshev(Mean, Sd) UCL	6.86
97.5% Chebyshev(Mean, Sd) UCL	7.611

Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL 9.086
95% Approximate Gamma UCL 5.988	
95% Adjusted Gamma UCL 6.234	
Potential UCL to Use	Use 95% Student's-t UCL 5.879

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Strontium mg/kg

General Statistics

Number of Valid Observations 8

Number of Distinct Observations 8

Raw Statistics

Minimum	2.79
Maximum	10.3
Mean	6.194
Median	6.42
SD	2.684
Coefficient of Variation	0.433
Skewness	0.0748

Log-transformed Statistics

Minimum of Log Data	1.026
Maximum of Log Data	2.332
Mean of log Data	1.729
SD of log Data	0.482

Warning: There are only 8 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.94
Shapiro Wilk Critical Value	0.818

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.915
Shapiro Wilk Critical Value	0.818

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	7.991

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	7.781
95% Modified-t UCL (Johnson-1978)	7.996

Assuming Lognormal Distribution

95% H-UCL	9.667
95% Chebyshev (MVUE) UCL	10.91
97.5% Chebyshev (MVUE) UCL	12.93
99% Chebyshev (MVUE) UCL	16.9

Gamma Distribution Test

k star (bias corrected)	3.496
Theta Star	1.771
MLE of Mean	6.194
MLE of Standard Deviation	3.312
nu star	55.94
Approximate Chi Square Value (.05)	39.75
Adjusted Level of Significance	0.0195
Adjusted Chi Square Value	36.33
Anderson-Darling Test Statistic	0.352
Anderson-Darling 5% Critical Value	0.719
Kolmogorov-Smirnov Test Statistic	0.211
Kolmogorov-Smirnov 5% Critical Value	0.295

Data appear Gamma Distributed at 5% Significance Level

Data Distribution

Data appear Normal at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	8.716
95% Adjusted Gamma UCL	9.538

Nonparametric Statistics

95% CLT UCL	7.754
95% Jackknife UCL	7.991
95% Standard Bootstrap UCL	7.646
95% Bootstrap-t UCL	8.073
95% Hall's Bootstrap UCL	7.699
95% Percentile Bootstrap UCL	7.565
95% BCA Bootstrap UCL	7.614
95% Chebyshev(Mean, Sd) UCL	10.33
97.5% Chebyshev(Mean, Sd) UCL	12.12
99% Chebyshev(Mean, Sd) UCL	15.63

Potential UCL to Use	Use 95% Student's-t UCL 7.991

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Tellurium mg/kg

General Statistics

Number of Valid Data	8	Number of Detected Data	0
Number of Distinct Detected Data	0	Number of Non-Detect Data	8
		Percent Non-Detects	100.00%

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!

Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Tellurium mg/kg was not processed!

Thallium mg/kg

General Statistics

Number of Valid Data	8	Number of Detected Data	4
Number of Distinct Detected Data	4	Number of Non-Detect Data	4
		Percent Non-Detects	50.00%

Raw Statistics

Minimum Detected	0.002
Maximum Detected	0.012
Mean of Detected	0.00675
SD of Detected	0.00427
Minimum Non-Detect	0.002
Maximum Non-Detect	0.002

Log-transformed Statistics

Minimum Detected	-6.215
Maximum Detected	-4.423
Mean of Detected	-5.191
SD of Detected	0.77
Minimum Non-Detect	-6.215
Maximum Non-Detect	-6.215

Warning: There are only 4 Distinct Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.993
5% Shapiro Wilk Critical Value	0.748

Data appear Normal at 5% Significance Level

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.964
5% Shapiro Wilk Critical Value	0.748

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method	
Mean	0.00388
SD	0.00416
95% DL/2 (t) UCL	0.00666
Maximum Likelihood Estimate(MLE) Method	
Mean	0.00196
SD	0.00604
95% MLE (t) UCL	0.006
95% MLE (Tiku) UCL	0.00694

Assuming Lognormal Distribution

DL/2 Substitution Method	
Mean	-6.049
SD	1.047
95% H-Stat (DL/2) UCL	0.0166
Log ROS Method	
Mean in Log Scale	-6.397
SD in Log Scale	1.465
Mean in Original Scale	0.00368
SD in Original Scale	0.00432
95% t UCL	0.00657
95% Percentile Bootstrap UCL	0.00634
95% BCA Bootstrap UCL	0.00654

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	0.854
Theta Star	0.00791
nu star	6.83
A-D Test Statistic	0.211
5% A-D Critical Value	0.66
K-S Test Statistic	0.66
5% K-S Critical Value	0.397

Data Distribution Test with Detected Values Only

Data appear Normal at 5% Significance Level

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	0.00438
SD	0.00353

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	0.00193
Maximum	0.012
Mean	0.00675
Median	0.0065
SD	0.00395
k star	1.777
Theta star	0.0038
Nu star	28.43
AppChi2	17.27
95% Gamma Approximate UCL	0.0111
95% Adjusted Gamma UCL	N/A

SE of Mean	0.00144
95% KM (t) UCL	0.00711
95% KM (z) UCL	0.00675
95% KM (jackknife) UCL	0.00713
95% KM (bootstrap t) UCL	0.00656
95% KM (BCA) UCL	0.012
95% KM (Percentile Bootstrap) UCL	0.0085
95% KM (Chebyshev) UCL	0.0107
97.5% KM (Chebyshev) UCL	0.0134
99% KM (Chebyshev) UCL	0.0187

Potential UCLs to Use

95% KM (t) UCL	0.00711
95% KM (Percentile Bootstrap) UCL	0.0085

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Tin mg/kg

General Statistics

Number of Valid Data	8	Number of Detected Data	5
Number of Distinct Detected Data	3	Number of Non-Detect Data	3
		Percent Non-Detects	37.50%

Raw Statistics

Minimum Detected	0.01
Maximum Detected	0.05
Mean of Detected	0.024
SD of Detected	0.0152
Minimum Non-Detect	0.01
Maximum Non-Detect	0.01

Log-transformed Statistics

Minimum Detected	-4.605
Maximum Detected	-2.996
Mean of Detected	-3.867
SD of Detected	0.572
Minimum Non-Detect	-4.605
Maximum Non-Detect	-4.605

Warning: There are only 3 Distinct Detected Values in this data set

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

UCL Statistics

Normal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.768
5% Shapiro Wilk Critical Value	0.762

Data appear Normal at 5% Significance Level

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.873
5% Shapiro Wilk Critical Value	0.762

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method

Mean	0.0169
SD	0.0151
95% DL/2 (t) UCL	0.027

Maximum Likelihood Estimate(MLE) Method

Mean	0.0138
SD	0.0181
95% MLE (t) UCL	0.0259
95% MLE (Tiku) UCL	0.0272

Assuming Lognormal Distribution

DL/2 Substitution Method

Mean	-4.404
SD	0.858
95% H-Stat (DL/2) UCL	0.048

Log ROS Method

Mean in Log Scale	-4.428
SD in Log Scale	0.909
Mean in Original Scale	0.0168
SD in Original Scale	0.0152
95% t UCL	0.027
95% Percentile Bootstrap UCL	0.0256
95% BCA Bootstrap UCL	0.0283

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	1.649
Theta Star	0.0146
nu star	16.49

Data Distribution Test with Detected Values Only

Data appear Normal at 5% Significance Level

A-D Test Statistic	0.592
5% A-D Critical Value	0.682
K-S Test Statistic	0.682
5% K-S Critical Value	0.359

Data follow Appr. Gamma Distribution at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	0.00908
Maximum	0.05
Mean	0.021
Median	0.02
SD	0.0127
k star	2.592
Theta star	0.00809
Nu star	41.48
AppChi2	27.72
95% Gamma Approximate UCL	0.0314
95% Adjusted Gamma UCL	0.0349

Note: DL/2 is not a recommended method.

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	0.0188
SD	0.0127
SE of Mean	0.00501
95% KM (t) UCL	0.0283
95% KM (z) UCL	0.027
95% KM (jackknife) UCL	N/A
95% KM (bootstrap t) UCL	N/A
95% KM (BCA) UCL	N/A
95% KM (Percentile Bootstrap) UCL	N/A
95% KM (Chebyshev) UCL	0.0406
97.5% KM (Chebyshev) UCL	0.0501
99% KM (Chebyshev) UCL	0.0686

Potential UCLs to Use

95% KM (t) UCL	0.0283
95% KM (Percentile Bootstrap) UCL	N/A

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Tungsten mg/kg

General Statistics

Number of Valid Data	8	Number of Detected Data	3
Number of Distinct Detected Data	3	Number of Non-Detect Data	5
		Percent Non-Detects	62.50%

Raw Statistics

Minimum Detected	0.016
Maximum Detected	0.055
Mean of Detected	0.0297
SD of Detected	0.022
Minimum Non-Detect	0.005
Maximum Non-Detect	0.005

Log-transformed Statistics

Minimum Detected	-4.135
Maximum Detected	-2.9
Mean of Detected	-3.684
SD of Detected	0.681
Minimum Non-Detect	-5.298
Maximum Non-Detect	-5.298

Warning: There are only 3 Distinct Detected Values in this data set

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

UCL Statistics

Normal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.788
5% Shapiro Wilk Critical Value	0.767

Data appear Normal at 5% Significance Level

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.821
5% Shapiro Wilk Critical Value	0.767

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method

Mean	0.0127
SD	0.0183
95% DL/2 (t) UCL	0.025

Maximum Likelihood Estimate(MLE) Method

Mean	0.0323
SD	0.0179
95% MLE (t) UCL	0.0443
95% MLE (Tiku) UCL	0.0514

Assuming Lognormal Distribution

DL/2 Substitution Method

Mean	-5.126
SD	1.248
95% H-Stat (DL/2) UCL	0.0881

Log ROS Method

Mean in Log Scale	-5.276
SD in Log Scale	1.523
Mean in Original Scale	0.0127
SD in Original Scale	0.0183
95% t UCL	0.025
95% Percentile Bootstrap UCL	0.0239
95% BCA Bootstrap UCL	0.0301

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	N/A
Theta Star	N/A
nu star	N/A

Data Distribution Test with Detected Values Only

Data appear Normal at 5% Significance Level

A-D Test Statistic	N/A
5% A-D Critical Value	N/A
K-S Test Statistic	N/A
5% K-S Critical Value	N/A

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	N/A
Maximum	N/A
Mean	N/A
Median	N/A
SD	N/A
k star	N/A
Theta star	N/A
Nu star	N/A
AppChi2	N/A
95% Gamma Approximate UCL	N/A
95% Adjusted Gamma UCL	N/A

Note: DL/2 is not a recommended method.

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	0.0211
SD	0.0128
SE of Mean	0.00555
95% KM (t) UCL	0.0316
95% KM (z) UCL	0.0303
95% KM (jackknife) UCL	0.0297
95% KM (bootstrap t) UCL	0.121
95% KM (BCA) UCL	0.055
95% KM (Percentile Bootstrap) UCL	0.055
95% KM (Chebyshev) UCL	0.0453
97.5% KM (Chebyshev) UCL	0.0558
99% KM (Chebyshev) UCL	0.0764

Potential UCLs to Use

95% KM (t) UCL	0.0316
95% KM (Percentile Bootstrap) UCL	0.055

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Uranium mg/kg

General Statistics

Number of Valid Data	8	Number of Detected Data	1
Number of Distinct Detected Data	1	Number of Non-Detect Data	7
		Percent Non-Detects	87.50%

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Uranium mg/kg was not processed!

Vanadium mg/kg

General Statistics

Number of Valid Data	8	Number of Detected Data	6
Number of Distinct Detected Data	5	Number of Non-Detect Data	2
		Percent Non-Detects	25.00%

Raw Statistics

Minimum Detected	0.01
Maximum Detected	0.18
Mean of Detected	0.055
SD of Detected	0.0641
Minimum Non-Detect	0.01
Maximum Non-Detect	0.01

Log-transformed Statistics

Minimum Detected	-4.605
Maximum Detected	-1.715
Mean of Detected	-3.411
SD of Detected	1.107
Minimum Non-Detect	-4.605
Maximum Non-Detect	-4.605

Warning: There are only 6 Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.751
5% Shapiro Wilk Critical Value	0.788

Data not Normal at 5% Significance Level

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.929
5% Shapiro Wilk Critical Value	0.788

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method

Mean	0.0425
SD	0.0589
95% DL/2 (t) UCL	0.082

Maximum Likelihood Estimate(MLE) Method

Mean	0.0323
SD	0.0667
95% MLE (t) UCL	0.077
95% MLE (Tiku) UCL	0.0776

Assuming Lognormal Distribution

DL/2 Substitution Method

Mean	-3.883
SD	1.28
95% H-Stat (DL/2) UCL	0.348

Log ROS Method

Mean in Log Scale	-4.122
SD in Log Scale	1.628
Mean in Original Scale	0.0418
SD in Original Scale	0.0595
95% t UCL	0.0816
95% Percentile Bootstrap UCL	0.0779
95% BCA Bootstrap UCL	0.0929

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	0.67
Theta Star	0.0821
nu star	8.036
A-D Test Statistic	0.349
5% A-D Critical Value	0.713
K-S Test Statistic	0.713
5% K-S Critical Value	0.34

Data Distribution Test with Detected Values Only

Data appear Gamma Distributed at 5% Significance Level

Nonparametric Statistics

Kaplan-Meier (KM) Method

Mean	0.0438
SD	0.0543

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	1E-12
Maximum	0.18
Mean	0.0414
Median	0.02
SD	0.0597
k star	0.209
Theta star	0.198
Nu star	3.346
AppChi2	0.482
95% Gamma Approximate UCL	0.288
95% Adjusted Gamma UCL	0.492

Note: DL/2 is not a recommended method.

SE of Mean	0.021
95% KM (t) UCL	0.0836
95% KM (z) UCL	0.0783
95% KM (jackknife) UCL	0.0826
95% KM (bootstrap t) UCL	0.16
95% KM (BCA) UCL	0.0825
95% KM (Percentile Bootstrap) UCL	0.0825
95% KM (Chebyshev) UCL	0.135
97.5% KM (Chebyshev) UCL	0.175
99% KM (Chebyshev) UCL	0.253

Potential UCLs to Use

95% KM (Chebyshev) UCL	0.135

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Zinc mg/kg

General Statistics

Number of Valid Observations 8

Number of Distinct Observations 8

Raw Statistics

Minimum	7.93
Maximum	30.8
Mean	15.98
Median	14.15
SD	8.536
Coefficient of Variation	0.534
Skewness	1.016

Log-transformed Statistics

Minimum of Log Data	2.071
Maximum of Log Data	3.428
Mean of log Data	2.655
SD of log Data	0.507

Warning: There are only 8 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.851
Shapiro Wilk Critical Value	0.818

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.912
Shapiro Wilk Critical Value	0.818

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	21.69

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	22.1
95% Modified-t UCL (Johnson-1978)	21.88

Assuming Lognormal Distribution

95% H-UCL	25.46
95% Chebyshev (MVUE) UCL	28.45
97.5% Chebyshev (MVUE) UCL	33.88
99% Chebyshev (MVUE) UCL	44.55

Gamma Distribution Test

k star (bias corrected)	2.874
Theta Star	5.558
MLE of Mean	15.98
MLE of Standard Deviation	9.424
nu star	45.99
Approximate Chi Square Value (.05)	31.43
Adjusted Level of Significance	0.0195
Adjusted Chi Square Value	28.42
Anderson-Darling Test Statistic	0.426
Anderson-Darling 5% Critical Value	0.719
Kolmogorov-Smirnov Test Statistic	0.186
Kolmogorov-Smirnov 5% Critical Value	0.295

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	23.38
95% Adjusted Gamma UCL	25.86

Data Distribution

Data appear Normal at 5% Significance Level

Nonparametric Statistics

95% CLT UCL	20.94
95% Jackknife UCL	21.69
95% Standard Bootstrap UCL	20.65
95% Bootstrap-t UCL	27.44
95% Hall's Bootstrap UCL	55.38
95% Percentile Bootstrap UCL	20.92
95% BCA Bootstrap UCL	21.29
95% Chebyshev(Mean, Sd) UCL	29.13
97.5% Chebyshev(Mean, Sd) UCL	34.82
99% Chebyshev(Mean, Sd) UCL	46

Potential UCL to Use Use 95% Student's-t UCL 21.69

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

ProUCL Outputs: Poplar Tips

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	U:\121810356\1_environmental\4_field_data\3_hhera\6_reporting\pp.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Aluminum

General Statistics

Number of Valid Observations	8	Number of Distinct Observations	8

Raw Statistics		Log-transformed Statistics	
Minimum	4.9	Minimum of Log Data	1.589
Maximum	36.9	Maximum of Log Data	3.608
Mean	16.19	Mean of log Data	2.53
Median	10.25	SD of log Data	0.773
SD	12.04		
Coefficient of Variation	0.744		
Skewness	0.829		

Warning: There are only 8 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.849	Shapiro Wilk Test Statistic	0.899
Shapiro Wilk Critical Value	0.818	Shapiro Wilk Critical Value	0.818
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	24.25	95% H-UCL	39.36
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	35.8
95% Adjusted-CLT UCL (Chen-1995)	24.52	97.5% Chebyshev (MVUE) UCL	44.29
95% Modified-t UCL (Johnson-1978)	24.46	99% Chebyshev (MVUE) UCL	60.97

Gamma Distribution Test

k star (bias corrected)	1.407
Theta Star	11.51
MLE of Mean	16.19
MLE of Standard Deviation	13.65
nu star	22.51
Approximate Chi Square Value (.05)	12.72
Adjusted Level of Significance	0.0195
Adjusted Chi Square Value	10.9
Anderson-Darling Test Statistic	0.492
Anderson-Darling 5% Critical Value	0.724
Kolmogorov-Smirnov Test Statistic	0.271
Kolmogorov-Smirnov 5% Critical Value	0.297

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	28.65
95% Adjusted Gamma UCL	33.41

Potential UCL to Use

Data Distribution

Data appear Normal at 5% Significance Level

Nonparametric Statistics

95% CLT UCL	23.19
95% Jackknife UCL	24.25
95% Standard Bootstrap UCL	22.61
95% Bootstrap-t UCL	27.25
95% Hall's Bootstrap UCL	22.21
95% Percentile Bootstrap UCL	22.98
95% BCA Bootstrap UCL	23.63
95% Chebyshev(Mean, Sd) UCL	34.74
97.5% Chebyshev(Mean, Sd) UCL	42.77
99% Chebyshev(Mean, Sd) UCL	58.53

Use 95% Student's-t UCL 24.25

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Antimony

General Statistics

Number of Valid Data	8	Number of Detected Data	2
Number of Distinct Detected Data	1	Number of Non-Detect Data	6
		Percent Non-Detects	75.00%

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Antimony was not processed!

Arsenic

General Statistics

Number of Valid Data	8	Number of Detected Data	3
Number of Distinct Detected Data	3	Number of Non-Detect Data	5
		Percent Non-Detects	62.50%

Raw Statistics

Minimum Detected	0.02
Maximum Detected	0.06
Mean of Detected	0.0367
SD of Detected	0.0208
Minimum Non-Detect	0.02
Maximum Non-Detect	0.02

Log-transformed Statistics

Minimum Detected	-3.912
Maximum Detected	-2.813
Mean of Detected	-3.411
SD of Detected	0.556
Minimum Non-Detect	-3.912
Maximum Non-Detect	-3.912

Warning: There are only 3 Distinct Detected Values in this data set

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

UCL Statistics

Normal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.923
5% Shapiro Wilk Critical Value	0.767

Data appear Normal at 5% Significance Level

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.978
5% Shapiro Wilk Critical Value	0.767

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method

Mean	0.02
SD	0.0177
95% DL/2 (t) UCL	0.0319

Maximum Likelihood Estimate(MLE) Method

Mean	0.0104
SD	0.027
95% MLE (t) UCL	0.0284
95% MLE (Tiku) UCL	0.0372

Assuming Lognormal Distribution

DL/2 Substitution Method

Mean	-4.157
SD	0.686
95% H-Stat (DL/2) UCL	0.0399

Log ROS Method

Mean in Log Scale	-4.785
SD in Log Scale	1.311
Mean in Original Scale	0.0166
SD in Original Scale	0.0201
95% t UCL	0.0301
95% Percentile Bootstrap UCL	0.0297
95% BCA Bootstrap UCL	0.0322

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	N/A
Theta Star	N/A
nu star	N/A

Data Distribution Test with Detected Values Only

Data appear Normal at 5% Significance Level

A-D Test Statistic	N/A
5% A-D Critical Value	N/A
K-S Test Statistic	N/A
5% K-S Critical Value	N/A

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	N/A
Maximum	N/A
Mean	N/A
Median	N/A
SD	N/A
k star	N/A
Theta star	N/A
Nu star	N/A
AppChi2	N/A
95% Gamma Approximate UCL	N/A
95% Adjusted Gamma UCL	N/A

Note: DL/2 is not a recommended method.

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	0.0263
SD	0.0132
SE of Mean	0.0057
95% KM (t) UCL	0.0371
95% KM (z) UCL	0.0356
95% KM (jackknife) UCL	N/A
95% KM (bootstrap t) UCL	N/A
95% KM (BCA) UCL	N/A
95% KM (Percentile Bootstrap) UCL	N/A
95% KM (Chebyshev) UCL	0.0511
97.5% KM (Chebyshev) UCL	0.0619
99% KM (Chebyshev) UCL	0.083

Potential UCLs to Use

95% KM (t) UCL	0.0371
95% KM (Percentile Bootstrap) UCL	N/A

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Barium

General Statistics

Number of Valid Observations 8

Number of Distinct Observations 8

Raw Statistics

Minimum	10.1
Maximum	49.8
Mean	27.39
Median	24.7
SD	13.51
Coefficient of Variation	0.493
Skewness	0.318

Log-transformed Statistics

Minimum of Log Data	2.313
Maximum of Log Data	3.908
Mean of log Data	3.185
SD of log Data	0.562

Warning: There are only 8 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.944
Shapiro Wilk Critical Value	0.818

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.913
Shapiro Wilk Critical Value	0.818

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	36.44

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	35.82
95% Modified-t UCL (Johnson-1978)	36.53

Assuming Lognormal Distribution

95% H-UCL	47.74
95% Chebyshev (MVUE) UCL	51.95
97.5% Chebyshev (MVUE) UCL	62.45
99% Chebyshev (MVUE) UCL	83.07

Gamma Distribution Test

k star (bias corrected)	2.687
Theta Star	10.19
MLE of Mean	27.39
MLE of Standard Deviation	16.71
nu star	42.99
Approximate Chi Square Value (.05)	28.96
Adjusted Level of Significance	0.0195
Adjusted Chi Square Value	26.08
Anderson-Darling Test Statistic	0.341
Anderson-Darling 5% Critical Value	0.719
Kolmogorov-Smirnov Test Statistic	0.214
Kolmogorov-Smirnov 5% Critical Value	0.295

Data appear Gamma Distributed at 5% Significance Level

Data Distribution

Data appear Normal at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	40.66
95% Adjusted Gamma UCL	45.15

Nonparametric Statistics

95% CLT UCL	35.24
95% Jackknife UCL	36.44
95% Standard Bootstrap UCL	34.75
95% Bootstrap-t UCL	37.6
95% Hall's Bootstrap UCL	37.13
95% Percentile Bootstrap UCL	34.68
95% BCA Bootstrap UCL	35.41
95% Chebyshev(Mean, Sd) UCL	48.2
97.5% Chebyshev(Mean, Sd) UCL	57.21
99% Chebyshev(Mean, Sd) UCL	74.91

Potential UCL to Use	Use 95% Student's-t UCL 36.44

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Beryllium

General Statistics

Number of Valid Data	8	Number of Detected Data	3
Number of Distinct Detected Data	3	Number of Non-Detect Data	5
		Percent Non-Detects	62.50%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.002	Minimum Detected	-6.215
Maximum Detected	0.04	Maximum Detected	-3.219
Mean of Detected	0.0203	Mean of Detected	-4.466
SD of Detected	0.019	SD of Detected	1.56
Minimum Non-Detect	0.002	Minimum Non-Detect	-6.215
Maximum Non-Detect	0.002	Maximum Non-Detect	-6.215

Warning: There are only 3 Distinct Detected Values in this data set

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.996	Shapiro Wilk Test Statistic	0.922
5% Shapiro Wilk Critical Value	0.767	5% Shapiro Wilk Critical Value	0.767
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.00825	Mean	-5.992
SD	0.0143	SD	1.514
95% DL/2 (t) UCL	0.0178	95% H-Stat (DL/2) UCL	0.121
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	-8.058
		SD in Log Scale	3.44
		Mean in Original Scale	0.0077
		SD in Original Scale	0.0146
		95% t UCL	0.0175
		95% Percentile Bootstrap UCL	0.0155
		95% BCA Bootstrap UCL	0.02

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only
k star (bias corrected)	N/A	Data appear Normal at 5% Significance Level
Theta Star	N/A	
nu star	N/A	

A-D Test Statistic	N/A
5% A-D Critical Value	N/A
K-S Test Statistic	N/A
5% K-S Critical Value	N/A

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	N/A
Maximum	N/A
Mean	N/A
Median	N/A
SD	N/A
k star	N/A
Theta star	N/A
Nu star	N/A
AppChi2	N/A
95% Gamma Approximate UCL	N/A
95% Adjusted Gamma UCL	N/A

Note: DL/2 is not a recommended method.

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	0.00888
SD	0.013
SE of Mean	0.00564
95% KM (t) UCL	0.0196
95% KM (z) UCL	0.0181
95% KM (jackknife) UCL	N/A
95% KM (bootstrap t) UCL	N/A
95% KM (BCA) UCL	N/A
95% KM (Percentile Bootstrap) UCL	N/A
95% KM (Chebyshev) UCL	0.0334
97.5% KM (Chebyshev) UCL	0.0441
99% KM (Chebyshev) UCL	0.0649

Potential UCLs to Use

95% KM (t) UCL	0.0196
95% KM (Percentile Bootstrap) UCL	N/A

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Bismuth

General Statistics

Number of Valid Data	8	Number of Detected Data	0
Number of Distinct Detected Data	0	Number of Non-Detect Data	8
		Percent Non-Detects	100.00%

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!

Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Bismuth was not processed!

Boron

General Statistics

Number of Valid Observations 8

Number of Distinct Observations 7

Raw Statistics

Minimum	6.9
Maximum	13.5
Mean	9.5
Median	8.45
SD	2.806
Coefficient of Variation	0.295
Skewness	0.701

Log-transformed Statistics

Minimum of Log Data	1.932
Maximum of Log Data	2.603
Mean of log Data	2.215
SD of log Data	0.284

Warning: There are only 8 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.826
Shapiro Wilk Critical Value	0.818

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.848
Shapiro Wilk Critical Value	0.818

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	11.38

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	11.39
95% Modified-t UCL (Johnson-1978)	11.42

Assuming Lognormal Distribution

95% H-UCL	11.87
95% Chebyshev (MVUE) UCL	13.66
97.5% Chebyshev (MVUE) UCL	15.46
99% Chebyshev (MVUE) UCL	19

Gamma Distribution Test

k star (bias corrected)	8.805
Theta Star	1.079
MLE of Mean	9.5
MLE of Standard Deviation	3.202
nu star	140.9
Approximate Chi Square Value (.05)	114.4
Adjusted Level of Significance	0.0195
Adjusted Chi Square Value	108.4
Anderson-Darling Test Statistic	0.606
Anderson-Darling 5% Critical Value	0.715
Kolmogorov-Smirnov Test Statistic	0.248
Kolmogorov-Smirnov 5% Critical Value	0.294

Data appear Gamma Distributed at 5% Significance Level

Data Distribution

Data appear Normal at 5% Significance Level

Nonparametric Statistics

95% CLT UCL	11.13
95% Jackknife UCL	11.38
95% Standard Bootstrap UCL	11.02
95% Bootstrap-t UCL	11.98
95% Hall's Bootstrap UCL	11.24
95% Percentile Bootstrap UCL	11.11
95% BCA Bootstrap UCL	11.13
95% Chebyshev(Mean, Sd) UCL	13.82
97.5% Chebyshev(Mean, Sd) UCL	15.69
99% Chebyshev(Mean, Sd) UCL	19.37

Assuming Gamma Distribution

95% Approximate Gamma UCL	11.69
95% Adjusted Gamma UCL	12.34

Potential UCL to Use	Use 95% Student's-t UCL 11.38

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cadmium

General Statistics

Number of Valid Observations	8	Number of Distinct Observations	8

Raw Statistics

Minimum	0.131
Maximum	0.874
Mean	0.497
Median	0.471
SD	0.261
Coefficient of Variation	0.525
Skewness	0.0696

Log-transformed Statistics

Minimum of Log Data	-2.033
Maximum of Log Data	-0.135
Mean of log Data	-0.855
SD of log Data	0.643

Warning: There are only 8 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.966
Shapiro Wilk Critical Value	0.818

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.935
Shapiro Wilk Critical Value	0.818

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	0.671

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	0.651
95% Modified-t UCL (Johnson-1978)	0.672

Assuming Lognormal Distribution

95% H-UCL	0.988
95% Chebyshev (MVUE) UCL	1.019
97.5% Chebyshev (MVUE) UCL	1.239
99% Chebyshev (MVUE) UCL	1.673

Gamma Distribution Test

k star (bias corrected)	2.196
Theta Star	0.226
MLE of Mean	0.497
MLE of Standard Deviation	0.335
nu star	35.13
Approximate Chi Square Value (.05)	22.57
Adjusted Level of Significance	0.0195
Adjusted Chi Square Value	20.06
Anderson-Darling Test Statistic	0.224
Anderson-Darling 5% Critical Value	0.72
Kolmogorov-Smirnov Test Statistic	0.16
Kolmogorov-Smirnov 5% Critical Value	0.296

Data appear Gamma Distributed at 5% Significance Level

Data Distribution

Data appear Normal at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.773
95% Adjusted Gamma UCL	0.87

Nonparametric Statistics

95% CLT UCL	0.648
95% Jackknife UCL	0.671
95% Standard Bootstrap UCL	0.64
95% Bootstrap-t UCL	0.677
95% Hall's Bootstrap UCL	0.642
95% Percentile Bootstrap UCL	0.643
95% BCA Bootstrap UCL	0.641
95% Chebyshev(Mean, Sd) UCL	0.898
97.5% Chebyshev(Mean, Sd) UCL	1.072
99% Chebyshev(Mean, Sd) UCL	1.413

Potential UCL to Use	Use 95% Student's-t UCL 0.671

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Calcium

General Statistics

Number of Valid Observations 8

Number of Distinct Observations 8

Raw Statistics

Minimum	1570
Maximum	4860
Mean	2536
Median	2340
SD	979.6
Coefficient of Variation	0.386
Skewness	2.335

Log-transformed Statistics

Minimum of Log Data	7.359
Maximum of Log Data	8.489
Mean of log Data	7.789
SD of log Data	0.317

Warning: There are only 8 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.674
Shapiro Wilk Critical Value	0.818

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.788
Shapiro Wilk Critical Value	0.818

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	3192

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	3411
95% Modified-t UCL (Johnson-1978)	3240

Assuming Lognormal Distribution

95% H-UCL	3254
95% Chebyshev (MVUE) UCL	3757
97.5% Chebyshev (MVUE) UCL	4291
99% Chebyshev (MVUE) UCL	5341

Gamma Distribution Test

k star (bias corrected)	6.481
Theta Star	391.3
MLE of Mean	2536
MLE of Standard Deviation	996.3
nu star	103.7
Approximate Chi Square Value (.05)	81.2
Adjusted Level of Significance	0.0195
Adjusted Chi Square Value	76.17
Anderson-Darling Test Statistic	1.052
Anderson-Darling 5% Critical Value	0.715
Kolmogorov-Smirnov Test Statistic	0.382
Kolmogorov-Smirnov 5% Critical Value	0.294

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	3239
95% Adjusted Gamma UCL	3453

Data Distribution

Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

95% CLT UCL	3106
95% Jackknife UCL	3192
95% Standard Bootstrap UCL	3066
95% Bootstrap-t UCL	4616
95% Hall's Bootstrap UCL	6089
95% Percentile Bootstrap UCL	3160
95% BCA Bootstrap UCL	3284
95% Chebyshev(Mean, Sd) UCL	4046
97.5% Chebyshev(Mean, Sd) UCL	4699
99% Chebyshev(Mean, Sd) UCL	5982

Potential UCL to Use	Use 95% Student's-t UCL 3192
	or 95% Modified-t UCL 3240

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Data	8	Number of Detected Data	5
Number of Distinct Detected Data	4	Number of Non-Detect Data	3
		Percent Non-Detects	37.50%

Raw Statistics

Minimum Detected	0.05
Maximum Detected	0.12
Mean of Detected	0.08
SD of Detected	0.0265
Minimum Non-Detect	0.05
Maximum Non-Detect	0.05

Log-transformed Statistics

Minimum Detected	-2.996
Maximum Detected	-2.12
Mean of Detected	-2.568
SD of Detected	0.326
Minimum Non-Detect	-2.996
Maximum Non-Detect	-2.996

Warning: There are only 4 Distinct Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.942
5% Shapiro Wilk Critical Value	0.762

Data appear Normal at 5% Significance Level

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.97
5% Shapiro Wilk Critical Value	0.762

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method

Mean	0.0594
SD	0.0348
95% DL/2 (t) UCL	0.0827

Maximum Likelihood Estimate(MLE) Method

Mean	0.0597
SD	0.0342
95% MLE (t) UCL	0.0826
95% MLE (Tiku) UCL	0.0851

Assuming Lognormal Distribution

DL/2 Substitution Method

Mean	-2.989
SD	0.63
95% H-Stat (DL/2) UCL	0.114

Log ROS Method

Mean in Log Scale	-2.911
SD in Log Scale	0.547
Mean in Original Scale	0.0617
SD in Original Scale	0.0324
95% t UCL	0.0834
95% Percentile Bootstrap UCL	0.0818
95% BCA Bootstrap UCL	0.0823

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	4.876
Theta Star	0.0164
nu star	48.76
A-D Test Statistic	0.261
5% A-D Critical Value	0.679
K-S Test Statistic	0.679
5% K-S Critical Value	0.358

Data Distribution Test with Detected Values Only

Data appear Normal at 5% Significance Level

Nonparametric Statistics

Kaplan-Meier (KM) Method

Mean	0.0688
SD	0.0237

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	0.0473
Maximum	0.12
Mean	0.074
Median	0.07
SD	0.0233
k star	7.874
Theta star	0.0094
Nu star	126
AppChi2	101.1
95% Gamma Approximate UCL	0.0922
95% Adjusted Gamma UCL	0.0977

Note: DL/2 is not a recommended method.

SE of Mean	0.00936
95% KM (t) UCL	0.0865
95% KM (z) UCL	0.0841
95% KM (jackknife) UCL	0.0864
95% KM (bootstrap t) UCL	0.0895
95% KM (BCA) UCL	0.0913
95% KM (Percentile Bootstrap) UCL	0.0888
95% KM (Chebyshev) UCL	0.11
97.5% KM (Chebyshev) UCL	0.127
99% KM (Chebyshev) UCL	0.162

Potential UCLs to Use

95% KM (t) UCL	0.0865
95% KM (Percentile Bootstrap) UCL	0.0888

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Cobalt

General Statistics

Number of Valid Observations 8

Number of Distinct Observations 8

Raw Statistics

Minimum	0.02
Maximum	3.14
Mean	0.654
Median	0.14
SD	1.095
Coefficient of Variation	1.675
Skewness	2.136

Log-transformed Statistics

Minimum of Log Data	-3.912
Maximum of Log Data	1.144
Mean of log Data	-1.653
SD of log Data	1.704

Warning: There are only 8 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.654
Shapiro Wilk Critical Value	0.818

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.96
Shapiro Wilk Critical Value	0.818

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	1.387

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	1.603
95% Modified-t UCL (Johnson-1978)	1.436

Assuming Lognormal Distribution

95% H-UCL	24.87
95% Chebyshev (MVUE) UCL	2.138
97.5% Chebyshev (MVUE) UCL	2.807
99% Chebyshev (MVUE) UCL	4.12

Gamma Distribution Test

k star (bias corrected)	0.405
Theta Star	1.613
MLE of Mean	0.654
MLE of Standard Deviation	1.027
nu star	6.484
Approximate Chi Square Value (.05)	1.892
Adjusted Level of Significance	0.0195
Adjusted Chi Square Value	1.331
Anderson-Darling Test Statistic	0.522
Anderson-Darling 5% Critical Value	0.761
Kolmogorov-Smirnov Test Statistic	0.242
Kolmogorov-Smirnov 5% Critical Value	0.309

Data appear Gamma Distributed at 5% Significance Level

Data Distribution

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	2.24
95% Adjusted Gamma UCL	3.185

Nonparametric Statistics

95% CLT UCL	1.29
95% Jackknife UCL	1.387
95% Standard Bootstrap UCL	1.234
95% Bootstrap-t UCL	6.504
95% Hall's Bootstrap UCL	4.879
95% Percentile Bootstrap UCL	1.314
95% BCA Bootstrap UCL	1.629
95% Chebyshev(Mean, Sd) UCL	2.341
97.5% Chebyshev(Mean, Sd) UCL	3.071
99% Chebyshev(Mean, Sd) UCL	4.505

Potential UCL to Use	Use 95% Approximate Gamma UCL 2.24

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Copper

General Statistics

Number of Valid Observations 8

Number of Distinct Observations 8

Raw Statistics

Minimum	1.79
Maximum	4.67
Mean	3.013
Median	2.7
SD	1.04
Coefficient of Variation	0.345
Skewness	0.826

Log-transformed Statistics

Minimum of Log Data	0.582
Maximum of Log Data	1.541
Mean of log Data	1.053
SD of log Data	0.332

Warning: There are only 8 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.891
Shapiro Wilk Critical Value	0.818

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.944
Shapiro Wilk Critical Value	0.818

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	3.709

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	3.732
95% Modified-t UCL (Johnson-1978)	3.727

Assuming Lognormal Distribution

95% H-UCL	3.945
95% Chebyshev (MVUE) UCL	4.557
97.5% Chebyshev (MVUE) UCL	5.227
99% Chebyshev (MVUE) UCL	6.543

Gamma Distribution Test

k star (bias corrected)	6.508
Theta Star	0.463
MLE of Mean	3.013
MLE of Standard Deviation	1.181
nu star	104.1
Approximate Chi Square Value (.05)	81.58
Adjusted Level of Significance	0.0195
Adjusted Chi Square Value	76.54
Anderson-Darling Test Statistic	0.345
Anderson-Darling 5% Critical Value	0.715
Kolmogorov-Smirnov Test Statistic	0.189
Kolmogorov-Smirnov 5% Critical Value	0.294

Data appear Gamma Distributed at 5% Significance Level

Data Distribution

Data appear Normal at 5% Significance Level

Nonparametric Statistics

95% CLT UCL	3.617
95% Jackknife UCL	3.709
95% Standard Bootstrap UCL	3.564
95% Bootstrap-t UCL	4.245
95% Hall's Bootstrap UCL	5.265
95% Percentile Bootstrap UCL	3.603
95% BCA Bootstrap UCL	3.616
95% Chebyshev(Mean, Sd) UCL	4.615
97.5% Chebyshev(Mean, Sd) UCL	5.309
99% Chebyshev(Mean, Sd) UCL	6.671

Assuming Gamma Distribution

95% Approximate Gamma UCL	3.845
95% Adjusted Gamma UCL	4.098

Potential UCL to Use Use 95% Student's-t UCL 3.709

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Iron

General Statistics

Number of Valid Observations	8	Number of Distinct Observations	7

Raw Statistics

Minimum	14
Maximum	70
Mean	32.88
Median	22.5
SD	21.28
Coefficient of Variation	0.647
Skewness	1.005

Log-transformed Statistics

Minimum of Log Data	2.639
Maximum of Log Data	4.248
Mean of log Data	3.322
SD of log Data	0.61

Warning: There are only 8 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.83
Shapiro Wilk Critical Value	0.818

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.888
Shapiro Wilk Critical Value	0.818

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	47.13

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	48.1
95% Modified-t UCL (Johnson-1978)	47.57

Assuming Lognormal Distribution

95% H-UCL	60.22
95% Chebyshev (MVUE) UCL	63.57
97.5% Chebyshev (MVUE) UCL	77
99% Chebyshev (MVUE) UCL	103.4

Gamma Distribution Test

k star (bias corrected)	2.015
Theta Star	16.31
MLE of Mean	32.88
MLE of Standard Deviation	23.16
nu star	32.25
Approximate Chi Square Value (.05)	20.27
Adjusted Level of Significance	0.0195
Adjusted Chi Square Value	17.9
Anderson-Darling Test Statistic	0.56
Anderson-Darling 5% Critical Value	0.721
Kolmogorov-Smirnov Test Statistic	0.279
Kolmogorov-Smirnov 5% Critical Value	0.296

Data appear Gamma Distributed at 5% Significance Level

Data Distribution

Data appear Normal at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	52.31
95% Adjusted Gamma UCL	59.21

Nonparametric Statistics

95% CLT UCL	45.25
95% Jackknife UCL	47.13
95% Standard Bootstrap UCL	44.52
95% Bootstrap-t UCL	59.5
95% Hall's Bootstrap UCL	46.94
95% Percentile Bootstrap UCL	44.88
95% BCA Bootstrap UCL	47.25
95% Chebyshev(Mean, Sd) UCL	65.66
97.5% Chebyshev(Mean, Sd) UCL	79.85
99% Chebyshev(Mean, Sd) UCL	107.7

Potential UCL to Use	Use 95% Student's-t UCL 47.13

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Lead

General Statistics

Number of Valid Observations	8	Number of Distinct Observations	8

Raw Statistics

Minimum	0.008
Maximum	0.337
Mean	0.146
Median	0.134
SD	0.107
Coefficient of Variation	0.734
Skewness	0.752

Log-transformed Statistics

Minimum of Log Data	-4.828
Maximum of Log Data	-1.088
Mean of log Data	-2.31
SD of log Data	1.163

Warning: There are only 8 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.941
Shapiro Wilk Critical Value	0.818

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.856
Shapiro Wilk Critical Value	0.818

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	0.218

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	0.219
95% Modified-t UCL (Johnson-1978)	0.22

Assuming Lognormal Distribution

95% H-UCL	1.057
95% Chebyshev (MVUE) UCL	0.491
97.5% Chebyshev (MVUE) UCL	0.628
99% Chebyshev (MVUE) UCL	0.898

Gamma Distribution Test

k star (bias corrected)	0.98
Theta Star	0.149
MLE of Mean	0.146
MLE of Standard Deviation	0.148
nu star	15.69
Approximate Chi Square Value (.05)	7.742
Adjusted Level of Significance	0.0195
Adjusted Chi Square Value	6.383
Anderson-Darling Test Statistic	0.295
Anderson-Darling 5% Critical Value	0.729
Kolmogorov-Smirnov Test Statistic	0.193
Kolmogorov-Smirnov 5% Critical Value	0.299

Data appear Gamma Distributed at 5% Significance Level

Data Distribution

Data appear Normal at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.296
95% Adjusted Gamma UCL	0.359

Nonparametric Statistics

95% CLT UCL	0.209
95% Jackknife UCL	0.218
95% Standard Bootstrap UCL	0.203
95% Bootstrap-t UCL	0.255
95% Hall's Bootstrap UCL	0.375
95% Percentile Bootstrap UCL	0.207
95% BCA Bootstrap UCL	0.211
95% Chebyshev(Mean, Sd) UCL	0.312
97.5% Chebyshev(Mean, Sd) UCL	0.383
99% Chebyshev(Mean, Sd) UCL	0.524

Potential UCL to Use	Use 95% Student's-t UCL 0.218

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Lithium

General Statistics

Number of Valid Data	8	Number of Detected Data	3
Number of Distinct Detected Data	2	Number of Non-Detect Data	5
		Percent Non-Detects	62.50%

Raw Statistics

Minimum Detected	0.01
Maximum Detected	0.03
Mean of Detected	0.0167
SD of Detected	0.0115
Minimum Non-Detect	0.01
Maximum Non-Detect	0.01

Log-transformed Statistics

Minimum Detected	-4.605
Maximum Detected	-3.507
Mean of Detected	-4.239
SD of Detected	0.634
Minimum Non-Detect	-4.605
Maximum Non-Detect	-4.605

Warning: Data set has only 2 Distinct Detected Values.

This may not be adequate enough to compute meaningful and reliable test statistics and estimates.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

UCL Statistics

Normal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.75
5% Shapiro Wilk Critical Value	0.767

Data not Normal at 5% Significance Level

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.75
5% Shapiro Wilk Critical Value	0.767

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method	
Mean	0.00938
SD	0.00863
95% DL/2 (t) UCL	0.0152
Maximum Likelihood Estimate(MLE) Method	
Mean	0.00464
SD	0.013
95% MLE (t) UCL	0.0133
95% MLE (Tiku) UCL	0.0178

Assuming Lognormal Distribution

DL/2 Substitution Method	
Mean	-4.901
SD	0.645
95% H-Stat (DL/2) UCL	0.0173
Log ROS Method	
Mean in Log Scale	-5.669
SD in Log Scale	1.371
Mean in Original Scale	0.0074
SD in Original Scale	0.0099
95% t UCL	0.014
95% Percentile Bootstrap UCL	0.0132
95% BCA Bootstrap UCL	0.0163

Gamma Distribution Test with Detected Values Only	
k star (bias corrected)	N/A
Theta Star	N/A
nu star	N/A
A-D Test Statistic	N/A
5% A-D Critical Value	N/A
K-S Test Statistic	N/A
5% K-S Critical Value	N/A

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution	
Gamma ROS Statistics using Extrapolated Data	
Minimum	N/A
Maximum	N/A
Mean	N/A
Median	N/A
SD	N/A
k star	N/A
Theta star	N/A
Nu star	N/A
AppChi2	N/A
95% Gamma Approximate UCL	N/A
95% Adjusted Gamma UCL	N/A

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics	
Kaplan-Meier (KM) Method	
Mean	0.0125
SD	0.00661
SE of Mean	0.00286
95% KM (t) UCL	0.0179
95% KM (z) UCL	0.0172
95% KM (jackknife) UCL	N/A
95% KM (bootstrap t) UCL	N/A
95% KM (BCA) UCL	N/A
95% KM (Percentile Bootstrap) UCL	N/A
95% KM (Chebyshev) UCL	0.025
97.5% KM (Chebyshev) UCL	0.0304
99% KM (Chebyshev) UCL	0.041

Potential UCLs to Use	
95% KM (t) UCL	0.0179
95% KM (% Bootstrap) UCL	N/A

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Magnesium

General Statistics

Number of Valid Observations 8

Number of Distinct Observations 8

Raw Statistics

Minimum	410
Maximum	961
Mean	636
Median	600.5
SD	188.4
Coefficient of Variation	0.296
Skewness	0.709

Log-transformed Statistics

Minimum of Log Data	6.016
Maximum of Log Data	6.868
Mean of log Data	6.418
SD of log Data	0.29

Warning: There are only 8 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.942
Shapiro Wilk Critical Value	0.818

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.971
Shapiro Wilk Critical Value	0.818

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	762.2

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	763.4
95% Modified-t UCL (Johnson-1978)	765

Assuming Lognormal Distribution

95% H-UCL	799.7
95% Chebyshev (MVUE) UCL	920.8
97.5% Chebyshev (MVUE) UCL	1044
99% Chebyshev (MVUE) UCL	1286

Gamma Distribution Test

k star (bias corrected)	8.593
Theta Star	74.02
MLE of Mean	636
MLE of Standard Deviation	217
nu star	137.5
Approximate Chi Square Value (.05)	111.4
Adjusted Level of Significance	0.0195
Adjusted Chi Square Value	105.4
Anderson-Darling Test Statistic	0.205
Anderson-Darling 5% Critical Value	0.715
Kolmogorov-Smirnov Test Statistic	0.134
Kolmogorov-Smirnov 5% Critical Value	0.294

Data appear Gamma Distributed at 5% Significance Level

Data Distribution

Data appear Normal at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	785
95% Adjusted Gamma UCL	829.2

Nonparametric Statistics

95% CLT UCL	745.6
95% Jackknife UCL	762.2
95% Standard Bootstrap UCL	737.3
95% Bootstrap-t UCL	802.2
95% Hall's Bootstrap UCL	903.6
95% Percentile Bootstrap UCL	737.8
95% BCA Bootstrap UCL	747.3
95% Chebyshev(Mean, Sd) UCL	926.3
97.5% Chebyshev(Mean, Sd) UCL	1052
99% Chebyshev(Mean, Sd) UCL	1299

Potential UCL to Use	Use 95% Student's-t UCL 762.2

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations	8	Number of Distinct Observations	8

Raw Statistics

Minimum	148
Maximum	1210
Mean	686.5
Median	704
SD	412.4
Coefficient of Variation	0.601
Skewness	-0.163

Log-transformed Statistics

Minimum of Log Data	4.997
Maximum of Log Data	7.098
Mean of log Data	6.295
SD of log Data	0.818

Warning: There are only 8 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.909
Shapiro Wilk Critical Value	0.818

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.856
Shapiro Wilk Critical Value	0.818

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	962.7

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	917.3
95% Modified-t UCL (Johnson-1978)	961.3

Assuming Lognormal Distribution

95% H-UCL	1911
95% Chebyshev (MVUE) UCL	1645
97.5% Chebyshev (MVUE) UCL	2045
99% Chebyshev (MVUE) UCL	2831

Gamma Distribution Test

k star (bias corrected)	1.501
Theta Star	457.2
MLE of Mean	686.5
MLE of Standard Deviation	560.3
nu star	24.02
Approximate Chi Square Value (.05)	13.87
Adjusted Level of Significance	0.0195
Adjusted Chi Square Value	11.96
Anderson-Darling Test Statistic	0.483
Anderson-Darling 5% Critical Value	0.723
Kolmogorov-Smirnov Test Statistic	0.236
Kolmogorov-Smirnov 5% Critical Value	0.297

Data appear Gamma Distributed at 5% Significance Level

Data Distribution

Data appear Normal at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	1189
95% Adjusted Gamma UCL	1379

Nonparametric Statistics

95% CLT UCL	926.3
95% Jackknife UCL	962.7
95% Standard Bootstrap UCL	914.3
95% Bootstrap-t UCL	959.8
95% Hall's Bootstrap UCL	877.5
95% Percentile Bootstrap UCL	913
95% BCA Bootstrap UCL	899.9
95% Chebyshev(Mean, Sd) UCL	1322
97.5% Chebyshev(Mean, Sd) UCL	1597
99% Chebyshev(Mean, Sd) UCL	2137

Potential UCL to Use Use 95% Student's-t UCL 962.7

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Data	8	Number of Detected Data	7
Number of Distinct Detected Data	3	Number of Non-Detect Data	1
		Percent Non-Detects	12.50%

Raw Statistics

Minimum Detected	0.01
Maximum Detected	0.03
Mean of Detected	0.0186
SD of Detected	0.009
Minimum Non-Detect	0.01
Maximum Non-Detect	0.01

Log-transformed Statistics

Minimum Detected	-4.605
Maximum Detected	-3.507
Mean of Detected	-4.093
SD of Detected	0.507
Minimum Non-Detect	-4.605
Maximum Non-Detect	-4.605

Warning: There are only 3 Distinct Detected Values in this data set

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

UCL Statistics

Normal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.818
5% Shapiro Wilk Critical Value	0.803

Data appear Normal at 5% Significance Level

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.807
5% Shapiro Wilk Critical Value	0.803

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method

Mean	0.0169
SD	0.00961
95% DL/2 (t) UCL	0.0233

Maximum Likelihood Estimate(MLE) Method

Mean	0.0168
SD	0.00918
95% MLE (t) UCL	0.023
95% MLE (Tiku) UCL	0.0228

Assuming Lognormal Distribution

DL/2 Substitution Method

Mean	-4.244
SD	0.634
95% H-Stat (DL/2) UCL	0.0327

Log ROS Method

Mean in Log Scale	-4.243
SD in Log Scale	0.632
Mean in Original Scale	0.0169
SD in Original Scale	0.00961
95% t UCL	0.0233
95% Percentile Bootstrap UCL	0.0225
95% BCA Bootstrap UCL	0.0225

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	2.854
Theta Star	0.00651
nu star	39.96

Data Distribution Test with Detected Values Only

Data appear Normal at 5% Significance Level

A-D Test Statistic	0.669
5% A-D Critical Value	0.71
K-S Test Statistic	0.71
5% K-S Critical Value	0.313

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	0.00474
Maximum	0.03
Mean	0.0168
Median	0.015
SD	0.00966
k star	2.057
Theta star	0.00819
Nu star	32.9
AppChi2	20.79
95% Gamma Approximate UCL	0.0267
95% Adjusted Gamma UCL	0.0301

Note: DL/2 is not a recommended method.

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	0.0175
SD	0.00829
SE of Mean	0.00317
95% KM (t) UCL	0.0235
95% KM (z) UCL	0.0227
95% KM (jackknife) UCL	N/A
95% KM (bootstrap t) UCL	N/A
95% KM (BCA) UCL	N/A
95% KM (Percentile Bootstrap) UCL	N/A
95% KM (Chebyshev) UCL	0.0313
97.5% KM (Chebyshev) UCL	0.0373
99% KM (Chebyshev) UCL	0.049

Potential UCLs to Use

95% KM (t) UCL	0.0235
95% KM (Percentile Bootstrap) UCL	N/A

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Molybdenum

General Statistics

Number of Valid Data	8	Number of Detected Data	4
Number of Distinct Detected Data	3	Number of Non-Detect Data	4
		Percent Non-Detects	50.00%

Raw Statistics

Minimum Detected	0.01
Maximum Detected	0.11
Mean of Detected	0.04
SD of Detected	0.0469
Minimum Non-Detect	0.01
Maximum Non-Detect	0.01

Log-transformed Statistics

Minimum Detected	-4.605
Maximum Detected	-2.207
Mean of Detected	-3.659
SD of Detected	1.022
Minimum Non-Detect	-4.605
Maximum Non-Detect	-4.605

Warning: There are only 3 Distinct Detected Values in this data set

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

UCL Statistics

Normal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.716
5% Shapiro Wilk Critical Value	0.748

Data not Normal at 5% Significance Level

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.867
5% Shapiro Wilk Critical Value	0.748

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method

Mean	0.0225
SD	0.036
95% DL/2 (t) UCL	0.0466

Maximum Likelihood Estimate(MLE) Method

Mean	0.00259
SD	0.0527
95% MLE (t) UCL	0.0379
95% MLE (Tiku) UCL	0.0464

Assuming Lognormal Distribution

DL/2 Substitution Method

Mean	-4.479
SD	1.102
95% H-Stat (DL/2) UCL	0.0966

Log ROS Method

Mean in Log Scale	-5.238
SD in Log Scale	1.921
Mean in Original Scale	0.0207
SD in Original Scale	0.037
95% t UCL	0.0455
95% Percentile Bootstrap UCL	0.0447
95% BCA Bootstrap UCL	0.0571

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	0.486
Theta Star	0.0823
nu star	3.887

Data Distribution Test with Detected Values Only

Data Follow Appr. Gamma Distribution at 5% Significance Level

A-D Test Statistic	0.574
5% A-D Critical Value	0.664
K-S Test Statistic	0.664
5% K-S Critical Value	0.401

Data follow Appr. Gamma Distribution at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	1E-12
Maximum	0.11
Mean	0.0402
Median	0.02
SD	0.0411
k star	0.223
Theta star	0.181
Nu star	3.561
AppChi2	0.556
95% Gamma Approximate UCL	0.257
95% Adjusted Gamma UCL	N/A

Note: DL/2 is not a recommended method.

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	0.025
SD	0.0324
SE of Mean	0.0132
95% KM (t) UCL	0.0501
95% KM (z) UCL	0.0468
95% KM (jackknife) UCL	N/A
95% KM (bootstrap t) UCL	N/A
95% KM (BCA) UCL	N/A
95% KM (Percentile Bootstrap) UCL	N/A
95% KM (Chebyshev) UCL	0.0827
97.5% KM (Chebyshev) UCL	0.108
99% KM (Chebyshev) UCL	0.157

Potential UCLs to Use

95% KM (t) UCL	0.0501

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations	8	Number of Distinct Observations	7

Raw Statistics

Minimum	0.5
Maximum	2.98
Mean	0.948
Median	0.67
SD	0.83
Coefficient of Variation	0.876
Skewness	2.714

Log-transformed Statistics

Minimum of Log Data	-0.693
Maximum of Log Data	1.092
Mean of log Data	-0.245
SD of log Data	0.57

Warning: There are only 8 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.549
Shapiro Wilk Critical Value	0.818

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.704
Shapiro Wilk Critical Value	0.818

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	1.503

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	1.731
95% Modified-t UCL (Johnson-1978)	1.55

Assuming Lognormal Distribution

95% H-UCL	1.569
95% Chebyshev (MVUE) UCL	1.7
97.5% Chebyshev (MVUE) UCL	2.046
99% Chebyshev (MVUE) UCL	2.726

Gamma Distribution Test

k star (bias corrected)	1.814
Theta Star	0.522
MLE of Mean	0.948
MLE of Standard Deviation	0.703
nu star	29.03
Approximate Chi Square Value (.05)	17.73
Adjusted Level of Significance	0.0195
Adjusted Chi Square Value	15.54
Anderson-Darling Test Statistic	1.341
Anderson-Darling 5% Critical Value	0.722
Kolmogorov-Smirnov Test Statistic	0.387
Kolmogorov-Smirnov 5% Critical Value	0.297

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	1.551
95% Adjusted Gamma UCL	1.77

Data Distribution

Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

95% CLT UCL	1.43
95% Jackknife UCL	1.503
95% Standard Bootstrap UCL	1.402
95% Bootstrap-t UCL	3.533
95% Hall's Bootstrap UCL	3.681
95% Percentile Bootstrap UCL	1.523
95% BCA Bootstrap UCL	1.779
95% Chebyshev(Mean, Sd) UCL	2.226
97.5% Chebyshev(Mean, Sd) UCL	2.78
99% Chebyshev(Mean, Sd) UCL	3.867

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 2.226

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Potassium

General Statistics

Number of Valid Observations 8

Number of Distinct Observations 8

Raw Statistics

Minimum	1990
Maximum	3960
Mean	2720
Median	2480
SD	702.6
Coefficient of Variation	0.258
Skewness	1.138

Log-transformed Statistics

Minimum of Log Data	7.596
Maximum of Log Data	8.284
Mean of log Data	7.882
SD of log Data	0.24

Warning: There are only 8 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.845
Shapiro Wilk Critical Value	0.818

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.891
Shapiro Wilk Critical Value	0.818

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	3191

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	3235
95% Modified-t UCL (Johnson-1978)	3207

Assuming Lognormal Distribution

95% H-UCL	3265
95% Chebyshev (MVUE) UCL	3725
97.5% Chebyshev (MVUE) UCL	4161
99% Chebyshev (MVUE) UCL	5018

Gamma Distribution Test

k star (bias corrected)	11.98
Theta Star	227
MLE of Mean	2720
MLE of Standard Deviation	785.7
nu star	191.7
Approximate Chi Square Value (.05)	160.7
Adjusted Level of Significance	0.0195
Adjusted Chi Square Value	153.5
Anderson-Darling Test Statistic	0.561
Anderson-Darling 5% Critical Value	0.716
Kolmogorov-Smirnov Test Statistic	0.258
Kolmogorov-Smirnov 5% Critical Value	0.294

Data appear Gamma Distributed at 5% Significance Level

Data Distribution

Data appear Normal at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	3245
95% Adjusted Gamma UCL	3397

Nonparametric Statistics

95% CLT UCL	3129
95% Jackknife UCL	3191
95% Standard Bootstrap UCL	3109
95% Bootstrap-t UCL	3841
95% Hall's Bootstrap UCL	6389
95% Percentile Bootstrap UCL	3134
95% BCA Bootstrap UCL	3220
95% Chebyshev(Mean, Sd) UCL	3803
97.5% Chebyshev(Mean, Sd) UCL	4271
99% Chebyshev(Mean, Sd) UCL	5192

Potential UCL to Use	Use 95% Student's-t UCL 3191

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Rubidium

General Statistics

Number of Valid Observations 8

Number of Distinct Observations 8

Raw Statistics

Minimum	5.33
Maximum	33.5
Mean	18.08
Median	14.65
SD	9.613
Coefficient of Variation	0.532
Skewness	0.449

Log-transformed Statistics

Minimum of Log Data	1.673
Maximum of Log Data	3.512
Mean of log Data	2.753
SD of log Data	0.597

Warning: There are only 8 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.932
Shapiro Wilk Critical Value	0.818

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.944
Shapiro Wilk Critical Value	0.818

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	24.52

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	24.25
95% Modified-t UCL (Johnson-1978)	24.61

Assuming Lognormal Distribution

95% H-UCL	33.19
95% Chebyshev (MVUE) UCL	35.35
97.5% Chebyshev (MVUE) UCL	42.73
99% Chebyshev (MVUE) UCL	57.23

Gamma Distribution Test

k star (bias corrected)	2.39
Theta Star	7.565
MLE of Mean	18.08
MLE of Standard Deviation	11.69
nu star	38.23
Approximate Chi Square Value (.05)	25.07
Adjusted Level of Significance	0.0195
Adjusted Chi Square Value	22.41
Anderson-Darling Test Statistic	0.284
Anderson-Darling 5% Critical Value	0.719
Kolmogorov-Smirnov Test Statistic	0.196
Kolmogorov-Smirnov 5% Critical Value	0.296

Data appear Gamma Distributed at 5% Significance Level

Data Distribution

Data appear Normal at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	27.57
95% Adjusted Gamma UCL	30.84

Nonparametric Statistics

95% CLT UCL	23.67
95% Jackknife UCL	24.52
95% Standard Bootstrap UCL	23.11
95% Bootstrap-t UCL	25.39
95% Hall's Bootstrap UCL	23.84
95% Percentile Bootstrap UCL	23.49
95% BCA Bootstrap UCL	23.8
95% Chebyshev(Mean, Sd) UCL	32.89
97.5% Chebyshev(Mean, Sd) UCL	39.3
99% Chebyshev(Mean, Sd) UCL	51.9

Potential UCL to Use	Use 95% Student's-t UCL 24.52

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Selenium

General Statistics

Number of Valid Data	8	Number of Detected Data	1
Number of Distinct Detected Data	1	Number of Non-Detect Data	7
		Percent Non-Detects	87.50%

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Selenium was not processed!

Silver

General Statistics

Number of Valid Data	8	Number of Detected Data	3
Number of Distinct Detected Data	2	Number of Non-Detect Data	5
		Percent Non-Detects	62.50%

Raw Statistics

Minimum Detected	0.002
Maximum Detected	0.008
Mean of Detected	0.004
SD of Detected	0.00346
Minimum Non-Detect	0.002
Maximum Non-Detect	0.002

Log-transformed Statistics

Minimum Detected	-6.215
Maximum Detected	-4.828
Mean of Detected	-5.753
SD of Detected	0.8
Minimum Non-Detect	-6.215
Maximum Non-Detect	-6.215

Warning: Data set has only 2 Distinct Detected Values.

This may not be adequate enough to compute meaningful and reliable test statistics and estimates.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

UCL Statistics

Normal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.75
5% Shapiro Wilk Critical Value	0.767

Data not Normal at 5% Significance Level

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.75
5% Shapiro Wilk Critical Value	0.767

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method	
Mean	0.00213
SD	0.00242
95% DL/2 (t) UCL	0.00374
Maximum Likelihood Estimate(MLE) Method	
Mean	0.0003906
SD	0.0039
95% MLE (t) UCL	0.003
95% MLE (Tiku) UCL	0.00433

Assuming Lognormal Distribution

DL/2 Substitution Method	
Mean	-6.475
SD	0.735
95% H-Stat (DL/2) UCL	0.00441
Log ROS Method	
Mean in Log Scale	-7.557
SD in Log Scale	1.73
Mean in Original Scale	0.00166
SD in Original Scale	0.00269
95% t UCL	0.00346
95% Percentile Bootstrap UCL	0.00338
95% BCA Bootstrap UCL	0.0041

Gamma Distribution Test with Detected Values Only	
k star (bias corrected)	N/A
Theta Star	N/A
nu star	N/A
A-D Test Statistic	N/A
5% A-D Critical Value	N/A
K-S Test Statistic	N/A
5% K-S Critical Value	N/A
Data not Gamma Distributed at 5% Significance Level	
Assuming Gamma Distribution	
Gamma ROS Statistics using Extrapolated Data	
Minimum	N/A
Maximum	N/A
Mean	N/A
Median	N/A
SD	N/A
k star	N/A
Theta star	N/A
Nu star	N/A
AppChi2	N/A
95% Gamma Approximate UCL	N/A
95% Adjusted Gamma UCL	N/A

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics	
Kaplan-Meier (KM) Method	
Mean	0.00275
SD	0.00198
SE of Mean	0.0008592
95% KM (t) UCL	0.00438
95% KM (z) UCL	0.00416
95% KM (jackknife) UCL	N/A
95% KM (bootstrap t) UCL	N/A
95% KM (BCA) UCL	N/A
95% KM (Percentile Bootstrap) UCL	N/A
95% KM (Chebyshev) UCL	0.0065
97.5% KM (Chebyshev) UCL	0.00812
99% KM (Chebyshev) UCL	0.0113
Potential UCLs to Use	
95% KM (t) UCL	0.00438
95% KM (% Bootstrap) UCL	N/A

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Sodium

General Statistics

Number of Valid Observations	8	Number of Distinct Observations	7

Raw Statistics

Minimum	4
Maximum	16
Mean	8.125
Median	7
SD	4.291
Coefficient of Variation	0.528
Skewness	0.899

Log-transformed Statistics

Minimum of Log Data	1.386
Maximum of Log Data	2.773
Mean of log Data	1.977
SD of log Data	0.518

Warning: There are only 8 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.901
Shapiro Wilk Critical Value	0.818

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.934
Shapiro Wilk Critical Value	0.818

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	11

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	11.14
95% Modified-t UCL (Johnson-1978)	11.08

Assuming Lognormal Distribution

95% H-UCL	13.16
95% Chebyshev (MVUE) UCL	14.64
97.5% Chebyshev (MVUE) UCL	17.46
99% Chebyshev (MVUE) UCL	23.01

Gamma Distribution Test

k star (bias corrected)	2.825
Theta Star	2.876
MLE of Mean	8.125
MLE of Standard Deviation	4.834
nu star	45.2
Approximate Chi Square Value (.05)	30.78
Adjusted Level of Significance	0.0195
Adjusted Chi Square Value	27.8
Anderson-Darling Test Statistic	0.292
Anderson-Darling 5% Critical Value	0.719
Kolmogorov-Smirnov Test Statistic	0.17
Kolmogorov-Smirnov 5% Critical Value	0.295

Data appear Gamma Distributed at 5% Significance Level

Data Distribution

Data appear Normal at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	11.93
95% Adjusted Gamma UCL	13.21

Nonparametric Statistics

95% CLT UCL	10.62
95% Jackknife UCL	11
95% Standard Bootstrap UCL	10.42
95% Bootstrap-t UCL	12.04
95% Hall's Bootstrap UCL	11.34
95% Percentile Bootstrap UCL	10.5
95% BCA Bootstrap UCL	10.88
95% Chebyshev(Mean, Sd) UCL	14.74
97.5% Chebyshev(Mean, Sd) UCL	17.6
99% Chebyshev(Mean, Sd) UCL	23.22

Potential UCL to Use Use 95% Student's-t UCL 11

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Strontium

General Statistics

Number of Valid Observations 8

Number of Distinct Observations 8

Raw Statistics

Minimum	5.88
Maximum	35.1
Mean	11.88
Median	9.18
SD	9.706
Coefficient of Variation	0.817
Skewness	2.471

Log-transformed Statistics

Minimum of Log Data	1.772
Maximum of Log Data	3.558
Mean of log Data	2.287
SD of log Data	0.591

Warning: There are only 8 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.649
Shapiro Wilk Critical Value	0.818

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.832
Shapiro Wilk Critical Value	0.818

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	18.38

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	20.73
95% Modified-t UCL (Johnson-1978)	18.88

Assuming Lognormal Distribution

95% H-UCL	20.57
95% Chebyshev (MVUE) UCL	21.99
97.5% Chebyshev (MVUE) UCL	26.56
99% Chebyshev (MVUE) UCL	35.54

Gamma Distribution Test

k star (bias corrected)	1.84
Theta Star	6.457
MLE of Mean	11.88
MLE of Standard Deviation	8.758
nu star	29.44
Approximate Chi Square Value (.05)	18.05
Adjusted Level of Significance	0.0195
Adjusted Chi Square Value	15.84
Anderson-Darling Test Statistic	0.78
Anderson-Darling 5% Critical Value	0.722
Kolmogorov-Smirnov Test Statistic	0.263
Kolmogorov-Smirnov 5% Critical Value	0.297

Data follow Appr. Gamma Distribution at 5% Significance Level

Data Distribution

Data Follow Appr. Gamma Distribution at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	19.37
95% Adjusted Gamma UCL	22.08

Nonparametric Statistics

95% CLT UCL	17.52
95% Jackknife UCL	18.38
95% Standard Bootstrap UCL	17.21
95% Bootstrap-t UCL	30.01
95% Hall's Bootstrap UCL	40.26
95% Percentile Bootstrap UCL	17.95
95% BCA Bootstrap UCL	21.18
95% Chebyshev(Mean, Sd) UCL	26.84
97.5% Chebyshev(Mean, Sd) UCL	33.31
99% Chebyshev(Mean, Sd) UCL	46.02

Potential UCL to Use	Use 95% Approximate Gamma UCL 19.37

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Tellurium

General Statistics

Number of Valid Data	8	Number of Detected Data	0
Number of Distinct Detected Data	0	Number of Non-Detect Data	8
		Percent Non-Detects	100.00%

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!

Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Tellurium was not processed!

Thallium

General Statistics

Number of Valid Data	8	Number of Detected Data	5
Number of Distinct Detected Data	3	Number of Non-Detect Data	3
		Percent Non-Detects	37.50%

Raw Statistics

Minimum Detected	0.003
Maximum Detected	0.01
Mean of Detected	0.0052
SD of Detected	0.00286
Minimum Non-Detect	0.002
Maximum Non-Detect	0.002

Log-transformed Statistics

Minimum Detected	-5.809
Maximum Detected	-4.605
Mean of Detected	-5.364
SD of Detected	0.495
Minimum Non-Detect	-6.215
Maximum Non-Detect	-6.215

Warning: There are only 3 Distinct Detected Values in this data set

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

UCL Statistics

Normal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.804
5% Shapiro Wilk Critical Value	0.762

Data appear Normal at 5% Significance Level

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.869
5% Shapiro Wilk Critical Value	0.762

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method

Mean	0.00363
SD	0.00307
95% DL/2 (t) UCL	0.00568

Maximum Likelihood Estimate(MLE) Method

Mean	0.00303
SD	0.00368
95% MLE (t) UCL	0.00549
95% MLE (Tiku) UCL	0.00575

Assuming Lognormal Distribution

DL/2 Substitution Method

Mean	-5.943
SD	0.882
95% H-Stat (DL/2) UCL	0.011

Log ROS Method

Mean in Log Scale	-5.873
SD in Log Scale	0.817
Mean in Original Scale	0.00372
SD in Original Scale	0.00298
95% t UCL	0.00572
95% Percentile Bootstrap UCL	0.00544
95% BCA Bootstrap UCL	0.0059

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	2.104
Theta Star	0.00247
nu star	21.04

Data Distribution Test with Detected Values Only

Data appear Normal at 5% Significance Level

A-D Test Statistic	0.475
5% A-D Critical Value	0.681
K-S Test Statistic	0.681
5% K-S Critical Value	0.358

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	0.00215
Maximum	0.01
Mean	0.0046
Median	0.00433
SD	0.00243
k star	3.25
Theta star	0.00142
Nu star	52
AppChi2	36.44
95% Gamma Approximate UCL	0.00657
95% Adjusted Gamma UCL	0.00721

Note: DL/2 is not a recommended method.

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	0.00438
SD	0.00229
SE of Mean	0.0009044
95% KM (t) UCL	0.00609
95% KM (z) UCL	0.00586
95% KM (jackknife) UCL	0.00601
95% KM (bootstrap t) UCL	0.00814
95% KM (BCA) UCL	0.00588
95% KM (Percentile Bootstrap) UCL	0.00625
95% KM (Chebyshev) UCL	0.00832
97.5% KM (Chebyshev) UCL	0.01
99% KM (Chebyshev) UCL	0.0134

Potential UCLs to Use

95% KM (t) UCL	0.00609
95% KM (Percentile Bootstrap) UCL	0.00625

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Tin

General Statistics

Number of Valid Data	8	Number of Detected Data	3
Number of Distinct Detected Data	2	Number of Non-Detect Data	5
		Percent Non-Detects	62.50%

Raw Statistics

Minimum Detected	0.04
Maximum Detected	0.05
Mean of Detected	0.0433
SD of Detected	0.00577
Minimum Non-Detect	0.01
Maximum Non-Detect	0.01

Log-transformed Statistics

Minimum Detected	-3.219
Maximum Detected	-2.996
Mean of Detected	-3.144
SD of Detected	0.129
Minimum Non-Detect	-4.605
Maximum Non-Detect	-4.605

Warning: Data set has only 2 Distinct Detected Values.

This may not be adequate enough to compute meaningful and reliable test statistics and estimates.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

UCL Statistics

Normal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.75
5% Shapiro Wilk Critical Value	0.767

Data not Normal at 5% Significance Level

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.75
5% Shapiro Wilk Critical Value	0.767

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method	
Mean	0.0194
SD	0.0201
95% DL/2 (t) UCL	0.0328
Maximum Likelihood Estimate(MLE) Method	
Mean	0.00181
SD	0.0375
95% MLE (t) UCL	0.0269
95% MLE (Tiku) UCL	0.0382

Assuming Lognormal Distribution

DL/2 Substitution Method	
Mean	-4.491
SD	1.117
95% H-Stat (DL/2) UCL	0.101
Log ROS Method	
Mean in Log Scale	-3.435
SD in Log Scale	0.279
Mean in Original Scale	0.0333
SD in Original Scale	0.00942
95% t UCL	0.0397
95% Percentile Bootstrap UCL	0.0385
95% BCA Bootstrap UCL	0.0388

Gamma Distribution Test with Detected Values Only	
k star (bias corrected)	N/A
Theta Star	N/A
nu star	N/A
A-D Test Statistic	N/A
5% A-D Critical Value	N/A
K-S Test Statistic	N/A
5% K-S Critical Value	N/A

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution	
Gamma ROS Statistics using Extrapolated Data	
Minimum	N/A
Maximum	N/A
Mean	N/A
Median	N/A
SD	N/A
k star	N/A
Theta star	N/A
Nu star	N/A
AppChi2	N/A
95% Gamma Approximate UCL	N/A
95% Adjusted Gamma UCL	N/A

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics	
Kaplan-Meier (KM) Method	
Mean	0.0413
SD	0.00331
SE of Mean	0.00143
95% KM (t) UCL	0.044
95% KM (z) UCL	0.0436
95% KM (jackknife) UCL	N/A
95% KM (bootstrap t) UCL	N/A
95% KM (BCA) UCL	N/A
95% KM (Percentile Bootstrap) UCL	N/A
95% KM (Chebyshev) UCL	0.0475
97.5% KM (Chebyshev) UCL	0.0502
99% KM (Chebyshev) UCL	0.0555

Potential UCLs to Use	
95% KM (t) UCL	0.044
95% KM (% Bootstrap) UCL	N/A

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

General Statistics

Number of Valid Data	8	Number of Detected Data	1
Number of Distinct Detected Data	1	Number of Non-Detect Data	7
		Percent Non-Detects	87.50%

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Tungsten was not processed!

Uranium

General Statistics

Number of Valid Data	8	Number of Detected Data	1
Number of Distinct Detected Data	1	Number of Non-Detect Data	7
		Percent Non-Detects	87.50%

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Uranium was not processed!

Vanadium

General Statistics

Number of Valid Data	8	Number of Detected Data	6
Number of Distinct Detected Data	3	Number of Non-Detect Data	2
		Percent Non-Detects	25.00%

Raw Statistics

Minimum Detected	0.01
Maximum Detected	0.07
Mean of Detected	0.0267
SD of Detected	0.0216
Minimum Non-Detect	0.01
Maximum Non-Detect	0.01

Log-transformed Statistics

Minimum Detected	-4.605
Maximum Detected	-2.659
Mean of Detected	-3.819
SD of Detected	0.632
Minimum Non-Detect	-4.605
Maximum Non-Detect	-4.605

Warning: There are only 3 Distinct Detected Values in this data set

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

UCL Statistics

Normal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.638
5% Shapiro Wilk Critical Value	0.788

Data not Normal at 5% Significance Level

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.784
5% Shapiro Wilk Critical Value	0.788

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method

Mean	0.0213
SD	0.0208
95% DL/2 (t) UCL	0.0352

Maximum Likelihood Estimate(MLE) Method

Mean	0.0186
SD	0.0229
95% MLE (t) UCL	0.034
95% MLE (Tiku) UCL	0.0342

Assuming Lognormal Distribution

DL/2 Substitution Method

Mean	-4.189
SD	0.869
95% H-Stat (DL/2) UCL	0.0614

Log ROS Method

Mean in Log Scale	-4.175
SD in Log Scale	0.856
Mean in Original Scale	0.0213
SD in Original Scale	0.0208
95% t UCL	0.0352
95% Percentile Bootstrap UCL	0.0338
95% BCA Bootstrap UCL	0.0375

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	1.475
Theta Star	0.0181
nu star	17.7

Data Distribution Test with Detected Values Only

Data do not follow a Discernable Distribution (0.05)

A-D Test Statistic	0.984
5% A-D Critical Value	0.702
K-S Test Statistic	0.702
5% K-S Critical Value	0.335

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	0.00618
Maximum	0.07
Mean	0.0224
Median	0.02
SD	0.02
k star	1.46
Theta star	0.0153
Nu star	23.36
AppChi2	13.37
95% Gamma Approximate UCL	0.0392
95% Adjusted Gamma UCL	0.0455

Note: DL/2 is not a recommended method.

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	0.0225
SD	0.0185
SE of Mean	0.00718
95% KM (t) UCL	0.0361
95% KM (z) UCL	0.0343
95% KM (jackknife) UCL	N/A
95% KM (bootstrap t) UCL	N/A
95% KM (BCA) UCL	N/A
95% KM (Percentile Bootstrap) UCL	N/A
95% KM (Chebyshev) UCL	0.0538
97.5% KM (Chebyshev) UCL	0.0673
99% KM (Chebyshev) UCL	0.0939

Potential UCLs to Use

95% KM (BCA) UCL	N/A

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Zinc

General Statistics

Number of Valid Observations 8

Number of Distinct Observations 8

Raw Statistics

Minimum	40.1
Maximum	278
Mean	113.6
Median	93.4
SD	74.32
Coefficient of Variation	0.654
Skewness	1.843

Log-transformed Statistics

Minimum of Log Data	3.691
Maximum of Log Data	5.628
Mean of log Data	4.58
SD of log Data	0.573

Warning: There are only 8 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.805
Shapiro Wilk Critical Value	0.818

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.958
Shapiro Wilk Critical Value	0.818

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	163.4

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	175.1
95% Modified-t UCL (Johnson-1978)	166.2

Assuming Lognormal Distribution

95% H-UCL	196.7
95% Chebyshev (MVUE) UCL	212.7
97.5% Chebyshev (MVUE) UCL	256.2
99% Chebyshev (MVUE) UCL	341.5

Gamma Distribution Test

k star (bias corrected)	2.226
Theta Star	51.03
MLE of Mean	113.6
MLE of Standard Deviation	76.13
nu star	35.61
Approximate Chi Square Value (.05)	22.96
Adjusted Level of Significance	0.0195
Adjusted Chi Square Value	20.42
Anderson-Darling Test Statistic	0.401
Anderson-Darling 5% Critical Value	0.72
Kolmogorov-Smirnov Test Statistic	0.262
Kolmogorov-Smirnov 5% Critical Value	0.296

Data appear Gamma Distributed at 5% Significance Level

Data Distribution

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	176.2
95% Adjusted Gamma UCL	198

Nonparametric Statistics

95% CLT UCL	156.8
95% Jackknife UCL	163.4
95% Standard Bootstrap UCL	154.3
95% Bootstrap-t UCL	241.5
95% Hall's Bootstrap UCL	423.5
95% Percentile Bootstrap UCL	156.7
95% BCA Bootstrap UCL	176
95% Chebyshev(Mean, Sd) UCL	228.1
97.5% Chebyshev(Mean, Sd) UCL	277.7
99% Chebyshev(Mean, Sd) UCL	375

Potential UCL to Use	Use 95% Approximate Gamma UCL 176.2

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

ProUCL Outputs: Small Mammals

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	U:\121810356\1_environmental\4_field_data\3_hhera\6_reporting\mammals.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Aluminum

General Statistics

Number of Valid Observations	30	Number of Distinct Observations	26

Raw Statistics

Minimum	1
Maximum	26
Mean	6.39
Median	3.8
SD	6.041
Coefficient of Variation	0.945
Skewness	1.835

Log-transformed Statistics

Minimum of Log Data	0
Maximum of Log Data	3.258
Mean of log Data	1.509
SD of log Data	0.824

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.767
Shapiro Wilk Critical Value	0.927

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.963
Shapiro Wilk Critical Value	0.927

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	8.264

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	8.599
95% Modified-t UCL (Johnson-1978)	8.326

Assuming Lognormal Distribution

95% H-UCL	8.983
95% Chebyshev (MVUE) UCL	10.81
97.5% Chebyshev (MVUE) UCL	12.77
99% Chebyshev (MVUE) UCL	16.64

Gamma Distribution Test

k star (bias corrected)	1.455
Theta Star	4.391
MLE of Mean	6.39
MLE of Standard Deviation	5.297
nu star	87.31

Data Distribution

Data Follow Appr. Gamma Distribution at 5% Significance Level

Approximate Chi Square Value (.05)	66.77
Adjusted Level of Significance	0.041
Adjusted Chi Square Value	65.73
Anderson-Darling Test Statistic	0.97
Anderson-Darling 5% Critical Value	0.762
Kolmogorov-Smirnov Test Statistic	0.162
Kolmogorov-Smirnov 5% Critical Value	0.163

Data follow Appr. Gamma Distribution at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	8.356
95% Adjusted Gamma UCL	8.487

Nonparametric Statistics

95% CLT UCL	8.204
95% Jackknife UCL	8.264
95% Standard Bootstrap UCL	8.169
95% Bootstrap-t UCL	8.858
95% Hall's Bootstrap UCL	9.015
95% Percentile Bootstrap UCL	8.283
95% BCA Bootstrap UCL	8.74
95% Chebyshev(Mean, Sd) UCL	11.2
97.5% Chebyshev(Mean, Sd) UCL	13.28
99% Chebyshev(Mean, Sd) UCL	17.36

Potential UCL to Use Use 95% Approximate Gamma UCL 8.356

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Antimony

General Statistics

Number of Valid Data	30	Number of Detected Data	3
Number of Distinct Detected Data	3	Number of Non-Detect Data	27
		Percent Non-Detects	90.00%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.006	Minimum Detected	-5.116
Maximum Detected	0.022	Maximum Detected	-3.817
Mean of Detected	0.0117	Mean of Detected	-4.632
SD of Detected	0.00896	SD of Detected	0.71
Minimum Non-Detect	0.005	Minimum Non-Detect	-5.298
Maximum Non-Detect	0.005	Maximum Non-Detect	-5.298

Warning: There are only 3 Distinct Detected Values in this data set

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.797	Shapiro Wilk Test Statistic	0.838
5% Shapiro Wilk Critical Value	0.767	5% Shapiro Wilk Critical Value	0.767
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.00342	Mean	-5.855
SD	0.00366	SD	0.455
95% DL/2 (t) UCL	0.00455	95% H-Stat (DL/2) UCL	0.00373
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	-8.969
		SD in Log Scale	2.433
		Mean in Original Scale	0.00147
		SD in Original Scale	0.00421
		95% t UCL	0.00277
		95% Percentile Bootstrap UCL	0.00283
		95% BCA Bootstrap UCL	0.00397

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only
k star (bias corrected)	N/A	Data appear Normal at 5% Significance Level
Theta Star	N/A	
nu star	N/A	

A-D Test Statistic	N/A
5% A-D Critical Value	N/A
K-S Test Statistic	N/A
5% K-S Critical Value	N/A

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	N/A
Maximum	N/A
Mean	N/A
Median	N/A
SD	N/A
k star	N/A
Theta star	N/A
Nu star	N/A
AppChi2	N/A
95% Gamma Approximate UCL	N/A
95% Adjusted Gamma UCL	N/A

Note: DL/2 is not a recommended method.

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	0.00657
SD	0.00287
SE of Mean	0.0006421
95% KM (t) UCL	0.00766
95% KM (z) UCL	0.00762
95% KM (jackknife) UCL	0.00747
95% KM (bootstrap t) UCL	0.0129
95% KM (BCA) UCL	0.022
95% KM (Percentile Bootstrap) UCL	0.022
95% KM (Chebyshev) UCL	0.00937
97.5% KM (Chebyshev) UCL	0.0106
99% KM (Chebyshev) UCL	0.013

Potential UCLs to Use

95% KM (t) UCL	0.00766
95% KM (Percentile Bootstrap) UCL	0.022

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Arsenic

General Statistics

Number of Valid Data	30	Number of Detected Data	24
Number of Distinct Detected Data	8	Number of Non-Detect Data	6
		Percent Non-Detects	20.00%

Raw Statistics

Minimum Detected	0.02
Maximum Detected	0.15
Mean of Detected	0.045
SD of Detected	0.0319
Minimum Non-Detect	0.02
Maximum Non-Detect	0.02

Log-transformed Statistics

Minimum Detected	-3.912
Maximum Detected	-1.897
Mean of Detected	-3.281
SD of Detected	0.578
Minimum Non-Detect	-3.912
Maximum Non-Detect	-3.912

UCL Statistics

Normal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.753
5% Shapiro Wilk Critical Value	0.916

Data not Normal at 5% Significance Level

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.881
5% Shapiro Wilk Critical Value	0.916

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method

Mean	0.038
SD	0.0318
95% DL/2 (t) UCL	0.0479

Maximum Likelihood Estimate(MLE) Method

Mean	0.0354
SD	0.0348
95% MLE (t) UCL	0.0462
95% MLE (Tiku) UCL	0.0461

Assuming Lognormal Distribution

DL/2 Substitution Method

Mean	-3.546
SD	0.745
95% H-Stat (DL/2) UCL	0.0515

Log ROS Method

Mean in Log Scale	-3.548
SD in Log Scale	0.757
Mean in Original Scale	0.038
SD in Original Scale	0.0318
95% t UCL	0.0479
95% Percentile Bootstrap UCL	0.0482
95% BCA Bootstrap UCL	0.0496

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	2.595
Theta Star	0.0173
nu star	124.5

Data Distribution Test with Detected Values Only

Data do not follow a Discernable Distribution (0.05)

A-D Test Statistic	1.4
5% A-D Critical Value	0.751
K-S Test Statistic	0.751
5% K-S Critical Value	0.179

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	1E-12
Maximum	0.15
Mean	0.0384
Median	0.03
SD	0.0316
k star	0.564
Theta star	0.0681
Nu star	33.87
AppChi2	21.56
95% Gamma Approximate UCL	0.0604
95% Adjusted Gamma UCL	0.062

Note: DL/2 is not a recommended method.

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	0.04
SD	0.0297
SE of Mean	0.00553
95% KM (t) UCL	0.0494
95% KM (z) UCL	0.0491
95% KM (jackknife) UCL	0.0494
95% KM (bootstrap t) UCL	0.0541
95% KM (BCA) UCL	0.049
95% KM (Percentile Bootstrap) UCL	0.0503
95% KM (Chebyshev) UCL	0.0641
97.5% KM (Chebyshev) UCL	0.0746
99% KM (Chebyshev) UCL	0.095

Potential UCLs to Use

95% KM (BCA) UCL	0.049

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Barium

General Statistics

Number of Valid Observations	30	Number of Distinct Observations	30

Raw Statistics

Minimum	0.67
Maximum	11.2
Mean	3.115
Median	2.335
SD	2.457
Coefficient of Variation	0.789
Skewness	2.098

Log-transformed Statistics

Minimum of Log Data	-0.4
Maximum of Log Data	2.416
Mean of log Data	0.921
SD of log Data	0.631

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.739
Shapiro Wilk Critical Value	0.927

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.953
Shapiro Wilk Critical Value	0.927

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	3.877

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	4.036
95% Modified-t UCL (Johnson-1978)	3.906

Assuming Lognormal Distribution

95% H-UCL	3.905
95% Chebyshev (MVUE) UCL	4.672
97.5% Chebyshev (MVUE) UCL	5.377
99% Chebyshev (MVUE) UCL	6.763

Gamma Distribution Test

k star (bias corrected)	2.255
Theta Star	1.381
MLE of Mean	3.115
MLE of Standard Deviation	2.074
nu star	135.3
Approximate Chi Square Value (.05)	109.4
Adjusted Level of Significance	0.041
Adjusted Chi Square Value	108.1
Anderson-Darling Test Statistic	1.199
Anderson-Darling 5% Critical Value	0.756
Kolmogorov-Smirnov Test Statistic	0.177
Kolmogorov-Smirnov 5% Critical Value	0.162

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	3.851
95% Adjusted Gamma UCL	3.899

Data Distribution

Data appear Lognormal at 5% Significance Level

Nonparametric Statistics

95% CLT UCL	3.853
95% Jackknife UCL	3.877
95% Standard Bootstrap UCL	3.83
95% Bootstrap-t UCL	4.258
95% Hall's Bootstrap UCL	4.107
95% Percentile Bootstrap UCL	3.832
95% BCA Bootstrap UCL	4.059
95% Chebyshev(Mean, Sd) UCL	5.07
97.5% Chebyshev(Mean, Sd) UCL	5.916
99% Chebyshev(Mean, Sd) UCL	7.579

Potential UCL to Use	Use 95% H-UCL 3.905

ProUCL computes and outputs H-statistic based UCLs for historical reasons only.

H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.

It is therefore recommended to avoid the use of H-statistic based 95% UCLs.

Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Beryllium

General Statistics

Number of Valid Data	30	Number of Detected Data	0
Number of Distinct Detected Data	0	Number of Non-Detect Data	30
		Percent Non-Detects	100.00%

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!

Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Beryllium was not processed!

Bismuth

General Statistics

Number of Valid Data	30	Number of Detected Data	1
Number of Distinct Detected Data	1	Number of Non-Detect Data	29
		Percent Non-Detects	96.67%

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Bismuth was not processed!

Boron

General Statistics

Number of Valid Data	30	Number of Detected Data	28
Number of Distinct Detected Data	10	Number of Non-Detect Data	2
		Percent Non-Detects	6.67%

Raw Statistics

Minimum Detected	0.1
Maximum Detected	1.7
Mean of Detected	0.421
SD of Detected	0.413
Minimum Non-Detect	0.1
Maximum Non-Detect	0.1

Log-transformed Statistics

Minimum Detected	-2.303
Maximum Detected	0.531
Mean of Detected	-1.263
SD of Detected	0.894
Minimum Non-Detect	-2.303
Maximum Non-Detect	-2.303

UCL Statistics

Normal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.774
5% Shapiro Wilk Critical Value	0.924

Data not Normal at 5% Significance Level

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.903
5% Shapiro Wilk Critical Value	0.924

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method

Mean	0.397
SD	0.41
95% DL/2 (t) UCL	0.524

Maximum Likelihood Estimate(MLE) Method

Mean	0.383
SD	0.42
95% MLE (t) UCL	0.514
95% MLE (Tiku) UCL	0.506

Assuming Lognormal Distribution

DL/2 Substitution Method

Mean	-1.378
SD	0.968
95% H-Stat (DL/2) UCL	0.624

Log ROS Method

Mean in Log Scale	-1.403
SD in Log Scale	1.016
Mean in Original Scale	0.396
SD in Original Scale	0.41
95% t UCL	0.523
95% Percentile Bootstrap UCL	0.522
95% BCA Bootstrap UCL	0.555

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	1.271
Theta Star	0.331
nu star	71.2

Data Distribution Test with Detected Values Only

Data do not follow a Discernable Distribution (0.05)

A-D Test Statistic	1.123
5% A-D Critical Value	0.765
K-S Test Statistic	0.765
5% K-S Critical Value	0.169

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	1E-12
Maximum	1.7
Mean	0.393
Median	0.2
SD	0.413
k star	0.316
Theta star	1.247
Nu star	18.93
AppChi2	10.07
95% Gamma Approximate UCL	0.74
95% Adjusted Gamma UCL	0.768

Note: DL/2 is not a recommended method.

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	0.4
SD	0.4
SE of Mean	0.0744
95% KM (t) UCL	0.526
95% KM (z) UCL	0.522
95% KM (jackknife) UCL	0.526
95% KM (bootstrap t) UCL	0.561
95% KM (BCA) UCL	0.533
95% KM (Percentile Bootstrap) UCL	0.527
95% KM (Chebyshev) UCL	0.724
97.5% KM (Chebyshev) UCL	0.864
99% KM (Chebyshev) UCL	1.14

Potential UCLs to Use

95% KM (Chebyshev) UCL	0.724

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Cadmium

General Statistics

Number of Valid Observations 30

Number of Distinct Observations 29

Raw Statistics

Minimum	0.006
Maximum	0.648
Mean	0.122
Median	0.093
SD	0.137
Coefficient of Variation	1.124
Skewness	2.391

Log-transformed Statistics

Minimum of Log Data	-5.116
Maximum of Log Data	-0.434
Mean of log Data	-2.638
SD of log Data	1.113

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.742
Shapiro Wilk Critical Value	0.927

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.983
Shapiro Wilk Critical Value	0.927

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	0.165

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	0.175
95% Modified-t UCL (Johnson-1978)	0.167

Assuming Lognormal Distribution

95% H-UCL	0.229
95% Chebyshev (MVUE) UCL	0.263
97.5% Chebyshev (MVUE) UCL	0.321
99% Chebyshev (MVUE) UCL	0.435

Gamma Distribution Test

k star (bias corrected)	0.983
Theta Star	0.124
MLE of Mean	0.122
MLE of Standard Deviation	0.123
nu star	58.96
Approximate Chi Square Value (.05)	42.31
Adjusted Level of Significance	0.041
Adjusted Chi Square Value	41.49
Anderson-Darling Test Statistic	0.335
Anderson-Darling 5% Critical Value	0.774
Kolmogorov-Smirnov Test Statistic	0.1
Kolmogorov-Smirnov 5% Critical Value	0.165

Data appear Gamma Distributed at 5% Significance Level

Data Distribution

Data appear Gamma Distributed at 5% Significance Level

Nonparametric Statistics

95% CLT UCL	0.164
95% Jackknife UCL	0.165
95% Standard Bootstrap UCL	0.163
95% Bootstrap-t UCL	0.186
95% Hall's Bootstrap UCL	0.249
95% Percentile Bootstrap UCL	0.164
95% BCA Bootstrap UCL	0.176
95% Chebyshev(Mean, Sd) UCL	0.232
97.5% Chebyshev(Mean, Sd) UCL	0.279
99% Chebyshev(Mean, Sd) UCL	0.372

Assuming Gamma Distribution

95% Approximate Gamma UCL 0.17

95% Adjusted Gamma UCL	0.174

Potential UCL to Use

Use 95% Approximate Gamma UCL 0.17

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Calcium

General Statistics

Number of Valid Observations 30

Number of Distinct Observations 27

Raw Statistics

Minimum	5540
Maximum	16100
Mean	9363
Median	9215
SD	2435
Coefficient of Variation	0.26
Skewness	0.627

Log-transformed Statistics

Minimum of Log Data	8.62
Maximum of Log Data	9.687
Mean of log Data	9.112
SD of log Data	0.26

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.962
Shapiro Wilk Critical Value	0.927

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.977
Shapiro Wilk Critical Value	0.927

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	10118

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	10148
95% Modified-t UCL (Johnson-1978)	10127

Assuming Lognormal Distribution

95% H-UCL	10221
95% Chebyshev (MVUE) UCL	11330
97.5% Chebyshev (MVUE) UCL	12180
99% Chebyshev (MVUE) UCL	13849

Gamma Distribution Test

k star (bias corrected)	14.04
Theta Star	666.7
MLE of Mean	9363
MLE of Standard Deviation	2498
nu star	842.5
Approximate Chi Square Value (.05)	776.2
Adjusted Level of Significance	0.041
Adjusted Chi Square Value	772.5
Anderson-Darling Test Statistic	0.223
Anderson-Darling 5% Critical Value	0.745
Kolmogorov-Smirnov Test Statistic	0.0793
Kolmogorov-Smirnov 5% Critical Value	0.16

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	10163
95% Adjusted Gamma UCL	10211

Data Distribution

Data appear Normal at 5% Significance Level

Nonparametric Statistics

95% CLT UCL	10094
95% Jackknife UCL	10118
95% Standard Bootstrap UCL	10069
95% Bootstrap-t UCL	10132
95% Hall's Bootstrap UCL	10212
95% Percentile Bootstrap UCL	10109
95% BCA Bootstrap UCL	10120
95% Chebyshev(Mean, Sd) UCL	11301
97.5% Chebyshev(Mean, Sd) UCL	12139
99% Chebyshev(Mean, Sd) UCL	13786

Potential UCL to Use

Use 95% Student's-t UCL 10118

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Data	30	Number of Detected Data	26
Number of Distinct Detected Data	14	Number of Non-Detect Data	4
		Percent Non-Detects	13.33%

Raw Statistics

Minimum Detected	0.05
Maximum Detected	1.14
Mean of Detected	0.157
SD of Detected	0.224
Minimum Non-Detect	0.05
Maximum Non-Detect	0.05

Log-transformed Statistics

Minimum Detected	-2.996
Maximum Detected	0.131
Mean of Detected	-2.242
SD of Detected	0.725
Minimum Non-Detect	-2.996
Maximum Non-Detect	-2.996

UCL Statistics

Normal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.462
5% Shapiro Wilk Critical Value	0.92

Data not Normal at 5% Significance Level

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.79
5% Shapiro Wilk Critical Value	0.92

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method

Mean	0.139
SD	0.213
95% DL/2 (t) UCL	0.205

Maximum Likelihood Estimate(MLE) Method

Mean	0.121
SD	0.229
95% MLE (t) UCL	0.192
95% MLE (Tiku) UCL	0.188

Assuming Lognormal Distribution

DL/2 Substitution Method

Mean	-2.435
SD	0.839
95% H-Stat (DL/2) UCL	0.178

Log ROS Method

Mean in Log Scale	-2.448
SD in Log Scale	0.864
Mean in Original Scale	0.139
SD in Original Scale	0.213
95% t UCL	0.205
95% Percentile Bootstrap UCL	0.203
95% BCA Bootstrap UCL	0.246

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	1.295
Theta Star	0.121
nu star	67.35

Data Distribution Test with Detected Values Only

Data do not follow a Discernable Distribution (0.05)

A-D Test Statistic	3.137
5% A-D Critical Value	0.763
K-S Test Statistic	0.763
5% K-S Critical Value	0.175

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	1E-12
Maximum	1.14
Mean	0.136
Median	0.08
SD	0.215
k star	0.204
Theta star	0.664
Nu star	12.26
AppChi2	5.4
95% Gamma Approximate UCL	0.308
95% Adjusted Gamma UCL	0.324

Note: DL/2 is not a recommended method.

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	0.142
SD	0.208
SE of Mean	0.0387
95% KM (t) UCL	0.208
95% KM (z) UCL	0.206
95% KM (jackknife) UCL	0.208
95% KM (bootstrap t) UCL	0.342
95% KM (BCA) UCL	0.225
95% KM (Percentile Bootstrap) UCL	0.212
95% KM (Chebyshev) UCL	0.311
97.5% KM (Chebyshev) UCL	0.384
99% KM (Chebyshev) UCL	0.528

Potential UCLs to Use

95% KM (Chebyshev) UCL	0.311

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Cobalt

General Statistics

Number of Valid Data	30	Number of Detected Data	26
Number of Distinct Detected Data	5	Number of Non-Detect Data	4
		Percent Non-Detects	13.33%

Raw Statistics

Minimum Detected	0.01
Maximum Detected	0.1
Mean of Detected	0.0231
SD of Detected	0.0181
Minimum Non-Detect	0.01
Maximum Non-Detect	0.01

Log-transformed Statistics

Minimum Detected	-4.605
Maximum Detected	-2.303
Mean of Detected	-3.948
SD of Detected	0.566
Minimum Non-Detect	-4.605
Maximum Non-Detect	-4.605

UCL Statistics

Normal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.622
5% Shapiro Wilk Critical Value	0.92

Data not Normal at 5% Significance Level

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.854
5% Shapiro Wilk Critical Value	0.92

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method

Mean	0.0207
SD	0.0179
95% DL/2 (t) UCL	0.0262

Maximum Likelihood Estimate(MLE) Method

Mean	0.0197
SD	0.0189
95% MLE (t) UCL	0.0256
95% MLE (Tiku) UCL	0.0253

Assuming Lognormal Distribution

DL/2 Substitution Method

Mean	-4.128
SD	0.703
95% H-Stat (DL/2) UCL	0.0273

Log ROS Method

Mean in Log Scale	-4.114
SD in Log Scale	0.683
Mean in Original Scale	0.0208
SD in Original Scale	0.0178
95% t UCL	0.0263
95% Percentile Bootstrap UCL	0.0263
95% BCA Bootstrap UCL	0.0285

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	2.638
Theta Star	0.00875
nu star	137.2

Data Distribution Test with Detected Values Only

Data do not follow a Discernable Distribution (0.05)

A-D Test Statistic	1.596
5% A-D Critical Value	0.751
K-S Test Statistic	0.751
5% K-S Critical Value	0.172

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	1E-12
Maximum	0.1
Mean	0.0204
Median	0.02
SD	0.0181
k star	0.571
Theta star	0.0358
Nu star	34.28
AppChi2	21.89
95% Gamma Approximate UCL	0.032
95% Adjusted Gamma UCL	0.0329

Note: DL/2 is not a recommended method.

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	0.0213
SD	0.0171
SE of Mean	0.00318
95% KM (t) UCL	0.0267
95% KM (z) UCL	0.0266
95% KM (jackknife) UCL	0.0267
95% KM (bootstrap t) UCL	0.0314
95% KM (BCA) UCL	0.027
95% KM (Percentile Bootstrap) UCL	0.027
95% KM (Chebyshev) UCL	0.0352
97.5% KM (Chebyshev) UCL	0.0412
99% KM (Chebyshev) UCL	0.053

Potential UCLs to Use

95% KM (Chebyshev) UCL	0.0352

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Copper

General Statistics

Number of Valid Observations 30

Number of Distinct Observations 27

Raw Statistics

Minimum	2.32
Maximum	5.2
Mean	3.619
Median	3.635
SD	0.646
Coefficient of Variation	0.178
Skewness	0.244

Log-transformed Statistics

Minimum of Log Data	0.842
Maximum of Log Data	1.649
Mean of log Data	1.27
SD of log Data	0.183

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.965
Shapiro Wilk Critical Value	0.927

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.956
Shapiro Wilk Critical Value	0.927

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	3.819

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	3.819
95% Modified-t UCL (Johnson-1978)	3.82

Assuming Lognormal Distribution

95% H-UCL	3.844
95% Chebyshev (MVUE) UCL	4.15
97.5% Chebyshev (MVUE) UCL	4.38
99% Chebyshev (MVUE) UCL	4.83

Gamma Distribution Test

k star (bias corrected)	28.66
Theta Star	0.126
MLE of Mean	3.619
MLE of Standard Deviation	0.676
nu star	1720
Approximate Chi Square Value (.05)	1624
Adjusted Level of Significance	0.041
Adjusted Chi Square Value	1619
Anderson-Darling Test Statistic	0.442
Anderson-Darling 5% Critical Value	0.744
Kolmogorov-Smirnov Test Statistic	0.121
Kolmogorov-Smirnov 5% Critical Value	0.16

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	3.831
95% Adjusted Gamma UCL	3.844

Data Distribution

Data appear Normal at 5% Significance Level

Nonparametric Statistics

95% CLT UCL	3.813
95% Jackknife UCL	3.819
95% Standard Bootstrap UCL	3.807
95% Bootstrap-t UCL	3.827
95% Hall's Bootstrap UCL	3.835
95% Percentile Bootstrap UCL	3.814
95% BCA Bootstrap UCL	3.82
95% Chebyshev(Mean, Sd) UCL	4.133
97.5% Chebyshev(Mean, Sd) UCL	4.355
99% Chebyshev(Mean, Sd) UCL	4.792

Potential UCL to Use

Use 95% Student's-t UCL 3.819

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Iron

General Statistics

Number of Valid Observations 30

Number of Distinct Observations 25

Raw Statistics

Minimum	63
Maximum	191
Mean	97.37
Median	91
SD	26
Coefficient of Variation	0.267
Skewness	1.815

Log-transformed Statistics

Minimum of Log Data	4.143
Maximum of Log Data	5.252
Mean of log Data	4.549
SD of log Data	0.237

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.859
Shapiro Wilk Critical Value	0.927

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.952
Shapiro Wilk Critical Value	0.927

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	105.4

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	106.9
95% Modified-t UCL (Johnson-1978)	105.7

Assuming Lognormal Distribution

95% H-UCL	105.1
95% Chebyshev (MVUE) UCL	115.7
97.5% Chebyshev (MVUE) UCL	123.7
99% Chebyshev (MVUE) UCL	139.4

Gamma Distribution Test

k star (bias corrected)	15.68
Theta Star	6.21
MLE of Mean	97.37
MLE of Standard Deviation	24.59
nu star	940.7
Approximate Chi Square Value (.05)	870.6
Adjusted Level of Significance	0.041
Adjusted Chi Square Value	866.7
Anderson-Darling Test Statistic	0.603
Anderson-Darling 5% Critical Value	0.745
Kolmogorov-Smirnov Test Statistic	0.144
Kolmogorov-Smirnov 5% Critical Value	0.16

Data appear Gamma Distributed at 5% Significance Level

Data Distribution

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	105.2
95% Adjusted Gamma UCL	105.7

Nonparametric Statistics

95% CLT UCL	105.2
95% Jackknife UCL	105.4
95% Standard Bootstrap UCL	104.8
95% Bootstrap-t UCL	108.1
95% Hall's Bootstrap UCL	110.1
95% Percentile Bootstrap UCL	105.9
95% BCA Bootstrap UCL	106.5
95% Chebyshev(Mean, Sd) UCL	118.1
97.5% Chebyshev(Mean, Sd) UCL	127
99% Chebyshev(Mean, Sd) UCL	144.6

Potential UCL to Use

Use 95% Approximate Gamma UCL 105.2

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Lead

General Statistics

Number of Valid Observations 30

Number of Distinct Observations 27

Raw Statistics

Minimum	0.024
Maximum	0.427
Mean	0.148
Median	0.147
SD	0.0914
Coefficient of Variation	0.616
Skewness	1.096

Log-transformed Statistics

Minimum of Log Data	-3.73
Maximum of Log Data	-0.851
Mean of log Data	-2.103
SD of log Data	0.667

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.918
Shapiro Wilk Critical Value	0.927

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.969
Shapiro Wilk Critical Value	0.927

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	0.177

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	0.179
95% Modified-t UCL (Johnson-1978)	0.177

Assuming Lognormal Distribution

95% H-UCL	0.198
95% Chebyshev (MVUE) UCL	0.238
97.5% Chebyshev (MVUE) UCL	0.275
99% Chebyshev (MVUE) UCL	0.348

Gamma Distribution Test

k star (bias corrected)	2.467
Theta Star	0.0602
MLE of Mean	0.148
MLE of Standard Deviation	0.0945
nu star	148
Approximate Chi Square Value (.05)	120.9
Adjusted Level of Significance	0.041
Adjusted Chi Square Value	119.5
Anderson-Darling Test Statistic	0.331
Anderson-Darling 5% Critical Value	0.754
Kolmogorov-Smirnov Test Statistic	0.112
Kolmogorov-Smirnov 5% Critical Value	0.161

Data appear Gamma Distributed at 5% Significance Level

Data Distribution

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.182
95% Adjusted Gamma UCL	0.184

Nonparametric Statistics

95% CLT UCL	0.176
95% Jackknife UCL	0.177
95% Standard Bootstrap UCL	0.175
95% Bootstrap-t UCL	0.182
95% Hall's Bootstrap UCL	0.184
95% Percentile Bootstrap UCL	0.176
95% BCA Bootstrap UCL	0.179
95% Chebyshev(Mean, Sd) UCL	0.221
97.5% Chebyshev(Mean, Sd) UCL	0.253
99% Chebyshev(Mean, Sd) UCL	0.314

Potential UCL to Use

Use 95% Approximate Gamma UCL 0.182

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Lithium

General Statistics

Number of Valid Data	30	Number of Detected Data	7
Number of Distinct Detected Data	3	Number of Non-Detect Data	23
		Percent Non-Detects	76.67%

Raw Statistics

Minimum Detected	0.01
Maximum Detected	0.03
Mean of Detected	0.0143
SD of Detected	0.00787
Minimum Non-Detect	0.01
Maximum Non-Detect	0.01

Log-transformed Statistics

Minimum Detected	-4.605
Maximum Detected	-3.507
Mean of Detected	-4.349
SD of Detected	0.453
Minimum Non-Detect	-4.605
Maximum Non-Detect	-4.605

Warning: There are only 3 Distinct Detected Values in this data set

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

UCL Statistics

Normal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.647
5% Shapiro Wilk Critical Value	0.803

Data not Normal at 5% Significance Level

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.652
5% Shapiro Wilk Critical Value	0.803

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method

Mean	0.00717
SD	0.00536
95% DL/2 (t) UCL	0.00883

Maximum Likelihood Estimate(MLE) Method

Mean	0.00177
SD	0.0103
95% MLE (t) UCL	0.00497
95% MLE (Tiku) UCL	0.00876

Assuming Lognormal Distribution

DL/2 Substitution Method

Mean	-5.077
SD	0.457
95% H-Stat (DL/2) UCL	0.00815

Log ROS Method

Mean in Log Scale	-5.697
SD in Log Scale	1.01
Mean in Original Scale	0.00547
SD in Original Scale	0.00629
95% t UCL	0.00742
95% Percentile Bootstrap UCL	0.00743
95% BCA Bootstrap UCL	0.00801

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	3.024
Theta Star	0.00472
nu star	42.34

Data Distribution Test with Detected Values Only

Data do not follow a Discernable Distribution (0.05)

A-D Test Statistic	1.344
5% A-D Critical Value	0.71
K-S Test Statistic	0.71
5% K-S Critical Value	0.313

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	0.00539
Maximum	0.0382
Mean	0.0232
Median	0.0245
SD	0.0102
k star	3.877
Theta star	0.00599
Nu star	232.6
AppChi2	198.3
95% Gamma Approximate UCL	0.0272
95% Adjusted Gamma UCL	0.0275

Note: DL/2 is not a recommended method.

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	0.011
SD	0.00396
SE of Mean	0.0007806
95% KM (t) UCL	0.0123
95% KM (z) UCL	0.0123
95% KM (jackknife) UCL	N/A
95% KM (bootstrap t) UCL	N/A
95% KM (BCA) UCL	N/A
95% KM (Percentile Bootstrap) UCL	N/A
95% KM (Chebyshev) UCL	0.0144
97.5% KM (Chebyshev) UCL	0.0159
99% KM (Chebyshev) UCL	0.0188

Potential UCLs to Use

95% KM (t) UCL	0.0123
95% KM (% Bootstrap) UCL	N/A

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Magnesium

General Statistics

Number of Valid Observations 30

Number of Distinct Observations 30

Raw Statistics

Minimum	308
Maximum	574
Mean	384.3
Median	376
SD	58.03
Coefficient of Variation	0.151
Skewness	1.596

Log-transformed Statistics

Minimum of Log Data	5.73
Maximum of Log Data	6.353
Mean of log Data	5.942
SD of log Data	0.14

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.871
Shapiro Wilk Critical Value	0.927

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.926
Shapiro Wilk Critical Value	0.927

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	402.3

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	405
95% Modified-t UCL (Johnson-1978)	402.8

Assuming Lognormal Distribution

95% H-UCL	401.9
95% Chebyshev (MVUE) UCL	427
97.5% Chebyshev (MVUE) UCL	445.6
99% Chebyshev (MVUE) UCL	482

Gamma Distribution Test

k star (bias corrected)	45.61
Theta Star	8.426
MLE of Mean	384.3
MLE of Standard Deviation	56.91
nu star	2736
Approximate Chi Square Value (.05)	2616
Adjusted Level of Significance	0.041
Adjusted Chi Square Value	2609
Anderson-Darling Test Statistic	0.711
Anderson-Darling 5% Critical Value	0.744
Kolmogorov-Smirnov Test Statistic	0.149
Kolmogorov-Smirnov 5% Critical Value	0.16

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	402
95% Adjusted Gamma UCL	403.1

Data Distribution

Data appear Gamma Distributed at 5% Significance Level

Nonparametric Statistics

95% CLT UCL	401.7
95% Jackknife UCL	402.3
95% Standard Bootstrap UCL	401.2
95% Bootstrap-t UCL	407.4
95% Hall's Bootstrap UCL	414.2
95% Percentile Bootstrap UCL	401.8
95% BCA Bootstrap UCL	404.3
95% Chebyshev(Mean, Sd) UCL	430.5
97.5% Chebyshev(Mean, Sd) UCL	450.5
99% Chebyshev(Mean, Sd) UCL	489.7

Potential UCL to Use

Use 95% Approximate Gamma UCL 402

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations 30

Number of Distinct Observations 30

Raw Statistics

Minimum	2.97
Maximum	191
Mean	23.89
Median	12.4
SD	37.33
Coefficient of Variation	1.563
Skewness	3.689

Log-transformed Statistics

Minimum of Log Data	1.089
Maximum of Log Data	5.252
Mean of log Data	2.625
SD of log Data	0.949

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.518
Shapiro Wilk Critical Value	0.927

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.948
Shapiro Wilk Critical Value	0.927

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	35.47

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	40.01
95% Modified-t UCL (Johnson-1978)	36.24

Assuming Lognormal Distribution

95% H-UCL	33.15
95% Chebyshev (MVUE) UCL	39.43
97.5% Chebyshev (MVUE) UCL	47.32
99% Chebyshev (MVUE) UCL	62.81

Gamma Distribution Test

k star (bias corrected)	0.964
Theta Star	24.78
MLE of Mean	23.89
MLE of Standard Deviation	24.33
nu star	57.86
Approximate Chi Square Value (.05)	41.37
Adjusted Level of Significance	0.041
Adjusted Chi Square Value	40.57
Anderson-Darling Test Statistic	1.583
Anderson-Darling 5% Critical Value	0.774
Kolmogorov-Smirnov Test Statistic	0.187
Kolmogorov-Smirnov 5% Critical Value	0.165

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	33.41
95% Adjusted Gamma UCL	34.07

Data Distribution

Data appear Lognormal at 5% Significance Level

Nonparametric Statistics

95% CLT UCL	35.1
95% Jackknife UCL	35.47
95% Standard Bootstrap UCL	34.88
95% Bootstrap-t UCL	60.79
95% Hall's Bootstrap UCL	87.18
95% Percentile Bootstrap UCL	36.11
95% BCA Bootstrap UCL	42.49
95% Chebyshev(Mean, Sd) UCL	53.6
97.5% Chebyshev(Mean, Sd) UCL	66.46
99% Chebyshev(Mean, Sd) UCL	91.71

Potential UCL to Use	Use 95% H-UCL 33.15

ProUCL computes and outputs H-statistic based UCLs for historical reasons only.

H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.

It is therefore recommended to avoid the use of H-statistic based 95% UCLs.

Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Data	30	Number of Detected Data	16
Number of Distinct Detected Data	4	Number of Non-Detect Data	14
		Percent Non-Detects	46.67%

Raw Statistics

Minimum Detected	0.01
Maximum Detected	0.04
Mean of Detected	0.0213
SD of Detected	0.00957
Minimum Non-Detect	0.01
Maximum Non-Detect	0.01

Log-transformed Statistics

Minimum Detected	-4.605
Maximum Detected	-3.219
Mean of Detected	-3.948
SD of Detected	0.461
Minimum Non-Detect	-4.605
Maximum Non-Detect	-4.605

Warning: There are only 4 Distinct Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.839
5% Shapiro Wilk Critical Value	0.887

Data not Normal at 5% Significance Level

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.85
5% Shapiro Wilk Critical Value	0.887

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method

Mean	0.0137
SD	0.0107
95% DL/2 (t) UCL	0.017

Maximum Likelihood Estimate(MLE) Method

Mean	0.0108
SD	0.0143
95% MLE (t) UCL	0.0153
95% MLE (Tiku) UCL	0.0161

Assuming Lognormal Distribution

DL/2 Substitution Method

Mean	-4.578
SD	0.761
95% H-Stat (DL/2) UCL	0.0187

Log ROS Method

Mean in Log Scale	-4.5
SD in Log Scale	0.735
Mean in Original Scale	0.0143
SD in Original Scale	0.0103
95% t UCL	0.0175
95% Percentile Bootstrap UCL	0.0175
95% BCA Bootstrap UCL	0.0176

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	4.379
Theta Star	0.00485
nu star	140.1

Data Distribution Test with Detected Values Only

Data do not follow a Discernable Distribution (0.05)

A-D Test Statistic	1.094
5% A-D Critical Value	0.741
K-S Test Statistic	0.741
5% K-S Critical Value	0.216

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	0.00381
Maximum	0.04
Mean	0.0205
Median	0.02
SD	0.00865
k star	4.469
Theta star	0.0046
Nu star	268.1
AppChi2	231.2
95% Gamma Approximate UCL	0.0238
95% Adjusted Gamma UCL	0.024

Note: DL/2 is not a recommended method.

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	0.016
SD	0.00879
SE of Mean	0.00166
95% KM (t) UCL	0.0188
95% KM (z) UCL	0.0187
95% KM (jackknife) UCL	0.0188
95% KM (bootstrap t) UCL	0.0193
95% KM (BCA) UCL	0.0187
95% KM (Percentile Bootstrap) UCL	0.0187
95% KM (Chebyshev) UCL	0.0232
97.5% KM (Chebyshev) UCL	0.0264
99% KM (Chebyshev) UCL	0.0325

Potential UCLs to Use

95% KM (t) UCL	0.0188
95% KM (% Bootstrap) UCL	0.0187

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Molybdenum

General Statistics

Number of Valid Observations 30

Number of Distinct Observations 14

Raw Statistics

Minimum	0.04
Maximum	0.24
Mean	0.133
Median	0.135
SD	0.0437
Coefficient of Variation	0.327
Skewness	0.0623

Log-transformed Statistics

Minimum of Log Data	-3.219
Maximum of Log Data	-1.427
Mean of log Data	-2.077
SD of log Data	0.383

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.981
Shapiro Wilk Critical Value	0.927

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.916
Shapiro Wilk Critical Value	0.927

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	0.147

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	0.147
95% Modified-t UCL (Johnson-1978)	0.147

Assuming Lognormal Distribution

95% H-UCL	0.154
95% Chebyshev (MVUE) UCL	0.177
97.5% Chebyshev (MVUE) UCL	0.195
99% Chebyshev (MVUE) UCL	0.231

Gamma Distribution Test

k star (bias corrected)	7.396
Theta Star	0.018
MLE of Mean	0.133
MLE of Standard Deviation	0.049
nu star	443.8
Approximate Chi Square Value (.05)	395.9
Adjusted Level of Significance	0.041
Adjusted Chi Square Value	393.3
Anderson-Darling Test Statistic	0.582
Anderson-Darling 5% Critical Value	0.746
Kolmogorov-Smirnov Test Statistic	0.129
Kolmogorov-Smirnov 5% Critical Value	0.16

Data appear Gamma Distributed at 5% Significance Level

Data Distribution

Data appear Normal at 5% Significance Level

Nonparametric Statistics

95% CLT UCL	0.146
95% Jackknife UCL	0.147
95% Standard Bootstrap UCL	0.146
95% Bootstrap-t UCL	0.147
95% Hall's Bootstrap UCL	0.148
95% Percentile Bootstrap UCL	0.146
95% BCA Bootstrap UCL	0.146
95% Chebyshev(Mean, Sd) UCL	0.168
97.5% Chebyshev(Mean, Sd) UCL	0.183
99% Chebyshev(Mean, Sd) UCL	0.213

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.149
95% Adjusted Gamma UCL	0.15

Potential UCL to Use

Use 95% Student's-t UCL 0.147

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Data	30	Number of Detected Data	29
Number of Distinct Detected Data	16	Number of Non-Detect Data	1
		Percent Non-Detects	3.33%

Raw Statistics

Minimum Detected	0.05
Maximum Detected	0.58
Mean of Detected	0.13
SD of Detected	0.105
Minimum Non-Detect	0.05
Maximum Non-Detect	0.05

Log-transformed Statistics

Minimum Detected	-2.996
Maximum Detected	-0.545
Mean of Detected	-2.228
SD of Detected	0.567
Minimum Non-Detect	-2.996
Maximum Non-Detect	-2.996

UCL Statistics

Normal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.657
5% Shapiro Wilk Critical Value	0.926

Data not Normal at 5% Significance Level

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.912
5% Shapiro Wilk Critical Value	0.926

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method

Mean	0.127
SD	0.105
95% DL/2 (t) UCL	0.159

Maximum Likelihood Estimate(MLE) Method

Mean	0.125
SD	0.105
95% MLE (t) UCL	0.158
95% MLE (Tiku) UCL	0.156

Assuming Lognormal Distribution

DL/2 Substitution Method

Mean	-2.277
SD	0.618
95% H-Stat (DL/2) UCL	0.157

Log ROS Method

Mean in Log Scale	-2.275
SD in Log Scale	0.612
Mean in Original Scale	0.127
SD in Original Scale	0.105
95% t UCL	0.159
95% Percentile Bootstrap UCL	0.16
95% BCA Bootstrap UCL	0.171

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	2.544
Theta Star	0.0511
nu star	147.6

Data Distribution Test with Detected Values Only

Data do not follow a Discernable Distribution (0.05)

A-D Test Statistic	1.33
5% A-D Critical Value	0.754
K-S Test Statistic	0.754
5% K-S Critical Value	0.164

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	1E-12
Maximum	0.58
Mean	0.126
Median	0.095
SD	0.106
k star	0.576
Theta star	0.218
Nu star	34.54
AppChi2	22.1
95% Gamma Approximate UCL	0.196
95% Adjusted Gamma UCL	0.202

Note: DL/2 is not a recommended method.

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	0.127
SD	0.103
SE of Mean	0.0191
95% KM (t) UCL	0.16
95% KM (z) UCL	0.159
95% KM (jackknife) UCL	0.16
95% KM (bootstrap t) UCL	0.183
95% KM (BCA) UCL	0.162
95% KM (Percentile Bootstrap) UCL	0.159
95% KM (Chebyshev) UCL	0.211
97.5% KM (Chebyshev) UCL	0.247
99% KM (Chebyshev) UCL	0.318

Potential UCLs to Use

95% KM (Chebyshev) UCL	0.211

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Potassium

General Statistics

Number of Valid Observations 30

Number of Distinct Observations 25

Raw Statistics

Minimum	2630
Maximum	3680
Mean	3125
Median	3165
SD	240.9
Coefficient of Variation	0.0771
Skewness	0.238

Log-transformed Statistics

Minimum of Log Data	7.875
Maximum of Log Data	8.211
Mean of log Data	8.044
SD of log Data	0.077

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.953
Shapiro Wilk Critical Value	0.927

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.957
Shapiro Wilk Critical Value	0.927

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL 3200

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	3199
95% Modified-t UCL (Johnson-1978)	3200

Assuming Lognormal Distribution

95% H-UCL	N/A
95% Chebyshev (MVUE) UCL	3317
97.5% Chebyshev (MVUE) UCL	3400
99% Chebyshev (MVUE) UCL	3563

Gamma Distribution Test

k star (bias corrected)	157.1
Theta Star	19.89
MLE of Mean	3125
MLE of Standard Deviation	249.3
nu star	9428
Approximate Chi Square Value (.05)	9203
Adjusted Level of Significance	0.041
Adjusted Chi Square Value	9190
Anderson-Darling Test Statistic	0.574
Anderson-Darling 5% Critical Value	0.745
Kolmogorov-Smirnov Test Statistic	0.145
Kolmogorov-Smirnov 5% Critical Value	0.16

Data appear Gamma Distributed at 5% Significance Level

Data Distribution

Data appear Normal at 5% Significance Level

Nonparametric Statistics

95% CLT UCL	3197
95% Jackknife UCL	3200
95% Standard Bootstrap UCL	3195
95% Bootstrap-t UCL	3199
95% Hall's Bootstrap UCL	3209
95% Percentile Bootstrap UCL	3197
95% BCA Bootstrap UCL	3202
95% Chebyshev(Mean, Sd) UCL	3317
97.5% Chebyshev(Mean, Sd) UCL	3400
99% Chebyshev(Mean, Sd) UCL	3563

Assuming Gamma Distribution

95% Approximate Gamma UCL	3201
95% Adjusted Gamma UCL	3206

Potential UCL to Use

Use 95% Student's-t UCL 3200

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General Statistics

Number of Valid Observations	30	Number of Distinct Observations	29

Raw Statistics

Minimum	12.3
Maximum	131
Mean	43.18
Median	31.4
SD	29.53
Coefficient of Variation	0.684
Skewness	1.479

Log-transformed Statistics

Minimum of Log Data	2.51
Maximum of Log Data	4.875
Mean of log Data	3.572
SD of log Data	0.618

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.836
Shapiro Wilk Critical Value	0.927

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.961
Shapiro Wilk Critical Value	0.927

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	52.34

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	53.61
95% Modified-t UCL (Johnson-1978)	52.59

Assuming Lognormal Distribution

95% H-UCL	54.53
95% Chebyshev (MVUE) UCL	65.15
97.5% Chebyshev (MVUE) UCL	74.84
99% Chebyshev (MVUE) UCL	93.87

Gamma Distribution Test

k star (bias corrected)	2.493
Theta Star	17.32
MLE of Mean	43.18
MLE of Standard Deviation	27.35
nu star	149.6
Approximate Chi Square Value (.05)	122.3
Adjusted Level of Significance	0.041
Adjusted Chi Square Value	120.9
Anderson-Darling Test Statistic	0.744
Anderson-Darling 5% Critical Value	0.754
Kolmogorov-Smirnov Test Statistic	0.156
Kolmogorov-Smirnov 5% Critical Value	0.161

Data appear Gamma Distributed at 5% Significance Level

Data Distribution

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	52.81
95% Adjusted Gamma UCL	53.43

Nonparametric Statistics

95% CLT UCL	52.05
95% Jackknife UCL	52.34
95% Standard Bootstrap UCL	52.04
95% Bootstrap-t UCL	54.29
95% Hall's Bootstrap UCL	54.37
95% Percentile Bootstrap UCL	51.61
95% BCA Bootstrap UCL	53.16
95% Chebyshev(Mean, Sd) UCL	66.69
97.5% Chebyshev(Mean, Sd) UCL	76.86
99% Chebyshev(Mean, Sd) UCL	96.83

Potential UCL to Use

Use 95% Approximate Gamma UCL 52.81

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Selenium

General Statistics

Number of Valid Observations 30

Number of Distinct Observations 20

Raw Statistics

Minimum	0.05
Maximum	0.71
Mean	0.342
Median	0.375
SD	0.231
Coefficient of Variation	0.675
Skewness	0.00419

Log-transformed Statistics

Minimum of Log Data	-2.996
Maximum of Log Data	-0.342
Mean of log Data	-1.407
SD of log Data	0.922

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.861
Shapiro Wilk Critical Value	0.927

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.84
Shapiro Wilk Critical Value	0.927

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	0.414

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	0.412
95% Modified-t UCL (Johnson-1978)	0.414

Assuming Lognormal Distribution

95% H-UCL	0.563
95% Chebyshev (MVUE) UCL	0.672
97.5% Chebyshev (MVUE) UCL	0.804
99% Chebyshev (MVUE) UCL	1.064

Gamma Distribution Test

k star (bias corrected)	1.498
Theta Star	0.228
MLE of Mean	0.342
MLE of Standard Deviation	0.28
nu star	89.91
Approximate Chi Square Value (.05)	69.04
Adjusted Level of Significance	0.041
Adjusted Chi Square Value	67.99
Anderson-Darling Test Statistic	1.8
Anderson-Darling 5% Critical Value	0.762
Kolmogorov-Smirnov Test Statistic	0.191
Kolmogorov-Smirnov 5% Critical Value	0.163

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.446
95% Adjusted Gamma UCL	0.453

Data Distribution

Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

95% CLT UCL	0.412
95% Jackknife UCL	0.414
95% Standard Bootstrap UCL	0.41
95% Bootstrap-t UCL	0.413
95% Hall's Bootstrap UCL	0.409
95% Percentile Bootstrap UCL	0.412
95% BCA Bootstrap UCL	0.411
95% Chebyshev(Mean, Sd) UCL	0.526
97.5% Chebyshev(Mean, Sd) UCL	0.606
99% Chebyshev(Mean, Sd) UCL	0.762

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 0.526

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Data	30	Number of Detected Data	26
Number of Distinct Detected Data	17	Number of Non-Detect Data	4
		Percent Non-Detects	13.33%

Raw Statistics

Minimum Detected	0.003
Maximum Detected	0.228
Mean of Detected	0.0307
SD of Detected	0.0551
Minimum Non-Detect	0.002
Maximum Non-Detect	0.002

Log-transformed Statistics

Minimum Detected	-5.809
Maximum Detected	-1.478
Mean of Detected	-4.387
SD of Detected	1.252
Minimum Non-Detect	-6.215
Maximum Non-Detect	-6.215

UCL Statistics

Normal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.532
5% Shapiro Wilk Critical Value	0.92

Data not Normal at 5% Significance Level

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.899
5% Shapiro Wilk Critical Value	0.92

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method

Mean	0.0267
SD	0.0522
95% DL/2 (t) UCL	0.0429

Maximum Likelihood Estimate(MLE) Method

Mean	0.0217
SD	0.0564
95% MLE (t) UCL	0.0392
95% MLE (Tiku) UCL	0.0383

Assuming Lognormal Distribution

DL/2 Substitution Method

Mean	-4.723
SD	1.453
95% H-Stat (DL/2) UCL	0.0589

Log ROS Method

Mean in Log Scale	-4.771
SD in Log Scale	1.54
Mean in Original Scale	0.0267
SD in Original Scale	0.0522
95% t UCL	0.0429
95% Percentile Bootstrap UCL	0.044
95% BCA Bootstrap UCL	0.0501

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	0.621
Theta Star	0.0494
nu star	32.29

Data Distribution Test with Detected Values Only

Data do not follow a Discernable Distribution (0.05)

A-D Test Statistic	1.796
5% A-D Critical Value	0.792
K-S Test Statistic	0.792
5% K-S Critical Value	0.179

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	1E-12
Maximum	0.228
Mean	0.0266
Median	0.006
SD	0.0523
k star	0.195
Theta star	0.136
Nu star	11.7
AppChi2	5.028
95% Gamma Approximate UCL	0.0619
95% Adjusted Gamma UCL	0.0651

Note: DL/2 is not a recommended method.

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	0.027
SD	0.0512
SE of Mean	0.00954
95% KM (t) UCL	0.0432
95% KM (z) UCL	0.0427
95% KM (jackknife) UCL	0.0432
95% KM (bootstrap t) UCL	0.077
95% KM (BCA) UCL	0.0456
95% KM (Percentile Bootstrap) UCL	0.0428
95% KM (Chebyshev) UCL	0.0686
97.5% KM (Chebyshev) UCL	0.0865
99% KM (Chebyshev) UCL	0.122

Potential UCLs to Use

97.5% KM (Chebyshev) UCL	0.0865

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Sodium

General Statistics

Number of Valid Observations 30

Number of Distinct Observations 23

Raw Statistics

Minimum	851
Maximum	1450
Mean	1212
Median	1220
SD	141.5
Coefficient of Variation	0.117
Skewness	-0.532

Log-transformed Statistics

Minimum of Log Data	6.746
Maximum of Log Data	7.279
Mean of log Data	7.093
SD of log Data	0.122

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.971
Shapiro Wilk Critical Value	0.927

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.949
Shapiro Wilk Critical Value	0.927

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	1256

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	1252
95% Modified-t UCL (Johnson-1978)	1256

Assuming Lognormal Distribution

95% H-UCL	1261
95% Chebyshev (MVUE) UCL	1331
97.5% Chebyshev (MVUE) UCL	1382
99% Chebyshev (MVUE) UCL	1483

Gamma Distribution Test

k star (bias corrected)	64.55
Theta Star	18.78
MLE of Mean	1212
MLE of Standard Deviation	150.9
nu star	3873
Approximate Chi Square Value (.05)	3729
Adjusted Level of Significance	0.041
Adjusted Chi Square Value	3721
Anderson-Darling Test Statistic	0.364
Anderson-Darling 5% Critical Value	0.745
Kolmogorov-Smirnov Test Statistic	0.0916
Kolmogorov-Smirnov 5% Critical Value	0.16

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	1259
95% Adjusted Gamma UCL	1262

Data Distribution

Data appear Normal at 5% Significance Level

Nonparametric Statistics

95% CLT UCL	1255
95% Jackknife UCL	1256
95% Standard Bootstrap UCL	1255
95% Bootstrap-t UCL	1254
95% Hall's Bootstrap UCL	1254
95% Percentile Bootstrap UCL	1254
95% BCA Bootstrap UCL	1254
95% Chebyshev(Mean, Sd) UCL	1325
97.5% Chebyshev(Mean, Sd) UCL	1374
99% Chebyshev(Mean, Sd) UCL	1469

Potential UCL to Use

Use 95% Student's-t UCL 1256

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Strontium

General Statistics

Number of Valid Observations 30

Number of Distinct Observations 29

Raw Statistics

Minimum	1.47
Maximum	12.7
Mean	4.538
Median	3.745
SD	2.69
Coefficient of Variation	0.593
Skewness	1.396

Log-transformed Statistics

Minimum of Log Data	0.385
Maximum of Log Data	2.542
Mean of log Data	1.366
SD of log Data	0.538

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.859
Shapiro Wilk Critical Value	0.927

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.97
Shapiro Wilk Critical Value	0.927

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	5.373

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	5.48
95% Modified-t UCL (Johnson-1978)	5.394

Assuming Lognormal Distribution

95% H-UCL	5.524
95% Chebyshev (MVUE) UCL	6.534
97.5% Chebyshev (MVUE) UCL	7.411
99% Chebyshev (MVUE) UCL	9.135

Gamma Distribution Test

k star (bias corrected)	3.236
Theta Star	1.403
MLE of Mean	4.538
MLE of Standard Deviation	2.523
nu star	194.1
Approximate Chi Square Value (.05)	162.9
Adjusted Level of Significance	0.041
Adjusted Chi Square Value	161.3
Anderson-Darling Test Statistic	0.637
Anderson-Darling 5% Critical Value	0.751
Kolmogorov-Smirnov Test Statistic	0.144
Kolmogorov-Smirnov 5% Critical Value	0.161

Data appear Gamma Distributed at 5% Significance Level

Data Distribution

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	5.408
95% Adjusted Gamma UCL	5.464

Nonparametric Statistics

95% CLT UCL	5.346
95% Jackknife UCL	5.373
95% Standard Bootstrap UCL	5.333
95% Bootstrap-t UCL	5.546
95% Hall's Bootstrap UCL	5.526
95% Percentile Bootstrap UCL	5.308
95% BCA Bootstrap UCL	5.486
95% Chebyshev(Mean, Sd) UCL	6.679
97.5% Chebyshev(Mean, Sd) UCL	7.605
99% Chebyshev(Mean, Sd) UCL	9.425

Potential UCL to Use

Use 95% Approximate Gamma UCL 5.408

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General Statistics

Number of Valid Data	30	Number of Detected Data	0
Number of Distinct Detected Data	0	Number of Non-Detect Data	30
		Percent Non-Detects	100.00%

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!

Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Tellurium was not processed!

Thallium

General Statistics

Number of Valid Data	30	Number of Detected Data	26
Number of Distinct Detected Data	18	Number of Non-Detect Data	4
		Percent Non-Detects	13.33%

Raw Statistics

Minimum Detected	0.002
Maximum Detected	0.097
Mean of Detected	0.0196
SD of Detected	0.0185
Minimum Non-Detect	0.002
Maximum Non-Detect	0.002

Log-transformed Statistics

Minimum Detected	-6.215
Maximum Detected	-2.333
Mean of Detected	-4.27
SD of Detected	0.876
Minimum Non-Detect	-6.215
Maximum Non-Detect	-6.215

UCL Statistics

Normal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.697
5% Shapiro Wilk Critical Value	0.92

Data not Normal at 5% Significance Level

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.955
5% Shapiro Wilk Critical Value	0.92

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method

Mean	0.0171
SD	0.0183
95% DL/2 (t) UCL	0.0228

Maximum Likelihood Estimate(MLE) Method

Mean	0.0157
SD	0.02
95% MLE (t) UCL	0.0218
95% MLE (Tiku) UCL	0.0217

Assuming Lognormal Distribution

DL/2 Substitution Method

Mean	-4.622
SD	1.222
95% H-Stat (DL/2) UCL	0.0389

Log ROS Method

Mean in Log Scale	-4.532
SD in Log Scale	1.064
Mean in Original Scale	0.0172
SD in Original Scale	0.0182
95% t UCL	0.0229
95% Percentile Bootstrap UCL	0.0229
95% BCA Bootstrap UCL	0.025

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	1.468
Theta Star	0.0133
nu star	76.36

Data Distribution Test with Detected Values Only

Data appear Gamma Distributed at 5% Significance Level

A-D Test Statistic	0.403
5% A-D Critical Value	0.76
K-S Test Statistic	0.76
5% K-S Critical Value	0.174

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	1E-12
Maximum	0.097
Mean	0.017
Median	0.0125
SD	0.0184
k star	0.263
Theta star	0.0645
Nu star	15.8
AppChi2	7.821
95% Gamma Approximate UCL	0.0343
95% Adjusted Gamma UCL	0.0358

Note: DL/2 is not a recommended method.

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	0.0172
SD	0.0179
SE of Mean	0.00334
95% KM (t) UCL	0.0229
95% KM (z) UCL	0.0227
95% KM (jackknife) UCL	0.0228
95% KM (bootstrap t) UCL	0.0261
95% KM (BCA) UCL	0.0233
95% KM (Percentile Bootstrap) UCL	0.0234
95% KM (Chebyshev) UCL	0.0318
97.5% KM (Chebyshev) UCL	0.0381
99% KM (Chebyshev) UCL	0.0504

Potential UCLs to Use

95% KM (BCA) UCL	0.0233

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Tin

General Statistics

Number of Valid Data	30	Number of Detected Data	4
Number of Distinct Detected Data	4	Number of Non-Detect Data	26
		Percent Non-Detects	86.67%

Raw Statistics

Minimum Detected	0.02
Maximum Detected	0.13
Mean of Detected	0.065
SD of Detected	0.0465
Minimum Non-Detect	0.01
Maximum Non-Detect	0.01

Log-transformed Statistics

Minimum Detected	-3.912
Maximum Detected	-2.04
Mean of Detected	-2.94
SD of Detected	0.769
Minimum Non-Detect	-4.605
Maximum Non-Detect	-4.605

Warning: There are only 4 Distinct Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.919
5% Shapiro Wilk Critical Value	0.748

Data appear Normal at 5% Significance Level

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.978
5% Shapiro Wilk Critical Value	0.748

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method

Mean	0.013
SD	0.0256
95% DL/2 (t) UCL	0.0209

Maximum Likelihood Estimate(MLE) Method

Mean	0.0757
SD	0.0403
95% MLE (t) UCL	0.0882
95% MLE (Tiku) UCL	0.109

Assuming Lognormal Distribution

DL/2 Substitution Method

Mean	-4.984
SD	0.852
95% H-Stat (DL/2) UCL	0.0142

Log ROS Method

Mean in Log Scale	-6.769
SD in Log Scale	2.331
Mean in Original Scale	0.0106
SD in Original Scale	0.0265
95% t UCL	0.0188
95% Percentile Bootstrap UCL	0.0187
95% BCA Bootstrap UCL	0.0236

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	0.809
Theta Star	0.0803
nu star	6.474

Data Distribution Test with Detected Values Only

Data appear Normal at 5% Significance Level

A-D Test Statistic	0.247
5% A-D Critical Value	0.66
K-S Test Statistic	0.66
5% K-S Critical Value	0.397

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	0.0153
Maximum	1.267
Mean	0.517
Median	0.456
SD	0.404
k star	1.004
Theta star	0.515
Nu star	60.23
AppChi2	43.38
95% Gamma Approximate UCL	0.717
95% Adjusted Gamma UCL	N/A

Note: DL/2 is not a recommended method.

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	0.026
SD	0.0212
SE of Mean	0.00448
95% KM (t) UCL	0.0336
95% KM (z) UCL	0.0334
95% KM (jackknife) UCL	0.045
95% KM (bootstrap t) UCL	0.0348
95% KM (BCA) UCL	0.067
95% KM (Percentile Bootstrap) UCL	0.0647
95% KM (Chebyshev) UCL	0.0455
97.5% KM (Chebyshev) UCL	0.0539
99% KM (Chebyshev) UCL	0.0705

Potential UCLs to Use

95% KM (t) UCL	0.0336
95% KM (Percentile Bootstrap) UCL	0.0647

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Tungsten

General Statistics

Number of Valid Data	30	Number of Detected Data	12
Number of Distinct Detected Data	8	Number of Non-Detect Data	18
		Percent Non-Detects	60.00%

Raw Statistics

Minimum Detected	0.005
Maximum Detected	0.029
Mean of Detected	0.0115
SD of Detected	0.00799
Minimum Non-Detect	0.005
Maximum Non-Detect	0.005

Log-transformed Statistics

Minimum Detected	-5.298
Maximum Detected	-3.54
Mean of Detected	-4.663
SD of Detected	0.639
Minimum Non-Detect	-5.298
Maximum Non-Detect	-5.298

UCL Statistics

Normal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.821
5% Shapiro Wilk Critical Value	0.859

Data not Normal at 5% Significance Level

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.877
5% Shapiro Wilk Critical Value	0.859

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method

Mean	0.0061
SD	0.00666
95% DL/2 (t) UCL	0.00817

Maximum Likelihood Estimate(MLE) Method

Mean	0.0014
SD	0.0111
95% MLE (t) UCL	0.00486
95% MLE (Tiku) UCL	0.00634

Assuming Lognormal Distribution

DL/2 Substitution Method

Mean	-5.46
SD	0.77
95% H-Stat (DL/2) UCL	0.00785

Log ROS Method

Mean in Log Scale	-5.889
SD in Log Scale	1.24
Mean in Original Scale	0.00553
SD in Original Scale	0.00703
95% t UCL	0.00771
95% Percentile Bootstrap UCL	0.00768
95% BCA Bootstrap UCL	0.00824

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	2.07
Theta Star	0.00555
nu star	49.69

Data Distribution Test with Detected Values Only

Data appear Gamma Distributed at 5% Significance Level

A-D Test Statistic	0.68
5% A-D Critical Value	0.74
K-S Test Statistic	0.74
5% K-S Critical Value	0.248

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	1E-12
Maximum	0.029
Mean	0.0142
Median	0.0141
SD	0.00837
k star	0.616
Theta star	0.023
Nu star	36.94
AppChi2	24.03
95% Gamma Approximate UCL	0.0218
95% Adjusted Gamma UCL	0.0223

Note: DL/2 is not a recommended method.

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	0.0076
SD	0.00579
SE of Mean	0.0011
95% KM (t) UCL	0.00948
95% KM (z) UCL	0.00942
95% KM (jackknife) UCL	0.00943
95% KM (bootstrap t) UCL	0.0107
95% KM (BCA) UCL	0.0096
95% KM (Percentile Bootstrap) UCL	0.00943
95% KM (Chebyshev) UCL	0.0124
97.5% KM (Chebyshev) UCL	0.0145
99% KM (Chebyshev) UCL	0.0186

Potential UCLs to Use

95% KM (t) UCL	0.00948

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

General Statistics

Number of Valid Data	30	Number of Detected Data	0
Number of Distinct Detected Data	0	Number of Non-Detect Data	30
		Percent Non-Detects	100.00%

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Uranium was not processed!

Vanadium

General Statistics

Number of Valid Data	30	Number of Detected Data	19
Number of Distinct Detected Data	5	Number of Non-Detect Data	11
		Percent Non-Detects	36.67%

Raw Statistics

Minimum Detected	0.01
Maximum Detected	0.08
Mean of Detected	0.0247
SD of Detected	0.0193
Minimum Non-Detect	0.01
Maximum Non-Detect	0.01

Log-transformed Statistics

Minimum Detected	-4.605
Maximum Detected	-2.526
Mean of Detected	-3.961
SD of Detected	0.731
Minimum Non-Detect	-4.605
Maximum Non-Detect	-4.605

UCL Statistics

Normal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.768
5% Shapiro Wilk Critical Value	0.901

Data not Normal at 5% Significance Level

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.775
5% Shapiro Wilk Critical Value	0.901

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method

Mean	0.0175
SD	0.018
95% DL/2 (t) UCL	0.0231

Maximum Likelihood Estimate(MLE) Method

Mean	0.013
SD	0.0229
95% MLE (t) UCL	0.0201
95% MLE (Tiku) UCL	0.0208

Assuming Lognormal Distribution

DL/2 Substitution Method

Mean	-4.451
SD	0.873
95% H-Stat (DL/2) UCL	0.0249

Log ROS Method

Mean in Log Scale	-4.605
SD in Log Scale	1.08
Mean in Original Scale	0.017
SD in Original Scale	0.0184
95% t UCL	0.0227
95% Percentile Bootstrap UCL	0.0226
95% BCA Bootstrap UCL	0.0239

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	1.773
Theta Star	0.0139
nu star	67.38

Data Distribution Test with Detected Values Only

Data do not follow a Discernable Distribution (0.05)

A-D Test Statistic	1.893
5% A-D Critical Value	0.752
K-S Test Statistic	0.752
5% K-S Critical Value	0.201

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	1E-12
Maximum	0.08
Mean	0.0208
Median	0.0133
SD	0.017
k star	0.543
Theta star	0.0383
Nu star	32.6
AppChi2	20.55
95% Gamma Approximate UCL	0.0331
95% Adjusted Gamma UCL	0.034

Note: DL/2 is not a recommended method.

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	0.0193
SD	0.0165
SE of Mean	0.0031
95% KM (t) UCL	0.0246
95% KM (z) UCL	0.0244
95% KM (jackknife) UCL	0.0245
95% KM (bootstrap t) UCL	0.0263
95% KM (BCA) UCL	0.0243
95% KM (Percentile Bootstrap) UCL	0.0247
95% KM (Chebyshev) UCL	0.0328
97.5% KM (Chebyshev) UCL	0.0387
99% KM (Chebyshev) UCL	0.0502

Potential UCLs to Use

95% KM (BCA) UCL	0.0243

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Zinc

General Statistics

Number of Valid Observations 30

Number of Distinct Observations 24

Raw Statistics

Minimum	19.9
Maximum	41.2
Mean	30.1
Median	30.2
SD	4.473
Coefficient of Variation	0.149
Skewness	0.019

Log-transformed Statistics

Minimum of Log Data	2.991
Maximum of Log Data	3.718
Mean of log Data	3.394
SD of log Data	0.153

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.979
Shapiro Wilk Critical Value	0.927

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.967
Shapiro Wilk Critical Value	0.927

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL 31.49

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	31.45
95% Modified-t UCL (Johnson-1978)	31.49

Assuming Lognormal Distribution

95% H-UCL	31.64
95% Chebyshev (MVUE) UCL	33.8
97.5% Chebyshev (MVUE) UCL	35.39
99% Chebyshev (MVUE) UCL	38.53

Gamma Distribution Test

k star (bias corrected)	40.86
Theta Star	0.737
MLE of Mean	30.1
MLE of Standard Deviation	4.709
nu star	2452
Approximate Chi Square Value (.05)	2338
Adjusted Level of Significance	0.041
Adjusted Chi Square Value	2331
Anderson-Darling Test Statistic	0.352
Anderson-Darling 5% Critical Value	0.744
Kolmogorov-Smirnov Test Statistic	0.105
Kolmogorov-Smirnov 5% Critical Value	0.16

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	31.57
95% Adjusted Gamma UCL	31.66

Data Distribution

Data appear Normal at 5% Significance Level

Nonparametric Statistics

95% CLT UCL	31.45
95% Jackknife UCL	31.49
95% Standard Bootstrap UCL	31.43
95% Bootstrap-t UCL	31.46
95% Hall's Bootstrap UCL	31.45
95% Percentile Bootstrap UCL	31.39
95% BCA Bootstrap UCL	31.44
95% Chebyshev(Mean, Sd) UCL	33.66
97.5% Chebyshev(Mean, Sd) UCL	35.2
99% Chebyshev(Mean, Sd) UCL	38.23

Potential UCL to Use

Use 95% Student's-t UCL 31.49

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

ProUCL Outputs: Slugs

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	U:\121810356\1_environmental\4_field_data\3_hhera\6_reporting\slugs.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Aluminum

General Statistics

Number of Valid Observations	7	Number of Distinct Observations	7

Raw Statistics		Log-transformed Statistics	
Minimum	2	Minimum of Log Data	0.693
Maximum	9.6	Maximum of Log Data	2.262
Mean	4.714	Mean of log Data	1.377
Median	2.7	SD of log Data	0.631
SD	3.027		
Coefficient of Variation	0.642		
Skewness	0.811		

Warning: A sample size of 'n' = 7 may not adequate enough to compute meaningful and reliable test statistics and estimates!

It is suggested to collect at least 8 to 10 observations using these statistical methods!
If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Warning: There are only 7 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.835	Shapiro Wilk Test Statistic	0.861
Shapiro Wilk Critical Value	0.803	Shapiro Wilk Critical Value	0.803
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	6.938	95% H-UCL	9.791
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	9.577
95% Adjusted-CLT UCL (Chen-1995)	6.971	97.5% Chebyshev (MVUE) UCL	11.7
95% Modified-t UCL (Johnson-1978)	6.996	99% Chebyshev (MVUE) UCL	15.86

Gamma Distribution Test

k star (bias corrected)	1.827
Theta Star	2.581
MLE of Mean	4.714
MLE of Standard Deviation	3.488
nu star	25.57
Approximate Chi Square Value (.05)	15.05
Adjusted Level of Significance	0.0158
Adjusted Chi Square Value	12.68
Anderson-Darling Test Statistic	0.61
Anderson-Darling 5% Critical Value	0.712
Kolmogorov-Smirnov Test Statistic	0.326
Kolmogorov-Smirnov 5% Critical Value	0.314

Data follow Appr. Gamma Distribution at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	8.01
95% Adjusted Gamma UCL	9.507

Potential UCL to Use

Data Distribution

Data appear Normal at 5% Significance Level

Nonparametric Statistics

95% CLT UCL	6.596
95% Jackknife UCL	6.938
95% Standard Bootstrap UCL	6.43
95% Bootstrap-t UCL	8.706
95% Hall's Bootstrap UCL	6.065
95% Percentile Bootstrap UCL	6.529
95% BCA Bootstrap UCL	6.543
95% Chebyshev(Mean, Sd) UCL	9.702
97.5% Chebyshev(Mean, Sd) UCL	11.86
99% Chebyshev(Mean, Sd) UCL	16.1

Use 95% Student's-t UCL 6.938

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Antimony

General Statistics

Number of Valid Data	7	Number of Detected Data	0
Number of Distinct Detected Data	0	Number of Non-Detect Data	7
		Percent Non-Detects	100.00%

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!

Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Antimony was not processed!

Arsenic

General Statistics

Number of Valid Data	7	Number of Detected Data	6
Number of Distinct Detected Data	5	Number of Non-Detect Data	1
		Percent Non-Detects	14.29%

Raw Statistics

Minimum Detected	0.04
Maximum Detected	0.7
Mean of Detected	0.21
SD of Detected	0.251
Minimum Non-Detect	0.02
Maximum Non-Detect	0.02

Log-transformed Statistics

Minimum Detected	-3.219
Maximum Detected	-0.357
Mean of Detected	-2.084
SD of Detected	1.105
Minimum Non-Detect	-3.912
Maximum Non-Detect	-3.912

Warning: There are only 6 Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.743
5% Shapiro Wilk Critical Value	0.788

Data not Normal at 5% Significance Level

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.929
5% Shapiro Wilk Critical Value	0.788

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method

Mean	0.181
SD	0.241
95% DL/2 (t) UCL	0.359

Maximum Likelihood Estimate(MLE) Method

Mean	0.161
SD	0.249
95% MLE (t) UCL	0.343
95% MLE (Tiku) UCL	0.338

Assuming Lognormal Distribution

DL/2 Substitution Method

Mean	-2.444
SD	1.388
95% H-Stat (DL/2) UCL	3.526

Log ROS Method

Mean in Log Scale	-2.483
SD in Log Scale	1.46
Mean in Original Scale	0.181
SD in Original Scale	0.242
95% t UCL	0.359
95% Percentile Bootstrap UCL	0.348
95% BCA Bootstrap UCL	0.381

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	0.657
Theta Star	0.32
nu star	7.883

Data Distribution Test with Detected Values Only

Data appear Gamma Distributed at 5% Significance Level

A-D Test Statistic	0.364
5% A-D Critical Value	0.714
K-S Test Statistic	0.714
5% K-S Critical Value	0.34

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	1E-12
Maximum	0.7
Mean	0.18
Median	0.09
SD	0.243
k star	0.201
Theta star	0.895
Nu star	2.816
AppChi2	0.32
95% Gamma Approximate UCL	1.584
95% Adjusted Gamma UCL	3.076

Note: DL/2 is not a recommended method.

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	0.186
SD	0.22
SE of Mean	0.0912
95% KM (t) UCL	0.363
95% KM (z) UCL	0.336
95% KM (jackknife) UCL	0.361
95% KM (bootstrap t) UCL	0.757
95% KM (BCA) UCL	0.351
95% KM (Percentile Bootstrap) UCL	0.34
95% KM (Chebyshev) UCL	0.583
97.5% KM (Chebyshev) UCL	0.756
99% KM (Chebyshev) UCL	1.094

Potential UCLs to Use

95% KM (Chebyshev) UCL	0.583

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Barium

General Statistics

Number of Valid Observations 7

Number of Distinct Observations 7

Raw Statistics

Minimum	15
Maximum	64.6
Mean	37.54
Median	35.5
SD	15.47
Coefficient of Variation	0.412
Skewness	0.578

Log-transformed Statistics

Minimum of Log Data	2.708
Maximum of Log Data	4.168
Mean of log Data	3.545
SD of log Data	0.451

Warning: A sample size of 'n' = 7 may not adequate enough to compute meaningful and reliable test statistics and estimates!

It is suggested to collect at least 8 to 10 observations using these statistical methods!

If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Warning: There are only 7 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set,

the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.942
Shapiro Wilk Critical Value	0.803

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.924
Shapiro Wilk Critical Value	0.803

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL 48.91

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	48.53
95% Modified-t UCL (Johnson-1978)	49.12

Assuming Lognormal Distribution

95% H-UCL	59.27
95% Chebyshev (MVUE) UCL	65.98
97.5% Chebyshev (MVUE) UCL	78.18
99% Chebyshev (MVUE) UCL	102.1

Gamma Distribution Test

k star (bias corrected)	3.751
Theta Star	10.01
MLE of Mean	37.54
MLE of Standard Deviation	19.38
nu star	52.51

Data Distribution

Data appear Normal at 5% Significance Level

Slugs

Approximate Chi Square Value (.05)	36.87
Adjusted Level of Significance	0.0158
Adjusted Chi Square Value	32.95
Anderson-Darling Test Statistic	0.332
Anderson-Darling 5% Critical Value	0.709
Kolmogorov-Smirnov Test Statistic	0.223
Kolmogorov-Smirnov 5% Critical Value	0.313

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	53.48
95% Adjusted Gamma UCL	59.83

Potential UCL to Use

Nonparametric Statistics

95% CLT UCL	47.16
95% Jackknife UCL	48.91
95% Standard Bootstrap UCL	46.55
95% Bootstrap-t UCL	53.47
95% Hall's Bootstrap UCL	72.06
95% Percentile Bootstrap UCL	46.94
95% BCA Bootstrap UCL	48.37
95% Chebyshev(Mean, Sd) UCL	63.04
97.5% Chebyshev(Mean, Sd) UCL	74.07
99% Chebyshev(Mean, Sd) UCL	95.74

Use 95% Student's-t UCL 48.91

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Beryllium

General Statistics

Number of Valid Data	7	Number of Detected Data	0
Number of Distinct Detected Data	0	Number of Non-Detect Data	7
		Percent Non-Detects	100.00%

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!

Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Beryllium was not processed!

Bismuth

General Statistics

Number of Valid Data	7	Number of Detected Data	0
Number of Distinct Detected Data	0	Number of Non-Detect Data	7
		Percent Non-Detects	100.00%

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!

Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Bismuth was not processed!

Boron

General Statistics

Number of Valid Observations	7	Number of Distinct Observations	6

Raw Statistics

Minimum	1
Maximum	4.8
Mean	2.414
Median	1.8
SD	1.32
Coefficient of Variation	0.547
Skewness	1.058

Log-transformed Statistics

Minimum of Log Data	0
Maximum of Log Data	1.569
Mean of log Data	0.759
SD of log Data	0.532

Warning: A sample size of 'n' = 7 may not adequate enough to compute meaningful and reliable test statistics and estimates!

It is suggested to collect at least 8 to 10 observations using these statistical methods!
If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Warning: There are only 7 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.901
Shapiro Wilk Critical Value	0.803

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.964
Shapiro Wilk Critical Value	0.803

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	3.383

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	3.448
95% Modified-t UCL (Johnson-1978)	3.417

Assuming Lognormal Distribution

95% H-UCL	4.263
95% Chebyshev (MVUE) UCL	4.529
97.5% Chebyshev (MVUE) UCL	5.447
99% Chebyshev (MVUE) UCL	7.251

Gamma Distribution Test

k star (bias corrected)	2.522
Theta Star	0.957
MLE of Mean	2.414
MLE of Standard Deviation	1.52
nu star	35.31

Data Distribution

Data appear Normal at 5% Significance Level

Slugs

Approximate Chi Square Value (.05)	22.71
Adjusted Level of Significance	0.0158
Adjusted Chi Square Value	19.72
Anderson-Darling Test Statistic	0.291
Anderson-Darling 5% Critical Value	0.71
Kolmogorov-Smirnov Test Statistic	0.231
Kolmogorov-Smirnov 5% Critical Value	0.313

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	3.753
95% Adjusted Gamma UCL	4.323

Potential UCL to Use

Nonparametric Statistics

95% CLT UCL	3.235
95% Jackknife UCL	3.383
95% Standard Bootstrap UCL	3.178
95% Bootstrap-t UCL	4.139
95% Hall's Bootstrap UCL	4.101
95% Percentile Bootstrap UCL	3.214
95% BCA Bootstrap UCL	3.371
95% Chebyshev(Mean, Sd) UCL	4.588
97.5% Chebyshev(Mean, Sd) UCL	5.529
99% Chebyshev(Mean, Sd) UCL	7.377

Use 95% Student's-t UCL 3.383

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cadmium

General Statistics

Number of Valid Observations 7

Number of Distinct Observations 7

Raw Statistics

Minimum	1.16
Maximum	6.53
Mean	3.31
Median	3.3
SD	1.775
Coefficient of Variation	0.536
Skewness	0.876

Log-transformed Statistics

Minimum of Log Data	0.148
Maximum of Log Data	1.876
Mean of log Data	1.067
SD of log Data	0.566

Warning: A sample size of 'n' = 7 may not adequate enough to compute meaningful and reliable test statistics and estimates!

It is suggested to collect at least 8 to 10 observations using these statistical methods!

If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Warning: There are only 7 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set,

the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.949
Shapiro Wilk Critical Value	0.803

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.985
Shapiro Wilk Critical Value	0.803

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	4.614

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	4.651
95% Modified-t UCL (Johnson-1978)	4.651

Assuming Lognormal Distribution

95% H-UCL	6.224
95% Chebyshev (MVUE) UCL	6.449
97.5% Chebyshev (MVUE) UCL	7.8
99% Chebyshev (MVUE) UCL	10.45

Gamma Distribution Test

k star (bias corrected)	2.389
Theta Star	1.386
MLE of Mean	3.31
MLE of Standard Deviation	2.142
nu star	33.44

Data Distribution

Data appear Normal at 5% Significance Level

Slugs

Approximate Chi Square Value (.05)	21.22
Adjusted Level of Significance	0.0158
Adjusted Chi Square Value	18.34
Anderson-Darling Test Statistic	0.162
Anderson-Darling 5% Critical Value	0.71
Kolmogorov-Smirnov Test Statistic	0.139
Kolmogorov-Smirnov 5% Critical Value	0.313

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	5.217
95% Adjusted Gamma UCL	6.036

Potential UCL to Use

Nonparametric Statistics

95% CLT UCL	4.414
95% Jackknife UCL	4.614
95% Standard Bootstrap UCL	4.327
95% Bootstrap-t UCL	4.928
95% Hall's Bootstrap UCL	5.463
95% Percentile Bootstrap UCL	4.407
95% BCA Bootstrap UCL	4.473
95% Chebyshev(Mean, Sd) UCL	6.235
97.5% Chebyshev(Mean, Sd) UCL	7.501
99% Chebyshev(Mean, Sd) UCL	9.987

Use 95% Student's-t UCL 4.614

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Calcium

General Statistics

Number of Valid Observations 7

Number of Distinct Observations 7

Raw Statistics

Minimum	2180
Maximum	6340
Mean	4293
Median	4200
SD	1480
Coefficient of Variation	0.345
Skewness	0.206

Log-transformed Statistics

Minimum of Log Data	7.687
Maximum of Log Data	8.755
Mean of log Data	8.31
SD of log Data	0.367

Warning: A sample size of 'n' = 7 may not adequate enough to compute meaningful and reliable test statistics and estimates!

It is suggested to collect at least 8 to 10 observations using these statistical methods!

If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Warning: There are only 7 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set,

the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.952
Shapiro Wilk Critical Value	0.803

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.954
Shapiro Wilk Critical Value	0.803

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL 5380

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	5260
95% Modified-t UCL (Johnson-1978)	5387

Assuming Lognormal Distribution

95% H-UCL	6114
95% Chebyshev (MVUE) UCL	6913
97.5% Chebyshev (MVUE) UCL	8042
99% Chebyshev (MVUE) UCL	10261

Gamma Distribution Test

k star (bias corrected)	5.389
Theta Star	796.5
MLE of Mean	4293
MLE of Standard Deviation	1849
nu star	75.45

Data Distribution

Data appear Normal at 5% Significance Level

Slugs

Approximate Chi Square Value (.05)	56.44
Adjusted Level of Significance	0.0158
Adjusted Chi Square Value	51.51
Anderson-Darling Test Statistic	0.226
Anderson-Darling 5% Critical Value	0.709
Kolmogorov-Smirnov Test Statistic	0.169
Kolmogorov-Smirnov 5% Critical Value	0.312

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	5738
95% Adjusted Gamma UCL	6288

Potential UCL to Use

Use 95% Student's-t UCL 5380

Nonparametric Statistics

95% CLT UCL	5213
95% Jackknife UCL	5380
95% Standard Bootstrap UCL	5195
95% Bootstrap-t UCL	5686
95% Hall's Bootstrap UCL	5897
95% Percentile Bootstrap UCL	5170
95% BCA Bootstrap UCL	5111
95% Chebyshev(Mean, Sd) UCL	6731
97.5% Chebyshev(Mean, Sd) UCL	7787
99% Chebyshev(Mean, Sd) UCL	9859

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Data	7	Number of Detected Data	1
Number of Distinct Detected Data	1	Number of Non-Detect Data	6
		Percent Non-Detects	85.71%

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Chromium was not processed!

Cobalt

General Statistics

Number of Valid Observations 7

Number of Distinct Observations 6

Raw Statistics

Minimum	0.01
Maximum	0.19
Mean	0.06
Median	0.05
SD	0.0616
Coefficient of Variation	1.027
Skewness	1.936

Log-transformed Statistics

Minimum of Log Data	-4.605
Maximum of Log Data	-1.661
Mean of log Data	-3.223
SD of log Data	0.986

Warning: A sample size of 'n' = 7 may not adequate enough to compute meaningful and reliable test statistics and estimates!

It is suggested to collect at least 8 to 10 observations using these statistical methods!

If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Warning: There are only 7 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set,

the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.775
Shapiro Wilk Critical Value	0.803

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.961
Shapiro Wilk Critical Value	0.803

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	0.105

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	0.117
95% Modified-t UCL (Johnson-1978)	0.108

Assuming Lognormal Distribution

95% H-UCL	0.283
95% Chebyshev (MVUE) UCL	0.156
97.5% Chebyshev (MVUE) UCL	0.198
99% Chebyshev (MVUE) UCL	0.28

Gamma Distribution Test

k star (bias corrected)	0.875
Theta Star	0.0686
MLE of Mean	0.06
MLE of Standard Deviation	0.0641
nu star	12.25

Data Distribution

Data appear Gamma Distributed at 5% Significance Level

Approximate Chi Square Value (.05)	5.392
Adjusted Level of Significance	0.0158
Adjusted Chi Square Value	4.102
Anderson-Darling Test Statistic	0.323
Anderson-Darling 5% Critical Value	0.723
Kolmogorov-Smirnov Test Statistic	0.211
Kolmogorov-Smirnov 5% Critical Value	0.318

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.136
95% Adjusted Gamma UCL	0.179

Potential UCL to Use

Use 95% Approximate Gamma UCL 0.136

Nonparametric Statistics

95% CLT UCL	0.0983
95% Jackknife UCL	0.105
95% Standard Bootstrap UCL	0.0958
95% Bootstrap-t UCL	0.147
95% Hall's Bootstrap UCL	0.251
95% Percentile Bootstrap UCL	0.101
95% BCA Bootstrap UCL	0.111
95% Chebyshev(Mean, Sd) UCL	0.162
97.5% Chebyshev(Mean, Sd) UCL	0.206
99% Chebyshev(Mean, Sd) UCL	0.292

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Copper

General Statistics

Number of Valid Observations 7

Number of Distinct Observations 7

Raw Statistics

Minimum	9
Maximum	16.9
Mean	11.8
Median	11.4
SD	2.529
Coefficient of Variation	0.214
Skewness	1.523

Log-transformed Statistics

Minimum of Log Data	2.197
Maximum of Log Data	2.827
Mean of log Data	2.45
SD of log Data	0.198

Warning: A sample size of 'n' = 7 may not adequate enough to compute meaningful and reliable test statistics and estimates!

It is suggested to collect at least 8 to 10 observations using these statistical methods!

If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Warning: There are only 7 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set,

the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.875
Shapiro Wilk Critical Value	0.803

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.934
Shapiro Wilk Critical Value	0.803

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	13.66

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	13.96
95% Modified-t UCL (Johnson-1978)	13.75

Assuming Lognormal Distribution

95% H-UCL	13.89
95% Chebyshev (MVUE) UCL	15.65
97.5% Chebyshev (MVUE) UCL	17.32
99% Chebyshev (MVUE) UCL	20.6

Gamma Distribution Test

k star (bias corrected)	16.32
Theta Star	0.723
MLE of Mean	11.8
MLE of Standard Deviation	2.921
nu star	228.5

Data Distribution

Data appear Normal at 5% Significance Level

Approximate Chi Square Value (.05)	194.5
Adjusted Level of Significance	0.0158
Adjusted Chi Square Value	185
Anderson-Darling Test Statistic	0.361
Anderson-Darling 5% Critical Value	0.707
Kolmogorov-Smirnov Test Statistic	0.207
Kolmogorov-Smirnov 5% Critical Value	0.311

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	13.86
95% Adjusted Gamma UCL	14.57

Nonparametric Statistics

95% CLT UCL	13.37
95% Jackknife UCL	13.66
95% Standard Bootstrap UCL	13.23
95% Bootstrap-t UCL	14.97
95% Hall's Bootstrap UCL	22.03
95% Percentile Bootstrap UCL	13.29
95% BCA Bootstrap UCL	13.73
95% Chebyshev(Mean, Sd) UCL	15.97
97.5% Chebyshev(Mean, Sd) UCL	17.77
99% Chebyshev(Mean, Sd) UCL	21.31

Potential UCL to Use

Use 95% Student's-t UCL 13.66

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Iron

General Statistics

Number of Valid Observations 7

Number of Distinct Observations 6

Raw Statistics

Minimum	24
Maximum	36
Mean	28.71
Median	28
SD	3.773
Coefficient of Variation	0.131
Skewness	1.144

Log-transformed Statistics

Minimum of Log Data	3.178
Maximum of Log Data	3.584
Mean of log Data	3.35
SD of log Data	0.127

Warning: A sample size of 'n' = 7 may not adequate enough to compute meaningful and reliable test statistics and estimates!

It is suggested to collect at least 8 to 10 observations using these statistical methods!

If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Warning: There are only 7 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set,

the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.913
Shapiro Wilk Critical Value	0.803

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.943
Shapiro Wilk Critical Value	0.803

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL 31.49

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	31.72
95% Modified-t UCL (Johnson-1978)	31.59

Assuming Lognormal Distribution

95% H-UCL	31.71
95% Chebyshev (MVUE) UCL	34.7
97.5% Chebyshev (MVUE) UCL	37.29
99% Chebyshev (MVUE) UCL	42.38

Gamma Distribution Test

k star (bias corrected)	40.85
Theta Star	0.703
MLE of Mean	28.71
MLE of Standard Deviation	4.493
nu star	571.9

Data Distribution

Data appear Normal at 5% Significance Level

Slugs

Approximate Chi Square Value (.05)	517.4
Adjusted Level of Significance	0.0158
Adjusted Chi Square Value	501.6
Anderson-Darling Test Statistic	0.33
Anderson-Darling 5% Critical Value	0.708
Kolmogorov-Smirnov Test Statistic	0.197
Kolmogorov-Smirnov 5% Critical Value	0.311

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	31.74
95% Adjusted Gamma UCL	32.73

Nonparametric Statistics

95% CLT UCL	31.06
95% Jackknife UCL	31.49
95% Standard Bootstrap UCL	30.83
95% Bootstrap-t UCL	32.48
95% Hall's Bootstrap UCL	44.29
95% Percentile Bootstrap UCL	31
95% BCA Bootstrap UCL	31.43
95% Chebyshev(Mean, Sd) UCL	34.93
97.5% Chebyshev(Mean, Sd) UCL	37.62
99% Chebyshev(Mean, Sd) UCL	42.9

Potential UCL to Use

Use 95% Student's-t UCL 31.49

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Lead

General Statistics

Number of Valid Observations 7

Number of Distinct Observations 7

Raw Statistics

Minimum	0.085
Maximum	0.207
Mean	0.122
Median	0.107
SD	0.0437
Coefficient of Variation	0.357
Skewness	1.537

Log-transformed Statistics

Minimum of Log Data	-2.465
Maximum of Log Data	-1.575
Mean of log Data	-2.147
SD of log Data	0.316

Warning: A sample size of 'n' = 7 may not adequate enough to compute meaningful and reliable test statistics and estimates!

It is suggested to collect at least 8 to 10 observations using these statistical methods!

If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Warning: There are only 7 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set,

the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.806
Shapiro Wilk Critical Value	0.803

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.867
Shapiro Wilk Critical Value	0.803

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL 0.155

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	0.16
95% Modified-t UCL (Johnson-1978)	0.156

Assuming Lognormal Distribution

95% H-UCL	0.164
95% Chebyshev (MVUE) UCL	0.186
97.5% Chebyshev (MVUE) UCL	0.213
99% Chebyshev (MVUE) UCL	0.267

Gamma Distribution Test

k star (bias corrected)	6.353
Theta Star	0.0193
MLE of Mean	0.122
MLE of Standard Deviation	0.0486
nu star	88.95

Data Distribution

Data appear Normal at 5% Significance Level

Slugs

Approximate Chi Square Value (.05)	68.2
Adjusted Level of Significance	0.0158
Adjusted Chi Square Value	62.74
Anderson-Darling Test Statistic	0.605
Anderson-Darling 5% Critical Value	0.708
Kolmogorov-Smirnov Test Statistic	0.323
Kolmogorov-Smirnov 5% Critical Value	0.312

Data follow Appr. Gamma Distribution at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.16
95% Adjusted Gamma UCL	0.174

Nonparametric Statistics

95% CLT UCL	0.15
95% Jackknife UCL	0.155
95% Standard Bootstrap UCL	0.147
95% Bootstrap-t UCL	0.239
95% Hall's Bootstrap UCL	0.345
95% Percentile Bootstrap UCL	0.148
95% BCA Bootstrap UCL	0.155
95% Chebyshev(Mean, Sd) UCL	0.194
97.5% Chebyshev(Mean, Sd) UCL	0.226
99% Chebyshev(Mean, Sd) UCL	0.287

Potential UCL to Use

Use 95% Student's-t UCL 0.155

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Lithium

General Statistics

Number of Valid Data	7	Number of Detected Data	2
Number of Distinct Detected Data	1	Number of Non-Detect Data	5
		Percent Non-Detects	71.43%

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Lithium was not processed!

Magnesium

General Statistics

Number of Valid Observations 7

Number of Distinct Observations 7

Raw Statistics

Minimum	413
Maximum	747
Mean	534.9
Median	496
SD	124
Coefficient of Variation	0.232
Skewness	0.847

Log-transformed Statistics

Minimum of Log Data	6.023
Maximum of Log Data	6.616
Mean of log Data	6.26
SD of log Data	0.223

Warning: A sample size of 'n' = 7 may not adequate enough to compute meaningful and reliable test statistics and estimates!

It is suggested to collect at least 8 to 10 observations using these statistical methods!

If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Warning: There are only 7 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set,

the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.91
Shapiro Wilk Critical Value	0.803

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.93
Shapiro Wilk Critical Value	0.803

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	625.9

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	628
95% Modified-t UCL (Johnson-1978)	628.4

Assuming Lognormal Distribution

95% H-UCL	645.3
95% Chebyshev (MVUE) UCL	730.9
97.5% Chebyshev (MVUE) UCL	815.9
99% Chebyshev (MVUE) UCL	982.8

Gamma Distribution Test

k star (bias corrected)	13.28
Theta Star	40.27
MLE of Mean	534.9
MLE of Standard Deviation	146.8
nu star	185.9

Data Distribution

Data appear Normal at 5% Significance Level

Slugs

Approximate Chi Square Value (.05)	155.4
Adjusted Level of Significance	0.0158
Adjusted Chi Square Value	147
Anderson-Darling Test Statistic	0.311
Anderson-Darling 5% Critical Value	0.707
Kolmogorov-Smirnov Test Statistic	0.185
Kolmogorov-Smirnov 5% Critical Value	0.311

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	640
95% Adjusted Gamma UCL	676.8

Nonparametric Statistics

95% CLT UCL	612
95% Jackknife UCL	625.9
95% Standard Bootstrap UCL	606.3
95% Bootstrap-t UCL	678.2
95% Hall's Bootstrap UCL	640.7
95% Percentile Bootstrap UCL	608.6
95% BCA Bootstrap UCL	618.1
95% Chebyshev(Mean, Sd) UCL	739.2
97.5% Chebyshev(Mean, Sd) UCL	827.6
99% Chebyshev(Mean, Sd) UCL	1001

Potential UCL to Use

Use 95% Student's-t UCL 625.9

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations 7

Number of Distinct Observations 7

Raw Statistics

Minimum	1050
Maximum	4100
Mean	2517
Median	2340
SD	1102
Coefficient of Variation	0.438
Skewness	0.423

Log-transformed Statistics

Minimum of Log Data	6.957
Maximum of Log Data	8.319
Mean of log Data	7.742
SD of log Data	0.47

Warning: A sample size of 'n' = 7 may not adequate enough to compute meaningful and reliable test statistics and estimates!

It is suggested to collect at least 8 to 10 observations using these statistical methods!

If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Warning: There are only 7 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set,

the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.914
Shapiro Wilk Critical Value	0.803

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.932
Shapiro Wilk Critical Value	0.803

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL 3327

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	3273
95% Modified-t UCL (Johnson-1978)	3338

Assuming Lognormal Distribution

95% H-UCL	4076
95% Chebyshev (MVUE) UCL	4497
97.5% Chebyshev (MVUE) UCL	5348
99% Chebyshev (MVUE) UCL	7021

Gamma Distribution Test

k star (bias corrected)	3.389
Theta Star	742.7
MLE of Mean	2517
MLE of Standard Deviation	1367
nu star	47.45

Data Distribution

Data appear Normal at 5% Significance Level

Approximate Chi Square Value (.05)	32.64
Adjusted Level of Significance	0.0158
Adjusted Chi Square Value	28.98
Anderson-Darling Test Statistic	0.335
Anderson-Darling 5% Critical Value	0.71
Kolmogorov-Smirnov Test Statistic	0.216
Kolmogorov-Smirnov 5% Critical Value	0.313

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	3659
95% Adjusted Gamma UCL	4121

Potential UCL to Use

Nonparametric Statistics

95% CLT UCL	3202
95% Jackknife UCL	3327
95% Standard Bootstrap UCL	3155
95% Bootstrap-t UCL	3670
95% Hall's Bootstrap UCL	4717
95% Percentile Bootstrap UCL	3201
95% BCA Bootstrap UCL	3241
95% Chebyshev(Mean, Sd) UCL	4333
97.5% Chebyshev(Mean, Sd) UCL	5118
99% Chebyshev(Mean, Sd) UCL	6661

Use 95% Student's-t UCL 3327

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Observations 7

Number of Distinct Observations 5

Raw Statistics

Minimum	0.01
Maximum	0.05
Mean	0.0286
Median	0.03
SD	0.0157
Coefficient of Variation	0.551
Skewness	-0.0367

Log-transformed Statistics

Minimum of Log Data	-4.605
Maximum of Log Data	-2.996
Mean of log Data	-3.723
SD of log Data	0.668

Warning: A sample size of 'n' = 7 may not adequate enough to compute meaningful and reliable test statistics and estimates!

It is suggested to collect at least 8 to 10 observations using these statistical methods!

If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Warning: There are only 7 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set,

the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.913
Shapiro Wilk Critical Value	0.803

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.864
Shapiro Wilk Critical Value	0.803

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	0.0401

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	0.0383
95% Modified-t UCL (Johnson-1978)	0.0401

Assuming Lognormal Distribution

95% H-UCL	0.0653
95% Chebyshev (MVUE) UCL	0.0614
97.5% Chebyshev (MVUE) UCL	0.0753
99% Chebyshev (MVUE) UCL	0.103

Gamma Distribution Test

k star (bias corrected)	1.887
Theta Star	0.0151
MLE of Mean	0.0286
MLE of Standard Deviation	0.0208
nu star	26.42

Data Distribution

Data appear Normal at 5% Significance Level

Slugs

Approximate Chi Square Value (.05)	15.7
Adjusted Level of Significance	0.0158
Adjusted Chi Square Value	13.27
Anderson-Darling Test Statistic	0.444
Anderson-Darling 5% Critical Value	0.712
Kolmogorov-Smirnov Test Statistic	0.221
Kolmogorov-Smirnov 5% Critical Value	0.314

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.0481
95% Adjusted Gamma UCL	0.0569

Nonparametric Statistics

95% CLT UCL	0.0384
95% Jackknife UCL	0.0401
95% Standard Bootstrap UCL	0.0376
95% Bootstrap-t UCL	0.0405
95% Hall's Bootstrap UCL	0.0368
95% Percentile Bootstrap UCL	0.0371
95% BCA Bootstrap UCL	0.0357
95% Chebyshev(Mean, Sd) UCL	0.0545
97.5% Chebyshev(Mean, Sd) UCL	0.0657
99% Chebyshev(Mean, Sd) UCL	0.0877

Potential UCL to Use

Use 95% Student's-t UCL 0.0401

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Molybdenum

General Statistics

Number of Valid Observations 7

Number of Distinct Observations 7

Raw Statistics

Minimum	0.04
Maximum	0.18
Mean	0.111
Median	0.12
SD	0.0463
Coefficient of Variation	0.416
Skewness	-0.198

Log-transformed Statistics

Minimum of Log Data	-3.219
Maximum of Log Data	-1.715
Mean of log Data	-2.289
SD of log Data	0.504

Warning: A sample size of 'n' = 7 may not adequate enough to compute meaningful and reliable test statistics and estimates!

It is suggested to collect at least 8 to 10 observations using these statistical methods!

If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Warning: There are only 7 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set,

the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.985
Shapiro Wilk Critical Value	0.803

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.919
Shapiro Wilk Critical Value	0.803

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	0.145

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	0.139
95% Modified-t UCL (Johnson-1978)	0.145

Assuming Lognormal Distribution

95% H-UCL	0.192
95% Chebyshev (MVUE) UCL	0.207
97.5% Chebyshev (MVUE) UCL	0.248
99% Chebyshev (MVUE) UCL	0.328

Gamma Distribution Test

k star (bias corrected)	3.211
Theta Star	0.0347
MLE of Mean	0.111
MLE of Standard Deviation	0.0622
nu star	44.95

Data Distribution

Data appear Normal at 5% Significance Level

Slugs

Approximate Chi Square Value (.05)	30.57
Adjusted Level of Significance	0.0158
Adjusted Chi Square Value	27.04
Anderson-Darling Test Statistic	0.276
Anderson-Darling 5% Critical Value	0.71
Kolmogorov-Smirnov Test Statistic	0.196
Kolmogorov-Smirnov 5% Critical Value	0.313

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.164
95% Adjusted Gamma UCL	0.185

Potential UCL to Use

Nonparametric Statistics

95% CLT UCL	0.14
95% Jackknife UCL	0.145
95% Standard Bootstrap UCL	0.139
95% Bootstrap-t UCL	0.144
95% Hall's Bootstrap UCL	0.141
95% Percentile Bootstrap UCL	0.137
95% BCA Bootstrap UCL	0.137
95% Chebyshev(Mean, Sd) UCL	0.188
97.5% Chebyshev(Mean, Sd) UCL	0.221
99% Chebyshev(Mean, Sd) UCL	0.286

Use 95% Student's-t UCL 0.145

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Data	7	Number of Detected Data	6
Number of Distinct Detected Data	6	Number of Non-Detect Data	1
		Percent Non-Detects	14.29%

Raw Statistics

Minimum Detected	0.06
Maximum Detected	0.18
Mean of Detected	0.105
SD of Detected	0.0432
Minimum Non-Detect	0.05
Maximum Non-Detect	0.05

Log-transformed Statistics

Minimum Detected	-2.813
Maximum Detected	-1.715
Mean of Detected	-2.32
SD of Detected	0.396
Minimum Non-Detect	-2.996
Maximum Non-Detect	-2.996

Warning: There are only 6 Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.924
5% Shapiro Wilk Critical Value	0.788

Data appear Normal at 5% Significance Level

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.976
5% Shapiro Wilk Critical Value	0.788

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method

Mean	0.0936
SD	0.0497
95% DL/2 (t) UCL	0.13

Maximum Likelihood Estimate(MLE) Method

Mean	0.0935
SD	0.0468
95% MLE (t) UCL	0.128
95% MLE (Tiku) UCL	0.128

Assuming Lognormal Distribution

DL/2 Substitution Method

Mean	-2.516
SD	0.631
95% H-Stat (DL/2) UCL	0.2

Log ROS Method

Mean in Log Scale	-2.465
SD in Log Scale	0.527
Mean in Original Scale	0.0951
SD in Original Scale	0.0474
95% t UCL	0.13
95% Percentile Bootstrap UCL	0.123
95% BCA Bootstrap UCL	0.127

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	3.941
Theta Star	0.0266
nu star	47.29

Data Distribution Test with Detected Values Only

Data appear Normal at 5% Significance Level

A-D Test Statistic	0.21
5% A-D Critical Value	0.698
K-S Test Statistic	0.698
5% K-S Critical Value	0.333

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	0.0412
Maximum	0.18
Mean	0.0959
Median	0.09
SD	0.0463
k star	3.044
Theta star	0.0315
Nu star	42.62
AppChi2	28.65
95% Gamma Approximate UCL	0.143
95% Adjusted Gamma UCL	0.162

Note: DL/2 is not a recommended method.

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	0.0986
SD	0.0398
SE of Mean	0.0165
95% KM (t) UCL	0.131
95% KM (z) UCL	0.126
95% KM (jackknife) UCL	0.13
95% KM (bootstrap t) UCL	0.144
95% KM (BCA) UCL	0.124
95% KM (Percentile Bootstrap) UCL	0.129
95% KM (Chebyshev) UCL	0.17
97.5% KM (Chebyshev) UCL	0.201
99% KM (Chebyshev) UCL	0.263

Potential UCLs to Use

95% KM (t) UCL	0.131
95% KM (Percentile Bootstrap) UCL	0.129

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Potassium

General Statistics

Number of Valid Observations 7

Number of Distinct Observations 7

Raw Statistics

Minimum	984
Maximum	1290
Mean	1093
Median	1070
SD	104.9
Coefficient of Variation	0.096
Skewness	1.223

Log-transformed Statistics

Minimum of Log Data	6.892
Maximum of Log Data	7.162
Mean of log Data	6.993
SD of log Data	0.0926

Warning: A sample size of 'n' = 7 may not adequate enough to compute meaningful and reliable test statistics and estimates!

It is suggested to collect at least 8 to 10 observations using these statistical methods!

If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Warning: There are only 7 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set,

the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.897
Shapiro Wilk Critical Value	0.803

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.917
Shapiro Wilk Critical Value	0.803

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	1170

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	1178
95% Modified-t UCL (Johnson-1978)	1174

Assuming Lognormal Distribution

95% H-UCL	N/A
95% Chebyshev (MVUE) UCL	1260
97.5% Chebyshev (MVUE) UCL	1332
99% Chebyshev (MVUE) UCL	1474

Gamma Distribution Test

k star (bias corrected)	76.09
Theta Star	14.37
MLE of Mean	1093
MLE of Standard Deviation	125.4
nu star	1065

Data Distribution

Data appear Normal at 5% Significance Level

Slugs

Approximate Chi Square Value (.05)	990.5
Adjusted Level of Significance	0.0158
Adjusted Chi Square Value	968.5
Anderson-Darling Test Statistic	0.374
Anderson-Darling 5% Critical Value	0.708
Kolmogorov-Smirnov Test Statistic	0.259
Kolmogorov-Smirnov 5% Critical Value	0.311

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	1176
95% Adjusted Gamma UCL	1203

Potential UCL to Use

Nonparametric Statistics

95% CLT UCL	1159
95% Jackknife UCL	1170
95% Standard Bootstrap UCL	1154
95% Bootstrap-t UCL	1249
95% Hall's Bootstrap UCL	1606
95% Percentile Bootstrap UCL	1159
95% BCA Bootstrap UCL	1171
95% Chebyshev(Mean, Sd) UCL	1266
97.5% Chebyshev(Mean, Sd) UCL	1341
99% Chebyshev(Mean, Sd) UCL	1488

Use 95% Student's-t UCL 1170

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Rubidium

General Statistics

Number of Valid Observations 7

Number of Distinct Observations 7

Raw Statistics

Minimum	8.69
Maximum	16.6
Mean	12.22
Median	13
SD	2.829
Coefficient of Variation	0.231
Skewness	0.226

Log-transformed Statistics

Minimum of Log Data	2.162
Maximum of Log Data	2.809
Mean of log Data	2.48
SD of log Data	0.234

Warning: A sample size of 'n' = 7 may not adequate enough to compute meaningful and reliable test statistics and estimates!

It is suggested to collect at least 8 to 10 observations using these statistical methods!

If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Warning: There are only 7 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set,

the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.933
Shapiro Wilk Critical Value	0.803

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.932
Shapiro Wilk Critical Value	0.803

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	14.3

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	14.08
95% Modified-t UCL (Johnson-1978)	14.31

Assuming Lognormal Distribution

95% H-UCL	14.94
95% Chebyshev (MVUE) UCL	16.95
97.5% Chebyshev (MVUE) UCL	18.99
99% Chebyshev (MVUE) UCL	23

Gamma Distribution Test

k star (bias corrected)	12.45
Theta Star	0.982
MLE of Mean	12.22
MLE of Standard Deviation	3.464
nu star	174.2

Data Distribution

Data appear Normal at 5% Significance Level

Slugs

Approximate Chi Square Value (.05)	144.7
Adjusted Level of Significance	0.0158
Adjusted Chi Square Value	136.6
Anderson-Darling Test Statistic	0.357
Anderson-Darling 5% Critical Value	0.707
Kolmogorov-Smirnov Test Statistic	0.225
Kolmogorov-Smirnov 5% Critical Value	0.311

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	14.71
95% Adjusted Gamma UCL	15.59

Nonparametric Statistics

95% CLT UCL	13.98
95% Jackknife UCL	14.3
95% Standard Bootstrap UCL	13.87
95% Bootstrap-t UCL	14.4
95% Hall's Bootstrap UCL	13.83
95% Percentile Bootstrap UCL	13.82
95% BCA Bootstrap UCL	13.86
95% Chebyshev(Mean, Sd) UCL	16.88
97.5% Chebyshev(Mean, Sd) UCL	18.9
99% Chebyshev(Mean, Sd) UCL	22.86

Potential UCL to Use

Use 95% Student's-t UCL 14.3

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Selenium

General Statistics

Number of Valid Observations 7

Number of Distinct Observations 7

Raw Statistics

Minimum	0.06
Maximum	0.48
Mean	0.181
Median	0.15
SD	0.14
Coefficient of Variation	0.77
Skewness	2.045

Log-transformed Statistics

Minimum of Log Data	-2.813
Maximum of Log Data	-0.734
Mean of log Data	-1.905
SD of log Data	0.652

Warning: A sample size of 'n' = 7 may not adequate enough to compute meaningful and reliable test statistics and estimates!

It is suggested to collect at least 8 to 10 observations using these statistical methods!

If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Warning: There are only 7 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set,

the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.771
Shapiro Wilk Critical Value	0.803

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.963
Shapiro Wilk Critical Value	0.803

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	0.284

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	0.312
95% Modified-t UCL (Johnson-1978)	0.291

Assuming Lognormal Distribution

95% H-UCL	0.387
95% Chebyshev (MVUE) UCL	0.37
97.5% Chebyshev (MVUE) UCL	0.453
99% Chebyshev (MVUE) UCL	0.617

Gamma Distribution Test

k star (bias corrected)	1.625
Theta Star	0.112
MLE of Mean	0.181
MLE of Standard Deviation	0.142
nu star	22.75

Data Distribution

Data appear Gamma Distributed at 5% Significance Level

Approximate Chi Square Value (.05)	12.9
Adjusted Level of Significance	0.0158
Adjusted Chi Square Value	10.73
Anderson-Darling Test Statistic	0.369
Anderson-Darling 5% Critical Value	0.713
Kolmogorov-Smirnov Test Statistic	0.214
Kolmogorov-Smirnov 5% Critical Value	0.314

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.32
95% Adjusted Gamma UCL	0.385

Potential UCL to Use

Use 95% Approximate Gamma UCL 0.32

Nonparametric Statistics

95% CLT UCL	0.268
95% Jackknife UCL	0.284
95% Standard Bootstrap UCL	0.26
95% Bootstrap-t UCL	0.407
95% Hall's Bootstrap UCL	0.653
95% Percentile Bootstrap UCL	0.267
95% BCA Bootstrap UCL	0.3
95% Chebyshev(Mean, Sd) UCL	0.412
97.5% Chebyshev(Mean, Sd) UCL	0.511
99% Chebyshev(Mean, Sd) UCL	0.707

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Observations 7

Number of Distinct Observations 7

Raw Statistics

Minimum	0.29
Maximum	9.74
Mean	2.747
Median	1.15
SD	3.433
Coefficient of Variation	1.25
Skewness	1.815

Log-transformed Statistics

Minimum of Log Data	-1.238
Maximum of Log Data	2.276
Mean of log Data	0.385
SD of log Data	1.207

Warning: A sample size of 'n' = 7 may not adequate enough to compute meaningful and reliable test statistics and estimates!

It is suggested to collect at least 8 to 10 observations using these statistical methods!

If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Warning: There are only 7 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set,

the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.748
Shapiro Wilk Critical Value	0.803

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.97
Shapiro Wilk Critical Value	0.803

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	5.269

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	5.833
95% Modified-t UCL (Johnson-1978)	5.417

Assuming Lognormal Distribution

95% H-UCL	25.32
95% Chebyshev (MVUE) UCL	7.844
97.5% Chebyshev (MVUE) UCL	10.1
99% Chebyshev (MVUE) UCL	14.53

Gamma Distribution Test

k star (bias corrected)	0.627
Theta Star	4.382
MLE of Mean	2.747
MLE of Standard Deviation	3.47
nu star	8.777

Data Distribution

Data appear Gamma Distributed at 5% Significance Level

Slugs

Approximate Chi Square Value (.05)	3.193
Adjusted Level of Significance	0.0158
Adjusted Chi Square Value	2.266
Anderson-Darling Test Statistic	0.381
Anderson-Darling 5% Critical Value	0.73
Kolmogorov-Smirnov Test Statistic	0.242
Kolmogorov-Smirnov 5% Critical Value	0.32

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	7.552
95% Adjusted Gamma UCL	10.64

Potential UCL to Use

Use 95% Approximate Gamma UCL 7.552

Nonparametric Statistics

95% CLT UCL	4.882
95% Jackknife UCL	5.269
95% Standard Bootstrap UCL	4.776
95% Bootstrap-t UCL	16.22
95% Hall's Bootstrap UCL	17.54
95% Percentile Bootstrap UCL	4.801
95% BCA Bootstrap UCL	5.406
95% Chebyshev(Mean, Sd) UCL	8.404
97.5% Chebyshev(Mean, Sd) UCL	10.85
99% Chebyshev(Mean, Sd) UCL	15.66

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Sodium

General Statistics

Number of Valid Observations 7

Number of Distinct Observations 7

Raw Statistics

Minimum	387
Maximum	529
Mean	454.1
Median	426
SD	54.57
Coefficient of Variation	0.12
Skewness	0.474

Log-transformed Statistics

Minimum of Log Data	5.958
Maximum of Log Data	6.271
Mean of log Data	6.112
SD of log Data	0.119

Warning: A sample size of 'n' = 7 may not adequate enough to compute meaningful and reliable test statistics and estimates!

It is suggested to collect at least 8 to 10 observations using these statistical methods!

If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Warning: There are only 7 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set,

the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.89
Shapiro Wilk Critical Value	0.803

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.901
Shapiro Wilk Critical Value	0.803

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL 494.2

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	492
95% Modified-t UCL (Johnson-1978)	494.8

Assuming Lognormal Distribution

95% H-UCL	498.3
95% Chebyshev (MVUE) UCL	542.9
97.5% Chebyshev (MVUE) UCL	581.3
99% Chebyshev (MVUE) UCL	656.7

Gamma Distribution Test

k star (bias corrected)	47.19
Theta Star	9.625
MLE of Mean	454.1
MLE of Standard Deviation	66.11
nu star	660.6

Data Distribution

Data appear Normal at 5% Significance Level

Slugs

Approximate Chi Square Value (.05)	602
Adjusted Level of Significance	0.0158
Adjusted Chi Square Value	584.9
Anderson-Darling Test Statistic	0.456
Anderson-Darling 5% Critical Value	0.708
Kolmogorov-Smirnov Test Statistic	0.276
Kolmogorov-Smirnov 5% Critical Value	0.311

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	498.4
95% Adjusted Gamma UCL	512.9

Nonparametric Statistics

95% CLT UCL	488.1
95% Jackknife UCL	494.2
95% Standard Bootstrap UCL	485
95% Bootstrap-t UCL	517.7
95% Hall's Bootstrap UCL	498
95% Percentile Bootstrap UCL	488
95% BCA Bootstrap UCL	488.9
95% Chebyshev(Mean, Sd) UCL	544
97.5% Chebyshev(Mean, Sd) UCL	582.9
99% Chebyshev(Mean, Sd) UCL	659.4

Potential UCL to Use

Use 95% Student's-t UCL 494.2

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Strontium

General Statistics

Number of Valid Observations 7

Number of Distinct Observations 6

Raw Statistics

Minimum	7.42
Maximum	17.6
Mean	11.29
Median	10.7
SD	3.232
Coefficient of Variation	0.286
Skewness	1.234

Log-transformed Statistics

Minimum of Log Data	2.004
Maximum of Log Data	2.868
Mean of log Data	2.391
SD of log Data	0.271

Warning: A sample size of 'n' = 7 may not adequate enough to compute meaningful and reliable test statistics and estimates!

It is suggested to collect at least 8 to 10 observations using these statistical methods!

If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Warning: There are only 7 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set,

the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.899
Shapiro Wilk Critical Value	0.803

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.955
Shapiro Wilk Critical Value	0.803

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL 13.66

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	13.91
95% Modified-t UCL (Johnson-1978)	13.76

Assuming Lognormal Distribution

95% H-UCL	14.36
95% Chebyshev (MVUE) UCL	16.32
97.5% Chebyshev (MVUE) UCL	18.5
99% Chebyshev (MVUE) UCL	22.79

Gamma Distribution Test

k star (bias corrected)	8.999
Theta Star	1.254
MLE of Mean	11.29
MLE of Standard Deviation	3.763
nu star	126

Data Distribution

Data appear Normal at 5% Significance Level

Slugs

Approximate Chi Square Value (.05)	101.1
Adjusted Level of Significance	0.0158
Adjusted Chi Square Value	94.32
Anderson-Darling Test Statistic	0.314
Anderson-Darling 5% Critical Value	0.707
Kolmogorov-Smirnov Test Statistic	0.204
Kolmogorov-Smirnov 5% Critical Value	0.312

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	14.07
95% Adjusted Gamma UCL	15.08

Nonparametric Statistics

95% CLT UCL	13.3
95% Jackknife UCL	13.66
95% Standard Bootstrap UCL	13.13
95% Bootstrap-t UCL	14.52
95% Hall's Bootstrap UCL	23.83
95% Percentile Bootstrap UCL	13.27
95% BCA Bootstrap UCL	13.64
95% Chebyshev(Mean, Sd) UCL	16.61
97.5% Chebyshev(Mean, Sd) UCL	18.92
99% Chebyshev(Mean, Sd) UCL	23.44

Potential UCL to Use

Use 95% Student's-t UCL 13.66

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Tellurium

General Statistics

Number of Valid Data	7	Number of Detected Data	0
Number of Distinct Detected Data	0	Number of Non-Detect Data	7
		Percent Non-Detects	100.00%

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Tellurium was not processed!

Thallium

General Statistics

Number of Valid Observations 7

Number of Distinct Observations 7

Raw Statistics

Minimum	0.004
Maximum	0.066
Mean	0.0274
Median	0.015
SD	0.0255
Coefficient of Variation	0.929
Skewness	0.921

Log-transformed Statistics

Minimum of Log Data	-5.521
Maximum of Log Data	-2.718
Mean of log Data	-4.024
SD of log Data	1.043

Warning: A sample size of 'n' = 7 may not adequate enough to compute meaningful and reliable test statistics and estimates!

It is suggested to collect at least 8 to 10 observations using these statistical methods!

If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Warning: There are only 7 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set,

the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.827
Shapiro Wilk Critical Value	0.803

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.949
Shapiro Wilk Critical Value	0.803

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	0.0462

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	0.0469
95% Modified-t UCL (Johnson-1978)	0.0467

Assuming Lognormal Distribution

95% H-UCL	0.157
95% Chebyshev (MVUE) UCL	0.0758
97.5% Chebyshev (MVUE) UCL	0.0965
99% Chebyshev (MVUE) UCL	0.137

Gamma Distribution Test

k star (bias corrected)	0.844
Theta Star	0.0325
MLE of Mean	0.0274
MLE of Standard Deviation	0.0299
nu star	11.82

Data Distribution

Data appear Normal at 5% Significance Level

Slugs

Approximate Chi Square Value (.05)	5.109
Adjusted Level of Significance	0.0158
Adjusted Chi Square Value	3.861
Anderson-Darling Test Statistic	0.33
Anderson-Darling 5% Critical Value	0.724
Kolmogorov-Smirnov Test Statistic	0.198
Kolmogorov-Smirnov 5% Critical Value	0.318

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.0635
95% Adjusted Gamma UCL	0.084

Nonparametric Statistics

95% CLT UCL	0.0433
95% Jackknife UCL	0.0462
95% Standard Bootstrap UCL	0.0421
95% Bootstrap-t UCL	0.0741
95% Hall's Bootstrap UCL	0.0623
95% Percentile Bootstrap UCL	0.0427
95% BCA Bootstrap UCL	0.0446
95% Chebyshev(Mean, Sd) UCL	0.0694
97.5% Chebyshev(Mean, Sd) UCL	0.0876
99% Chebyshev(Mean, Sd) UCL	0.123

Potential UCL to Use

Use 95% Student's-t UCL 0.0462

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Tin

General Statistics

Number of Valid Data	7	Number of Detected Data	0
Number of Distinct Detected Data	0	Number of Non-Detect Data	7
		Percent Non-Detects	100.00%

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Tin was not processed!

Tungsten

General Statistics

Number of Valid Data	7	Number of Detected Data	1
Number of Distinct Detected Data	1	Number of Non-Detect Data	6
		Percent Non-Detects	85.71%

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Tungsten was not processed!

Uranium

General Statistics

Number of Valid Data	7	Number of Detected Data	0
Number of Distinct Detected Data	0	Number of Non-Detect Data	7
		Percent Non-Detects	100.00%

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!

Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Uranium was not processed!

Vanadium

General Statistics

Number of Valid Data	7	Number of Detected Data	2
Number of Distinct Detected Data	2	Number of Non-Detect Data	5
		Percent Non-Detects	71.43%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.01	Minimum Detected	-4.605
Maximum Detected	0.02	Maximum Detected	-3.912
Mean of Detected	0.015	Mean of Detected	-4.259
SD of Detected	0.00707	SD of Detected	0.49
Minimum Non-Detect	0.01	Minimum Non-Detect	-4.605
Maximum Non-Detect	0.01	Maximum Non-Detect	-4.605

Warning: Data set has only 2 Distinct Detected Values.

This may not be adequate enough to compute meaningful and reliable test statistics and estimates.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	N/A	Shapiro Wilk Test Statistic	N/A
5% Shapiro Wilk Critical Value	N/A	5% Shapiro Wilk Critical Value	N/A
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.00786	Mean	-5.001
SD	0.00567	SD	0.545
95% DL/2 (t) UCL	0.012	95% H-Stat (DL/2) UCL	0.0138
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	N/A
		SD in Log Scale	N/A
		Mean in Original Scale	N/A
		SD in Original Scale	N/A
		95% t UCL	N/A
		95% Percentile Bootstrap UCL	N/A
		95% BCA Bootstrap UCL	N/A

Gamma Distribution Test with Detected Values Only	
k star (bias corrected)	N/A
Theta Star	N/A
nu star	N/A
A-D Test Statistic	N/A
5% A-D Critical Value	N/A
K-S Test Statistic	N/A
5% K-S Critical Value	N/A

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	N/A
Maximum	N/A
Mean	N/A
Median	N/A
SD	N/A
k star	N/A
Theta star	N/A
Nu star	N/A
AppChi2	N/A
95% Gamma Approximate UCL	N/A
95% Adjusted Gamma UCL	N/A

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only

Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	0.0114
SD	0.0035
SE of Mean	0.00187
95% KM (t) UCL	0.0151
95% KM (z) UCL	0.0145
95% KM (jackknife) UCL	N/A
95% KM (bootstrap t) UCL	N/A
95% KM (BCA) UCL	N/A
95% KM (Percentile Bootstrap) UCL	N/A
95% KM (Chebyshev) UCL	0.0196
97.5% KM (Chebyshev) UCL	0.0231
99% KM (Chebyshev) UCL	0.03

Potential UCLs to Use

95% KM (t) UCL	0.0151
95% KM (% Bootstrap) UCL	N/A

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Zinc

General Statistics

Number of Valid Observations 7

Number of Distinct Observations 7

Raw Statistics

Minimum	45.5
Maximum	218
Mean	84.86
Median	69.1
SD	59.9
Coefficient of Variation	0.706
Skewness	2.423

Log-transformed Statistics

Minimum of Log Data	3.818
Maximum of Log Data	5.384
Mean of log Data	4.299
SD of log Data	0.521

Warning: A sample size of 'n' = 7 may not adequate enough to compute meaningful and reliable test statistics and estimates!

It is suggested to collect at least 8 to 10 observations using these statistical methods!

If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Warning: There are only 7 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set,

the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.633
Shapiro Wilk Critical Value	0.803

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.783
Shapiro Wilk Critical Value	0.803

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	128.9

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	144.3
95% Modified-t UCL (Johnson-1978)	132.3

Assuming Lognormal Distribution

95% H-UCL	143.6
95% Chebyshev (MVUE) UCL	153.7
97.5% Chebyshev (MVUE) UCL	184.5
99% Chebyshev (MVUE) UCL	245

Gamma Distribution Test

k star (bias corrected)	2.196
Theta Star	38.64
MLE of Mean	84.86
MLE of Standard Deviation	57.26
nu star	30.74

Data Distribution

Data do not follow a Discernable Distribution (0.05)

Slugs

Approximate Chi Square Value (.05)	19.08
Adjusted Level of Significance	0.0158
Adjusted Chi Square Value	16.37
Anderson-Darling Test Statistic	0.946
Anderson-Darling 5% Critical Value	0.71
Kolmogorov-Smirnov Test Statistic	0.379
Kolmogorov-Smirnov 5% Critical Value	0.313

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	136.7
95% Adjusted Gamma UCL	159.4

Nonparametric Statistics

95% CLT UCL	122.1
95% Jackknife UCL	128.9
95% Standard Bootstrap UCL	118.6
95% Bootstrap-t UCL	216.3
95% Hall's Bootstrap UCL	321.6
95% Percentile Bootstrap UCL	126.3
95% BCA Bootstrap UCL	144.5
95% Chebyshev(Mean, Sd) UCL	183.5
97.5% Chebyshev(Mean, Sd) UCL	226.3
99% Chebyshev(Mean, Sd) UCL	310.1

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 183.5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

ProUCL Outputs: Earthworms

General UCL Statistics for Data Sets with Non-Detects

User Selected Options	
From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Aluminum

General Statistics

Number of Valid Observations	2	Number of Distinct Observations	2

Warning: This data set only has 2 observations!

Data set is too small to compute reliable and meaningful statistics and estimates!

The data set for variable Aluminum was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!

If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Antimony

General Statistics

Number of Valid Observations	2	Number of Distinct Observations	2

Warning: This data set only has 2 observations!

Data set is too small to compute reliable and meaningful statistics and estimates!

The data set for variable Antimony was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!

If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Arsenic

General Statistics

Number of Valid Observations	2	Number of Distinct Observations	2

Warning: This data set only has 2 observations!

Data set is too small to compute reliable and meaningful statistics and estimates!

The data set for variable Arsenic was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!

If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

	A	B	C	D	E	F	G	H	I	J	K	L
53												
54												
55												
56	**Barium**											
57												
58						**General Statistics**							
59					Number of Valid Observations	2			Number of Distinct Observations	2		
60												
61												
62						**Warning: This data set only has 2 observations!**							
63						**Data set is too small to compute reliable and meaningful statistics and estimates!**						
64						**The data set for variable Barium was not processed!**						
65												
66						**It is suggested to collect at least 8 to 10 observations before using these statistical methods!**						
67						**If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.**						
68												
69												
70												
71	**Beryllium**											
72												
73						**General Statistics**							
74					Number of Valid Observations	2			Number of Distinct Observations	2		
75												
76												
77						**Warning: This data set only has 2 observations!**							
78						**Data set is too small to compute reliable and meaningful statistics and estimates!**						
79						**The data set for variable Beryllium was not processed!**						
80												
81						**It is suggested to collect at least 8 to 10 observations before using these statistical methods!**						
82						**If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.**						
83												
84												
85												
86	**Bismuth**											
87												
88						**General Statistics**							
89					Number of Valid Data	2			Number of Detected Data	1		
90					Number of Distinct Detected Data	1			Number of Non-Detect Data	1		
91									Percent Non-Detects	50.00%		
92												
93						**Warning: This data set only has 2 observations!**							
94						**Data set is too small to compute reliable and meaningful statistics and estimates!**						
95						**The data set for variable Bismuth was not processed!**						
96												
97						**It is suggested to collect at least 8 to 10 observations before using these statistical methods!**						
98						**If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.**						
99												
100												
101												
102	**Boron**											
103												
104						**General Statistics**							

105				Number of Valid Data	2				Number of Detected Data	1		
106				Number of Distinct Detected Data	1				Number of Non-Detect Data	1		
107									Percent Non-Detects	50.00%		
108												
109												
110												
111												
112												
113												
114												
115												
116												
117												
118	Cadmium											
119												
120												
121				Number of Valid Observations	2				Number of Distinct Observations	2		
122												
123												
124												
125												
126												
127												
128												
129												
130												
131												
132												
133	Calcium											
134												
135												
136				Number of Valid Observations	2				Number of Distinct Observations	2		
137												
138												
139												
140												
141												
142												
143												
144												
145												
146												
147												
148	Chromium											
149												
150												
151				Number of Valid Observations	2				Number of Distinct Observations	2		
152												
153												
154												
155												
156												

Warning: This data set only has 2 observations!

Data set is too small to compute reliable and meaningful statistics and estimates!

The data set for variable Boron was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!

If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

General Statistics

Warning: This data set only has 2 observations!

Data set is too small to compute reliable and meaningful statistics and estimates!

The data set for variable Cadmium was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!

If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

General Statistics

Warning: This data set only has 2 observations!

Data set is too small to compute reliable and meaningful statistics and estimates!

The data set for variable Calcium was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!

If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

General Statistics

Warning: This data set only has 2 observations!

Data set is too small to compute reliable and meaningful statistics and estimates!

The data set for variable Chromium was not processed!

	A	B	C	D	E	F	G	H	I	J	K	L
157												
158	It is suggested to collect at least 8 to 10 observations before using these statistical methods!											
159	If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.											
160												
161												
162												
163	Cobalt											
164												
165	General Statistics											
166	Number of Valid Observations	2					Number of Distinct Observations	2				
167												
168												
169	Warning: This data set only has 2 observations!											
170	Data set is too small to compute reliable and meaningful statistics and estimates!											
171	The data set for variable Cobalt was not processed!											
172												
173	It is suggested to collect at least 8 to 10 observations before using these statistical methods!											
174	If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.											
175												
176												
177												
178	Copper											
179												
180	General Statistics											
181	Number of Valid Observations	2					Number of Distinct Observations	2				
182												
183												
184	Warning: This data set only has 2 observations!											
185	Data set is too small to compute reliable and meaningful statistics and estimates!											
186	The data set for variable Copper was not processed!											
187												
188	It is suggested to collect at least 8 to 10 observations before using these statistical methods!											
189	If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.											
190												
191												
192												
193	Iron											
194												
195	General Statistics											
196	Number of Valid Observations	2					Number of Distinct Observations	2				
197												
198												
199	Warning: This data set only has 2 observations!											
200	Data set is too small to compute reliable and meaningful statistics and estimates!											
201	The data set for variable Iron was not processed!											
202												
203	It is suggested to collect at least 8 to 10 observations before using these statistical methods!											
204	If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.											
205												
206												
207												
208	Lead											

	A	B	C	D	E	F	G	H	I	J	K	L
209												
210	General Statistics											
211	Number of Valid Observations					2	Number of Distinct Observations					2
212												
213												
214	Warning: This data set only has 2 observations!											
215	Data set is too small to compute reliable and meaningful statistics and estimates!											
216	The data set for variable Lead was not processed!											
217												
218	It is suggested to collect at least 8 to 10 observations before using these statistical methods!											
219	If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.											
220												
221												
222												
223	Lithium											
224												
225	General Statistics											
226	Number of Valid Observations					2	Number of Distinct Observations					2
227												
228												
229	Warning: This data set only has 2 observations!											
230	Data set is too small to compute reliable and meaningful statistics and estimates!											
231	The data set for variable Lithium was not processed!											
232												
233	It is suggested to collect at least 8 to 10 observations before using these statistical methods!											
234	If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.											
235												
236												
237												
238	Magnesium											
239												
240	General Statistics											
241	Number of Valid Observations					2	Number of Distinct Observations					2
242												
243												
244	Warning: This data set only has 2 observations!											
245	Data set is too small to compute reliable and meaningful statistics and estimates!											
246	The data set for variable Magnesium was not processed!											
247												
248	It is suggested to collect at least 8 to 10 observations before using these statistical methods!											
249	If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.											
250												
251												
252												
253	Manganese											
254												
255	General Statistics											
256	Number of Valid Observations					2	Number of Distinct Observations					2
257												
258												
259	Warning: This data set only has 2 observations!											
260	Data set is too small to compute reliable and meaningful statistics and estimates!											

	A	B	C	D	E	F	G	H	I	J	K	L
261	The data set for variable Manganese was not processed!											
262												
263	It is suggested to collect at least 8 to 10 observations before using these statistical methods!											
264	If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.											
265												
266												
267												
268	**Mercury**											
269												
270	General Statistics											
271	Number of Valid Observations	2					Number of Distinct Observations	2				
272												
273												
274	Warning: This data set only has 2 observations!											
275	Data set is too small to compute reliable and meaningful statistics and estimates!											
276	The data set for variable Mercury was not processed!											
277												
278	It is suggested to collect at least 8 to 10 observations before using these statistical methods!											
279	If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.											
280												
281												
282												
283	**Molybdenum**											
284												
285	General Statistics											
286	Number of Valid Observations	2					Number of Distinct Observations	2				
287												
288												
289	Warning: This data set only has 2 observations!											
290	Data set is too small to compute reliable and meaningful statistics and estimates!											
291	The data set for variable Molybdenum was not processed!											
292												
293	It is suggested to collect at least 8 to 10 observations before using these statistical methods!											
294	If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.											
295												
296												
297												
298	**Nickel**											
299												
300	General Statistics											
301	Number of Valid Observations	2					Number of Distinct Observations	2				
302												
303												
304	Warning: This data set only has 2 observations!											
305	Data set is too small to compute reliable and meaningful statistics and estimates!											
306	The data set for variable Nickel was not processed!											
307												
308	It is suggested to collect at least 8 to 10 observations before using these statistical methods!											
309	If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.											
310												
311												
312												

	A	B	C	D	E	F	G	H	I	J	K	L
313	**Potassium**											
314												
315						**General Statistics**						
316					Number of Valid Observations	2				Number of Distinct Observations	2	
317												
318												
319						**Warning: This data set only has 2 observations!**						
320						**Data set is too small to compute reliable and meaningful statistics and estimates!**						
321						**The data set for variable Potassium was not processed!**						
322												
323						**It is suggested to collect at least 8 to 10 observations before using these statistical methods!**						
324						**If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.**						
325												
326												
327												
328	**Rubidium**											
329												
330						**General Statistics**						
331					Number of Valid Observations	2				Number of Distinct Observations	2	
332												
333												
334						**Warning: This data set only has 2 observations!**						
335						**Data set is too small to compute reliable and meaningful statistics and estimates!**						
336						**The data set for variable Rubidium was not processed!**						
337												
338						**It is suggested to collect at least 8 to 10 observations before using these statistical methods!**						
339						**If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.**						
340												
341												
342												
343	**Selenium**											
344												
345						**General Statistics**						
346					Number of Valid Observations	2				Number of Distinct Observations	2	
347												
348												
349						**Warning: This data set only has 2 observations!**						
350						**Data set is too small to compute reliable and meaningful statistics and estimates!**						
351						**The data set for variable Selenium was not processed!**						
352												
353						**It is suggested to collect at least 8 to 10 observations before using these statistical methods!**						
354						**If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.**						
355												
356												
357												
358	**Silver**											
359												
360						**General Statistics**						
361					Number of Valid Observations	2				Number of Distinct Observations	2	
362												
363												
364						**Warning: This data set only has 2 observations!**						

	A	B	C	D	E	F	G	H	I	J	K	L
365	Data set is too small to compute reliable and meaningful statistics and estimates!											
366	The data set for variable Silver was not processed!											
367												
368	It is suggested to collect at least 8 to 10 observations before using these statistical methods!											
369	If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.											
370												
371												
372												
373	Sodium											
374												
375	General Statistics											
376					Number of Valid Observations	2			Number of Distinct Observations	2		
377												
378												
379	Warning: This data set only has 2 observations!											
380	Data set is too small to compute reliable and meaningful statistics and estimates!											
381	The data set for variable Sodium was not processed!											
382												
383	It is suggested to collect at least 8 to 10 observations before using these statistical methods!											
384	If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.											
385												
386												
387												
388	Strontium											
389												
390	General Statistics											
391					Number of Valid Observations	2			Number of Distinct Observations	2		
392												
393												
394	Warning: This data set only has 2 observations!											
395	Data set is too small to compute reliable and meaningful statistics and estimates!											
396	The data set for variable Strontium was not processed!											
397												
398	It is suggested to collect at least 8 to 10 observations before using these statistical methods!											
399	If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.											
400												
401												
402												
403	Tellurium											
404												
405	General Statistics											
406					Number of Valid Observations	2			Number of Distinct Observations	2		
407												
408												
409	Warning: This data set only has 2 observations!											
410	Data set is too small to compute reliable and meaningful statistics and estimates!											
411	The data set for variable Tellurium was not processed!											
412												
413	It is suggested to collect at least 8 to 10 observations before using these statistical methods!											
414	If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.											
415												
416												

	A	B	C	D	E	F	G	H	I	J	K	L
417												
418	**Thallium**											
419												
420						**General Statistics**							
421					Number of Valid Observations	2				Number of Distinct Observations	2	
422												
423												
424						**Warning: This data set only has 2 observations!**							
425						**Data set is too small to compute reliable and meaningful statistics and estimates!**							
426						**The data set for variable Thallium was not processed!**							
427												
428						**It is suggested to collect at least 8 to 10 observations before using these statistical methods!**							
429						**If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.**							
430												
431												
432												
433	**Tin**											
434												
435						**General Statistics**							
436					Number of Valid Observations	2				Number of Distinct Observations	2	
437												
438												
439						**Warning: This data set only has 2 observations!**							
440						**Data set is too small to compute reliable and meaningful statistics and estimates!**							
441						**The data set for variable Tin was not processed!**							
442												
443						**It is suggested to collect at least 8 to 10 observations before using these statistical methods!**							
444						**If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.**							
445												
446												
447												
448	**Tungsten**											
449												
450						**General Statistics**							
451					Number of Valid Observations	2				Number of Distinct Observations	2	
452												
453												
454						**Warning: This data set only has 2 observations!**							
455						**Data set is too small to compute reliable and meaningful statistics and estimates!**							
456						**The data set for variable Tungsten was not processed!**							
457												
458						**It is suggested to collect at least 8 to 10 observations before using these statistical methods!**							
459						**If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.**							
460												
461												
462												
463	**Uranium**											
464												
465						**General Statistics**							
466					Number of Valid Observations	2				Number of Distinct Observations	2	
467												
468												

	A	B	C	D	E	F	G	H	I	J	K	L
469	Warning: This data set only has 2 observations!											
470	Data set is too small to compute reliable and meaningful statistics and estimates!											
471	The data set for variable Uranium was not processed!											
472												
473	It is suggested to collect at least 8 to 10 observations before using these statistical methods!											
474	If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.											
475												
476												
477												
478	Vanadium											
479												
480	General Statistics											
481	Number of Valid Observations	2					Number of Distinct Observations	2				
482												
483												
484	Warning: This data set only has 2 observations!											
485	Data set is too small to compute reliable and meaningful statistics and estimates!											
486	The data set for variable Vanadium was not processed!											
487												
488	It is suggested to collect at least 8 to 10 observations before using these statistical methods!											
489	If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.											
490												
491												
492												
493	Zinc											
494												
495	General Statistics											
496	Number of Valid Observations	2					Number of Distinct Observations	2				
497												
498												
499	Warning: This data set only has 2 observations!											
500	Data set is too small to compute reliable and meaningful statistics and estimates!											
501	The data set for variable Zinc was not processed!											
502												
503	It is suggested to collect at least 8 to 10 observations before using these statistical methods!											
504	If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.											
505												
506												

ProUCL Outputs: Berries

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	U:\121810356\1_environmental\4_field_data\3_hhera\6_reporting\berries.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Aluminum mg/kg

General Statistics

Number of Valid Observations	9	Number of Distinct Observations	9

Raw Statistics

Minimum	2.6
Maximum	68.2
Mean	13.21
Median	6
SD	20.9
Coefficient of Variation	1.582
Skewness	2.853

Log-transformed Statistics

Minimum of Log Data	0.956
Maximum of Log Data	4.222
Mean of log Data	1.998
SD of log Data	0.969

Warning: There are only 9 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.528
Shapiro Wilk Critical Value	0.829

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.848
Shapiro Wilk Critical Value	0.829

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	26.17

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	31.75
95% Modified-t UCL (Johnson-1978)	27.27

Assuming Lognormal Distribution

95% H-UCL	34.95
95% Chebyshev (MVUE) UCL	27.07
97.5% Chebyshev (MVUE) UCL	34.02
99% Chebyshev (MVUE) UCL	47.67

Gamma Distribution Test

k star (bias corrected)	0.735
Theta Star	17.98
MLE of Mean	13.21
MLE of Standard Deviation	15.41
nu star	13.23

Data Distribution

Data appear Lognormal at 5% Significance Level

Approximate Chi Square Value (.05)	6.045
Adjusted Level of Significance	0.0231
Adjusted Chi Square Value	5.058
Anderson-Darling Test Statistic	1.127
Anderson-Darling 5% Critical Value	0.744
Kolmogorov-Smirnov Test Statistic	0.31
Kolmogorov-Smirnov 5% Critical Value	0.287

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	28.91
95% Adjusted Gamma UCL	34.54

Nonparametric Statistics

95% CLT UCL	24.67
95% Jackknife UCL	26.17
95% Standard Bootstrap UCL	24.22
95% Bootstrap-t UCL	110.9
95% Hall's Bootstrap UCL	82.62
95% Percentile Bootstrap UCL	26.54
95% BCA Bootstrap UCL	32.99
95% Chebyshev(Mean, Sd) UCL	43.58
97.5% Chebyshev(Mean, Sd) UCL	56.73
99% Chebyshev(Mean, Sd) UCL	82.54

Potential UCL to Use Use 95% H-UCL 34.95

ProUCL computes and outputs H-statistic based UCLs for historical reasons only.
H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.
It is therefore recommended to avoid the use of H-statistic based 95% UCLs.
Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Antimony mg/kg

General Statistics

Number of Valid Data	9	Number of Detected Data	0
Number of Distinct Detected Data	0	Number of Non-Detect Data	9
		Percent Non-Detects	100.00%

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!

Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Antimony mg/kg was not processed!

Arsenic mg/kg

General Statistics

Number of Valid Data	9	Number of Detected Data	1
Number of Distinct Detected Data	1	Number of Non-Detect Data	8
		Percent Non-Detects	88.89%

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Arsenic mg/kg was not processed!

Barium mg/kg

General Statistics

Number of Valid Observations 9

Number of Distinct Observations 9

Raw Statistics

Minimum	3.28
Maximum	20.9
Mean	7.978
Median	4.9
SD	7.11
Coefficient of Variation	0.891
Skewness	1.522

Log-transformed Statistics

Minimum of Log Data	1.188
Maximum of Log Data	3.04
Mean of log Data	1.803
SD of log Data	0.726

Warning: There are only 9 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.67
Shapiro Wilk Critical Value	0.829

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.786
Shapiro Wilk Critical Value	0.829

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	12.38

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	13.16
95% Modified-t UCL (Johnson-1978)	12.59

Assuming Lognormal Distribution

95% H-UCL	15.66
95% Chebyshev (MVUE) UCL	15.88
97.5% Chebyshev (MVUE) UCL	19.45
99% Chebyshev (MVUE) UCL	26.47

Gamma Distribution Test

k star (bias corrected)	1.394
Theta Star	5.724
MLE of Mean	7.978
MLE of Standard Deviation	6.758
nu star	25.09
Approximate Chi Square Value (.05)	14.68
Adjusted Level of Significance	0.0231
Adjusted Chi Square Value	13.03
Anderson-Darling Test Statistic	1.112
Anderson-Darling 5% Critical Value	0.73
Kolmogorov-Smirnov Test Statistic	0.313
Kolmogorov-Smirnov 5% Critical Value	0.283

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	13.64
95% Adjusted Gamma UCL	15.36

Data Distribution

Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

95% CLT UCL	11.88
95% Jackknife UCL	12.38
95% Standard Bootstrap UCL	11.68
95% Bootstrap-t UCL	29.55
95% Hall's Bootstrap UCL	36.76
95% Percentile Bootstrap UCL	11.77
95% BCA Bootstrap UCL	13.19
95% Chebyshev(Mean, Sd) UCL	18.31
97.5% Chebyshev(Mean, Sd) UCL	22.78
99% Chebyshev(Mean, Sd) UCL	31.56

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 18.31

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Beryllium mg/kg

General Statistics

Number of Valid Data	9	Number of Detected Data	1
Number of Distinct Detected Data	1	Number of Non-Detect Data	8
		Percent Non-Detects	88.89%

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Beryllium mg/kg was not processed!

Bismuth mg/kg

General Statistics

Number of Valid Data	9	Number of Detected Data	0
Number of Distinct Detected Data	0	Number of Non-Detect Data	9
		Percent Non-Detects	100.00%

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!

Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Bismuth mg/kg was not processed!

Boron mg/kg

General Statistics

Number of Valid Observations	9	Number of Distinct Observations	6

Raw Statistics

Minimum	0.9
Maximum	2
Mean	1.511
Median	1.7
SD	0.408
Coefficient of Variation	0.27
Skewness	-0.331

Log-transformed Statistics

Minimum of Log Data	-0.105
Maximum of Log Data	0.693
Mean of log Data	0.377
SD of log Data	0.293

Warning: There are only 9 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.909
Shapiro Wilk Critical Value	0.829

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.893
Shapiro Wilk Critical Value	0.829

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	1.764

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	1.719
95% Modified-t UCL (Johnson-1978)	1.761

Assuming Lognormal Distribution

95% H-UCL	1.872
95% Chebyshev (MVUE) UCL	2.161
97.5% Chebyshev (MVUE) UCL	2.441
99% Chebyshev (MVUE) UCL	2.991

Gamma Distribution Test

k star (bias corrected)	9.443
Theta Star	0.16
MLE of Mean	1.511
MLE of Standard Deviation	0.492
nu star	170
Approximate Chi Square Value (.05)	140.8
Adjusted Level of Significance	0.0231
Adjusted Chi Square Value	135.2
Anderson-Darling Test Statistic	0.458
Anderson-Darling 5% Critical Value	0.721
Kolmogorov-Smirnov Test Statistic	0.26
Kolmogorov-Smirnov 5% Critical Value	0.279

Data appear Gamma Distributed at 5% Significance Level

Data Distribution

Data appear Normal at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	1.824
95% Adjusted Gamma UCL	1.899

Nonparametric Statistics

95% CLT UCL	1.735
95% Jackknife UCL	1.764
95% Standard Bootstrap UCL	1.721
95% Bootstrap-t UCL	1.749
95% Hall's Bootstrap UCL	1.705
95% Percentile Bootstrap UCL	1.722
95% BCA Bootstrap UCL	1.711
95% Chebyshev(Mean, Sd) UCL	2.103
97.5% Chebyshev(Mean, Sd) UCL	2.36
99% Chebyshev(Mean, Sd) UCL	2.863

Potential UCL to Use	Use 95% Student's-t UCL 1.764

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cadmium mg/kg

General Statistics

Number of Valid Observations 9

Number of Distinct Observations 8

Raw Statistics

Minimum	0.004
Maximum	0.413
Mean	0.0748
Median	0.012
SD	0.14
Coefficient of Variation	1.874
Skewness	2.236

Log-transformed Statistics

Minimum of Log Data	-5.521
Maximum of Log Data	-0.884
Mean of log Data	-3.933
SD of log Data	1.576

Warning: There are only 9 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.581
Shapiro Wilk Critical Value	0.829

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.797
Shapiro Wilk Critical Value	0.829

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	0.162

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	0.189
95% Modified-t UCL (Johnson-1978)	0.167

Assuming Lognormal Distribution

95% H-UCL	0.897
95% Chebyshev (MVUE) UCL	0.18
97.5% Chebyshev (MVUE) UCL	0.234
99% Chebyshev (MVUE) UCL	0.341

Gamma Distribution Test

k star (bias corrected)	0.392
Theta Star	0.191
MLE of Mean	0.0748
MLE of Standard Deviation	0.119
nu star	7.062
Approximate Chi Square Value (.05)	2.205
Adjusted Level of Significance	0.0231
Adjusted Chi Square Value	1.678
Anderson-Darling Test Statistic	1.356
Anderson-Darling 5% Critical Value	0.775
Kolmogorov-Smirnov Test Statistic	0.41
Kolmogorov-Smirnov 5% Critical Value	0.295

Data not Gamma Distributed at 5% Significance Level

Data Distribution

Data do not follow a Discernable Distribution (0.05)

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.24
95% Adjusted Gamma UCL	0.315

Nonparametric Statistics

95% CLT UCL	0.152
95% Jackknife UCL	0.162
95% Standard Bootstrap UCL	0.146
95% Bootstrap-t UCL	2.53
95% Hall's Bootstrap UCL	1.249
95% Percentile Bootstrap UCL	0.159
95% BCA Bootstrap UCL	0.19
95% Chebyshev(Mean, Sd) UCL	0.278
97.5% Chebyshev(Mean, Sd) UCL	0.367
99% Chebyshev(Mean, Sd) UCL	0.54

Potential UCL to Use Use 95% Hall's Bootstrap UCL 1.249

Recommended UCL exceeds the maximum observation

In Case Bootstrap t and/or Hall's Bootstrap yields an unreasonably large UCL value, use 97.5% or 99% Chebyshev (Mean, Sd) UCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Calcium mg/kg

General Statistics

Number of Valid Observations 9

Number of Distinct Observations 9

Raw Statistics

Minimum	684
Maximum	1610
Mean	918.1
Median	863
SD	266.8
Coefficient of Variation	0.291
Skewness	2.666

Log-transformed Statistics

Minimum of Log Data	6.528
Maximum of Log Data	7.384
Mean of log Data	6.794
SD of log Data	0.235

Warning: There are only 9 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.603
Shapiro Wilk Critical Value	0.829

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.69
Shapiro Wilk Critical Value	0.829

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	1083

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	1149
95% Modified-t UCL (Johnson-1978)	1097

Assuming Lognormal Distribution

95% H-UCL	1078
95% Chebyshev (MVUE) UCL	1228
97.5% Chebyshev (MVUE) UCL	1364
99% Chebyshev (MVUE) UCL	1631

Gamma Distribution Test

k star (bias corrected)	11.99
Theta Star	76.59
MLE of Mean	918.1
MLE of Standard Deviation	265.2
nu star	215.8
Approximate Chi Square Value (.05)	182.8
Adjusted Level of Significance	0.0231
Adjusted Chi Square Value	176.4
Anderson-Darling Test Statistic	1.486
Anderson-Darling 5% Critical Value	0.721
Kolmogorov-Smirnov Test Statistic	0.411
Kolmogorov-Smirnov 5% Critical Value	0.279

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	1084
95% Adjusted Gamma UCL	1123

Data Distribution

Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

95% CLT UCL	1064
95% Jackknife UCL	1083
95% Standard Bootstrap UCL	1060
95% Bootstrap-t UCL	1511
95% Hall's Bootstrap UCL	1871
95% Percentile Bootstrap UCL	1083
95% BCA Bootstrap UCL	1113
95% Chebyshev(Mean, Sd) UCL	1306
97.5% Chebyshev(Mean, Sd) UCL	1474
99% Chebyshev(Mean, Sd) UCL	1803

Potential UCL to Use	Use 95% Student's-t UCL 1083
	or 95% Modified-t UCL 1097

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium mg/kg

General Statistics

Number of Valid Data	9	Number of Detected Data	2
Number of Distinct Detected Data	2	Number of Non-Detect Data	7
		Percent Non-Detects	77.78%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.05	Minimum Detected	-2.996
Maximum Detected	0.09	Maximum Detected	-2.408
Mean of Detected	0.07	Mean of Detected	-2.702
SD of Detected	0.0283	SD of Detected	0.416
Minimum Non-Detect	0.05	Minimum Non-Detect	-2.996
Maximum Non-Detect	0.05	Maximum Non-Detect	-2.996

Warning: Data set has only 2 Distinct Detected Values.

This may not be adequate enough to compute meaningful and reliable test statistics and estimates.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	N/A	Shapiro Wilk Test Statistic	N/A
5% Shapiro Wilk Critical Value	N/A	5% Shapiro Wilk Critical Value	N/A
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.035	Mean	-3.47
SD	0.0222	SD	0.459
95% DL/2 (t) UCL	0.0488	95% H-Stat (DL/2) UCL	0.0494
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	N/A
		SD in Log Scale	N/A
		Mean in Original Scale	N/A
		SD in Original Scale	N/A
		95% t UCL	N/A
		95% Percentile Bootstrap UCL	N/A
		95% BCA Bootstrap UCL	N/A

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	N/A
Theta Star	N/A
nu star	N/A
A-D Test Statistic	N/A
5% A-D Critical Value	N/A
K-S Test Statistic	N/A
5% K-S Critical Value	N/A

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	N/A
Maximum	N/A
Mean	N/A
Median	N/A
SD	N/A
k star	N/A
Theta star	N/A
Nu star	N/A
AppChi2	N/A
95% Gamma Approximate UCL	N/A
95% Adjusted Gamma UCL	N/A

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only

Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	0.0544
SD	0.0126
SE of Mean	0.00593
95% KM (t) UCL	0.0655
95% KM (z) UCL	0.0642
95% KM (jackknife) UCL	N/A
95% KM (bootstrap t) UCL	N/A
95% KM (BCA) UCL	N/A
95% KM (Percentile Bootstrap) UCL	N/A
95% KM (Chebyshev) UCL	0.0803
97.5% KM (Chebyshev) UCL	0.0915
99% KM (Chebyshev) UCL	0.113

Potential UCLs to Use

95% KM (t) UCL	0.0655
95% KM (% Bootstrap) UCL	N/A

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Cobalt mg/kg

General Statistics

Number of Valid Data	9	Number of Detected Data	3
Number of Distinct Detected Data	2	Number of Non-Detect Data	6
		Percent Non-Detects	66.67%

Raw Statistics

Minimum Detected	0.01
Maximum Detected	0.02
Mean of Detected	0.0133
SD of Detected	0.00577
Minimum Non-Detect	0.01
Maximum Non-Detect	0.01

Log-transformed Statistics

Minimum Detected	-4.605
Maximum Detected	-3.912
Mean of Detected	-4.374
SD of Detected	0.4
Minimum Non-Detect	-4.605
Maximum Non-Detect	-4.605

Warning: Data set has only 2 Distinct Detected Values.

This may not be adequate enough to compute meaningful and reliable test statistics and estimates.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

UCL Statistics

Normal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.75
5% Shapiro Wilk Critical Value	0.767

Data not Normal at 5% Significance Level

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.75
5% Shapiro Wilk Critical Value	0.767

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method	
Mean	0.00778
SD	0.00507
95% DL/2 (t) UCL	0.0109
Maximum Likelihood Estimate(MLE) Method	
Mean	0.00659
SD	0.00669
95% MLE (t) UCL	0.0107
95% MLE (Tiku) UCL	0.0134

Assuming Lognormal Distribution

DL/2 Substitution Method	
Mean	-4.99
SD	0.504
95% H-Stat (DL/2) UCL	0.0115
Log ROS Method	
Mean in Log Scale	-5.397
SD in Log Scale	0.908
Mean in Original Scale	0.00649
SD in Original Scale	0.00602
95% t UCL	0.0102
95% Percentile Bootstrap UCL	0.00977
95% BCA Bootstrap UCL	0.0108

Gamma Distribution Test with Detected Values Only	
k star (bias corrected)	N/A
Theta Star	N/A
nu star	N/A
A-D Test Statistic	N/A
5% A-D Critical Value	N/A
K-S Test Statistic	N/A
5% K-S Critical Value	N/A
Data not Gamma Distributed at 5% Significance Level	
Assuming Gamma Distribution	
Gamma ROS Statistics using Extrapolated Data	
Minimum	N/A
Maximum	N/A
Mean	N/A
Median	N/A
SD	N/A
k star	N/A
Theta star	N/A
Nu star	N/A
AppChi2	N/A
95% Gamma Approximate UCL	N/A
95% Adjusted Gamma UCL	N/A

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics	
Kaplan-Meier (KM) Method	
Mean	0.0111
SD	0.00314
SE of Mean	0.00128
95% KM (t) UCL	0.0135
95% KM (z) UCL	0.0132
95% KM (jackknife) UCL	N/A
95% KM (bootstrap t) UCL	N/A
95% KM (BCA) UCL	N/A
95% KM (Percentile Bootstrap) UCL	N/A
95% KM (Chebyshev) UCL	0.0167
97.5% KM (Chebyshev) UCL	0.0191
99% KM (Chebyshev) UCL	0.0239
Potential UCLs to Use	
95% KM (t) UCL	0.0135
95% KM (% Bootstrap) UCL	N/A

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Copper mg/kg

General Statistics

Number of Valid Observations 9

Number of Distinct Observations 9

Raw Statistics

Minimum	0.23
Maximum	1.35
Mean	0.517
Median	0.37
SD	0.346
Coefficient of Variation	0.671
Skewness	2.044

Log-transformed Statistics

Minimum of Log Data	-1.47
Maximum of Log Data	0.3
Mean of log Data	-0.81
SD of log Data	0.547

Warning: There are only 9 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.77
Shapiro Wilk Critical Value	0.829

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.933
Shapiro Wilk Critical Value	0.829

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	0.731

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	0.791
95% Modified-t UCL (Johnson-1978)	0.745

Assuming Lognormal Distribution

95% H-UCL	0.807
95% Chebyshev (MVUE) UCL	0.917
97.5% Chebyshev (MVUE) UCL	1.094
99% Chebyshev (MVUE) UCL	1.442

Gamma Distribution Test

k star (bias corrected)	2.402
Theta Star	0.215
MLE of Mean	0.517
MLE of Standard Deviation	0.333
nu star	43.23
Approximate Chi Square Value (.05)	29.15
Adjusted Level of Significance	0.0231
Adjusted Chi Square Value	26.74
Anderson-Darling Test Statistic	0.455
Anderson-Darling 5% Critical Value	0.726
Kolmogorov-Smirnov Test Statistic	0.214
Kolmogorov-Smirnov 5% Critical Value	0.281

Data appear Gamma Distributed at 5% Significance Level

Data Distribution

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.766
95% Adjusted Gamma UCL	0.835

Nonparametric Statistics

95% CLT UCL	0.707
95% Jackknife UCL	0.731
95% Standard Bootstrap UCL	0.698
95% Bootstrap-t UCL	0.971
95% Hall's Bootstrap UCL	1.441
95% Percentile Bootstrap UCL	0.711
95% BCA Bootstrap UCL	0.784
95% Chebyshev(Mean, Sd) UCL	1.02
97.5% Chebyshev(Mean, Sd) UCL	1.238
99% Chebyshev(Mean, Sd) UCL	1.666

Potential UCL to Use	Use 95% Approximate Gamma UCL 0.766

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Iron mg/kg

General Statistics

Number of Valid Observations	9	Number of Distinct Observations	5

Raw Statistics

Minimum	3
Maximum	54
Mean	10.33
Median	5
SD	16.48
Coefficient of Variation	1.595
Skewness	2.925

Log-transformed Statistics

Minimum of Log Data	1.099
Maximum of Log Data	3.989
Mean of log Data	1.789
SD of log Data	0.904

Warning: There are only 9 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.488
Shapiro Wilk Critical Value	0.829

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.738
Shapiro Wilk Critical Value	0.829

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	20.55

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	25.1
95% Modified-t UCL (Johnson-1978)	21.44

Assuming Lognormal Distribution

95% H-UCL	23.69
95% Chebyshev (MVUE) UCL	20.02
97.5% Chebyshev (MVUE) UCL	25.01
99% Chebyshev (MVUE) UCL	34.81

Gamma Distribution Test

k star (bias corrected)	0.775
Theta Star	13.34
MLE of Mean	10.33
MLE of Standard Deviation	11.74
nu star	13.94
Approximate Chi Square Value (.05)	6.531
Adjusted Level of Significance	0.0231
Adjusted Chi Square Value	5.498
Anderson-Darling Test Statistic	1.492
Anderson-Darling 5% Critical Value	0.743
Kolmogorov-Smirnov Test Statistic	0.346
Kolmogorov-Smirnov 5% Critical Value	0.287

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	22.06
95% Adjusted Gamma UCL	26.2

Data Distribution

Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

95% CLT UCL	19.37
95% Jackknife UCL	20.55
95% Standard Bootstrap UCL	18.73
95% Bootstrap-t UCL	96.21
95% Hall's Bootstrap UCL	67.57
95% Percentile Bootstrap UCL	21.22
95% BCA Bootstrap UCL	26.11
95% Chebyshev(Mean, Sd) UCL	34.29
97.5% Chebyshev(Mean, Sd) UCL	44.65
99% Chebyshev(Mean, Sd) UCL	65.01

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 34.29

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Lead mg/kg

General Statistics

Number of Valid Data	9	Number of Detected Data	3
Number of Distinct Detected Data	3	Number of Non-Detect Data	6
		Percent Non-Detects	66.67%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.019	Minimum Detected	-3.963
Maximum Detected	0.079	Maximum Detected	-2.538
Mean of Detected	0.0533	Mean of Detected	-3.094
SD of Detected	0.0309	SD of Detected	0.762
Minimum Non-Detect	0.005	Minimum Non-Detect	-5.298
Maximum Non-Detect	0.024	Maximum Non-Detect	-3.73

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest ND are treated as NDs

Number treated as Non-Detect	7
Number treated as Detected	2
Single DL Non-Detect Percentage	77.78%

Warning: There are only 3 Distinct Detected Values in this data set
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.941	Shapiro Wilk Test Statistic	0.873
5% Shapiro Wilk Critical Value	0.767	5% Shapiro Wilk Critical Value	0.767
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.0205	Mean	-4.851
SD	0.0292	SD	1.462
95% DL/2 (t) UCL	0.0386	95% H-Stat (DL/2) UCL	0.216
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	-4.722
		SD in Log Scale	1.421
		Mean in Original Scale	0.021
		SD in Original Scale	0.0288
		95% t UCL	0.0389
		95% Percentile Bootstrap UCL	0.0377
		95% BCA Bootstrap UCL	0.0418

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	N/A
Theta Star	N/A
nu star	N/A
A-D Test Statistic	N/A
5% A-D Critical Value	N/A
K-S Test Statistic	N/A
5% K-S Critical Value	N/A

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data

Minimum	N/A
Maximum	N/A
Mean	N/A
Median	N/A
SD	N/A
k star	N/A
Theta star	N/A
Nu star	N/A
AppChi2	N/A
95% Gamma Approximate UCL	N/A
95% Adjusted Gamma UCL	N/A

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only

Data appear Normal at 5% Significance Level

Nonparametric Statistics

Kaplan-Meier (KM) Method

Mean	0.0304
SD	0.0218
SE of Mean	0.00889
95% KM (t) UCL	0.047
95% KM (z) UCL	0.0451
95% KM (jackknife) UCL	0.0595
95% KM (bootstrap t) UCL	0.0363
95% KM (BCA) UCL	0.079
95% KM (Percentile Bootstrap) UCL	0.079
95% KM (Chebyshev) UCL	0.0692
97.5% KM (Chebyshev) UCL	0.086
99% KM (Chebyshev) UCL	0.119

Potential UCLs to Use

95% KM (t) UCL	0.047
95% KM (Percentile Bootstrap) UCL	0.079

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Lithium mg/kg

General Statistics

Number of Valid Data	9	Number of Detected Data	1
Number of Distinct Detected Data	1	Number of Non-Detect Data	8
		Percent Non-Detects	88.89%

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Lithium mg/kg was not processed!

Magnesium mg/kg

General Statistics

Number of Valid Observations	9	Number of Distinct Observations	9

Raw Statistics

Minimum	176
Maximum	425
Mean	241.6
Median	205
SD	86.88
Coefficient of Variation	0.36
Skewness	1.67

Log-transformed Statistics

Minimum of Log Data	5.17
Maximum of Log Data	6.052
Mean of log Data	5.44
SD of log Data	0.307

Warning: There are only 9 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.723
Shapiro Wilk Critical Value	0.829

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.776
Shapiro Wilk Critical Value	0.829

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	295.4

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	306.4
95% Modified-t UCL (Johnson-1978)	298.1

Assuming Lognormal Distribution

95% H-UCL	300.9
95% Chebyshev (MVUE) UCL	348.3
97.5% Chebyshev (MVUE) UCL	395
99% Chebyshev (MVUE) UCL	486.8

Gamma Distribution Test

k star (bias corrected)	7.322
Theta Star	32.99
MLE of Mean	241.6
MLE of Standard Deviation	89.27
nu star	131.8
Approximate Chi Square Value (.05)	106.3
Adjusted Level of Significance	0.0231
Adjusted Chi Square Value	101.4
Anderson-Darling Test Statistic	1.103
Anderson-Darling 5% Critical Value	0.722
Kolmogorov-Smirnov Test Statistic	0.325
Kolmogorov-Smirnov 5% Critical Value	0.279

Data not Gamma Distributed at 5% Significance Level

Data Distribution

Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

95% CLT UCL	289.2
95% Jackknife UCL	295.4
95% Standard Bootstrap UCL	286.6
95% Bootstrap-t UCL	472.3
95% Hall's Bootstrap UCL	571.1
95% Percentile Bootstrap UCL	287.9
95% BCA Bootstrap UCL	300.1
95% Chebyshev(Mean, Sd) UCL	367.8
97.5% Chebyshev(Mean, Sd) UCL	422.4
99% Chebyshev(Mean, Sd) UCL	529.7

Assuming Gamma Distribution

95% Approximate Gamma UCL	299.6
95% Adjusted Gamma UCL	313.8

Potential UCL to Use	Use 95% Student's-t UCL 295.4
	or 95% Modified-t UCL 298.1

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese mg/kg

General Statistics

Number of Valid Observations	9	Number of Distinct Observations	9

Raw Statistics

Minimum	3.45
Maximum	98.6
Mean	21.57
Median	6.61
SD	32.87
Coefficient of Variation	1.524
Skewness	2.081

Log-transformed Statistics

Minimum of Log Data	1.238
Maximum of Log Data	4.591
Mean of log Data	2.287
SD of log Data	1.207

Warning: There are only 9 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.626
Shapiro Wilk Critical Value	0.829

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.819
Shapiro Wilk Critical Value	0.829

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	41.95

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	47.72
95% Modified-t UCL (Johnson-1978)	43.21

Assuming Lognormal Distribution

95% H-UCL	99.5
95% Chebyshev (MVUE) UCL	51.14
97.5% Chebyshev (MVUE) UCL	65.42
99% Chebyshev (MVUE) UCL	93.48

Gamma Distribution Test

k star (bias corrected)	0.582
Theta Star	37.07
MLE of Mean	21.57
MLE of Standard Deviation	28.28
nu star	10.47
Approximate Chi Square Value (.05)	4.24
Adjusted Level of Significance	0.0231
Adjusted Chi Square Value	3.444
Anderson-Darling Test Statistic	1.1
Anderson-Darling 5% Critical Value	0.751
Kolmogorov-Smirnov Test Statistic	0.349
Kolmogorov-Smirnov 5% Critical Value	0.289

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	53.29
95% Adjusted Gamma UCL	65.6

Data Distribution

Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

95% CLT UCL	39.6
95% Jackknife UCL	41.95
95% Standard Bootstrap UCL	38.76
95% Bootstrap-t UCL	223.1
95% Hall's Bootstrap UCL	169.9
95% Percentile Bootstrap UCL	38.05
95% BCA Bootstrap UCL	47.14
95% Chebyshev(Mean, Sd) UCL	69.34
97.5% Chebyshev(Mean, Sd) UCL	90
99% Chebyshev(Mean, Sd) UCL	130.6

Potential UCL to Use Use 95% Hall's Bootstrap UCL 169.9

Recommended UCL exceeds the maximum observation

In Case Bootstrap t and/or Hall's Bootstrap yields an unreasonably large UCL value, use 97.5% or 99% Chebyshev (Mean, Sd) UCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury mg/kg

General Statistics

Number of Valid Data	9	Number of Detected Data	0
Number of Distinct Detected Data	0	Number of Non-Detect Data	9
		Percent Non-Detects	100.00%

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!

Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Mercury mg/kg was not processed!

Molybdenum mg/kg

General Statistics

Number of Valid Data	9	Number of Detected Data	6
Number of Distinct Detected Data	4	Number of Non-Detect Data	3
		Percent Non-Detects	33.33%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.01	Minimum Detected	-4.605
Maximum Detected	0.12	Maximum Detected	-2.12
Mean of Detected	0.035	Mean of Detected	-3.777
SD of Detected	0.0423	SD of Detected	0.919
Minimum Non-Detect	0.01	Minimum Non-Detect	-4.605
Maximum Non-Detect	0.01	Maximum Non-Detect	-4.605

Warning: There are only 4 Distinct Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.651	Shapiro Wilk Test Statistic	0.86
5% Shapiro Wilk Critical Value	0.788	5% Shapiro Wilk Critical Value	0.788
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.025	Mean	-4.284
SD	0.0367	SD	1.052
95% DL/2 (t) UCL	0.0477	95% H-Stat (DL/2) UCL	0.0836
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	0.0155	Mean in Log Scale	-4.574
SD	0.0445	SD in Log Scale	1.428
95% MLE (t) UCL	0.0431	Mean in Original Scale	0.0241
95% MLE (Tiku) UCL	0.0449	SD in Original Scale	0.0372
		95% t UCL	0.0472
		95% Percentile Bootstrap UCL	0.0466
		95% BCA Bootstrap UCL	0.0604

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only
k star (bias corrected)	0.771	Data appear Gamma Distributed at 5% Significance Level
Theta Star	0.0454	
nu star	9.252	

A-D Test Statistic	0.665
5% A-D Critical Value	0.71
K-S Test Statistic	0.71
5% K-S Critical Value	0.339

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	1E-12
Maximum	0.12
Mean	0.0261
Median	0.0178
SD	0.0363
k star	0.236
Theta star	0.111
Nu star	4.242
AppChi2	0.819
95% Gamma Approximate UCL	0.135
95% Adjusted Gamma UCL	0.199

Note: DL/2 is not a recommended method.

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	0.0267
SD	0.0337
SE of Mean	0.0123
95% KM (t) UCL	0.0495
95% KM (z) UCL	0.0469
95% KM (jackknife) UCL	0.0488
95% KM (bootstrap t) UCL	0.12
95% KM (BCA) UCL	0.05
95% KM (Percentile Bootstrap) UCL	0.05
95% KM (Chebyshev) UCL	0.0802
97.5% KM (Chebyshev) UCL	0.103
99% KM (Chebyshev) UCL	0.149

Potential UCLs to Use

95% KM (BCA) UCL	0.05

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Nickel mg/kg

General Statistics

Number of Valid Observations	9	Number of Distinct Observations	7

Raw Statistics

Minimum	0.08
Maximum	0.29
Mean	0.182
Median	0.19
SD	0.0721
Coefficient of Variation	0.396
Skewness	-0.0898

Log-transformed Statistics

Minimum of Log Data	-2.526
Maximum of Log Data	-1.238
Mean of log Data	-1.787
SD of log Data	0.461

Warning: There are only 9 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.925
Shapiro Wilk Critical Value	0.829

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.863
Shapiro Wilk Critical Value	0.829

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	0.227

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	0.221
95% Modified-t UCL (Johnson-1978)	0.227

Assuming Lognormal Distribution

95% H-UCL	0.266
95% Chebyshev (MVUE) UCL	0.309
97.5% Chebyshev (MVUE) UCL	0.363
99% Chebyshev (MVUE) UCL	0.469

Gamma Distribution Test

k star (bias corrected)	4.129
Theta Star	0.0441
MLE of Mean	0.182
MLE of Standard Deviation	0.0897
nu star	74.32
Approximate Chi Square Value (.05)	55.47
Adjusted Level of Significance	0.0231
Adjusted Chi Square Value	52.05
Anderson-Darling Test Statistic	0.502
Anderson-Darling 5% Critical Value	0.723
Kolmogorov-Smirnov Test Statistic	0.208
Kolmogorov-Smirnov 5% Critical Value	0.28

Data appear Gamma Distributed at 5% Significance Level

Data Distribution

Data appear Normal at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.244
95% Adjusted Gamma UCL	0.26

Nonparametric Statistics

95% CLT UCL	0.222
95% Jackknife UCL	0.227
95% Standard Bootstrap UCL	0.218
95% Bootstrap-t UCL	0.227
95% Hall's Bootstrap UCL	0.228
95% Percentile Bootstrap UCL	0.219
95% BCA Bootstrap UCL	0.219
95% Chebyshev(Mean, Sd) UCL	0.287
97.5% Chebyshev(Mean, Sd) UCL	0.332
99% Chebyshev(Mean, Sd) UCL	0.421

Potential UCL to Use	Use 95% Student's-t UCL 0.227

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Potassium mg/kg

General Statistics

Number of Valid Observations 9

Number of Distinct Observations 9

Raw Statistics

Minimum	323
Maximum	2530
Mean	1476
Median	1600
SD	611.9
Coefficient of Variation	0.415
Skewness	-0.359

Log-transformed Statistics

Minimum of Log Data	5.778
Maximum of Log Data	7.836
Mean of log Data	7.179
SD of log Data	0.592

Warning: There are only 9 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.93
Shapiro Wilk Critical Value	0.829

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.791
Shapiro Wilk Critical Value	0.829

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	1855

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	1785
95% Modified-t UCL (Johnson-1978)	1851

Assuming Lognormal Distribution

95% H-UCL	2593
95% Chebyshev (MVUE) UCL	2870
97.5% Chebyshev (MVUE) UCL	3450
99% Chebyshev (MVUE) UCL	4589

Gamma Distribution Test

k star (bias corrected)	2.997
Theta Star	492.4
MLE of Mean	1476
MLE of Standard Deviation	852.5
nu star	53.94
Approximate Chi Square Value (.05)	38.07
Adjusted Level of Significance	0.0231
Adjusted Chi Square Value	35.28
Anderson-Darling Test Statistic	0.714
Anderson-Darling 5% Critical Value	0.724
Kolmogorov-Smirnov Test Statistic	0.291
Kolmogorov-Smirnov 5% Critical Value	0.28

Data follow Appr. Gamma Distribution at 5% Significance Level

Data Distribution

Data appear Normal at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	2091
95% Adjusted Gamma UCL	2257

Nonparametric Statistics

95% CLT UCL	1811
95% Jackknife UCL	1855
95% Standard Bootstrap UCL	1796
95% Bootstrap-t UCL	1810
95% Hall's Bootstrap UCL	1831
95% Percentile Bootstrap UCL	1803
95% BCA Bootstrap UCL	1778
95% Chebyshev(Mean, Sd) UCL	2365
97.5% Chebyshev(Mean, Sd) UCL	2750
99% Chebyshev(Mean, Sd) UCL	3505

Potential UCL to Use	Use 95% Student's-t UCL 1855

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Rubidium mg/kg

General Statistics

Number of Valid Observations 9

Number of Distinct Observations 9

Raw Statistics

Minimum	1.27
Maximum	26.3
Mean	17.04
Median	17.4
SD	7.442
Coefficient of Variation	0.437
Skewness	-1.038

Log-transformed Statistics

Minimum of Log Data	0.239
Maximum of Log Data	3.27
Mean of log Data	2.619
SD of log Data	0.924

Warning: There are only 9 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.92
Shapiro Wilk Critical Value	0.829

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.638
Shapiro Wilk Critical Value	0.829

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	21.65

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	20.2
95% Modified-t UCL (Johnson-1978)	21.51

Assuming Lognormal Distribution

95% H-UCL	57.33
95% Chebyshev (MVUE) UCL	47.24
97.5% Chebyshev (MVUE) UCL	59.12
99% Chebyshev (MVUE) UCL	82.45

Gamma Distribution Test

k star (bias corrected)	1.719
Theta Star	9.916
MLE of Mean	17.04
MLE of Standard Deviation	13
nu star	30.93
Approximate Chi Square Value (.05)	19.23
Adjusted Level of Significance	0.0231
Adjusted Chi Square Value	17.31
Anderson-Darling Test Statistic	1.045
Anderson-Darling 5% Critical Value	0.728
Kolmogorov-Smirnov Test Statistic	0.305
Kolmogorov-Smirnov 5% Critical Value	0.282

Data not Gamma Distributed at 5% Significance Level

Data Distribution

Data appear Normal at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	27.41
95% Adjusted Gamma UCL	30.46

Nonparametric Statistics

95% CLT UCL	21.12
95% Jackknife UCL	21.65
95% Standard Bootstrap UCL	20.86
95% Bootstrap-t UCL	21
95% Hall's Bootstrap UCL	20.63
95% Percentile Bootstrap UCL	20.58
95% BCA Bootstrap UCL	20.33
95% Chebyshev(Mean, Sd) UCL	27.85
97.5% Chebyshev(Mean, Sd) UCL	32.53
99% Chebyshev(Mean, Sd) UCL	41.72

Potential UCL to Use	Use 95% Student's-t UCL 21.65

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Selenium mg/kg

General Statistics

Number of Valid Data	9	Number of Detected Data	0
Number of Distinct Detected Data	0	Number of Non-Detect Data	9
		Percent Non-Detects	100.00%

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!

Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Selenium mg/kg was not processed!

Silver mg/kg

General Statistics

Number of Valid Data	9	Number of Detected Data	1
Number of Distinct Detected Data	1	Number of Non-Detect Data	8
		Percent Non-Detects	88.89%

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Silver mg/kg was not processed!

Sodium mg/kg

General Statistics

Number of Valid Data	9	Number of Detected Data	5
Number of Distinct Detected Data	4	Number of Non-Detect Data	4
		Percent Non-Detects	44.44%

Raw Statistics

Minimum Detected	2
Maximum Detected	6
Mean of Detected	3.8
SD of Detected	1.643
Minimum Non-Detect	2
Maximum Non-Detect	2

Log-transformed Statistics

Minimum Detected	0.693
Maximum Detected	1.792
Mean of Detected	1.258
SD of Detected	0.441
Minimum Non-Detect	0.693
Maximum Non-Detect	0.693

Warning: There are only 4 Distinct Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.914
5% Shapiro Wilk Critical Value	0.762

Data appear Normal at 5% Significance Level

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.936
5% Shapiro Wilk Critical Value	0.762

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method

Mean	2.556
SD	1.878
95% DL/2 (t) UCL	3.72

Maximum Likelihood Estimate(MLE) Method

Mean	2.25
SD	2.225
95% MLE (t) UCL	3.629
95% MLE (Tiku) UCL	3.859

Assuming Lognormal Distribution

DL/2 Substitution Method

Mean	0.699
SD	0.733
95% H-Stat (DL/2) UCL	5.27

Log ROS Method

Mean in Log Scale	0.685
SD in Log Scale	0.782
Mean in Original Scale	2.563
SD in Original Scale	1.884
95% t UCL	3.731
95% Percentile Bootstrap UCL	3.639
95% BCA Bootstrap UCL	3.813

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	2.806
Theta Star	1.354
nu star	28.06

Data Distribution Test with Detected Values Only

Data appear Normal at 5% Significance Level

A-D Test Statistic	0.339
5% A-D Critical Value	0.68
K-S Test Statistic	0.68
5% K-S Critical Value	0.358

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	1.754
Maximum	6
Mean	3.569
Median	3
SD	1.408
k star	4.799
Theta star	0.744
Nu star	86.38
AppChi2	65.95
95% Gamma Approximate UCL	4.675
95% Adjusted Gamma UCL	4.957

Note: DL/2 is not a recommended method.

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	3
SD	1.414
SE of Mean	0.527
95% KM (t) UCL	3.98
95% KM (z) UCL	3.867
95% KM (jackknife) UCL	3.945
95% KM (bootstrap t) UCL	4.936
95% KM (BCA) UCL	4.333
95% KM (Percentile Bootstrap) UCL	4.222
95% KM (Chebyshev) UCL	5.297
97.5% KM (Chebyshev) UCL	6.291
99% KM (Chebyshev) UCL	8.244

Potential UCLs to Use

95% KM (t) UCL	3.98
95% KM (Percentile Bootstrap) UCL	4.222

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Strontium mg/kg

General Statistics

Number of Valid Observations 9

Number of Distinct Observations 9

Raw Statistics

Minimum	2.19
Maximum	10.1
Mean	4.738
Median	4.45
SD	2.236
Coefficient of Variation	0.472
Skewness	1.903

Log-transformed Statistics

Minimum of Log Data	0.784
Maximum of Log Data	2.313
Mean of log Data	1.474
SD of log Data	0.417

Warning: There are only 9 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.811
Shapiro Wilk Critical Value	0.829

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.945
Shapiro Wilk Critical Value	0.829

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	6.124

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	6.469
95% Modified-t UCL (Johnson-1978)	6.203

Assuming Lognormal Distribution

95% H-UCL	6.54
95% Chebyshev (MVUE) UCL	7.599
97.5% Chebyshev (MVUE) UCL	8.848
99% Chebyshev (MVUE) UCL	11.3

Gamma Distribution Test

k star (bias corrected)	4.253
Theta Star	1.114
MLE of Mean	4.738
MLE of Standard Deviation	2.297
nu star	76.55
Approximate Chi Square Value (.05)	57.4
Adjusted Level of Significance	0.0231
Adjusted Chi Square Value	53.91
Anderson-Darling Test Statistic	0.428
Anderson-Darling 5% Critical Value	0.723
Kolmogorov-Smirnov Test Statistic	0.201
Kolmogorov-Smirnov 5% Critical Value	0.28

Data appear Gamma Distributed at 5% Significance Level

Data Distribution

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	6.319
95% Adjusted Gamma UCL	6.727

Nonparametric Statistics

95% CLT UCL	5.964
95% Jackknife UCL	6.124
95% Standard Bootstrap UCL	5.891
95% Bootstrap-t UCL	7.074
95% Hall's Bootstrap UCL	12.16
95% Percentile Bootstrap UCL	5.944
95% BCA Bootstrap UCL	6.26
95% Chebyshev(Mean, Sd) UCL	7.987
97.5% Chebyshev(Mean, Sd) UCL	9.393
99% Chebyshev(Mean, Sd) UCL	12.15

Potential UCL to Use	Use 95% Approximate Gamma UCL 6.319

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Tellurium mg/kg

General Statistics

Number of Valid Data	9	Number of Detected Data	0
Number of Distinct Detected Data	0	Number of Non-Detect Data	9
		Percent Non-Detects	100.00%

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!

Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Tellurium mg/kg was not processed!

Thallium mg/kg

General Statistics

Number of Valid Data	9	Number of Detected Data	1
Number of Distinct Detected Data	1	Number of Non-Detect Data	8
		Percent Non-Detects	88.89%

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Thallium mg/kg was not processed!

Tin mg/kg

General Statistics

Number of Valid Data	9	Number of Detected Data	0
Number of Distinct Detected Data	0	Number of Non-Detect Data	9
		Percent Non-Detects	100.00%

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!

Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Tin mg/kg was not processed!

Tungsten mg/kg

General Statistics

Number of Valid Data	9	Number of Detected Data	1
Number of Distinct Detected Data	1	Number of Non-Detect Data	8
		Percent Non-Detects	88.89%

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Tungsten mg/kg was not processed!

Uranium mg/kg

General Statistics

Number of Valid Data	9	Number of Detected Data	1
Number of Distinct Detected Data	1	Number of Non-Detect Data	8
		Percent Non-Detects	88.89%

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Uranium mg/kg was not processed!

Vanadium mg/kg

General Statistics

Number of Valid Data	9	Number of Detected Data	2
Number of Distinct Detected Data	2	Number of Non-Detect Data	7
		Percent Non-Detects	77.78%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.02	Minimum Detected	-3.912
Maximum Detected	0.11	Maximum Detected	-2.207
Mean of Detected	0.065	Mean of Detected	-3.06
SD of Detected	0.0636	SD of Detected	1.205
Minimum Non-Detect	0.01	Minimum Non-Detect	-4.605
Maximum Non-Detect	0.01	Maximum Non-Detect	-4.605

Warning: Data set has only 2 Distinct Detected Values.

This may not be adequate enough to compute meaningful and reliable test statistics and estimates.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	N/A	Shapiro Wilk Test Statistic	N/A
5% Shapiro Wilk Critical Value	N/A	5% Shapiro Wilk Critical Value	N/A
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.0183	Mean	-4.801
SD	0.0347	SD	1.075
95% DL/2 (t) UCL	0.0399	95% H-Stat (DL/2) UCL	0.0536
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	N/A
		SD in Log Scale	N/A
		Mean in Original Scale	N/A
		SD in Original Scale	N/A
		95% t UCL	N/A
		95% Percentile Bootstrap UCL	N/A
		95% BCA Bootstrap UCL	N/A

Gamma Distribution Test with Detected Values Only	
k star (bias corrected)	N/A
Theta Star	N/A
nu star	N/A
A-D Test Statistic	N/A
5% A-D Critical Value	N/A
K-S Test Statistic	N/A
5% K-S Critical Value	N/A

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution	
Gamma ROS Statistics using Extrapolated Data	
Minimum	N/A
Maximum	N/A
Mean	N/A
Median	N/A
SD	N/A
k star	N/A
Theta star	N/A
Nu star	N/A
AppChi2	N/A
95% Gamma Approximate UCL	N/A
95% Adjusted Gamma UCL	N/A

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics	
Kaplan-Meier (KM) Method	
Mean	0.03
SD	0.0283
SE of Mean	0.0133
95% KM (t) UCL	0.0548
95% KM (z) UCL	0.0519
95% KM (jackknife) UCL	N/A
95% KM (bootstrap t) UCL	N/A
95% KM (BCA) UCL	N/A
95% KM (Percentile Bootstrap) UCL	N/A
95% KM (Chebyshev) UCL	0.0881
97.5% KM (Chebyshev) UCL	0.113
99% KM (Chebyshev) UCL	0.163

Potential UCLs to Use	
95% KM (BCA) UCL	N/A

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Zinc mg/kg

General Statistics

Number of Valid Observations	9	Number of Distinct Observations	9

Raw Statistics

Minimum	0.88
Maximum	8.59
Mean	2.316
Median	1.51
SD	2.426
Coefficient of Variation	1.047
Skewness	2.693

Log-transformed Statistics

Minimum of Log Data	-0.128
Maximum of Log Data	2.151
Mean of log Data	0.564
SD of log Data	0.682

Warning: There are only 9 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.584
Shapiro Wilk Critical Value	0.829

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.804
Shapiro Wilk Critical Value	0.829

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	3.819

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	4.421
95% Modified-t UCL (Johnson-1978)	3.94

Assuming Lognormal Distribution

95% H-UCL	4.138
95% Chebyshev (MVUE) UCL	4.334
97.5% Chebyshev (MVUE) UCL	5.278
99% Chebyshev (MVUE) UCL	7.133

Gamma Distribution Test

k star (bias corrected)	1.384
Theta Star	1.673
MLE of Mean	2.316
MLE of Standard Deviation	1.968
nu star	24.91
Approximate Chi Square Value (.05)	14.54
Adjusted Level of Significance	0.0231
Adjusted Chi Square Value	12.9
Anderson-Darling Test Statistic	1.145
Anderson-Darling 5% Critical Value	0.73
Kolmogorov-Smirnov Test Statistic	0.356
Kolmogorov-Smirnov 5% Critical Value	0.283

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	3.966
95% Adjusted Gamma UCL	4.471

Data Distribution

Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

95% CLT UCL	3.645
95% Jackknife UCL	3.819
95% Standard Bootstrap UCL	3.6
95% Bootstrap-t UCL	11.7
95% Hall's Bootstrap UCL	11.34
95% Percentile Bootstrap UCL	3.83
95% BCA Bootstrap UCL	4.66
95% Chebyshev(Mean, Sd) UCL	5.84
97.5% Chebyshev(Mean, Sd) UCL	7.365
99% Chebyshev(Mean, Sd) UCL	10.36

Potential UCL to Use	Use 95% Chebyshev (Mean, Sd) UCL 5.84

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Appendix C

Laboratory Analytical Reports (RPC)

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS

for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Samples

RPC Sample ID:			128040-058	128040-058 Dup	128040-059
Client Sample ID:			5518-GS-1	Lab Duplicate	5518-PP-1
Date Sampled:			20-Sep-11	20-Sep-11	20-Sep-11
Analytes	**Units**	**RL**			
Aluminum	mg/kg	0.1	3.1	2.4	5.0
Antimony	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Arsenic	mg/kg	0.02	< 0.02	< 0.02	< 0.02
Barium	mg/kg	0.02	14.1	14.2	34.9
Beryllium	mg/kg	0.002	< 0.002	< 0.002	< 0.002
Bismuth	mg/kg	0.05	< 0.05	< 0.05	< 0.05
Boron	mg/kg	0.1	0.7	0.7	7.7
Cadmium	mg/kg	0.001	0.006	0.007	0.681
Calcium	mg/kg	5	1060	1070	2150
Chromium	mg/kg	0.05	0.25	0.71	< 0.05
Cobalt	mg/kg	0.01	0.05	0.05	0.09
Copper	mg/kg	0.02	1.67	1.73	2.63
Iron	mg/kg	1	22	25	14
Lead	mg/kg	0.005	0.052	0.053	0.133
Lithium	mg/kg	0.01	< 0.01	< 0.01	< 0.01
Magnesium	mg/kg	0.5	485.	493.	452.
Manganese	mg/kg	0.02	108.	108.	515.
Mercury	mg/kg	0.01	0.02	0.03	0.02
Molybdenum	mg/kg	0.01	0.11	0.11	< 0.01
Nickel	mg/kg	0.05	0.14	0.14	0.57
Potassium	mg/kg	0.5	4830	4870	2230
Rubidium	mg/kg	0.01	19.2	19.5	13.3
Selenium	mg/kg	0.05	0.16	0.12	< 0.05
Silver	mg/kg	0.002	< 0.002	< 0.002	< 0.002
Sodium	mg/kg	2	4	4	10
Strontium	mg/kg	0.02	6.39	6.46	11.1
Tellurium	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Thallium	mg/kg	0.002	< 0.002	< 0.002	0.003
Tin	mg/kg	0.01	< 0.01	0.01	< 0.01
Tungsten	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Uranium	mg/kg	0.002	< 0.002	< 0.002	< 0.002
Vanadium	mg/kg	0.01	< 0.01	0.01	0.02
Zinc	mg/kg	0.05	8.38	8.40	157.

This report relates only to the sample(s) and information provided to the laboratory.

RL = Reporting Limit

Ross Kean

A. Ross Kean, M.Sc.
Department Head
Inorganic Analytical Chemistry

Peter Crowhurst, B.Sc., C.Chem
Analytical Chemist
Inorganic Analytical Chemistry

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS

for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Samples

RPC Sample ID:			128040-060	128040-061	128040-061 Dup
Client Sample ID:			5518-SG-1	5518-MM-1	Lab Duplicate
Date Sampled:			20-Sep-11	-	-
Analytes	**Units**	**RL**			
Aluminum	mg/kg	0.1	2.7	26.0	20.0
Antimony	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Arsenic	mg/kg	0.02	0.16	0.03	0.03
Barium	mg/kg	0.02	35.5	3.10	3.45
Beryllium	mg/kg	0.002	< 0.002	< 0.002	< 0.002
Bismuth	mg/kg	0.05	< 0.05	< 0.05	< 0.05
Boron	mg/kg	0.1	4.8	0.3	0.2
Cadmium	mg/kg	0.001	4.30	0.024	0.023
Calcium	mg/kg	5	4450	9850	11500
Chromium	mg/kg	0.05	< 0.05	1.14	1.23
Cobalt	mg/kg	0.01	0.19	0.02	0.02
Copper	mg/kg	0.02	12.6	3.78	3.31
Iron	mg/kg	1	26	140	139
Lead	mg/kg	0.005	0.107	0.161	0.213
Lithium	mg/kg	0.01	< 0.01	0.03	0.02
Magnesium	mg/kg	0.5	572.	374.	399.
Manganese	mg/kg	0.02	2370	8.23	7.16
Mercury	mg/kg	0.01	0.01	< 0.01	< 0.01
Molybdenum	mg/kg	0.01	0.18	0.10	0.09
Nickel	mg/kg	0.05	0.11	0.12	0.13
Potassium	mg/kg	0.5	1170	3190	3160
Rubidium	mg/kg	0.01	10.0	54.8	54.2
Selenium	mg/kg	0.05	0.11	0.13	0.14
Silver	mg/kg	0.002	0.290	0.005	0.002
Sodium	mg/kg	2	529	1100	1130
Strontium	mg/kg	0.02	17.6	6.71	7.89
Tellurium	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Thallium	mg/kg	0.002	0.066	0.097	0.024
Tin	mg/kg	0.01	< 0.01	< 0.01	< 0.01
Tungsten	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Uranium	mg/kg	0.002	< 0.002	< 0.002	< 0.002
Vanadium	mg/kg	0.01	< 0.01	0.05	0.04
Zinc	mg/kg	0.05	218.	33.7	34.2

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS

for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Samples

RPC Sample ID:			128040-062	128040-063	128040-064
Client Sample ID:			5518-MM-8	16303-GS-1	16303-PP-1
Date Sampled:			-	-	-
Analytes	**Units**	**RL**			
Aluminum	mg/kg	0.1	10.3	9.1	27.9
Antimony	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Arsenic	mg/kg	0.02	0.15	< 0.02	0.06
Barium	mg/kg	0.02	0.67	6.39	11.5
Beryllium	mg/kg	0.002	< 0.002	< 0.002	< 0.002
Bismuth	mg/kg	0.05	< 0.05	< 0.05	< 0.05
Boron	mg/kg	0.1	0.1	1.3	13.5
Cadmium	mg/kg	0.001	0.209	0.057	0.237
Calcium	mg/kg	5	7120	664	2170
Chromium	mg/kg	0.05	0.13	0.09	0.09
Cobalt	mg/kg	0.01	0.04	0.01	0.04
Copper	mg/kg	0.02	3.29	3.77	4.67
Iron	mg/kg	1	97	20	42
Lead	mg/kg	0.005	0.170	0.063	0.337
Lithium	mg/kg	0.01	0.01	< 0.01	0.03
Magnesium	mg/kg	0.5	312.	425.	584.
Manganese	mg/kg	0.02	12.7	187.	1080
Mercury	mg/kg	0.01	0.04	0.03	0.03
Molybdenum	mg/kg	0.01	0.18	1.06	0.11
Nickel	mg/kg	0.05	0.06	0.97	0.58
Potassium	mg/kg	0.5	3020	4760	3640
Rubidium	mg/kg	0.01	29.5	48.0	33.5
Selenium	mg/kg	0.05	0.71	< 0.05	< 0.05
Silver	mg/kg	0.002	0.003	0.005	0.002
Sodium	mg/kg	2	1260	4	16
Strontium	mg/kg	0.02	2.18	2.79	5.90
Tellurium	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Thallium	mg/kg	0.002	0.013	0.008	0.010
Tin	mg/kg	0.01	< 0.01	0.01	0.04
Tungsten	mg/kg	0.005	< 0.005	0.055	0.148
Uranium	mg/kg	0.002	< 0.002	< 0.002	0.002
Vanadium	mg/kg	0.01	0.03	0.01	0.07
Zinc	mg/kg	0.05	32.4	16.0	68.9

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS

for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Samples

RPC Sample ID:			128040-065	128040-066	128040-067
Client Sample ID:			16303-SG-2	16303-BB-1	16303-MM-1
Date Sampled:			-	-	-
Analytes	**Units**	**RL**			
Aluminum	mg/kg	0.1	2.0	68.2	2.0
Antimony	mg/kg	0.005	< 0.005	< 0.005	0.022
Arsenic	mg/kg	0.02	0.23	0.06	0.03
Barium	mg/kg	0.02	64.6	4.90	1.65
Beryllium	mg/kg	0.002	< 0.002	0.003	< 0.002
Bismuth	mg/kg	0.05	< 0.05	< 0.05	0.16
Boron	mg/kg	0.1	1.6	1.7	1.3
Cadmium	mg/kg	0.001	3.30	0.013	0.102
Calcium	mg/kg	5	3570	854	6070
Chromium	mg/kg	0.05	< 0.05	0.09	0.06
Cobalt	mg/kg	0.01	0.02	0.02	0.02
Copper	mg/kg	0.02	16.9	0.59	5.20
Iron	mg/kg	1	24	54	81
Lead	mg/kg	0.005	0.098	0.062	0.156
Lithium	mg/kg	0.01	0.01	0.05	< 0.01
Magnesium	mg/kg	0.5	413.	188.	308.
Manganese	mg/kg	0.02	4100	8.72	24.5
Mercury	mg/kg	0.01	0.04	< 0.01	< 0.01
Molybdenum	mg/kg	0.01	0.13	0.12	0.14
Nickel	mg/kg	0.05	< 0.05	0.27	0.05
Potassium	mg/kg	0.5	1050	1610	2860
Rubidium	mg/kg	0.01	13.6	22.6	21.1
Selenium	mg/kg	0.05	0.48	< 0.05	0.49
Silver	mg/kg	0.002	9.74	0.003	0.032
Sodium	mg/kg	2	387	3	1140
Strontium	mg/kg	0.02	8.79	3.98	2.40
Tellurium	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Thallium	mg/kg	0.002	0.060	< 0.002	0.032
Tin	mg/kg	0.01	< 0.01	< 0.01	0.02
Tungsten	mg/kg	0.005	0.007	0.517	0.008
Uranium	mg/kg	0.002	< 0.002	0.002	< 0.002
Vanadium	mg/kg	0.01	< 0.01	0.11	< 0.01
Zinc	mg/kg	0.05	72.2	1.66	27.4

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS

for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Samples

RPC Sample ID:			128040-068	128040-069	128040-070
Client Sample ID:			16303-MM-2	16303-MM-3	16303-MM-4
Date Sampled:			-	-	-
Analytes	**Units**	**RL**			
Aluminum	mg/kg	0.1	1.3	5.4	19.3
Antimony	mg/kg	0.005	0.006	< 0.005	< 0.005
Arsenic	mg/kg	0.02	0.02	0.04	0.03
Barium	mg/kg	0.02	1.38	1.07	2.95
Beryllium	mg/kg	0.002	< 0.002	< 0.002	< 0.002
Bismuth	mg/kg	0.05	< 0.05	< 0.05	< 0.05
Boron	mg/kg	0.1	0.6	0.2	0.2
Cadmium	mg/kg	0.001	0.029	0.404	0.023
Calcium	mg/kg	5	11800	7660	13300
Chromium	mg/kg	0.05	< 0.05	0.07	0.08
Cobalt	mg/kg	0.01	0.01	0.02	0.01
Copper	mg/kg	0.02	4.81	3.64	3.45
Iron	mg/kg	1	118	101	115
Lead	mg/kg	0.005	0.095	0.161	0.080
Lithium	mg/kg	0.01	< 0.01	< 0.01	0.01
Magnesium	mg/kg	0.5	330.	341.	451.
Manganese	mg/kg	0.02	10.5	8.55	15.3
Mercury	mg/kg	0.01	0.02	0.01	< 0.01
Molybdenum	mg/kg	0.01	0.12	0.16	0.12
Nickel	mg/kg	0.05	0.09	0.09	0.10
Potassium	mg/kg	0.5	2910	3220	3090
Rubidium	mg/kg	0.01	14.4	27.4	53.5
Selenium	mg/kg	0.05	0.42	0.62	0.12
Silver	mg/kg	0.002	0.006	0.016	0.005
Sodium	mg/kg	2	1220	1310	1170
Strontium	mg/kg	0.02	2.62	2.69	8.80
Tellurium	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Thallium	mg/kg	0.002	0.024	0.031	0.012
Tin	mg/kg	0.01	< 0.01	< 0.01	< 0.01
Tungsten	mg/kg	0.005	0.005	0.007	0.023
Uranium	mg/kg	0.002	< 0.002	< 0.002	< 0.002
Vanadium	mg/kg	0.01	< 0.01	0.01	0.04
Zinc	mg/kg	0.05	28.5	30.2	33.7

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS

for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Samples

RPC Sample ID:			128040-071	128040-072	128040-073
Client Sample ID:			16303-MM-8	16303-MM-9	16303-MM-10
Date Sampled:			19-Sep-11	19-Sep-11	20-Sep-11
Analytes	**Units**	**RL**			
Aluminum	mg/kg	0.1	4.8	4.7	3.3
Antimony	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Arsenic	mg/kg	0.02	0.03	0.03	0.03
Barium	mg/kg	0.02	1.60	1.57	2.31
Beryllium	mg/kg	0.002	< 0.002	< 0.002	< 0.002
Bismuth	mg/kg	0.05	< 0.05	< 0.05	< 0.05
Boron	mg/kg	0.1	0.1	< 0.1	< 0.1
Cadmium	mg/kg	0.001	0.052	0.192	0.146
Calcium	mg/kg	5	10200	7580	11000
Chromium	mg/kg	0.05	0.06	0.35	0.12
Cobalt	mg/kg	0.01	0.01	0.03	0.02
Copper	mg/kg	0.02	3.95	3.90	3.63
Iron	mg/kg	1	84	90	100
Lead	mg/kg	0.005	0.161	0.217	0.308
Lithium	mg/kg	0.01	< 0.01	< 0.01	< 0.01
Magnesium	mg/kg	0.5	356.	377.	396.
Manganese	mg/kg	0.02	13.2	9.77	38.6
Mercury	mg/kg	0.01	0.02	< 0.01	0.01
Molybdenum	mg/kg	0.01	0.14	0.21	0.16
Nickel	mg/kg	0.05	0.06	0.12	0.08
Potassium	mg/kg	0.5	3240	3290	3260
Rubidium	mg/kg	0.01	20.7	36.7	28.5
Selenium	mg/kg	0.05	0.56	0.61	0.62
Silver	mg/kg	0.002	0.023	0.015	0.006
Sodium	mg/kg	2	1360	1190	1300
Strontium	mg/kg	0.02	2.62	2.32	4.55
Tellurium	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Thallium	mg/kg	0.002	0.033	0.023	0.017
Tin	mg/kg	0.01	0.06	0.05	< 0.01
Tungsten	mg/kg	0.005	0.007	0.029	0.012
Uranium	mg/kg	0.002	< 0.002	< 0.002	< 0.002
Vanadium	mg/kg	0.01	0.01	0.01	< 0.01
Zinc	mg/kg	0.05	31.5	34.3	33.9

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS

for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Samples

RPC Sample ID:			128040-074	128040-075	128040-076
Client Sample ID:			16303-MM-11	25083-MM-1	25083-MM-3
Date Sampled:			20-Sep-11	-	-
Analytes	**Units**	**RL**			
Aluminum	mg/kg	0.1	3.8	2.9	2.7
Antimony	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Arsenic	mg/kg	0.02	0.04	0.03	0.03
Barium	mg/kg	0.02	1.53	11.2	7.85
Beryllium	mg/kg	0.002	< 0.002	< 0.002	< 0.002
Bismuth	mg/kg	0.05	< 0.05	< 0.05	< 0.05
Boron	mg/kg	0.1	0.1	0.2	0.1
Cadmium	mg/kg	0.001	0.183	0.123	0.101
Calcium	mg/kg	5	8440	10700	6530
Chromium	mg/kg	0.05	0.07	0.11	< 0.05
Cobalt	mg/kg	0.01	0.02	0.01	< 0.01
Copper	mg/kg	0.02	4.68	3.34	2.32
Iron	mg/kg	1	89	80	112
Lead	mg/kg	0.005	0.091	0.166	0.129
Lithium	mg/kg	0.01	< 0.01	< 0.01	< 0.01
Magnesium	mg/kg	0.5	381.	402.	313.
Manganese	mg/kg	0.02	7.66	4.21	5.41
Mercury	mg/kg	0.01	0.02	0.04	0.03
Molybdenum	mg/kg	0.01	0.17	0.15	0.10
Nickel	mg/kg	0.05	0.06	0.10	0.06
Potassium	mg/kg	0.5	3230	3640	3190
Rubidium	mg/kg	0.01	27.1	70.7	74.6
Selenium	mg/kg	0.05	0.56	0.33	0.34
Silver	mg/kg	0.002	0.033	0.228	0.055
Sodium	mg/kg	2	1360	1130	1180
Strontium	mg/kg	0.02	3.51	3.94	1.47
Tellurium	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Thallium	mg/kg	0.002	0.022	0.025	0.019
Tin	mg/kg	0.01	< 0.01	0.13	< 0.01
Tungsten	mg/kg	0.005	0.017	< 0.005	< 0.005
Uranium	mg/kg	0.002	< 0.002	< 0.002	< 0.002
Vanadium	mg/kg	0.01	0.01	< 0.01	< 0.01
Zinc	mg/kg	0.05	33.6	29.6	26.5

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS
for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Samples

RPC Sample ID:			128040-076 Dup	128040-077	128040-078
Client Sample ID:			Lab Duplicate	15924-PP-1	15924-SG-1
Date Sampled:			-	-	-
Analytes	**Units**	**RL**			
Aluminum	mg/kg	0.1	2.4	9.3	9.6
Antimony	mg/kg	0.005	< 0.005	0.005	< 0.005
Arsenic	mg/kg	0.02	0.03	< 0.02	0.70
Barium	mg/kg	0.02	7.88	49.8	32.2
Beryllium	mg/kg	0.002	< 0.002	0.002	< 0.002
Bismuth	mg/kg	0.05	< 0.05	< 0.05	< 0.05
Boron	mg/kg	0.1	0.1	7.1	1.8
Cadmium	mg/kg	0.001	0.111	0.752	6.53
Calcium	mg/kg	5	6300	2440	2180
Chromium	mg/kg	0.05	0.05	0.07	< 0.05
Cobalt	mg/kg	0.01	< 0.01	0.11	0.07
Copper	mg/kg	0.02	2.41	3.19	10.9
Iron	mg/kg	1	116	17	30
Lead	mg/kg	0.005	0.129	0.261	0.156
Lithium	mg/kg	0.01	< 0.01	0.01	< 0.01
Magnesium	mg/kg	0.5	306.	846.	423.
Manganese	mg/kg	0.02	4.50	178.	1050
Mercury	mg/kg	0.01	0.03	0.03	0.05
Molybdenum	mg/kg	0.01	0.13	< 0.01	0.10
Nickel	mg/kg	0.05	0.05	0.76	0.18
Potassium	mg/kg	0.5	3070	2580	1080
Rubidium	mg/kg	0.01	72.8	10.6	9.75
Selenium	mg/kg	0.05	0.35	< 0.05	0.20
Silver	mg/kg	0.002	0.048	< 0.002	1.70
Sodium	mg/kg	2	1130	12	420
Strontium	mg/kg	0.02	1.53	12.5	7.42
Tellurium	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Thallium	mg/kg	0.002	0.018	0.005	0.015
Tin	mg/kg	0.01	< 0.01	0.04	< 0.01
Tungsten	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Uranium	mg/kg	0.002	< 0.002	< 0.002	< 0.002
Vanadium	mg/kg	0.01	< 0.01	0.02	0.01
Zinc	mg/kg	0.05	25.1	101.	67.3

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS

for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Samples

RPC Sample ID:			128040-079	128040-079 Dup	128040-080
Client Sample ID:			15924-EW-1	Lab Duplicate	15924-MM-5
Date Sampled:			-	-	-
Analytes	**Units**	**RL**			
Aluminum	mg/kg	0.1	781.	1150	9.3
Antimony	mg/kg	0.005	0.022	0.029	< 0.005
Arsenic	mg/kg	0.02	2.53	3.22	0.02
Barium	mg/kg	0.02	4.69	6.52	2.36
Beryllium	mg/kg	0.002	0.021	0.033	< 0.002
Bismuth	mg/kg	0.05	< 0.05	< 0.05	< 0.05
Boron	mg/kg	0.1	0.2	0.2	1.1
Cadmium	mg/kg	0.001	7.20	6.61	0.038
Calcium	mg/kg	5	475	386	9110
Chromium	mg/kg	0.05	1.31	1.95	0.09
Cobalt	mg/kg	0.01	1.23	1.30	0.01
Copper	mg/kg	0.02	2.25	2.45	3.26
Iron	mg/kg	1	931	1340	75
Lead	mg/kg	0.005	15.7	18.9	0.205
Lithium	mg/kg	0.01	0.77	1.11	< 0.01
Magnesium	mg/kg	0.5	344.	441.	360.
Manganese	mg/kg	0.02	31.5	39.5	4.29
Mercury	mg/kg	0.01	0.07	0.08	< 0.01
Molybdenum	mg/kg	0.01	0.14	0.15	0.11
Nickel	mg/kg	0.05	0.85	1.21	0.09
Potassium	mg/kg	0.5	1490	1520	2630
Rubidium	mg/kg	0.01	2.93	3.41	22.1
Selenium	mg/kg	0.05	3.04	3.14	0.08
Silver	mg/kg	0.002	0.163	0.171	0.004
Sodium	mg/kg	2	830	816	1320
Strontium	mg/kg	0.02	1.38	1.26	5.66
Tellurium	mg/kg	0.005	0.013	0.014	< 0.005
Thallium	mg/kg	0.002	0.017	0.021	0.002
Tin	mg/kg	0.01	0.02	0.02	< 0.01
Tungsten	mg/kg	0.005	0.063	0.056	< 0.005
Uranium	mg/kg	0.002	0.058	0.071	< 0.002
Vanadium	mg/kg	0.01	1.81	2.77	0.03
Zinc	mg/kg	0.05	75.1	61.6	26.1

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS

for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Samples

RPC Sample ID:			128040-081	128040-082	128040-083
Client Sample ID:			15924-MM-6	15924-MM-8	14534-GS-1
Date Sampled:			-	-	-
Analytes	**Units**	**RL**			
Aluminum	mg/kg	0.1	3.8	3.5	2.8
Antimony	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Arsenic	mg/kg	0.02	0.02	0.02	0.05
Barium	mg/kg	0.02	9.41	2.02	9.31
Beryllium	mg/kg	0.002	< 0.002	< 0.002	< 0.002
Bismuth	mg/kg	0.05	< 0.05	< 0.05	< 0.05
Boron	mg/kg	0.1	1.7	0.5	0.7
Cadmium	mg/kg	0.001	0.143	0.041	0.005
Calcium	mg/kg	5	8810	6400	1100
Chromium	mg/kg	0.05	0.11	0.05	0.39
Cobalt	mg/kg	0.01	0.02	0.02	0.17
Copper	mg/kg	0.02	4.39	3.76	1.43
Iron	mg/kg	1	69	73	16
Lead	mg/kg	0.005	0.138	0.061	0.076
Lithium	mg/kg	0.01	< 0.01	< 0.01	0.01
Magnesium	mg/kg	0.5	574.	345.	425.
Manganese	mg/kg	0.02	43.7	10.0	211.
Mercury	mg/kg	0.01	< 0.01	< 0.01	0.02
Molybdenum	mg/kg	0.01	0.08	0.06	0.27
Nickel	mg/kg	0.05	0.58	0.15	0.19
Potassium	mg/kg	0.5	3140	2930	3040
Rubidium	mg/kg	0.01	49.2	54.8	15.3
Selenium	mg/kg	0.05	0.08	0.11	< 0.05
Silver	mg/kg	0.002	0.003	0.004	< 0.002
Sodium	mg/kg	2	1140	978	6
Strontium	mg/kg	0.02	7.08	4.06	6.45
Tellurium	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Thallium	mg/kg	0.002	< 0.002	0.003	< 0.002
Tin	mg/kg	0.01	< 0.01	< 0.01	< 0.01
Tungsten	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Uranium	mg/kg	0.002	< 0.002	< 0.002	< 0.002
Vanadium	mg/kg	0.01	< 0.01	0.01	< 0.01
Zinc	mg/kg	0.05	32.4	28.5	7.93

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS

for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Samples

RPC Sample ID:			128040-084	128040-085	128040-085 Dup
Client Sample ID:			14534-GS-2	14534-BB-1	Lab Duplicate
Date Sampled:			-	-	-
Analytes	**Units**	**RL**			
Aluminum	mg/kg	0.1	11.7	5.2	6.1
Antimony	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Arsenic	mg/kg	0.02	0.05	< 0.02	< 0.02
Barium	mg/kg	0.02	9.22	4.95	5.24
Beryllium	mg/kg	0.002	< 0.002	< 0.002	< 0.002
Bismuth	mg/kg	0.05	< 0.05	< 0.05	< 0.05
Boron	mg/kg	0.1	1.1	1.7	1.7
Cadmium	mg/kg	0.001	0.024	0.007	0.007
Calcium	mg/kg	5	1520	828	759
Chromium	mg/kg	0.05	0.29	< 0.05	< 0.05
Cobalt	mg/kg	0.01	0.21	< 0.01	< 0.01
Copper	mg/kg	0.02	2.09	0.50	0.48
Iron	mg/kg	1	34	6	6
Lead	mg/kg	0.005	0.102	< 0.005	< 0.005
Lithium	mg/kg	0.01	0.02	< 0.01	< 0.01
Magnesium	mg/kg	0.5	415.	191.	189.
Manganese	mg/kg	0.02	262.	3.69	3.69
Mercury	mg/kg	0.01	0.02	< 0.01	< 0.01
Molybdenum	mg/kg	0.01	0.38	0.01	< 0.01
Nickel	mg/kg	0.05	0.29	0.29	0.28
Potassium	mg/kg	0.5	5690	1590	1560
Rubidium	mg/kg	0.01	22.0	17.4	17.0
Selenium	mg/kg	0.05	0.06	< 0.05	< 0.05
Silver	mg/kg	0.002	< 0.002	< 0.002	< 0.002
Sodium	mg/kg	2	6	6	6
Strontium	mg/kg	0.02	8.09	3.87	3.51
Tellurium	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Thallium	mg/kg	0.002	0.002	< 0.002	< 0.002
Tin	mg/kg	0.01	< 0.01	< 0.01	< 0.01
Tungsten	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Uranium	mg/kg	0.002	< 0.002	< 0.002	< 0.002
Vanadium	mg/kg	0.01	0.03	< 0.01	< 0.01
Zinc	mg/kg	0.05	9.51	1.23	1.21

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS

for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Samples

RPC Sample ID:			128040-086	128040-087	128040-088
Client Sample ID:			14534-BB-2	14534-EW-1	14534-BB-3 Berries
Date Sampled:			-	-	-
Analytes	**Units**	**RL**			
Aluminum	mg/kg	0.1	2.6	91.9	4.8
Antimony	mg/kg	0.005	< 0.005	0.044	< 0.005
Arsenic	mg/kg	0.02	< 0.02	1.17	< 0.02
Barium	mg/kg	0.02	19.8	3.78	20.9
Beryllium	mg/kg	0.002	< 0.002	0.006	< 0.002
Bismuth	mg/kg	0.05	< 0.05	0.11	< 0.05
Boron	mg/kg	0.1	2.0	< 0.1	1.0
Cadmium	mg/kg	0.001	0.413	13.7	0.190
Calcium	mg/kg	5	795	407	1610
Chromium	mg/kg	0.05	0.05	0.24	< 0.05
Cobalt	mg/kg	0.01	0.01	1.67	< 0.01
Copper	mg/kg	0.02	1.35	1.14	0.37
Iron	mg/kg	1	5	195	3
Lead	mg/kg	0.005	< 0.005	8.56	0.079
Lithium	mg/kg	0.01	< 0.01	0.15	< 0.01
Magnesium	mg/kg	0.5	353.	146.	425.
Manganese	mg/kg	0.02	53.0	149.	98.6
Mercury	mg/kg	0.01	< 0.01	0.15	< 0.01
Molybdenum	mg/kg	0.01	0.02	0.31	< 0.01
Nickel	mg/kg	0.05	0.20	0.46	0.08
Potassium	mg/kg	0.5	2530	1340	323.
Rubidium	mg/kg	0.01	18.0	2.13	1.27
Selenium	mg/kg	0.05	< 0.05	4.83	< 0.05
Silver	mg/kg	0.002	< 0.002	0.259	< 0.002
Sodium	mg/kg	2	5	1030	< 2
Strontium	mg/kg	0.02	5.01	1.49	10.1
Tellurium	mg/kg	0.005	< 0.005	0.015	< 0.005
Thallium	mg/kg	0.002	0.004	0.020	< 0.002
Tin	mg/kg	0.01	< 0.01	0.01	< 0.01
Tungsten	mg/kg	0.005	< 0.005	0.015	< 0.005
Uranium	mg/kg	0.002	< 0.002	0.054	< 0.002
Vanadium	mg/kg	0.01	< 0.01	0.35	< 0.01
Zinc	mg/kg	0.05	2.95	136.	8.59

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS

for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Samples

RPC Sample ID:			128040-089	128040-090	128040-091
Client Sample ID:			14534-SG-01	14534-MM-2	14534-MM-4
Date Sampled:			13-Sep-11	-	-
Analytes	**Units**	**RL**			
Aluminum	mg/kg	0.1	7.7	13.8	2.5
Antimony	mg/kg	0.005	< 0.005	< 0.005	0.007
Arsenic	mg/kg	0.02	0.09	< 0.02	0.08
Barium	mg/kg	0.02	48.4	3.27	1.62
Beryllium	mg/kg	0.002	< 0.002	< 0.002	< 0.002
Bismuth	mg/kg	0.05	< 0.05	< 0.05	< 0.05
Boron	mg/kg	0.1	3.4	0.9	0.1
Cadmium	mg/kg	0.001	3.63	0.010	0.342
Calcium	mg/kg	5	3300	10100	10100
Chromium	mg/kg	0.05	< 0.05	0.08	0.09
Cobalt	mg/kg	0.01	0.05	0.01	0.03
Copper	mg/kg	0.02	11.4	3.09	2.77
Iron	mg/kg	1	36	75	138
Lead	mg/kg	0.005	0.207	0.056	0.295
Lithium	mg/kg	0.01	< 0.01	< 0.01	< 0.01
Magnesium	mg/kg	0.5	496.	447.	364.
Manganese	mg/kg	0.02	1640	20.1	2.97
Mercury	mg/kg	0.01	0.04	< 0.01	0.02
Molybdenum	mg/kg	0.01	0.12	0.04	0.15
Nickel	mg/kg	0.05	0.12	0.25	0.07
Potassium	mg/kg	0.5	1070	3160	2900
Rubidium	mg/kg	0.01	13.0	20.1	21.9
Selenium	mg/kg	0.05	0.17	0.05	0.61
Silver	mg/kg	0.002	1.15	0.004	0.003
Sodium	mg/kg	2	521	1000	1420
Strontium	mg/kg	0.02	10.7	7.72	3.23
Tellurium	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Thallium	mg/kg	0.002	0.011	< 0.002	0.012
Tin	mg/kg	0.01	< 0.01	< 0.01	< 0.01
Tungsten	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Uranium	mg/kg	0.002	< 0.002	< 0.002	< 0.002
Vanadium	mg/kg	0.01	0.02	0.08	0.01
Zinc	mg/kg	0.05	69.1	27.2	26.1

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS
for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Samples

RPC Sample ID:			128040-091 Dup	128040-092	128040-093
Client Sample ID:			Lab Duplicate	14534-MM-12	14534-MM-14
Date Sampled:			-	-	-
Analytes	**Units**	**RL**			
Aluminum	mg/kg	0.1	2.7	6.3	7.7
Antimony	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Arsenic	mg/kg	0.02	0.08	0.02	0.08
Barium	mg/kg	0.02	1.48	1.93	1.68
Beryllium	mg/kg	0.002	< 0.002	< 0.002	< 0.002
Bismuth	mg/kg	0.05	< 0.05	< 0.05	< 0.05
Boron	mg/kg	0.1	0.1	0.3	0.2
Cadmium	mg/kg	0.001	0.305	0.022	0.648
Calcium	mg/kg	5	9580	9130	13500
Chromium	mg/kg	0.05	0.09	0.07	0.09
Cobalt	mg/kg	0.01	0.02	0.03	0.10
Copper	mg/kg	0.02	2.61	3.91	2.91
Iron	mg/kg	1	126	80	191
Lead	mg/kg	0.005	0.344	0.212	0.427
Lithium	mg/kg	0.01	< 0.01	< 0.01	0.01
Magnesium	mg/kg	0.5	351.	375.	397.
Manganese	mg/kg	0.02	2.65	4.35	24.7
Mercury	mg/kg	0.01	0.03	< 0.01	0.02
Molybdenum	mg/kg	0.01	0.14	0.12	0.18
Nickel	mg/kg	0.05	0.06	0.16	0.08
Potassium	mg/kg	0.5	2900	3170	3000
Rubidium	mg/kg	0.01	21.9	23.2	35.4
Selenium	mg/kg	0.05	0.61	0.11	0.64
Silver	mg/kg	0.002	0.002	< 0.002	0.020
Sodium	mg/kg	2	1400	1020	1380
Strontium	mg/kg	0.02	3.07	7.76	4.42
Tellurium	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Thallium	mg/kg	0.002	0.011	< 0.002	0.012
Tin	mg/kg	0.01	< 0.01	< 0.01	< 0.01
Tungsten	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Uranium	mg/kg	0.002	< 0.002	< 0.002	< 0.002
Vanadium	mg/kg	0.01	0.01	0.03	0.04
Zinc	mg/kg	0.05	27.5	32.4	41.2

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS

for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Samples

RPC Sample ID:			128040-094	128040-094 Dup	128040-095
Client Sample ID:			10070-GS-1	Lab Duplicate	10070-PP-1
Date Sampled:			26-Sep-11	26-Sep-11	26-Sep-11
Analytes	**Units**	**RL**			
Aluminum	mg/kg	0.1	5.3	6.0	25.0
Antimony	mg/kg	0.005	0.025	0.011	< 0.005
Arsenic	mg/kg	0.02	0.06	0.05	0.02
Barium	mg/kg	0.02	21.1	21.7	10.1
Beryllium	mg/kg	0.002	< 0.002	< 0.002	0.019
Bismuth	mg/kg	0.05	< 0.05	< 0.05	< 0.05
Boron	mg/kg	0.1	1.7	1.7	6.9
Cadmium	mg/kg	0.001	0.005	0.005	0.131
Calcium	mg/kg	5	987	1020	2420
Chromium	mg/kg	0.05	0.18	0.20	0.05
Cobalt	mg/kg	0.01	< 0.01	< 0.01	1.34
Copper	mg/kg	0.02	1.77	1.76	1.79
Iron	mg/kg	1	34	36	58
Lead	mg/kg	0.005	0.125	0.125	0.008
Lithium	mg/kg	0.01	< 0.01	< 0.01	< 0.01
Magnesium	mg/kg	0.5	228.	225.	677.
Manganese	mg/kg	0.02	133.	133.	148.
Mercury	mg/kg	0.01	0.01	0.01	0.01
Molybdenum	mg/kg	0.01	0.39	0.39	0.01
Nickel	mg/kg	0.05	0.13	0.13	0.79
Potassium	mg/kg	0.5	2110	2110	2380
Rubidium	mg/kg	0.01	4.73	4.57	5.33
Selenium	mg/kg	0.05	0.05	< 0.05	0.10
Silver	mg/kg	0.002	< 0.002	< 0.002	< 0.002
Sodium	mg/kg	2	5	6	4
Strontium	mg/kg	0.02	10.3	10.5	9.74
Tellurium	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Thallium	mg/kg	0.002	< 0.002	< 0.002	< 0.002
Tin	mg/kg	0.01	0.02	0.02	< 0.01
Tungsten	mg/kg	0.005	0.016	0.017	< 0.005
Uranium	mg/kg	0.002	< 0.002	< 0.002	< 0.002
Vanadium	mg/kg	0.01	0.01	0.01	< 0.01
Zinc	mg/kg	0.05	30.8	28.6	76.8

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS

for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Samples

RPC Sample ID:			128040-096	128040-097	128040-098
Client Sample ID:			10070-MM-1	24738-GS-1	24738-SG-1
Date Sampled:			-	3-Oct-11	3-Oct-11
Analytes	**Units**	**RL**			
Aluminum	mg/kg	0.1	2.8	22.6	2.6
Antimony	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Arsenic	mg/kg	0.02	0.10	< 0.02	0.04
Barium	mg/kg	0.02	1.46	10.7	36.2
Beryllium	mg/kg	0.002	< 0.002	< 0.002	< 0.002
Bismuth	mg/kg	0.05	< 0.05	< 0.05	< 0.05
Boron	mg/kg	0.1	0.1	1.9	2.7
Cadmium	mg/kg	0.001	0.059	0.112	2.25
Calcium	mg/kg	5	5570	877	6340
Chromium	mg/kg	0.05	0.06	0.17	< 0.05
Cobalt	mg/kg	0.01	0.01	0.01	0.01
Copper	mg/kg	0.02	3.92	2.56	10.1
Iron	mg/kg	1	83	27	29
Lead	mg/kg	0.005	0.045	0.111	0.085
Lithium	mg/kg	0.01	< 0.01	0.01	< 0.01
Magnesium	mg/kg	0.5	333.	378.	747.
Manganese	mg/kg	0.02	191.	384.	3840
Mercury	mg/kg	0.01	0.01	0.03	0.01
Molybdenum	mg/kg	0.01	0.15	0.04	0.07
Nickel	mg/kg	0.05	< 0.05	0.37	0.06
Potassium	mg/kg	0.5	3030	4440	1290
Rubidium	mg/kg	0.01	59.3	13.1	8.69
Selenium	mg/kg	0.05	0.44	< 0.05	0.06
Silver	mg/kg	0.002	0.068	0.008	0.580
Sodium	mg/kg	2	1220	5	426
Strontium	mg/kg	0.02	2.05	3.10	11.6
Tellurium	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Thallium	mg/kg	0.002	0.033	< 0.002	0.004
Tin	mg/kg	0.01	< 0.01	0.02	< 0.01
Tungsten	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Uranium	mg/kg	0.002	< 0.002	< 0.002	< 0.002
Vanadium	mg/kg	0.01	0.01	0.04	< 0.01
Zinc	mg/kg	0.05	21.9	14.1	75.0

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS

for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Samples

RPC Sample ID:			128040-099	128040-100	128040-100 Dup
Client Sample ID:			24738-MM-3	24738-MM-4	Lab Duplicate
Date Sampled:			-	-	-
Analytes	**Units**	**RL**			
Aluminum	mg/kg	0.1	1.3	2.9	2.8
Antimony	mg/kg	0.005	< 0.005	< 0.005	0.006
Arsenic	mg/kg	0.02	0.07	< 0.02	0.02
Barium	mg/kg	0.02	1.80	2.58	4.08
Beryllium	mg/kg	0.002	< 0.002	< 0.002	< 0.002
Bismuth	mg/kg	0.05	< 0.05	< 0.05	< 0.05
Boron	mg/kg	0.1	0.4	0.9	0.8
Cadmium	mg/kg	0.001	0.107	0.006	0.006
Calcium	mg/kg	5	10700	5540	11300
Chromium	mg/kg	0.05	0.14	0.52	0.35
Cobalt	mg/kg	0.01	0.02	< 0.01	< 0.01
Copper	mg/kg	0.02	3.91	4.08	3.00
Iron	mg/kg	1	109	92	68
Lead	mg/kg	0.005	0.076	0.052	0.088
Lithium	mg/kg	0.01	< 0.01	< 0.01	< 0.01
Magnesium	mg/kg	0.5	421.	336.	405.
Manganese	mg/kg	0.02	11.1	27.4	22.1
Mercury	mg/kg	0.01	0.02	< 0.01	< 0.01
Molybdenum	mg/kg	0.01	0.12	0.06	0.05
Nickel	mg/kg	0.05	0.12	0.28	0.26
Potassium	mg/kg	0.5	3070	2760	2720
Rubidium	mg/kg	0.01	12.3	35.0	34.6
Selenium	mg/kg	0.05	0.56	0.06	0.06
Silver	mg/kg	0.002	0.009	< 0.002	< 0.002
Sodium	mg/kg	2	1260	851	936
Strontium	mg/kg	0.02	3.97	2.54	5.59
Tellurium	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Thallium	mg/kg	0.002	0.006	0.021	0.017
Tin	mg/kg	0.01	< 0.01	< 0.01	< 0.01
Tungsten	mg/kg	0.005	0.005	< 0.005	< 0.005
Uranium	mg/kg	0.002	< 0.002	< 0.002	< 0.002
Vanadium	mg/kg	0.01	< 0.01	0.01	0.02
Zinc	mg/kg	0.05	32.2	19.9	26.7

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS
for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Samples

RPC Sample ID:			128040-101	128040-102	128040-103
Client Sample ID:			24738-MM-5	24738-MM-7	24738-MM-8
Date Sampled:			-	5-Oct-11	-
Analytes	**Units**	**RL**			
Aluminum	mg/kg	0.1	1.0	2.4	7.1
Antimony	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Arsenic	mg/kg	0.02	< 0.02	< 0.02	0.04
Barium	mg/kg	0.02	2.66	5.43	4.26
Beryllium	mg/kg	0.002	< 0.002	< 0.002	< 0.002
Bismuth	mg/kg	0.05	< 0.05	< 0.05	< 0.05
Boron	mg/kg	0.1	0.6	0.6	0.1
Cadmium	mg/kg	0.001	0.035	0.032	0.108
Calcium	mg/kg	5	9300	8350	10700
Chromium	mg/kg	0.05	0.07	0.10	0.14
Cobalt	mg/kg	0.01	< 0.01	< 0.01	0.03
Copper	mg/kg	0.02	2.32	3.79	3.50
Iron	mg/kg	1	63	92	109
Lead	mg/kg	0.005	0.024	0.050	0.070
Lithium	mg/kg	0.01	< 0.01	< 0.01	< 0.01
Magnesium	mg/kg	0.5	389.	412.	403.
Manganese	mg/kg	0.02	15.9	13.3	108.
Mercury	mg/kg	0.01	< 0.01	< 0.01	0.02
Molybdenum	mg/kg	0.01	0.13	0.12	0.17
Nickel	mg/kg	0.05	0.21	0.23	0.06
Potassium	mg/kg	0.5	2700	3680	3230
Rubidium	mg/kg	0.01	33.3	28.2	15.7
Selenium	mg/kg	0.05	0.12	0.06	0.53
Silver	mg/kg	0.002	< 0.002	< 0.002	0.008
Sodium	mg/kg	2	1050	1250	1360
Strontium	mg/kg	0.02	1.87	5.70	3.30
Tellurium	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Thallium	mg/kg	0.002	0.003	< 0.002	0.007
Tin	mg/kg	0.01	< 0.01	< 0.01	< 0.01
Tungsten	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Uranium	mg/kg	0.002	< 0.002	< 0.002	< 0.002
Vanadium	mg/kg	0.01	< 0.01	< 0.01	0.01
Zinc	mg/kg	0.05	23.8	30.2	33.0

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS
for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Samples

RPC Sample ID:			128040-104	128040-104 Dup	128040-105
Client Sample ID:			24738-MM-9	Lab Duplicate	17627-GS-1
Date Sampled:			6-Oct-11	6-Oct-11	-
Analytes	**Units**	**RL**			
Aluminum	mg/kg	0.1	2.6	2.3	83.7
Antimony	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Arsenic	mg/kg	0.02	0.07	0.07	0.04
Barium	mg/kg	0.02	2.40	2.87	24.6
Beryllium	mg/kg	0.002	< 0.002	< 0.002	0.009
Bismuth	mg/kg	0.05	< 0.05	< 0.05	< 0.05
Boron	mg/kg	0.1	0.1	0.1	2.4
Cadmium	mg/kg	0.001	0.152	0.118	0.113
Calcium	mg/kg	5	7400	8830	2040
Chromium	mg/kg	0.05	0.15	0.14	0.29
Cobalt	mg/kg	0.01	0.02	0.02	0.10
Copper	mg/kg	0.02	3.27	3.22	3.94
Iron	mg/kg	1	93	103	77
Lead	mg/kg	0.005	0.135	0.138	0.728
Lithium	mg/kg	0.01	< 0.01	< 0.01	0.04
Magnesium	mg/kg	0.5	368.	366.	500.
Manganese	mg/kg	0.02	21.5	20.8	1210
Mercury	mg/kg	0.01	0.02	0.02	0.03
Molybdenum	mg/kg	0.01	0.15	0.12	0.24
Nickel	mg/kg	0.05	0.06	0.06	0.79
Potassium	mg/kg	0.5	3260	3180	3430
Rubidium	mg/kg	0.01	20.4	20.0	27.9
Selenium	mg/kg	0.05	0.49	0.50	< 0.05
Silver	mg/kg	0.002	0.006	0.007	0.138
Sodium	mg/kg	2	1360	1360	7
Strontium	mg/kg	0.02	2.87	3.73	8.30
Tellurium	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Thallium	mg/kg	0.002	0.011	0.011	0.012
Tin	mg/kg	0.01	< 0.01	< 0.01	0.02
Tungsten	mg/kg	0.005	0.005	< 0.005	< 0.005
Uranium	mg/kg	0.002	< 0.002	< 0.002	0.004
Vanadium	mg/kg	0.01	< 0.01	< 0.01	0.18
Zinc	mg/kg	0.05	30.5	30.7	26.9

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS

for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Samples

RPC Sample ID:			128040-106	128040-107	128040-108
Client Sample ID:			17627-PP-1	17627-BB-1	17627-SG-1
Date Sampled:			-	-	30-Sep-11
Analytes	**Units**	**RL**			
Aluminum	mg/kg	0.1	10.2	6.2	5.9
Antimony	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Arsenic	mg/kg	0.02	< 0.02	< 0.02	0.04
Barium	mg/kg	0.02	24.5	4.32	30.9
Beryllium	mg/kg	0.002	< 0.002	< 0.002	< 0.002
Bismuth	mg/kg	0.05	< 0.05	< 0.05	< 0.05
Boron	mg/kg	0.1	13.5	1.7	1.6
Cadmium	mg/kg	0.001	0.548	0.011	1.16
Calcium	mg/kg	5	2350	875	6010
Chromium	mg/kg	0.05	0.07	< 0.05	0.08
Cobalt	mg/kg	0.01	0.17	< 0.01	0.02
Copper	mg/kg	0.02	2.38	0.34	11.7
Iron	mg/kg	1	22	5	28
Lead	mg/kg	0.005	0.153	< 0.005	0.109
Lithium	mg/kg	0.01	0.01	< 0.01	< 0.01
Magnesium	mg/kg	0.5	541.	206.	638.
Manganese	mg/kg	0.02	893.	6.39	2340
Mercury	mg/kg	0.01	0.01	< 0.01	0.03
Molybdenum	mg/kg	0.01	< 0.01	0.02	0.14
Nickel	mg/kg	0.05	0.58	0.20	0.09
Potassium	mg/kg	0.5	1990	1700	1010
Rubidium	mg/kg	0.01	16.0	26.3	16.6
Selenium	mg/kg	0.05	< 0.05	< 0.05	0.15
Silver	mg/kg	0.002	0.002	< 0.002	4.81
Sodium	mg/kg	2	8	< 2	423
Strontium	mg/kg	0.02	8.62	4.45	12.2
Tellurium	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Thallium	mg/kg	0.002	0.005	< 0.002	0.028
Tin	mg/kg	0.01	< 0.01	< 0.01	< 0.01
Tungsten	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Uranium	mg/kg	0.002	< 0.002	< 0.002	< 0.002
Vanadium	mg/kg	0.01	0.02	< 0.01	< 0.01
Zinc	mg/kg	0.05	97.0	1.24	45.5

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS
for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Samples

RPC Sample ID:			128040-109	128040-110	128040-111
Client Sample ID:			17627-MM-1	17706-GS-1	17706-PP-1
Date Sampled:			-	-	19-Sep-11
Analytes	**Units**	**RL**			
Aluminum	mg/kg	0.1	2.9	33.4	4.9
Antimony	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Arsenic	mg/kg	0.02	< 0.02	0.03	< 0.02
Barium	mg/kg	0.02	4.17	12.8	24.9
Beryllium	mg/kg	0.002	< 0.002	0.003	< 0.002
Bismuth	mg/kg	0.05	< 0.05	< 0.05	< 0.05
Boron	mg/kg	0.1	0.2	1.5	10.9
Cadmium	mg/kg	0.001	0.085	0.060	0.393
Calcium	mg/kg	5	8740	1070	1570
Chromium	mg/kg	0.05	0.07	0.31	< 0.05
Cobalt	mg/kg	0.01	0.04	0.03	0.32
Copper	mg/kg	0.02	3.22	3.78	2.22
Iron	mg/kg	1	76	58	17
Lead	mg/kg	0.005	0.214	0.427	0.056
Lithium	mg/kg	0.01	0.01	0.03	< 0.01
Magnesium	mg/kg	0.5	361.	638.	617.
Manganese	mg/kg	0.02	34.8	339.	995.
Mercury	mg/kg	0.01	0.01	0.02	< 0.01
Molybdenum	mg/kg	0.01	0.16	0.46	0.02
Nickel	mg/kg	0.05	0.11	0.32	0.82
Potassium	mg/kg	0.5	3530	4870	2320
Rubidium	mg/kg	0.01	110.	35.4	26.7
Selenium	mg/kg	0.05	0.26	0.07	< 0.05
Silver	mg/kg	0.002	0.189	0.032	< 0.002
Sodium	mg/kg	2	1160	4	4
Strontium	mg/kg	0.02	3.69	4.13	5.88
Tellurium	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Thallium	mg/kg	0.002	0.021	0.005	< 0.002
Tin	mg/kg	0.01	< 0.01	0.05	< 0.01
Tungsten	mg/kg	0.005	< 0.005	0.018	< 0.005
Uranium	mg/kg	0.002	< 0.002	< 0.002	< 0.002
Vanadium	mg/kg	0.01	< 0.01	0.06	0.01
Zinc	mg/kg	0.05	29.1	14.2	89.8

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS
for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Samples

RPC Sample ID:			128040-112	128040-113	128040-114
Client Sample ID:			17706-MM-2	17099-PP-1	17099-SG-1
Date Sampled:			-	20-Sep-11	-
Analytes	**Units**	**RL**			
Aluminum	mg/kg	0.1	13.3	36.9	2.5
Antimony	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Arsenic	mg/kg	0.02	< 0.02	0.03	< 0.02
Barium	mg/kg	0.02	2.55	39.3	15.0
Beryllium	mg/kg	0.002	< 0.002	0.040	< 0.002
Bismuth	mg/kg	0.05	< 0.05	< 0.05	< 0.05
Boron	mg/kg	0.1	0.2	9.2	1.0
Cadmium	mg/kg	0.001	0.015	0.874	2.00
Calcium	mg/kg	5	9880	4860	4200
Chromium	mg/kg	0.05	< 0.05	< 0.05	< 0.05
Cobalt	mg/kg	0.01	0.01	3.14	0.06
Copper	mg/kg	0.02	3.34	4.45	9.00
Iron	mg/kg	1	90	70	28
Lead	mg/kg	0.005	0.076	0.088	0.095
Lithium	mg/kg	0.01	0.01	< 0.01	0.01
Magnesium	mg/kg	0.5	392.	961.	455.
Manganese	mg/kg	0.02	4.08	473.	2280
Mercury	mg/kg	0.01	< 0.01	0.01	0.02
Molybdenum	mg/kg	0.01	0.11	0.02	0.04
Nickel	mg/kg	0.05	0.10	2.98	0.07
Potassium	mg/kg	0.5	3200	3960	984.
Rubidium	mg/kg	0.01	68.9	26.1	13.9
Selenium	mg/kg	0.05	0.08	< 0.05	0.10
Silver	mg/kg	0.002	0.004	0.008	0.960
Sodium	mg/kg	2	1190	6	473
Strontium	mg/kg	0.02	9.92	35.1	10.7
Tellurium	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Thallium	mg/kg	0.002	0.006	< 0.002	0.008
Tin	mg/kg	0.01	< 0.01	< 0.01	< 0.01
Tungsten	mg/kg	0.005	0.015	< 0.005	< 0.005
Uranium	mg/kg	0.002	< 0.002	< 0.002	< 0.002
Vanadium	mg/kg	0.01	0.03	< 0.01	< 0.01
Zinc	mg/kg	0.05	29.0	278.	46.9

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS
for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Samples

RPC Sample ID:			128040-115	128040-115 Dup	128040-116
Client Sample ID:			17099-MM-2	Lab Duplicate	17099-MM-4
Date Sampled:			-	-	-
Analytes	**Units**	**RL**			
Aluminum	mg/kg	0.1	17.7	22.3	4.3
Antimony	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Arsenic	mg/kg	0.02	0.02	0.03	0.05
Barium	mg/kg	0.02	4.74	2.58	2.22
Beryllium	mg/kg	0.002	< 0.002	< 0.002	< 0.002
Bismuth	mg/kg	0.05	< 0.05	< 0.05	< 0.05
Boron	mg/kg	0.1	0.3	0.4	0.3
Cadmium	mg/kg	0.001	0.052	0.070	0.187
Calcium	mg/kg	5	16100	7300	11200
Chromium	mg/kg	0.05	< 0.05	0.06	0.05
Cobalt	mg/kg	0.01	0.02	0.02	0.02
Copper	mg/kg	0.02	3.82	4.24	3.32
Iron	mg/kg	1	87	95	119
Lead	mg/kg	0.005	0.174	0.115	0.248
Lithium	mg/kg	0.01	0.02	0.02	< 0.01
Magnesium	mg/kg	0.5	525.	374.	386.
Manganese	mg/kg	0.02	12.1	13.5	8.82
Mercury	mg/kg	0.01	< 0.01	< 0.01	0.03
Molybdenum	mg/kg	0.01	0.10	0.10	0.24
Nickel	mg/kg	0.05	0.14	0.11	0.09
Potassium	mg/kg	0.5	3200	3200	3020
Rubidium	mg/kg	0.01	95.7	94.4	131.
Selenium	mg/kg	0.05	0.07	0.06	0.41
Silver	mg/kg	0.002	0.020	0.021	0.029
Sodium	mg/kg	2	1240	1090	1450
Strontium	mg/kg	0.02	12.7	6.08	3.80
Tellurium	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Thallium	mg/kg	0.002	0.007	0.007	0.017
Tin	mg/kg	0.01	< 0.01	< 0.01	< 0.01
Tungsten	mg/kg	0.005	0.005	0.006	< 0.005
Uranium	mg/kg	0.002	< 0.002	< 0.002	< 0.002
Vanadium	mg/kg	0.01	0.04	0.04	0.01
Zinc	mg/kg	0.05	38.0	27.1	26.3

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS

for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Samples

RPC Sample ID:			128040-117	128040-118	128040-119
Client Sample ID:			24738-PP-0	24738-PP-1	27518-BB-1
Date Sampled:			3-Oct-11	3-Oct-11	3-Oct-11
Analytes	**Units**	**RL**			
Aluminum	mg/kg	0.1	10.3	6.0	14.3
Antimony	mg/kg	0.005	0.005	< 0.005	< 0.005
Arsenic	mg/kg	0.02	< 0.02	< 0.02	< 0.02
Barium	mg/kg	0.02	24.1	23.3	6.90
Beryllium	mg/kg	0.002	< 0.002	< 0.002	< 0.002
Bismuth	mg/kg	0.05	< 0.05	< 0.05	< 0.05
Boron	mg/kg	0.1	7.2	6.9	1.4
Cadmium	mg/kg	0.001	0.358	0.342	0.012
Calcium	mg/kg	5	2290	2330	863
Chromium	mg/kg	0.05	0.12	< 0.05	< 0.05
Cobalt	mg/kg	0.01	0.02	0.01	0.01
Copper	mg/kg	0.02	2.77	2.16	0.31
Iron	mg/kg	1	23	18	9
Lead	mg/kg	0.005	0.134	0.043	< 0.005
Lithium	mg/kg	0.01	< 0.01	< 0.01	< 0.01
Magnesium	mg/kg	0.5	410.	373.	232.
Manganese	mg/kg	0.02	1210	842.	6.61
Mercury	mg/kg	0.01	0.02	0.01	< 0.01
Molybdenum	mg/kg	0.01	< 0.01	< 0.01	< 0.01
Nickel	mg/kg	0.05	0.31	0.50	0.17
Potassium	mg/kg	0.5	1830	2660	1770
Rubidium	mg/kg	0.01	8.94	13.1	24.3
Selenium	mg/kg	0.05	< 0.05	< 0.05	< 0.05
Silver	mg/kg	0.002	< 0.002	< 0.002	< 0.002
Sodium	mg/kg	2	5	4	2
Strontium	mg/kg	0.02	5.84	6.20	5.45
Tellurium	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Thallium	mg/kg	0.002	0.003	< 0.002	< 0.002
Tin	mg/kg	0.01	0.05	< 0.01	< 0.01
Tungsten	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Uranium	mg/kg	0.002	< 0.002	< 0.002	< 0.002
Vanadium	mg/kg	0.01	0.02	0.01	0.02
Zinc	mg/kg	0.05	32.7	40.1	1.51

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS
for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Samples

RPC Sample ID:			128040-120	128040-121	128040-122
Client Sample ID:			14953-BB-1	15663-BB-1	22897-N-BB-1
Date Sampled:			5-Oct-11	-	-
Analytes	**Units**	**RL**			
Aluminum	mg/kg	0.1	8.3	6.0	3.3
Antimony	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Arsenic	mg/kg	0.02	< 0.02	< 0.02	< 0.02
Barium	mg/kg	0.02	2.68	3.35	3.40
Beryllium	mg/kg	0.002	< 0.002	< 0.002	< 0.002
Bismuth	mg/kg	0.05	< 0.05	< 0.05	< 0.05
Boron	mg/kg	0.1	2.0	0.9	1.2
Cadmium	mg/kg	0.001	0.016	0.007	0.004
Calcium	mg/kg	5	889	684	865
Chromium	mg/kg	0.05	< 0.05	< 0.05	< 0.05
Cobalt	mg/kg	0.01	< 0.01	< 0.01	< 0.01
Copper	mg/kg	0.02	0.48	0.23	0.28
Iron	mg/kg	1	4	3	3
Lead	mg/kg	0.005	< 0.005	0.019	< 0.005
Lithium	mg/kg	0.01	< 0.01	< 0.01	< 0.01
Magnesium	mg/kg	0.5	205.	176.	198.
Manganese	mg/kg	0.02	10.2	3.45	3.48
Mercury	mg/kg	0.01	< 0.01	< 0.01	< 0.01
Molybdenum	mg/kg	0.01	0.02	< 0.01	0.01
Nickel	mg/kg	0.05	0.19	0.16	0.08
Potassium	mg/kg	0.5	1600	909.	1250
Rubidium	mg/kg	0.01	12.8	15.7	15.0
Selenium	mg/kg	0.05	< 0.05	< 0.05	< 0.05
Silver	mg/kg	0.002	< 0.002	< 0.002	< 0.002
Sodium	mg/kg	2	3	< 2	< 2
Strontium	mg/kg	0.02	3.09	4.50	2.19
Tellurium	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Thallium	mg/kg	0.002	< 0.002	< 0.002	< 0.002
Tin	mg/kg	0.01	< 0.01	< 0.01	< 0.01
Tungsten	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Uranium	mg/kg	0.002	< 0.002	< 0.002	< 0.002
Vanadium	mg/kg	0.01	< 0.01	< 0.01	< 0.01
Zinc	mg/kg	0.05	1.62	0.88	1.16

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS

for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Samples

RPC Sample ID:			128040-123	128040-123 Dup	128040-124
Client Sample ID:			14956-BB-0	Lab Duplicate	14534-BB-3 Leaves
Date Sampled:			-	-	-
Analytes	**Units**	**RL**			
Aluminum	mg/kg	0.1	4.1	3.9	6.1
Antimony	mg/kg	0.005	< 0.005	< 0.005	0.010
Arsenic	mg/kg	0.02	< 0.02	< 0.02	< 0.02
Barium	mg/kg	0.02	3.28	3.44	42.7
Beryllium	mg/kg	0.002	< 0.002	< 0.002	< 0.002
Bismuth	mg/kg	0.05	< 0.05	< 0.05	0.17
Boron	mg/kg	0.1	1.5	1.6	11.5
Cadmium	mg/kg	0.001	0.011	0.010	0.475
Calcium	mg/kg	5	765	762	3150
Chromium	mg/kg	0.05	< 0.05	< 0.05	0.08
Cobalt	mg/kg	0.01	< 0.01	< 0.01	0.01
Copper	mg/kg	0.02	0.68	0.63	4.21
Iron	mg/kg	1	5	4	13
Lead	mg/kg	0.005	0.024	0.024	< 0.005
Lithium	mg/kg	0.01	< 0.01	< 0.01	< 0.01
Magnesium	mg/kg	0.5	204.	198.	1130
Manganese	mg/kg	0.02	8.81	8.59	123.
Mercury	mg/kg	0.01	< 0.01	< 0.01	0.02
Molybdenum	mg/kg	0.01	0.03	0.02	0.06
Nickel	mg/kg	0.05	0.15	0.14	0.86
Potassium	mg/kg	0.5	1520	1540	7960
Rubidium	mg/kg	0.01	11.4	11.5	52.4
Selenium	mg/kg	0.05	< 0.05	< 0.05	< 0.05
Silver	mg/kg	0.002	< 0.002	< 0.002	< 0.002
Sodium	mg/kg	2	2	2	21
Strontium	mg/kg	0.02	2.81	2.87	20.9
Tellurium	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Thallium	mg/kg	0.002	< 0.002	< 0.002	< 0.002
Tin	mg/kg	0.01	< 0.01	< 0.01	0.02
Tungsten	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Uranium	mg/kg	0.002	< 0.002	< 0.002	< 0.002
Vanadium	mg/kg	0.01	< 0.01	< 0.01	< 0.01
Zinc	mg/kg	0.05	1.28	1.17	12.8

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

CERTIFICATE OF ANALYSIS

for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Analysis of Soil

RPC Sample ID:			128040-001	128040-001 Dup	128040-002
Client Sample ID:			13508-SS-0	Lab Duplicate	13508-SS-1
Date Sampled:			6-Oct-11	6-Oct-11	6-Oct-11
Analytes	**Units**	**RL**			
Loss @ 550°C	%	0.1	16.4	16.4	14.7

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS
for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Soil

RPC Sample ID:			128040-003	128040-004	128040-005
Client Sample ID:			27249-SS-1	10700-SS-1	12724-SS-1
Date Sampled:			6-Oct-11	6-Oct-11	6-Oct-11
Analytes	**Units**	**RL**			
Loss @ 550°C	%	0.1	91.0	24.9	19.0

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS
for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Soil

RPC Sample ID:			128040-006	128040-007	128040-008
Client Sample ID:			28648-SS-1	22914-SS-1	22135-SS-1
Date Sampled:			6-Oct-11	6-Oct-11	4-Oct-11
Analytes	**Units**	**RL**			
Loss @ 550°C	%	0.1	87.6	13.5	36.5

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS

for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Soil

RPC Sample ID:			128040-009	128040-010	128040-011
Client Sample ID:			12724-SS-1	28064-SS-0	28064-SS-1
Date Sampled:			6-Oct-11	6-Oct-11	6-Oct-11
Analytes	**Units**	**RL**			
Loss @ 550°C	%	0.1	10.3	16.9	4.8

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS

for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Soil

RPC Sample ID:			128040-012	128040-013	128040-014
Client Sample ID:			32066-SS-1	23068-SS-1	10070-SS-1
Date Sampled:			12-Sep-11	27-Sep-11	26-Sep-11
Analytes	**Units**	**RL**			
Loss @ 550°C	%	0.1	8.0	16.2	7.0

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS

for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Soil

RPC Sample ID:			128040-015	128040-016	128040-017
Client Sample ID:			27518-SS-1	33316-SS-1	25083-SS-1
Date Sampled:			3-Oct-11	12-Sep-11	27-Sep-11
Analytes	**Units**	**RL**			
Loss @ 550°C	%	0.1	36.9	5.1	21.1

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS

for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Soil

RPC Sample ID:			128040-018	128040-019	128040-020
Client Sample ID:			10336-SS-1	20953-SS-0	14534-SS-1
Date Sampled:			15-Sep-11	21-Sep-11	13-Sep-11
Analytes	**Units**	**RL**			
Loss @ 550°C	%	0.1	15.7	17.6	44.3

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS

for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Soil

RPC Sample ID:			128040-020 Dup	128040-021	128040-022
Client Sample ID:			Lab Duplicate	17627-SS-1	33127-SS-1
Date Sampled:			13-Sep-11	27-Sep-11	12-Sep-11
Analytes	**Units**	**RL**			
Loss @ 550°C	%	0.1	46.6	14.8	7.1

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS

for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Soil

RPC Sample ID:			128040-023	128040-024	128040-025
Client Sample ID:			32344-SS-1	11104-SS-1	22897-SS-0
Date Sampled:			12-Sep-11	13-Sep-11	14-Sep-11
Analytes	**Units**	**RL**			
Loss @ 550°C	%	0.1	13.0	4.9	10.8

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS

for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Soil

RPC Sample ID:			128040-026	128040-027	128040-028
Client Sample ID:			17706-SS-1	12897-SS-1	16303-SS-1
Date Sampled:			19-Sep-11	20-Sep-11	14-Sep-11
Analytes	**Units**	**RL**			
Loss @ 550°C	%	0.1	13.1	16.6	11.3

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS

for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Soil

RPC Sample ID:			128040-029	128040-030	128040-031
Client Sample ID:			15924-SS-1	17099-SS-1	5518-SS-1
Date Sampled:			13-Sep-11	20-Sep-11	20-Sep-11
Analytes	**Units**	**RL**			
Loss @ 550°C	%	0.1	26.0	11.1	31.4

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS

for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Soil

RPC Sample ID:			128040-032	128040-033	128040-034
Client Sample ID:			22897-SS-1	22897-N-SS-1	19733-SS-1
Date Sampled:			14-Sep-11	14-Sep-11	4-Oct-11
Analytes	**Units**	**RL**			
Loss @ 550°C	%	0.1	7.3	9.9	27.2

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS
for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Soil

RPC Sample ID:			128040-035	128040-036	128040-037
Client Sample ID:			11852-SS-1	10555-SS-1	24543-SS-1
Date Sampled:			28-Sep-11	5-Oct-11	3-Oct-11
Analytes	**Units**	**RL**			
Loss @ 550°C	%	0.1	10.2	14.7	42.9

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS

for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Soil

RPC Sample ID:			128040-038	128040-039	128040-040
Client Sample ID:			31957-SS-1	15663-SS-1	28890-SS-0
Date Sampled:			28-Sep-11	16-Sep-11	27-Sep-11
Analytes	**Units**	**RL**			
Loss @ 550°C	%	0.1	9.8	25.1	20.9

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS

for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Soil

RPC Sample ID:			128040-040 Dup	128040-041	128040-042
Client Sample ID:			Lab Duplicate	34090-SS-1	19342-SS-1
Date Sampled:			27-Sep-11	28-Sep-11	4-Oct-11
Analytes	**Units**	**RL**			
Loss @ 550°C	%	0.1	17.4	39.3	58.7

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS

for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Soil

RPC Sample ID:			128040-043	128040-044	128040-045
Client Sample ID:			30519-SS-1	19058-SS-1	29729-SS-1
Date Sampled:			3-Oct-11	4-Oct-11	3-Oct-11
Analytes	**Units**	**RL**			
Loss @ 550°C	%	0.1	26.1	13.3	8.4

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS

for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Soil

RPC Sample ID:			128040-046	128040-047	128040-048
Client Sample ID:			21171-SS-1	13046-SS-1	4488-SS-1
Date Sampled:			5-Oct-11	28-Sep-11	28-Sep-11
Analytes	**Units**	**RL**			
Loss @ 550°C	%	0.1	22.2	9.7	21.9

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS

for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Soil

RPC Sample ID:			128040-049	128040-050	128040-051
Client Sample ID:			20274-SS-1	16882-SS-1	25466-SS-1
Date Sampled:			4-Oct-11	4-Oct-11	14-Sep-11
Analytes	**Units**	**RL**			
Loss @ 550°C	%	0.1	23.4	49.7	11.3

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS

for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Soil

RPC Sample ID:			128040-052	128040-053	128040-054
Client Sample ID:			28890-SS-1	06753-SS-1	20953-SS-1
Date Sampled:			29-Sep-11	5-Oct-11	21-Sep-11
Analytes	**Units**	**RL**			
Loss @ 550°C	%	0.1	20.9	8.3	13.2

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS
for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Soil

RPC Sample ID:			128040-055	128040-056	128040-057
Client Sample ID:			14953-SS-1	24738-SS-1	5728-SS-1
Date Sampled:			5-Oct-11	3-Oct-11	21-Sep-11
Analytes	**Units**	**RL**			
Loss @ 550°C	%	0.1	72.7	6.4	17.2

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

CERTIFICATE OF ANALYSIS

for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Analysis of Metals in Soil

RPC Sample ID:			128040-001	128040-001 Dup	128040-002
Client Sample ID:			13508-SS-0	Lab Duplicate	13508-SS-1
Date Sampled:			6-Oct-11	6-Oct-11	6-Oct-11
Analytes	**Units**	**RL**			
Aluminum	mg/kg	1	17200	16900	22900
Antimony	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Arsenic	mg/kg	1	34	38	38
Barium	mg/kg	1	43	43	52
Beryllium	mg/kg	0.1	0.4	0.4	0.6
Bismuth	mg/kg	1	3	3	3
Boron	mg/kg	1	2	2	2
Cadmium	mg/kg	0.01	0.20	0.21	0.27
Calcium	mg/kg	50	900	860	960
Chromium	mg/kg	1	21	19	27
Cobalt	mg/kg	0.1	6.0	8.2	5.9
Copper	mg/kg	1	33	31	24
Iron	mg/kg	20	23700	22000	23000
Lead	mg/kg	0.1	21.3	19.8	26.4
Lithium	mg/kg	0.1	12.7	11.9	19.5
Magnesium	mg/kg	10	3160	2890	3320
Manganese	mg/kg	1	384	463	514
Mercury	mg/kg	0.01	0.06	0.07	0.09
Molybdenum	mg/kg	0.1	3.2	3.2	2.8
Nickel	mg/kg	1	14	12	16
Potassium	mg/kg	20	630	640	590
Rubidium	mg/kg	0.1	25.3	25.6	16.1
Selenium	mg/kg	1	< 1	< 1	< 1
Silver	mg/kg	0.1	< 0.1	< 0.1	0.1
Sodium	mg/kg	50	< 50	< 50	< 50
Strontium	mg/kg	1	7	7	7
Tellurium	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Thallium	mg/kg	0.1	0.3	0.2	0.3
Tin	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Tungsten	mg/kg	0.1	4.7	5.1	8.4
Uranium	mg/kg	0.1	1.0	1.0	1.0
Vanadium	mg/kg	1	44	46	42
Zinc	mg/kg	1	51	49	57

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS
for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Metals in Soil

RPC Sample ID:			128040-003	128040-004	128040-005
Client Sample ID:			27249-SS-1	10700-SS-1	12724-SS-1
Date Sampled:			6-Oct-11	6-Oct-11	6-Oct-11
Analytes	**Units**	**RL**			
Aluminum	mg/kg	1	766	8000	12100
Antimony	mg/kg	0.1	0.5	< 0.1	< 0.1
Arsenic	mg/kg	1	2	3	30
Barium	mg/kg	1	11	27	27
Beryllium	mg/kg	0.1	0.1	< 0.1	0.2
Bismuth	mg/kg	1	< 1	< 1	2
Boron	mg/kg	1	3	2	3
Cadmium	mg/kg	0.01	0.68	0.14	0.17
Calcium	mg/kg	50	22800	940	290
Chromium	mg/kg	1	2	15	15
Cobalt	mg/kg	0.1	0.6	6.0	2.2
Copper	mg/kg	1	3	7	7
Iron	mg/kg	20	1600	13000	26900
Lead	mg/kg	0.1	46.2	11.7	22.4
Lithium	mg/kg	0.1	0.6	3.4	10.3
Magnesium	mg/kg	10	1050	1800	1290
Manganese	mg/kg	1	1160	53	256
Mercury	mg/kg	0.01	0.21	0.06	0.10
Molybdenum	mg/kg	0.1	4.4	< 0.1	0.6
Nickel	mg/kg	1	2	10	6
Potassium	mg/kg	20	160	450	340
Rubidium	mg/kg	0.1	1.3	4.7	8.6
Selenium	mg/kg	1	1	< 1	< 1
Silver	mg/kg	0.1	0.1	< 0.1	0.1
Sodium	mg/kg	50	90	< 50	< 50
Strontium	mg/kg	1	165	8	3
Tellurium	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Thallium	mg/kg	0.1	< 0.1	< 0.1	0.2
Tin	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Tungsten	mg/kg	0.1	0.2	< 0.1	0.4
Uranium	mg/kg	0.1	0.5	0.4	0.8
Vanadium	mg/kg	1	6	44	50
Zinc	mg/kg	1	37	17	25

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS
for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Metals in Soil

RPC Sample ID:			128040-006	128040-007	128040-008
Client Sample ID:			28648-SS-1	22914-SS-1	22135-SS-1
Date Sampled:			6-Oct-11	6-Oct-11	4-Oct-11
Analytes	**Units**	**RL**			
Aluminum	mg/kg	1	1270	6900	6000
Antimony	mg/kg	0.1	0.3	0.2	< 0.1
Arsenic	mg/kg	1	1	38	9
Barium	mg/kg	1	11	150	19
Beryllium	mg/kg	0.1	1.3	1.2	0.2
Bismuth	mg/kg	1	1	< 1	< 1
Boron	mg/kg	1	1	1	2
Cadmium	mg/kg	0.01	0.07	6.21	0.20
Calcium	mg/kg	50	3150	1360	900
Chromium	mg/kg	1	2	10	6
Cobalt	mg/kg	0.1	0.2	22.5	2.8
Copper	mg/kg	1	2	8	8
Iron	mg/kg	20	880	18600	14800
Lead	mg/kg	0.1	3.6	48.8	16.6
Lithium	mg/kg	0.1	0.3	6.9	2.1
Magnesium	mg/kg	10	510	1000	860
Manganese	mg/kg	1	13	3530	47
Mercury	mg/kg	0.01	0.21	0.06	0.07
Molybdenum	mg/kg	0.1	1.5	2.6	0.5
Nickel	mg/kg	1	1	34	4
Potassium	mg/kg	20	90	360	500
Rubidium	mg/kg	0.1	0.7	11.1	5.8
Selenium	mg/kg	1	< 1	< 1	< 1
Silver	mg/kg	0.1	< 0.1	< 0.1	0.5
Sodium	mg/kg	50	50	< 50	< 50
Strontium	mg/kg	1	23	14	11
Tellurium	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Thallium	mg/kg	0.1	< 0.1	0.3	0.1
Tin	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Tungsten	mg/kg	0.1	< 0.1	0.1	< 0.1
Uranium	mg/kg	0.1	3.2	0.9	0.6
Vanadium	mg/kg	1	2	29	46
Zinc	mg/kg	1	10	100	21

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS
for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Metals in Soil

RPC Sample ID:			128040-009	128040-010	128040-011
Client Sample ID:			12724-SS-1	28064-SS-0	28064-SS-1
Date Sampled:			6-Oct-11	6-Oct-11	6-Oct-11
Analytes	**Units**	**RL**			
Aluminum	mg/kg	1	9370	840	1610
Antimony	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Arsenic	mg/kg	1	28	< 1	2
Barium	mg/kg	1	24	15	7
Beryllium	mg/kg	0.1	0.1	< 0.1	< 0.1
Bismuth	mg/kg	1	1	< 1	< 1
Boron	mg/kg	1	3	2	2
Cadmium	mg/kg	0.01	0.22	0.08	0.04
Calcium	mg/kg	50	220	570	180
Chromium	mg/kg	1	13	< 1	1
Cobalt	mg/kg	0.1	1.9	0.2	0.3
Copper	mg/kg	1	5	1	1
Iron	mg/kg	20	18400	640	1760
Lead	mg/kg	0.1	15.5	11.1	4.0
Lithium	mg/kg	0.1	7.6	0.4	0.8
Magnesium	mg/kg	10	1100	90	100
Manganese	mg/kg	1	218	21	11
Mercury	mg/kg	0.01	0.07	0.05	0.02
Molybdenum	mg/kg	0.1	0.4	0.1	0.1
Nickel	mg/kg	1	5	1	< 1
Potassium	mg/kg	20	420	180	210
Rubidium	mg/kg	0.1	10.8	2.3	2.9
Selenium	mg/kg	1	< 1	< 1	< 1
Silver	mg/kg	0.1	0.1	< 0.1	< 0.1
Sodium	mg/kg	50	< 50	< 50	< 50
Strontium	mg/kg	1	3	4	2
Tellurium	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Thallium	mg/kg	0.1	0.2	< 0.1	< 0.1
Tin	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Tungsten	mg/kg	0.1	0.3	< 0.1	0.2
Uranium	mg/kg	0.1	0.7	0.4	0.9
Vanadium	mg/kg	1	42	3	6
Zinc	mg/kg	1	23	8	5

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS
for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Metals in Soil

RPC Sample ID:			128040-011 Dup	128040-012	128040-013
Client Sample ID:			Lab Duplicate	32066-SS-1	23068-SS-1
Date Sampled:			6-Oct-11	12-Sep-11	27-Sep-11
Analytes	**Units**	**RL**			
Aluminum	mg/kg	1	1820	4560	3170
Antimony	mg/kg	0.1	< 0.1	< 0.1	0.2
Arsenic	mg/kg	1	2	< 1	3
Barium	mg/kg	1	8	9	18
Beryllium	mg/kg	0.1	< 0.1	1.1	< 0.1
Bismuth	mg/kg	1	< 1	< 1	< 1
Boron	mg/kg	1	2	< 1	2
Cadmium	mg/kg	0.01	0.04	0.08	0.07
Calcium	mg/kg	50	190	110	630
Chromium	mg/kg	1	2	2	3
Cobalt	mg/kg	0.1	0.3	0.4	0.5
Copper	mg/kg	1	1	1	2
Iron	mg/kg	20	1940	1680	5580
Lead	mg/kg	0.1	4.0	6.7	10.9
Lithium	mg/kg	0.1	1.1	1.8	0.7
Magnesium	mg/kg	10	120	210	200
Manganese	mg/kg	1	13	20	20
Mercury	mg/kg	0.01	0.02	0.04	0.06
Molybdenum	mg/kg	0.1	0.2	< 0.1	0.2
Nickel	mg/kg	1	< 1	1	2
Potassium	mg/kg	20	250	250	190
Rubidium	mg/kg	0.1	3.6	10.4	3.2
Selenium	mg/kg	1	< 1	< 1	< 1
Silver	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Sodium	mg/kg	50	< 50	< 50	< 50
Strontium	mg/kg	1	2	2	5
Tellurium	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Thallium	mg/kg	0.1	< 0.1	< 0.1	0.1
Tin	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Tungsten	mg/kg	0.1	0.2	< 0.1	0.2
Uranium	mg/kg	0.1	1.0	1.4	0.5
Vanadium	mg/kg	1	7	5	17
Zinc	mg/kg	1	6	5	8

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS
for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Metals in Soil

RPC Sample ID:			128040-014	128040-015	128040-016
Client Sample ID:			10070-SS-1	27518-SS-1	33316-SS-1
Date Sampled:			26-Sep-11	3-Oct-11	12-Sep-11
Analytes	**Units**	**RL**			
Aluminum	mg/kg	1	17800	5900	4220
Antimony	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Arsenic	mg/kg	1	6	1	1
Barium	mg/kg	1	20	13	7
Beryllium	mg/kg	0.1	0.4	0.1	< 0.1
Bismuth	mg/kg	1	< 1	< 1	< 1
Boron	mg/kg	1	1	1	2
Cadmium	mg/kg	0.01	0.05	0.06	0.02
Calcium	mg/kg	50	510	160	80
Chromium	mg/kg	1	21	5	2
Cobalt	mg/kg	0.1	4.3	0.8	1.7
Copper	mg/kg	1	6	3	1
Iron	mg/kg	20	25700	4140	3350
Lead	mg/kg	0.1	10.9	9.3	4.5
Lithium	mg/kg	0.1	20.0	2.4	3.1
Magnesium	mg/kg	10	3300	570	210
Manganese	mg/kg	1	180	35	124
Mercury	mg/kg	0.01	0.06	0.09	0.02
Molybdenum	mg/kg	0.1	0.5	0.2	< 0.1
Nickel	mg/kg	1	14	2	1
Potassium	mg/kg	20	720	560	160
Rubidium	mg/kg	0.1	12.5	10.7	4.5
Selenium	mg/kg	1	< 1	< 1	< 1
Silver	mg/kg	0.1	< 0.1	0.1	< 0.1
Sodium	mg/kg	50	< 50	< 50	< 50
Strontium	mg/kg	1	2	2	1
Tellurium	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Thallium	mg/kg	0.1	0.1	0.1	< 0.1
Tin	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Tungsten	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Uranium	mg/kg	0.1	0.8	0.8	0.7
Vanadium	mg/kg	1	46	13	5
Zinc	mg/kg	1	26	9	4

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS
for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Metals in Soil

RPC Sample ID:			128040-017	128040-018	128040-019
Client Sample ID:			25083-SS-1	10336-SS-1	20953-SS-0
Date Sampled:			27-Sep-11	15-Sep-11	21-Sep-11
Analytes	**Units**	**RL**			
Aluminum	mg/kg	1	3020	6240	11100
Antimony	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Arsenic	mg/kg	1	2	10	4
Barium	mg/kg	1	10	15	31
Beryllium	mg/kg	0.1	< 0.1	0.1	0.1
Bismuth	mg/kg	1	< 1	< 1	< 1
Boron	mg/kg	1	2	2	2
Cadmium	mg/kg	0.01	0.11	0.11	0.15
Calcium	mg/kg	50	420	330	1030
Chromium	mg/kg	1	2	7	43
Cobalt	mg/kg	0.1	0.2	1.1	4.3
Copper	mg/kg	1	2	5	10
Iron	mg/kg	20	3830	10700	27200
Lead	mg/kg	0.1	10.7	11.6	10.0
Lithium	mg/kg	0.1	1.4	3.7	10.2
Magnesium	mg/kg	10	160	760	3510
Manganese	mg/kg	1	45	48	148
Mercury	mg/kg	0.01	0.08	0.06	0.06
Molybdenum	mg/kg	0.1	0.1	0.2	0.1
Nickel	mg/kg	1	1	3	10
Potassium	mg/kg	20	140	190	380
Rubidium	mg/kg	0.1	2.1	3.5	9.0
Selenium	mg/kg	1	< 1	< 1	< 1
Silver	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Sodium	mg/kg	50	< 50	< 50	< 50
Strontium	mg/kg	1	3	5	8
Tellurium	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Thallium	mg/kg	0.1	< 0.1	< 0.1	0.1
Tin	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Tungsten	mg/kg	0.1	< 0.1	0.2	< 0.1
Uranium	mg/kg	0.1	0.4	0.5	0.5
Vanadium	mg/kg	1	7	32	115
Zinc	mg/kg	1	11	14	33

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS
for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Metals in Soil

RPC Sample ID:			128040-020	128040-021	128040-021 Dup
Client Sample ID:			14534-SS-1	17627-SS-1	Lab Duplicate
Date Sampled:			13-Sep-11	27-Sep-11	27-Sep-11
Analytes	**Units**	**RL**			
Aluminum	mg/kg	1	7640	11500	11500
Antimony	mg/kg	0.1	< 0.1	0.1	< 0.1
Arsenic	mg/kg	1	9	3	3
Barium	mg/kg	1	122	12	11
Beryllium	mg/kg	0.1	0.3	0.2	0.2
Bismuth	mg/kg	1	< 1	1	< 1
Boron	mg/kg	1	1	2	2
Cadmium	mg/kg	0.01	1.90	0.07	0.07
Calcium	mg/kg	50	1880	200	240
Chromium	mg/kg	1	16	5	5
Cobalt	mg/kg	0.1	22.2	0.9	1.0
Copper	mg/kg	1	14	2	2
Iron	mg/kg	20	20700	12200	12700
Lead	mg/kg	0.1	39.5	8.5	8.5
Lithium	mg/kg	0.1	11.9	4.3	4.5
Magnesium	mg/kg	10	1430	550	620
Manganese	mg/kg	1	3520	57	59
Mercury	mg/kg	0.01	0.17	0.10	-
Molybdenum	mg/kg	0.1	3.3	0.2	0.2
Nickel	mg/kg	1	13	2	2
Potassium	mg/kg	20	530	310	310
Rubidium	mg/kg	0.1	6.9	7.9	7.7
Selenium	mg/kg	1	< 1	< 1	< 1
Silver	mg/kg	0.1	0.1	0.1	0.1
Sodium	mg/kg	50	< 50	< 50	< 50
Strontium	mg/kg	1	16	2	2
Tellurium	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Thallium	mg/kg	0.1	0.2	< 0.1	< 0.1
Tin	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Tungsten	mg/kg	0.1	0.1	< 0.1	< 0.1
Uranium	mg/kg	0.1	0.5	0.6	0.6
Vanadium	mg/kg	1	51	23	24
Zinc	mg/kg	1	95	10	10

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS
for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Metals in Soil

RPC Sample ID:			128040-022	128040-023	128040-024
Client Sample ID:			33127-SS-1	32344-SS-1	11104-SS-1
Date Sampled:			12-Sep-11	12-Sep-11	13-Sep-11
Analytes	**Units**	**RL**			
Aluminum	mg/kg	1	7420	9300	21700
Antimony	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Arsenic	mg/kg	1	5	8	103
Barium	mg/kg	1	28	19	61
Beryllium	mg/kg	0.1	0.5	0.2	0.8
Bismuth	mg/kg	1	< 1	< 1	3
Boron	mg/kg	1	< 1	2	< 1
Cadmium	mg/kg	0.01	0.09	0.12	0.35
Calcium	mg/kg	50	840	490	1110
Chromium	mg/kg	1	6	14	25
Cobalt	mg/kg	0.1	2.5	2.1	14.0
Copper	mg/kg	1	3	4	62
Iron	mg/kg	20	10700	17700	28700
Lead	mg/kg	0.1	9.1	16.1	30.2
Lithium	mg/kg	0.1	13.5	8.7	22.8
Magnesium	mg/kg	10	1320	1240	5880
Manganese	mg/kg	1	226	113	534
Mercury	mg/kg	0.01	0.03	0.06	0.02
Molybdenum	mg/kg	0.1	0.4	0.2	1.7
Nickel	mg/kg	1	5	7	24
Potassium	mg/kg	20	630	390	1390
Rubidium	mg/kg	0.1	15.9	8.6	20.3
Selenium	mg/kg	1	< 1	< 1	< 1
Silver	mg/kg	0.1	< 0.1	0.2	< 0.1
Sodium	mg/kg	50	< 50	< 50	< 50
Strontium	mg/kg	1	4	3	7
Tellurium	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Thallium	mg/kg	0.1	0.1	0.1	0.2
Tin	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Tungsten	mg/kg	0.1	< 0.1	< 0.1	3.3
Uranium	mg/kg	0.1	1.4	0.7	2.8
Vanadium	mg/kg	1	12	39	44
Zinc	mg/kg	1	27	21	88

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS
for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Metals in Soil

RPC Sample ID:			128040-025	128040-026	128040-027
Client Sample ID:			22897-SS-0	17706-SS-1	12897-SS-1
Date Sampled:			14-Sep-11	19-Sep-11	20-Sep-11
Analytes	**Units**	**RL**			
Aluminum	mg/kg	1	10900	8590	5910
Antimony	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Arsenic	mg/kg	1	6	3	2
Barium	mg/kg	1	25	14	9
Beryllium	mg/kg	0.1	0.5	0.2	0.2
Bismuth	mg/kg	1	< 1	< 1	< 1
Boron	mg/kg	1	1	2	< 1
Cadmium	mg/kg	0.01	0.08	0.09	0.54
Calcium	mg/kg	50	650	170	2640
Chromium	mg/kg	1	7	9	6
Cobalt	mg/kg	0.1	3.1	1.4	2.2
Copper	mg/kg	1	4	3	4
Iron	mg/kg	20	11000	11100	5800
Lead	mg/kg	0.1	13.2	8.7	6.7
Lithium	mg/kg	0.1	13.4	7.7	6.9
Magnesium	mg/kg	10	1960	970	2300
Manganese	mg/kg	1	146	69	94
Mercury	mg/kg	0.01	0.04	0.07	0.02
Molybdenum	mg/kg	0.1	0.3	0.6	0.3
Nickel	mg/kg	1	6	4	5
Potassium	mg/kg	20	950	340	250
Rubidium	mg/kg	0.1	15.7	5.7	3.5
Selenium	mg/kg	1	< 1	< 1	< 1
Silver	mg/kg	0.1	< 0.1	0.2	< 0.1
Sodium	mg/kg	50	< 50	< 50	250
Strontium	mg/kg	1	3	2	20
Tellurium	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Thallium	mg/kg	0.1	0.1	< 0.1	< 0.1
Tin	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Tungsten	mg/kg	0.1	0.1	0.2	0.7
Uranium	mg/kg	0.1	1.3	0.8	0.6
Vanadium	mg/kg	1	16	21	12
Zinc	mg/kg	1	28	16	29

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS
for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Metals in Soil

RPC Sample ID:			128040-028	128040-029	128040-030
Client Sample ID:			16303-SS-1	15924-SS-1	17099-SS-1
Date Sampled:			14-Sep-11	13-Sep-11	20-Sep-11
Analytes	**Units**	**RL**			
Aluminum	mg/kg	1	3600	19400	10000
Antimony	mg/kg	0.1	< 0.1	1.1	0.3
Arsenic	mg/kg	1	2	50	10
Barium	mg/kg	1	11	65	14
Beryllium	mg/kg	0.1	< 0.1	0.6	0.2
Bismuth	mg/kg	1	1	< 1	3
Boron	mg/kg	1	3	1	2
Cadmium	mg/kg	0.01	0.08	0.24	0.10
Calcium	mg/kg	50	290	720	130
Chromium	mg/kg	1	5	41	9
Cobalt	mg/kg	0.1	0.6	10.8	1.8
Copper	mg/kg	1	3	27	4
Iron	mg/kg	20	7250	32800	13000
Lead	mg/kg	0.1	15.5	35.5	11.0
Lithium	mg/kg	0.1	1.3	23.9	7.8
Magnesium	mg/kg	10	280	6980	880
Manganese	mg/kg	1	47	667	71
Mercury	mg/kg	0.01	0.05	0.06	0.07
Molybdenum	mg/kg	0.1	4.4	2.0	0.6
Nickel	mg/kg	1	2	25	4
Potassium	mg/kg	20	160	1220	380
Rubidium	mg/kg	0.1	3.1	18.4	8.0
Selenium	mg/kg	1	< 1	< 1	< 1
Silver	mg/kg	0.1	< 0.1	< 0.1	0.2
Sodium	mg/kg	50	< 50	< 50	< 50
Strontium	mg/kg	1	2	5	2
Tellurium	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Thallium	mg/kg	0.1	0.1	0.3	0.1
Tin	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Tungsten	mg/kg	0.1	3.2	0.3	0.3
Uranium	mg/kg	0.1	0.6	1.0	0.9
Vanadium	mg/kg	1	39	65	27
Zinc	mg/kg	1	9	88	15

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS
for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Metals in Soil

RPC Sample ID:			128040-031	128040-031 Dup	128040-032
Client Sample ID:			5518-SS-1	Lab Duplicate	22897-SS-1
Date Sampled:			20-Sep-11	20-Sep-11	14-Sep-11
Analytes	**Units**	**RL**			
Aluminum	mg/kg	1	20300	21100	11400
Antimony	mg/kg	0.1	0.2	0.2	< 0.1
Arsenic	mg/kg	1	10	10	6
Barium	mg/kg	1	31	32	25
Beryllium	mg/kg	0.1	0.9	1.0	0.5
Bismuth	mg/kg	1	1	< 1	< 1
Boron	mg/kg	1	3	3	1
Cadmium	mg/kg	0.01	0.32	0.31	0.07
Calcium	mg/kg	50	860	860	500
Chromium	mg/kg	1	19	20	7
Cobalt	mg/kg	0.1	12.3	13.2	3.5
Copper	mg/kg	1	9	9	4
Iron	mg/kg	20	17600	17400	11600
Lead	mg/kg	0.1	40.6	40.8	8.6
Lithium	mg/kg	0.1	8.4	8.4	14.4
Magnesium	mg/kg	10	1120	1110	2040
Manganese	mg/kg	1	1170	1290	144
Mercury	mg/kg	0.01	0.33	-	0.03
Molybdenum	mg/kg	0.1	1.6	1.6	0.3
Nickel	mg/kg	1	6	6	6
Potassium	mg/kg	20	720	560	1060
Rubidium	mg/kg	0.1	12.9	12.5	17.9
Selenium	mg/kg	1	2	2	< 1
Silver	mg/kg	0.1	1.1	1.2	< 0.1
Sodium	mg/kg	50	220	< 50	< 50
Strontium	mg/kg	1	7	7	2
Tellurium	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Thallium	mg/kg	0.1	0.2	0.2	0.2
Tin	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Tungsten	mg/kg	0.1	0.4	0.3	0.1
Uranium	mg/kg	0.1	2.5	2.6	1.4
Vanadium	mg/kg	1	35	35	16
Zinc	mg/kg	1	34	33	28

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS
for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Metals in Soil

RPC Sample ID:			128040-033	128040-034	128040-035
Client Sample ID:			22897-N-SS-1	19733-SS-1	11852-SS-1
Date Sampled:			14-Sep-11	4-Oct-11	28-Sep-11
Analytes	**Units**	**RL**			
Aluminum	mg/kg	1	15400	8320	22400
Antimony	mg/kg	0.1	< 0.1	1.0	< 0.1
Arsenic	mg/kg	1	4	25	4
Barium	mg/kg	1	20	35	29
Beryllium	mg/kg	0.1	0.5	0.1	0.5
Bismuth	mg/kg	1	< 1	< 1	< 1
Boron	mg/kg	1	1	2	2
Cadmium	mg/kg	0.01	0.07	0.17	0.12
Calcium	mg/kg	50	590	600	310
Chromium	mg/kg	1	9	14	14
Cobalt	mg/kg	0.1	2.9	2.7	3.1
Copper	mg/kg	1	5	10	4
Iron	mg/kg	20	13200	31100	20400
Lead	mg/kg	0.1	9.1	20.5	13.2
Lithium	mg/kg	0.1	13.4	5.2	18.5
Magnesium	mg/kg	10	1920	2250	1870
Manganese	mg/kg	1	154	94	571
Mercury	mg/kg	0.01	0.06	0.08	0.11
Molybdenum	mg/kg	0.1	0.2	7.8	0.5
Nickel	mg/kg	1	6	7	8
Potassium	mg/kg	20	960	320	580
Rubidium	mg/kg	0.1	15.6	4.6	15.0
Selenium	mg/kg	1	< 1	< 1	< 1
Silver	mg/kg	0.1	< 0.1	0.2	< 0.1
Sodium	mg/kg	50	< 50	< 50	< 50
Strontium	mg/kg	1	2	6	2
Tellurium	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Thallium	mg/kg	0.1	0.1	0.2	0.2
Tin	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Tungsten	mg/kg	0.1	0.1	0.3	< 0.1
Uranium	mg/kg	0.1	1.4	1.0	1.6
Vanadium	mg/kg	1	19	48	25
Zinc	mg/kg	1	24	24	49

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS

for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Metals in Soil

RPC Sample ID:			128040-036	128040-037	128040-038
Client Sample ID:			10555-SS-1	24543-SS-1	31957-SS-1
Date Sampled:			5-Oct-11	3-Oct-11	28-Sep-11
Analytes	**Units**	**RL**			
Aluminum	mg/kg	1	3130	10600	15900
Antimony	mg/kg	0.1	0.7	0.4	< 0.1
Arsenic	mg/kg	1	2	12	26
Barium	mg/kg	1	100	299	15
Beryllium	mg/kg	0.1	0.1	0.5	0.5
Bismuth	mg/kg	1	< 1	< 1	< 1
Boron	mg/kg	1	3	4	1
Cadmium	mg/kg	0.01	0.55	1.52	0.12
Calcium	mg/kg	50	2460	5150	190
Chromium	mg/kg	1	3	17	15
Cobalt	mg/kg	0.1	0.9	21.4	3.7
Copper	mg/kg	1	7	24	18
Iron	mg/kg	20	3810	27600	30100
Lead	mg/kg	0.1	48.3	15.8	13.8
Lithium	mg/kg	0.1	0.6	11.4	11.6
Magnesium	mg/kg	10	440	1150	1310
Manganese	mg/kg	1	118	6120	110
Mercury	mg/kg	0.01	0.27	0.15	0.07
Molybdenum	mg/kg	0.1	0.7	16.5	1.3
Nickel	mg/kg	1	4	31	8
Potassium	mg/kg	20	370	380	440
Rubidium	mg/kg	0.1	3.0	5.7	15.9
Selenium	mg/kg	1	< 1	2	< 1
Silver	mg/kg	0.1	0.3	0.1	0.2
Sodium	mg/kg	50	< 50	< 50	< 50
Strontium	mg/kg	1	21	30	3
Tellurium	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Thallium	mg/kg	0.1	< 0.1	0.3	0.3
Tin	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Tungsten	mg/kg	0.1	0.2	< 0.1	< 0.1
Uranium	mg/kg	0.1	0.2	1.9	1.4
Vanadium	mg/kg	1	10	59	37
Zinc	mg/kg	1	60	118	21

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS

for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Metals in Soil

RPC Sample ID:			128040-039	128040-040	128040-041
Client Sample ID:			15663-SS-1	28890-SS-0	34090-SS-1
Date Sampled:			16-Sep-11	27-Sep-11	28-Sep-11
Analytes	**Units**	**RL**			
Aluminum	mg/kg	1	4680	5410	6330
Antimony	mg/kg	0.1	< 0.1	< 0.1	0.2
Arsenic	mg/kg	1	3	2	4
Barium	mg/kg	1	12	11	40
Beryllium	mg/kg	0.1	< 0.1	< 0.1	0.4
Bismuth	mg/kg	1	< 1	< 1	< 1
Boron	mg/kg	1	2	2	1
Cadmium	mg/kg	0.01	0.06	0.10	0.25
Calcium	mg/kg	50	220	520	8250
Chromium	mg/kg	1	7	3	8
Cobalt	mg/kg	0.1	1.2	0.2	1.3
Copper	mg/kg	1	2	< 1	2
Iron	mg/kg	20	8280	3670	4390
Lead	mg/kg	0.1	6.1	5.8	17.5
Lithium	mg/kg	0.1	2.0	2.0	15.4
Magnesium	mg/kg	10	820	120	1060
Manganese	mg/kg	1	57	9	43
Mercury	mg/kg	0.01	0.40	0.11	0.13
Molybdenum	mg/kg	0.1	0.2	0.4	1.2
Nickel	mg/kg	1	3	< 1	3
Potassium	mg/kg	20	530	190	670
Rubidium	mg/kg	0.1	5.3	3.5	10.4
Selenium	mg/kg	1	< 1	< 1	< 1
Silver	mg/kg	0.1	< 0.1	< 0.1	0.1
Sodium	mg/kg	50	< 50	< 50	80
Strontium	mg/kg	1	2	4	37
Tellurium	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Thallium	mg/kg	0.1	< 0.1	< 0.1	0.2
Tin	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Tungsten	mg/kg	0.1	0.1	< 0.1	0.2
Uranium	mg/kg	0.1	0.5	0.7	2.5
Vanadium	mg/kg	1	30	8	7
Zinc	mg/kg	1	11	10	14

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS
for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Metals in Soil

RPC Sample ID:			128040-041 Dup	128040-042	128040-043
Client Sample ID:			Lab Duplicate	19342-SS-1	30519-SS-1
Date Sampled:			28-Sep-11	4-Oct-11	3-Oct-11
Analytes	**Units**	**RL**			
Aluminum	mg/kg	1	5960	4440	12200
Antimony	mg/kg	0.1	0.2	0.3	< 0.1
Arsenic	mg/kg	1	4	4	7
Barium	mg/kg	1	38	73	45
Beryllium	mg/kg	0.1	0.3	< 0.1	0.9
Bismuth	mg/kg	1	< 1	< 1	< 1
Boron	mg/kg	1	1	3	3
Cadmium	mg/kg	0.01	0.23	0.11	0.18
Calcium	mg/kg	50	7710	1340	970
Chromium	mg/kg	1	8	7	14
Cobalt	mg/kg	0.1	1.1	1.0	9.4
Copper	mg/kg	1	2	5	5
Iron	mg/kg	20	3750	8790	10600
Lead	mg/kg	0.1	17.2	13.5	18.3
Lithium	mg/kg	0.1	13.2	2.0	23.2
Magnesium	mg/kg	10	950	620	1760
Manganese	mg/kg	1	32	76	408
Mercury	mg/kg	0.01	0.14	0.10	0.10
Molybdenum	mg/kg	0.1	1.2	0.5	0.5
Nickel	mg/kg	1	3	4	11
Potassium	mg/kg	20	590	250	670
Rubidium	mg/kg	0.1	8.8	2.4	12.4
Selenium	mg/kg	1	< 1	< 1	< 1
Silver	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Sodium	mg/kg	50	70	< 50	< 50
Strontium	mg/kg	1	35	10	6
Tellurium	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Thallium	mg/kg	0.1	0.1	< 0.1	0.2
Tin	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Tungsten	mg/kg	0.1	0.2	0.2	0.2
Uranium	mg/kg	0.1	2.5	0.5	1.1
Vanadium	mg/kg	1	6	23	24
Zinc	mg/kg	1	12	17	43

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS
for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Metals in Soil

RPC Sample ID:			128040-044	128040-045	128040-046
Client Sample ID:			19058-SS-1	29729-SS-1	21171-SS-1
Date Sampled:			4-Oct-11	3-Oct-11	5-Oct-11
Analytes	**Units**	**RL**			
Aluminum	mg/kg	1	2700	11300	4850
Antimony	mg/kg	0.1	0.1	< 0.1	0.2
Arsenic	mg/kg	1	2	15	6
Barium	mg/kg	1	12	21	34
Beryllium	mg/kg	0.1	< 0.1	0.3	< 0.1
Bismuth	mg/kg	1	< 1	< 1	< 1
Boron	mg/kg	1	2	1	2
Cadmium	mg/kg	0.01	0.07	0.08	0.23
Calcium	mg/kg	50	240	230	1230
Chromium	mg/kg	1	3	16	7
Cobalt	mg/kg	0.1	0.6	2.1	1.1
Copper	mg/kg	1	2	8	6
Iron	mg/kg	20	6280	36800	14600
Lead	mg/kg	0.1	13.9	13.1	20.2
Lithium	mg/kg	0.1	0.6	6.8	2.3
Magnesium	mg/kg	10	220	1110	440
Manganese	mg/kg	1	23	236	72
Mercury	mg/kg	0.01	0.08	0.09	0.14
Molybdenum	mg/kg	0.1	0.2	0.3	0.4
Nickel	mg/kg	1	1	5	4
Potassium	mg/kg	20	180	630	320
Rubidium	mg/kg	0.1	2.1	12.1	4.2
Selenium	mg/kg	1	< 1	< 1	< 1
Silver	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Sodium	mg/kg	50	< 50	< 50	< 50
Strontium	mg/kg	1	2	2	7
Tellurium	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Thallium	mg/kg	0.1	< 0.1	0.2	< 0.1
Tin	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Tungsten	mg/kg	0.1	0.2	< 0.1	0.4
Uranium	mg/kg	0.1	0.3	1.1	0.4
Vanadium	mg/kg	1	17	52	31
Zinc	mg/kg	1	7	20	33

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS
for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Metals in Soil

RPC Sample ID:			128040-047	128040-048	128040-049
Client Sample ID:			13046-SS-1	4488-SS-1	20274-SS-1
Date Sampled:			28-Sep-11	28-Sep-11	4-Oct-11
Analytes	**Units**	**RL**			
Aluminum	mg/kg	1	2300	12400	9500
Antimony	mg/kg	0.1	0.3	0.1	0.2
Arsenic	mg/kg	1	2	3	4
Barium	mg/kg	1	15	30	16
Beryllium	mg/kg	0.1	< 0.1	0.4	0.2
Bismuth	mg/kg	1	1	< 1	< 1
Boron	mg/kg	1	2	< 1	2
Cadmium	mg/kg	0.01	0.09	0.29	0.09
Calcium	mg/kg	50	440	4820	310
Chromium	mg/kg	1	3	17	10
Cobalt	mg/kg	0.1	0.5	5.5	2.1
Copper	mg/kg	1	2	8	4
Iron	mg/kg	20	4220	12500	11600
Lead	mg/kg	0.1	6.0	10.9	10.1
Lithium	mg/kg	0.1	0.4	12.9	8.6
Magnesium	mg/kg	10	150	3840	1200
Manganese	mg/kg	1	13	149	90
Mercury	mg/kg	0.01	0.04	0.10	0.06
Molybdenum	mg/kg	0.1	0.4	1.1	0.3
Nickel	mg/kg	1	1	9	6
Potassium	mg/kg	20	200	320	390
Rubidium	mg/kg	0.1	3.3	3.9	6.6
Selenium	mg/kg	1	< 1	1	< 1
Silver	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Sodium	mg/kg	50	< 50	230	< 50
Strontium	mg/kg	1	4	27	3
Tellurium	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Thallium	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Tin	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Tungsten	mg/kg	0.1	0.1	0.2	0.2
Uranium	mg/kg	0.1	0.3	2.1	0.7
Vanadium	mg/kg	1	20	33	21
Zinc	mg/kg	1	13	34	19

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS
for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Metals in Soil

RPC Sample ID:			128040-050	128040-051	128040-051 Dup
Client Sample ID:			16882-SS-1	25466-SS-1	Lab Duplicate
Date Sampled:			4-Oct-11	14-Sep-11	14-Sep-11
Analytes	**Units**	**RL**			
Aluminum	mg/kg	1	4400	5060	4780
Antimony	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Arsenic	mg/kg	1	7	2	2
Barium	mg/kg	1	30	15	14
Beryllium	mg/kg	0.1	< 0.1	0.2	0.2
Bismuth	mg/kg	1	< 1	< 1	< 1
Boron	mg/kg	1	2	2	2
Cadmium	mg/kg	0.01	0.19	0.10	0.09
Calcium	mg/kg	50	900	270	250
Chromium	mg/kg	1	3	3	3
Cobalt	mg/kg	0.1	0.4	1.0	0.9
Copper	mg/kg	1	3	2	2
Iron	mg/kg	20	10600	5490	5330
Lead	mg/kg	0.1	11.1	10.1	9.3
Lithium	mg/kg	0.1	1.0	4.1	3.7
Magnesium	mg/kg	10	240	310	360
Manganese	mg/kg	1	50	69	62
Mercury	mg/kg	0.01	0.07	0.06	0.06
Molybdenum	mg/kg	0.1	0.3	0.1	0.1
Nickel	mg/kg	1	1	3	2
Potassium	mg/kg	20	180	250	290
Rubidium	mg/kg	0.1	2.2	6.1	6.7
Selenium	mg/kg	1	< 1	< 1	< 1
Silver	mg/kg	0.1	0.1	< 0.1	< 0.1
Sodium	mg/kg	50	< 50	< 50	< 50
Strontium	mg/kg	1	8	2	2
Tellurium	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Thallium	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Tin	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Tungsten	mg/kg	0.1	0.2	< 0.1	< 0.1
Uranium	mg/kg	0.1	0.4	0.8	0.7
Vanadium	mg/kg	1	27	9	11
Zinc	mg/kg	1	23	10	9

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS
for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Metals in Soil

RPC Sample ID:			128040-052	128040-053	128040-054
Client Sample ID:			28890-SS-1	06753-SS-1	20953-SS-1
Date Sampled:			29-Sep-11	5-Oct-11	21-Sep-11
Analytes	**Units**	**RL**			
Aluminum	mg/kg	1	4780	7730	10400
Antimony	mg/kg	0.1	0.2	0.3	0.2
Arsenic	mg/kg	1	2	9	6
Barium	mg/kg	1	11	12	48
Beryllium	mg/kg	0.1	< 0.1	0.1	0.2
Bismuth	mg/kg	1	< 1	< 1	< 1
Boron	mg/kg	1	2	3	2
Cadmium	mg/kg	0.01	0.10	0.07	0.23
Calcium	mg/kg	50	480	280	1460
Chromium	mg/kg	1	3	8	39
Cobalt	mg/kg	0.1	0.2	1.1	5.2
Copper	mg/kg	1	< 1	3	11
Iron	mg/kg	20	3410	15400	28200
Lead	mg/kg	0.1	5.3	9.3	10.5
Lithium	mg/kg	0.1	2.2	3.3	8.9
Magnesium	mg/kg	10	160	520	3360
Manganese	mg/kg	1	13	69	258
Mercury	mg/kg	0.01	0.12	0.07	0.07
Molybdenum	mg/kg	0.1	0.4	0.3	0.3
Nickel	mg/kg	1	< 1	2	10
Potassium	mg/kg	20	170	170	430
Rubidium	mg/kg	0.1	3.3	4.9	8.8
Selenium	mg/kg	1	< 1	< 1	< 1
Silver	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Sodium	mg/kg	50	< 50	< 50	< 50
Strontium	mg/kg	1	3	3	12
Tellurium	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Thallium	mg/kg	0.1	< 0.1	< 0.1	0.1
Tin	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Tungsten	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Uranium	mg/kg	0.1	0.7	0.4	0.5
Vanadium	mg/kg	1	6	45	113
Zinc	mg/kg	1	10	11	41

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS
for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

*** Revised Report ***

Attention: Jennifer McPhail
Project #: 121810356 400.140.102

Analysis of Metals in Soil

RPC Sample ID:			128040-055	128040-056	128040-057
Client Sample ID:			14953-SS-1	24738-SS-1	5728-SS-1
Date Sampled:			5-Oct-11	3-Oct-11	21-Sep-11
Analytes	**Units**	**RL**			
Aluminum	mg/kg	1	9130	4240	24700
Antimony	mg/kg	0.1	0.3	0.2	0.3
Arsenic	mg/kg	1	5	6	19
Barium	mg/kg	1	49	35	140
Beryllium	mg/kg	0.1	< 0.1	0.1	1.4
Bismuth	mg/kg	1	< 1	< 1	2
Boron	mg/kg	1	1	3	2
Cadmium	mg/kg	0.01	0.24	0.09	0.40
Calcium	mg/kg	50	2500	530	2490
Chromium	mg/kg	1	27	5	28
Cobalt	mg/kg	0.1	2.2	1.2	11.8
Copper	mg/kg	1	8	5	16
Iron	mg/kg	20	27800	8460	27000
Lead	mg/kg	0.1	13.7	20.4	25.9
Lithium	mg/kg	0.1	7.3	3.0	35.6
Magnesium	mg/kg	10	1450	410	5560
Manganese	mg/kg	1	98	92	1410
Mercury	mg/kg	0.01	0.13	0.11	0.11
Molybdenum	mg/kg	0.1	0.4	0.3	1.4
Nickel	mg/kg	1	6	4	19
Potassium	mg/kg	20	260	290	1320
Rubidium	mg/kg	0.1	2.5	3.7	31.0
Selenium	mg/kg	1	< 1	< 1	< 1
Silver	mg/kg	0.1	< 0.1	< 0.1	0.2
Sodium	mg/kg	50	< 50	< 50	< 50
Strontium	mg/kg	1	18	4	16
Tellurium	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Thallium	mg/kg	0.1	< 0.1	< 0.1	0.3
Tin	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Tungsten	mg/kg	0.1	0.1	< 0.1	0.9
Uranium	mg/kg	0.1	0.3	0.5	3.0
Vanadium	mg/kg	1	64	13	46
Zinc	mg/kg	1	37	11	89

CERTIFICATE OF ANALYSIS
for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

General Report Comments

128040-58 to 128040-124

The resulting solutions were analyzed for trace elements by ICP-MS.
Mercury was analysed by Cold Vapour AAS.

128040-1 to 128040-57 (Soil Samples)
Samples were air dried and sieved at 2 mm. A portion of each was digested according to EPA Method 3050B.
The resulting solutions were analyzed for trace elements by ICP-MS.
Mercury was analysed by Cold Vapour AAS.

Revision Comments

128040-75
Corrected Potassium result.

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS

for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Project #: 121810356 400.140.102

QA/QC Report

RPC Sample ID:			CRM000682	CRM000683	CRM000684
Type:			CRM NIST 1573a	CRM NIST 1573a	CRM NIST 1547
Analytes	**Units**	**RL**			
Aluminum	mg/kg	0.1	391.	423.	224.
Antimony	mg/kg	0.005	0.036	0.035	0.012
Arsenic	mg/kg	0.02	0.11	0.12	0.09
Barium	mg/kg	0.02	63.7	65.4	134.
Beryllium	mg/kg	0.002	0.024	0.023	0.007
Bismuth	mg/kg	0.05	< 0.05	< 0.05	< 0.05
Boron	mg/kg	0.1	32.0	31.9	28.2
Cadmium	mg/kg	0.001	1.36	1.37	0.022
Calcium	mg/kg	5	48800	50400	16200
Chromium	mg/kg	0.05	1.77	1.83	0.86
Cobalt	mg/kg	0.01	0.54	0.55	0.06
Copper	mg/kg	0.02	4.44	4.48	3.61
Iron	mg/kg	1	355	369	216
Lead	mg/kg	0.005	0.434	0.424	0.646
Lithium	mg/kg	0.01	0.53	0.54	0.12
Magnesium	mg/kg	0.5	10400	10700	4270
Manganese	mg/kg	0.02	247.	252.	99.2
Mercury	mg/kg	0.01	0.03	0.03	0.03
Molybdenum	mg/kg	0.01	0.45	0.45	0.05
Nickel	mg/kg	0.05	1.62	1.66	0.57
Potassium	mg/kg	0.5	26200	26900	24600
Rubidium	mg/kg	0.01	15.0	15.5	20.3
Selenium	mg/kg	0.05	1.37	1.37	0.26
Silver	mg/kg	0.002	0.013	0.017	0.003
Sodium	mg/kg	2	120	122	37
Strontium	mg/kg	0.02	93.0	95.5	61.2
Tellurium	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Thallium	mg/kg	0.002	0.036	0.035	0.015
Tin	mg/kg	0.01	0.02	0.03	0.10
Tungsten	mg/kg	0.005	0.006	0.005	< 0.005
Uranium	mg/kg	0.002	0.019	0.020	0.009
Vanadium	mg/kg	0.01	0.67	0.71	0.33
Zinc	mg/kg	0.05	26.3	26.9	17.1

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS
for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Project #: 121810356 400.140.102

QA/QC Report

RPC Sample ID:			CRM000685	CRM000692	CRM000693
Type:			CRM NIST 1547	CRM NIST 1577	CRM NIST 1577
Analytes	**Units**	**RL**			
Aluminum	mg/kg	0.1	226.	0.7	52.2
Antimony	mg/kg	0.005	0.019	< 0.005	< 0.005
Arsenic	mg/kg	0.02	0.12	0.08	0.10
Barium	mg/kg	0.02	136.	0.02	0.11
Beryllium	mg/kg	0.002	0.006	< 0.002	< 0.002
Bismuth	mg/kg	0.05	< 0.05	< 0.05	< 0.05
Boron	mg/kg	0.1	29.0	0.6	0.5
Cadmium	mg/kg	0.001	0.024	0.485	0.461
Calcium	mg/kg	5	16700	119	142
Chromium	mg/kg	0.05	0.89	0.55	0.42
Cobalt	mg/kg	0.01	0.06	0.27	0.25
Copper	mg/kg	0.02	3.71	167.	161.
Iron	mg/kg	1	219	192	245
Lead	mg/kg	0.005	0.647	0.144	0.162
Lithium	mg/kg	0.01	0.12	0.17	0.23
Magnesium	mg/kg	0.5	4330	606.	603.
Manganese	mg/kg	0.02	101.	10.4	11.3
Mercury	mg/kg	0.01	0.03	0.01	0.01
Molybdenum	mg/kg	0.01	0.05	4.07	3.75
Nickel	mg/kg	0.05	0.59	0.34	0.33
Potassium	mg/kg	0.5	25300	9970	9740
Rubidium	mg/kg	0.01	21.0	13.0	12.9
Selenium	mg/kg	0.05	0.24	0.69	0.69
Silver	mg/kg	0.002	< 0.002	0.024	0.024
Sodium	mg/kg	2	40	2340	2250
Strontium	mg/kg	0.02	62.4	0.13	0.26
Tellurium	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Thallium	mg/kg	0.002	0.015	0.003	0.003
Tin	mg/kg	0.01	0.10	0.03	0.02
Tungsten	mg/kg	0.005	< 0.005	0.222	0.005
Uranium	mg/kg	0.002	0.010	< 0.002	0.006
Vanadium	mg/kg	0.01	0.33	0.17	0.18
Zinc	mg/kg	0.05	17.2	119.	115.

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS
for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Project #: 121810356 400.140.102

QA/QC Report

RPC Sample ID:			CRM000694	CRM000695	CRM000696
Type:			CRM DORM-3	CRM DORM-3	CRM NIST 1577
Analytes	**Units**	**RL**			
Aluminum	mg/kg	0.1	1330	1320	1.2
Antimony	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Arsenic	mg/kg	0.02	6.09	6.41	0.07
Barium	mg/kg	0.02	5.07	4.97	0.05
Beryllium	mg/kg	0.002	0.014	0.015	< 0.002
Bismuth	mg/kg	0.05	< 0.05	< 0.05	< 0.05
Boron	mg/kg	0.1	8.3	8.1	0.5
Cadmium	mg/kg	0.001	0.291	0.296	0.464
Calcium	mg/kg	5	2600	2500	117
Chromium	mg/kg	0.05	1.76	1.93	0.32
Cobalt	mg/kg	0.01	0.25	0.25	0.23
Copper	mg/kg	0.02	15.1	15.0	157.
Iron	mg/kg	1	338	330	183
Lead	mg/kg	0.005	0.412	0.370	0.116
Lithium	mg/kg	0.01	1.07	1.05	0.17
Magnesium	mg/kg	0.5	861.	869.	590.
Manganese	mg/kg	0.02	3.04	2.96	9.83
Mercury	mg/kg	0.01	0.37	0.35	0.01
Molybdenum	mg/kg	0.01	0.31	0.29	3.73
Nickel	mg/kg	0.05	1.22	1.38	0.25
Potassium	mg/kg	0.5	12900	12800	9790
Rubidium	mg/kg	0.01	5.70	5.66	12.8
Selenium	mg/kg	0.05	3.40	3.74	0.60
Silver	mg/kg	0.002	0.018	0.016	0.027
Sodium	mg/kg	2	13500	13300	2290
Strontium	mg/kg	0.02	9.69	9.35	0.13
Tellurium	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Thallium	mg/kg	0.002	0.009	0.008	0.002
Tin	mg/kg	0.01	0.09	0.05	0.03
Tungsten	mg/kg	0.005	0.055	0.051	< 0.005
Uranium	mg/kg	0.002	0.053	0.052	< 0.002
Vanadium	mg/kg	0.01	1.50	1.51	0.10
Zinc	mg/kg	0.05	47.7	49.4	110.

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS
for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Project #: 121810356 400.140.102

QA/QC Report

RPC Sample ID:			CRM000697	CRM000698	CRM000699
Type:			CRM NIST 1577	CRM DORM-3	CRM DORM-3
Analytes	**Units**	**RL**			
Aluminum	mg/kg	0.1	0.9	1390	1360
Antimony	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Arsenic	mg/kg	0.02	0.08	5.60	5.73
Barium	mg/kg	0.02	0.06	5.10	5.14
Beryllium	mg/kg	0.002	< 0.002	0.011	0.013
Bismuth	mg/kg	0.05	< 0.05	< 0.05	< 0.05
Boron	mg/kg	0.1	0.8	8.0	7.9
Cadmium	mg/kg	0.001	0.481	0.278	0.278
Calcium	mg/kg	5	118	2420	2440
Chromium	mg/kg	0.05	0.32	1.92	1.84
Cobalt	mg/kg	0.01	0.23	0.25	0.25
Copper	mg/kg	0.02	163.	14.8	14.6
Iron	mg/kg	1	184	417	339
Lead	mg/kg	0.005	0.116	0.425	0.393
Lithium	mg/kg	0.01	0.17	1.09	1.08
Magnesium	mg/kg	0.5	597.	907.	884.
Manganese	mg/kg	0.02	10.1	3.18	2.86
Mercury	mg/kg	0.01	0.01	0.38	0.37
Molybdenum	mg/kg	0.01	3.76	0.30	0.28
Nickel	mg/kg	0.05	0.29	1.19	1.24
Potassium	mg/kg	0.5	9890	13000	12800
Rubidium	mg/kg	0.01	13.3	5.75	5.80
Selenium	mg/kg	0.05	0.71	2.87	3.06
Silver	mg/kg	0.002	0.029	0.015	0.014
Sodium	mg/kg	2	2300	13700	13400
Strontium	mg/kg	0.02	0.13	9.60	9.55
Tellurium	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Thallium	mg/kg	0.002	< 0.002	0.009	0.009
Tin	mg/kg	0.01	0.02	0.09	0.06
Tungsten	mg/kg	0.005	< 0.005	0.059	0.055
Uranium	mg/kg	0.002	< 0.002	0.055	0.052
Vanadium	mg/kg	0.01	0.10	1.57	1.56
Zinc	mg/kg	0.05	118.	42.9	43.6

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS
for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Project #: 121810356 400.140.102

QA/QC Report

RPC Sample ID:			RB002175	RB002176	RB002198
Type:			Blank	Blank	Blank
Analytes	**Units**	**RL**			
Aluminum	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Antimony	mg/kg	0.005	< 0.005	< 0.005	0.008
Arsenic	mg/kg	0.02	< 0.02	< 0.02	< 0.02
Barium	mg/kg	0.02	< 0.02	< 0.02	< 0.02
Beryllium	mg/kg	0.002	< 0.002	< 0.002	< 0.002
Bismuth	mg/kg	0.05	< 0.05	< 0.05	< 0.05
Boron	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Cadmium	mg/kg	0.001	< 0.001	< 0.001	< 0.001
Calcium	mg/kg	5	< 5	< 5	< 5
Chromium	mg/kg	0.05	< 0.05	< 0.05	< 0.05
Cobalt	mg/kg	0.01	< 0.01	< 0.01	< 0.01
Copper	mg/kg	0.02	< 0.02	< 0.02	< 0.02
Iron	mg/kg	1	< 1	< 1	< 1
Lead	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Lithium	mg/kg	0.01	< 0.01	< 0.01	< 0.01
Magnesium	mg/kg	0.5	< 0.5	< 0.5	< 0.5
Manganese	mg/kg	0.02	< 0.02	< 0.02	< 0.02
Mercury	mg/kg	0.01	< 0.01	< 0.01	< 0.01
Molybdenum	mg/kg	0.01	< 0.01	< 0.01	< 0.01
Nickel	mg/kg	0.05	< 0.05	< 0.05	< 0.05
Potassium	mg/kg	0.5	< 0.5	< 0.5	< 0.5
Rubidium	mg/kg	0.01	< 0.01	< 0.01	< 0.01
Selenium	mg/kg	0.05	< 0.05	< 0.05	< 0.05
Silver	mg/kg	0.002	< 0.002	< 0.002	< 0.002
Sodium	mg/kg	2	< 2	< 2	< 2
Strontium	mg/kg	0.02	< 0.02	< 0.02	< 0.02
Tellurium	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Thallium	mg/kg	0.002	< 0.002	< 0.002	< 0.002
Tin	mg/kg	0.01	0.01	< 0.01	< 0.01
Tungsten	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Uranium	mg/kg	0.002	< 0.002	< 0.002	< 0.002
Vanadium	mg/kg	0.01	< 0.01	< 0.01	< 0.01
Zinc	mg/kg	0.05	< 0.05	< 0.05	0.06

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS
for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Project #: 121810356 400.140.102

QA/QC Report

RPC Sample ID:			RB002199	RB002200	RB002201
Type:			Blank	Blank	Blank
Analytes	**Units**	**RL**			
Aluminum	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Antimony	mg/kg	0.005	0.006	< 0.005	0.012
Arsenic	mg/kg	0.02	< 0.02	< 0.02	< 0.02
Barium	mg/kg	0.02	0.02	< 0.02	< 0.02
Beryllium	mg/kg	0.002	< 0.002	< 0.002	< 0.002
Bismuth	mg/kg	0.05	< 0.05	< 0.05	0.05
Boron	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Cadmium	mg/kg	0.001	< 0.001	< 0.001	< 0.001
Calcium	mg/kg	5	< 5	< 5	< 5
Chromium	mg/kg	0.05	< 0.05	< 0.05	< 0.05
Cobalt	mg/kg	0.01	< 0.01	< 0.01	< 0.01
Copper	mg/kg	0.02	< 0.02	< 0.02	< 0.02
Iron	mg/kg	1	< 1	< 1	< 1
Lead	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Lithium	mg/kg	0.01	< 0.01	< 0.01	< 0.01
Magnesium	mg/kg	0.5	< 0.5	< 0.5	< 0.5
Manganese	mg/kg	0.02	< 0.02	< 0.02	0.03
Mercury	mg/kg	0.01	< 0.01	< 0.01	< 0.01
Molybdenum	mg/kg	0.01	< 0.01	< 0.01	< 0.01
Nickel	mg/kg	0.05	< 0.05	< 0.05	< 0.05
Potassium	mg/kg	0.5	< 0.5	< 0.5	< 0.5
Rubidium	mg/kg	0.01	< 0.01	< 0.01	< 0.01
Selenium	mg/kg	0.05	< 0.05	< 0.05	< 0.05
Silver	mg/kg	0.002	< 0.002	< 0.002	< 0.002
Sodium	mg/kg	2	< 2	< 2	< 2
Strontium	mg/kg	0.02	< 0.02	< 0.02	< 0.02
Tellurium	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Thallium	mg/kg	0.002	< 0.002	< 0.002	< 0.002
Tin	mg/kg	0.01	< 0.01	< 0.01	< 0.01
Tungsten	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Uranium	mg/kg	0.002	< 0.002	< 0.002	< 0.002
Vanadium	mg/kg	0.01	< 0.01	< 0.01	< 0.01
Zinc	mg/kg	0.05	< 0.05	< 0.05	< 0.05

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS
for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Project #: 121810356 400.140.102

QA/QC Report

RPC Sample ID:			RB002202	RB002203	RB002208
Type:			Blank	Blank	Blank
Analytes	**Units**	**RL**			
Aluminum	mg/kg	0.1	< 0.1	< 0.1	0.3
Antimony	mg/kg	0.005	0.005	< 0.005	< 0.005
Arsenic	mg/kg	0.02	< 0.02	< 0.02	< 0.02
Barium	mg/kg	0.02	< 0.02	< 0.02	< 0.02
Beryllium	mg/kg	0.002	< 0.002	< 0.002	< 0.002
Bismuth	mg/kg	0.05	< 0.05	< 0.05	< 0.05
Boron	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Cadmium	mg/kg	0.001	< 0.001	< 0.001	< 0.001
Calcium	mg/kg	5	< 5	< 5	< 5
Chromium	mg/kg	0.05	< 0.05	< 0.05	< 0.05
Cobalt	mg/kg	0.01	< 0.01	< 0.01	< 0.01
Copper	mg/kg	0.02	< 0.02	< 0.02	< 0.02
Iron	mg/kg	1	< 1	< 1	< 1
Lead	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Lithium	mg/kg	0.01	< 0.01	< 0.01	< 0.01
Magnesium	mg/kg	0.5	< 0.5	< 0.5	< 0.5
Manganese	mg/kg	0.02	0.02	0.02	< 0.02
Mercury	mg/kg	0.01	< 0.01	< 0.01	< 0.01
Molybdenum	mg/kg	0.01	< 0.01	< 0.01	< 0.01
Nickel	mg/kg	0.05	< 0.05	< 0.05	< 0.05
Potassium	mg/kg	0.5	< 0.5	< 0.5	< 0.5
Rubidium	mg/kg	0.01	< 0.01	< 0.01	< 0.01
Selenium	mg/kg	0.05	< 0.05	< 0.05	< 0.05
Silver	mg/kg	0.002	< 0.002	< 0.002	< 0.002
Sodium	mg/kg	2	< 2	< 2	< 2
Strontium	mg/kg	0.02	< 0.02	< 0.02	< 0.02
Tellurium	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Thallium	mg/kg	0.002	< 0.002	< 0.002	< 0.002
Tin	mg/kg	0.01	< 0.01	< 0.01	< 0.01
Tungsten	mg/kg	0.005	< 0.005	< 0.005	< 0.005
Uranium	mg/kg	0.002	< 0.002	< 0.002	< 0.002
Vanadium	mg/kg	0.01	< 0.01	< 0.01	< 0.01
Zinc	mg/kg	0.05	< 0.05	0.14	0.07

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS

for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Project #: 121810356 400.140.102

QA/QC Report

RPC Sample ID:			CRM000664	CRM000665	CRM000666
Type:			CRM NIST 2709a	CRM NIST 2709a	CRM NIST 2709a
Analytes	**Units**	**RL**			
Aluminum	mg/kg	1	23800	23400	22300
Antimony	mg/kg	0.1	< 0.1	< 0.1	0.1
Arsenic	mg/kg	1	8	8	8
Barium	mg/kg	1	430	432	415
Beryllium	mg/kg	0.1	0.7	0.7	0.7
Bismuth	mg/kg	1	< 1	< 1	< 1
Boron	mg/kg	1	36	35	35
Cadmium	mg/kg	0.01	0.35	0.34	0.38
Calcium	mg/kg	50	14100	14000	13600
Chromium	mg/kg	1	72	71	70
Cobalt	mg/kg	0.1	11.3	11.4	11.3
Copper	mg/kg	1	29	29	29
Iron	mg/kg	20	28000	27800	27700
Lead	mg/kg	0.1	11.6	11.6	11.8
Lithium	mg/kg	0.1	35.4	34.9	33.3
Magnesium	mg/kg	10	12400	12300	12000
Manganese	mg/kg	1	460	462	460
Mercury	mg/kg	0.01	0.84	0.81	0.83
Molybdenum	mg/kg	0.1	0.6	0.6	0.7
Nickel	mg/kg	1	72	73	73
Potassium	mg/kg	20	3590	3510	3340
Rubidium	mg/kg	0.1	32.3	32.0	31.2
Selenium	mg/kg	1	1	1	1
Silver	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Sodium	mg/kg	50	550	540	520
Strontium	mg/kg	1	106	106	104
Tellurium	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Thallium	mg/kg	0.1	0.2	0.2	0.3
Tin	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Tungsten	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Uranium	mg/kg	0.1	1.8	1.8	1.7
Vanadium	mg/kg	1	68	67	66
Zinc	mg/kg	1	84	84	83

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS

for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Project #: 121810356 400.140.102

QA/QC Report

RPC Sample ID:			RB002141	RB002142	RB002143
Type:			Blank	Blank	Blank
Analytes	**Units**	**RL**			
Aluminum	mg/kg	1	1	< 1	1
Antimony	mg/kg	0.1	0.2	0.1	< 0.1
Arsenic	mg/kg	1	< 1	< 1	< 1
Barium	mg/kg	1	< 1	< 1	< 1
Beryllium	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Bismuth	mg/kg	1	< 1	< 1	< 1
Boron	mg/kg	1	< 1	< 1	< 1
Cadmium	mg/kg	0.01	< 0.01	< 0.01	< 0.01
Calcium	mg/kg	50	< 50	< 50	< 50
Chromium	mg/kg	1	< 1	< 1	< 1
Cobalt	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Copper	mg/kg	1	< 1	< 1	< 1
Iron	mg/kg	20	< 20	< 20	< 20
Lead	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Lithium	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Magnesium	mg/kg	10	< 10	< 10	< 10
Manganese	mg/kg	1	< 1	< 1	< 1
Mercury	mg/kg	0.01	< 0.01	< 0.01	-
Molybdenum	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Nickel	mg/kg	1	< 1	< 1	< 1
Potassium	mg/kg	20	< 20	< 20	< 20
Rubidium	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Selenium	mg/kg	1	< 1	< 1	< 1
Silver	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Sodium	mg/kg	50	< 50	< 50	< 50
Strontium	mg/kg	1	< 1	< 1	< 1
Tellurium	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Thallium	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Tin	mg/kg	0.1	4.2	4.3	4.1
Tungsten	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Uranium	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Vanadium	mg/kg	1	< 1	< 1	< 1
Zinc	mg/kg	1	< 1	< 1	< 1

Report ID: 128040-IAS Rev01
Report Date: 27-Jan-12
Date Received: 02-Nov-11

CERTIFICATE OF ANALYSIS
for
Stantec Consulting Ltd
845 Prospect Street
Fredericton, NB E3B 2T7

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

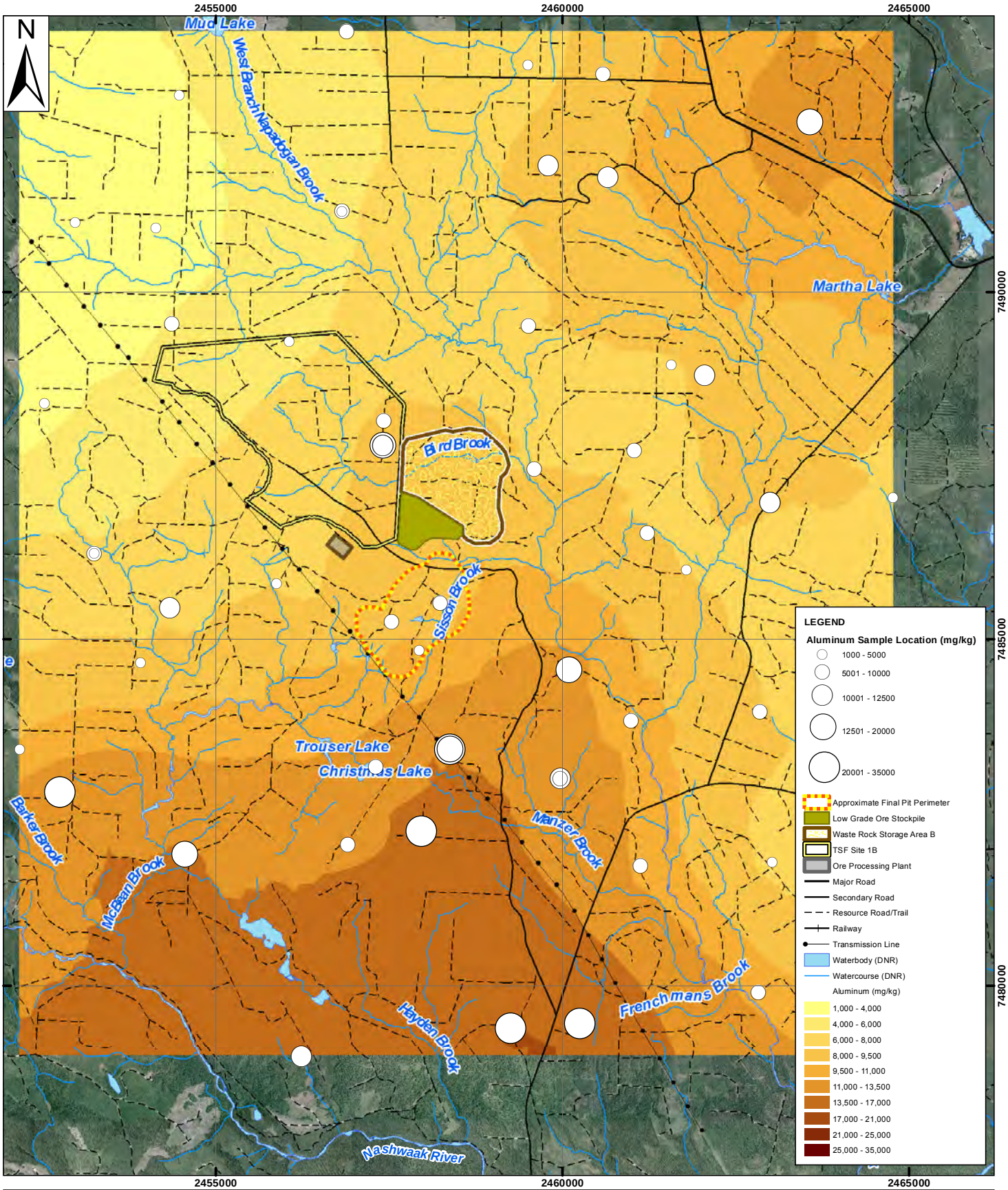
Methods

Analyte	RPC SOP #	Method Reference	Method Principle
EPA 3050B Digestion	4.M19	EPA 3050B	Nitric acid/Hydrogen Peroxide Digestion
Trace Metals	4.M01 & 4.M29	EPA 200.8 or EPA 200.7	ICP-MS or ICP-ES
Mercury	4.M20	EPA 245.5	Cold Vapor AAS

Appendix D

Baseline Soil Maps (Uncorrected Raw Data)

Note: The figures presented in this appendix presented soil data only for those metals that were above the detection limit in at least one sample. As tellurium and tin were not detected in any soil samples, they are not included in this appendix.



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Baseline Soil – Aluminum

Sisson Project

Napadogan, N.B.

Client: Northcliff Resources Ltd.

Scale: NTS

0 0.5 1 1.5

Kilometres

Project No.: 121810356

Date: (dd/mm/yyyy) 02/02/2012

Dwn. By: JAB

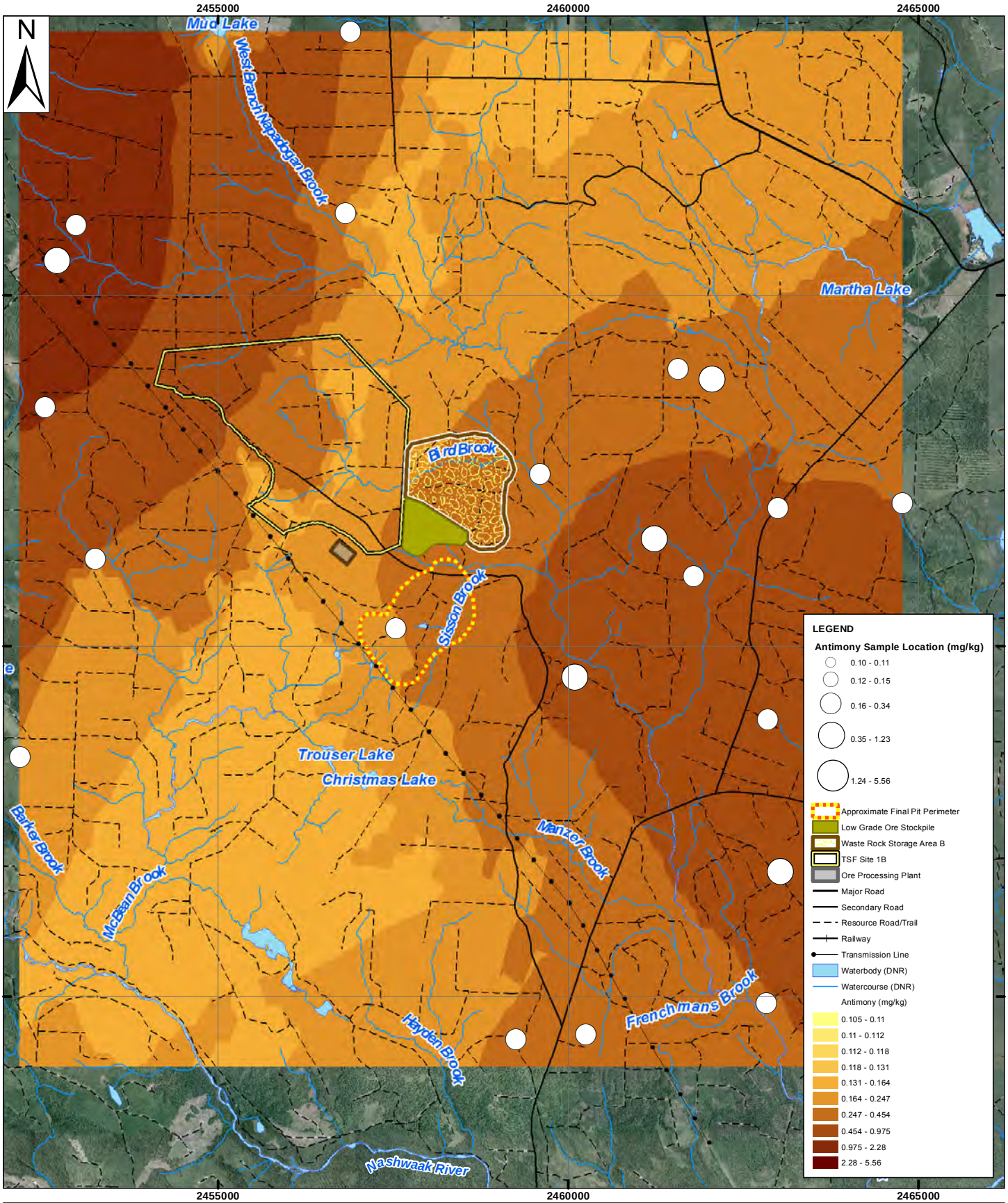
Appd. By: DM

Data Sources:
NBDNR, SNB
NHN, NB Aquatic Data Warehouse
Imagery Provided By:
NBDNR
Google Earth Pro

Fig. No.: D1

Stantec

Map: NAD83 CSRS NB Double Stereographic



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Baseline Soil – Antimony

Sisson Project

Napadogan, N.B.

Client: Northcliff Resources Ltd.

Scale: NTS

0 0.5 1 1.5

Kilometres

Project No.: 121810356

Date: (dd/mm/yyyy) 02/02/2012

Dwn. By: JAB

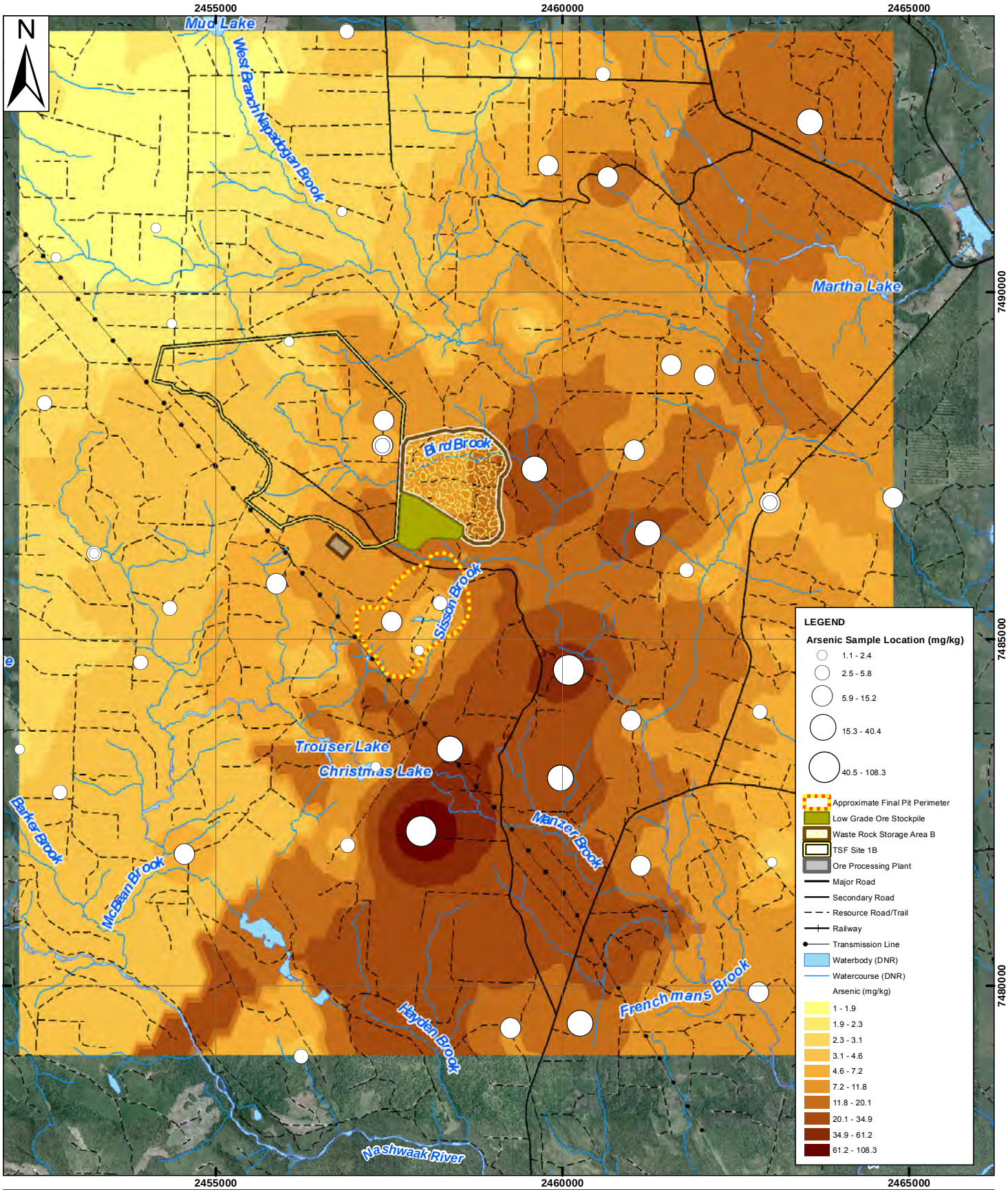
Appd. By: DM

Data Sources: NBDNR, SNB NHN, NB Aquatic Data Warehouse Imagery Provided By: NBDNR Google Earth Pro

Fig. No.: D2

Stantec

Map: NAD83 CSRS NB Double Stereographic



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Baseline Soil – Arsenic

Sisson Project

Napadogan, N.B.

Client: Northcliff Resources Ltd.

Scale: NTS

0 0.5 1 1.5

Kilometres

Project No.: 121810356

Date: (dd/mm/yyyy) 02/02/2012

Dwn. By: JAB

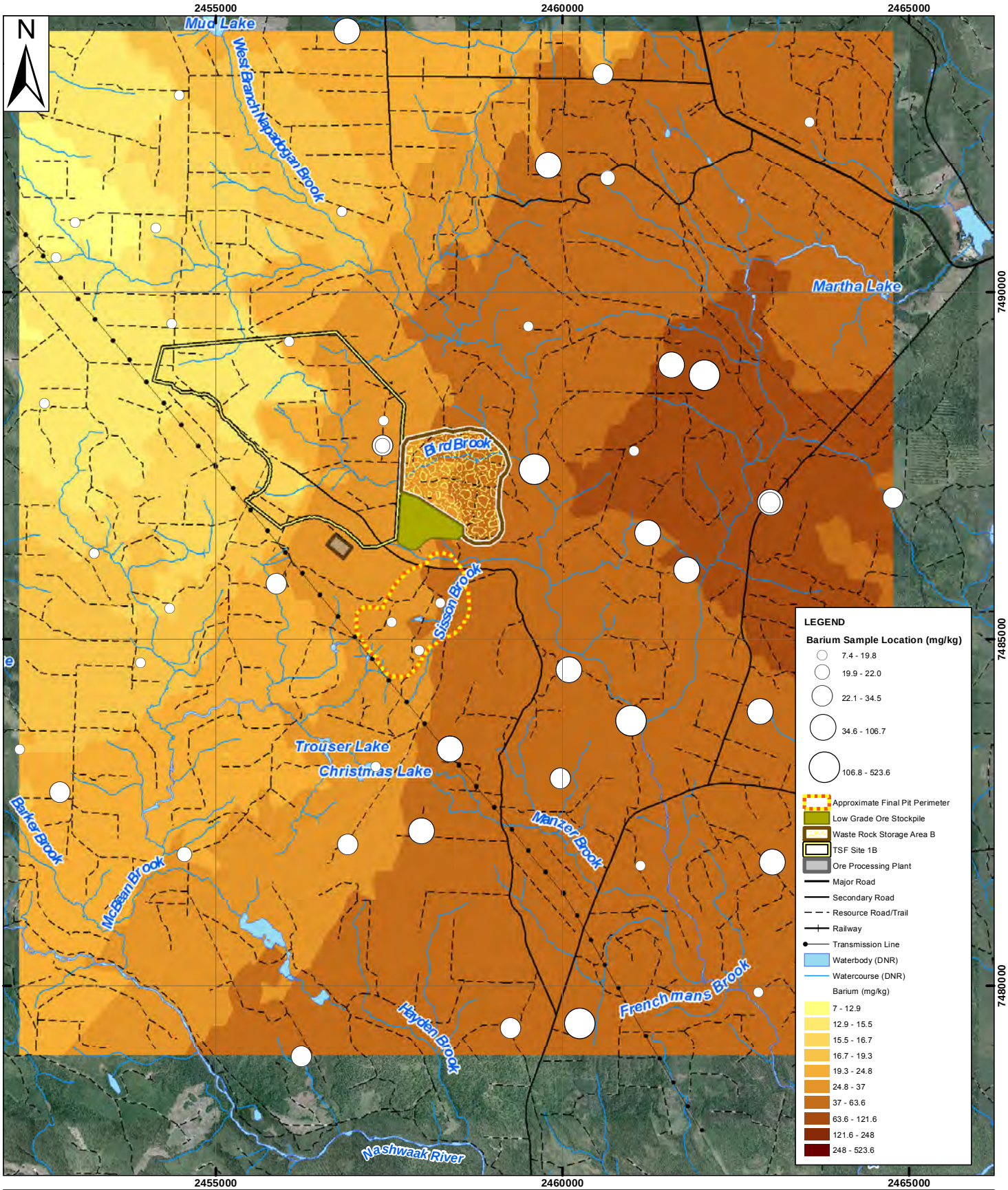
Appd. By: DM

Data Sources:
NBDNR, SNB
NHN, NB Aquatic Data Warehouse
Imagery Provided By:
NBDNR
Google Earth Pro

Fig. No.: D3

Stantec

Map: NAD83 CSRS NB Double Stereographic



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Baseline Soil – Barium

Sisson Project

Napadogan, N.B.

Client: Northcliff Resources Ltd.

Scale: NTS

0 0.5 1 1.5

Kilometres

Project No.: 121810356

Data Sources: NBDNR, SNB NHN, NB Aquatic Data Warehouse Imagery Provided By: NBDNR Google Earth Pro

Fig. No.: D4

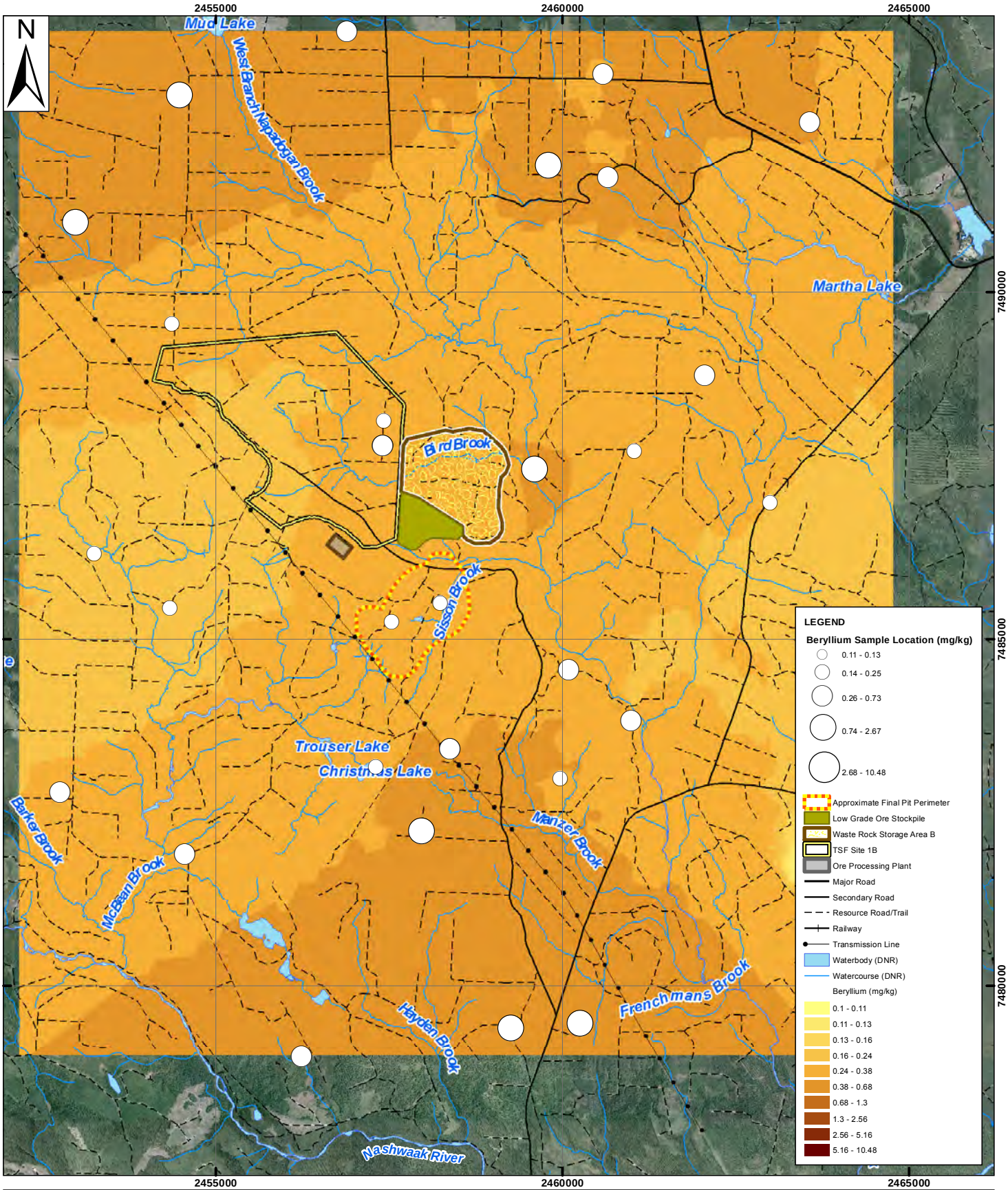
Date: (dd/mm/yyyy) 02/02/2012

Dwn. By: JAB

Appd. By: DM

Stantec

Map: NAD83 CSRS NB Double Stereographic



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Baseline Soil – Beryllium

Sisson Project

Napadogan, N.B.

Client: Northcliff Resources Ltd.

Scale: NTS

0 0.5 1 1.5

Kilometres

Project No.: 121810356

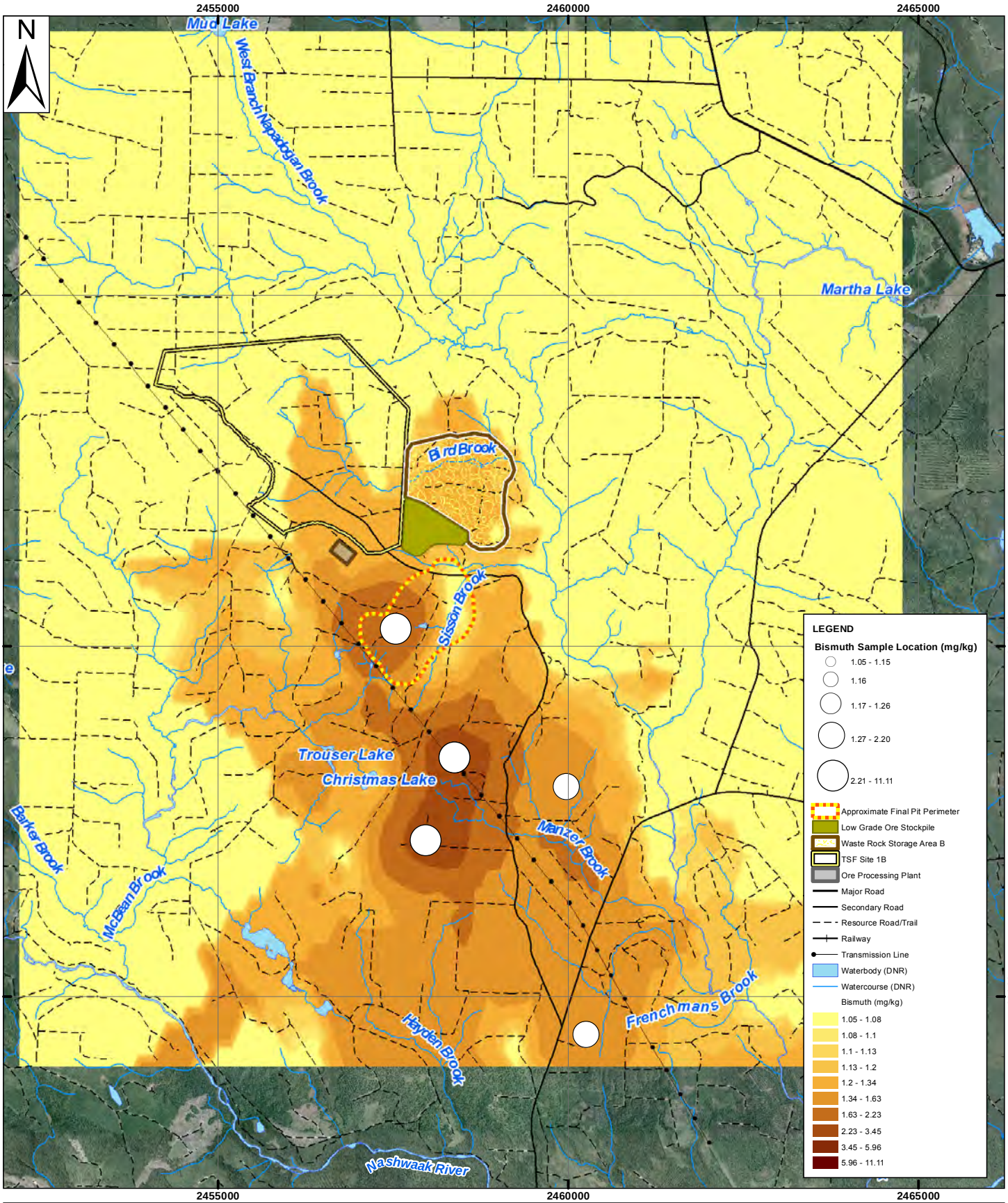
Data Sources: NBDNR, SNB NHN, NB Aquatic Data Warehouse Imagery Provided By: NBDNR Google Earth Pro

Fig. No.: D5

Date: (dd/mm/yyyy)	Dwn. By:	Appd. By:
02/02/2012	JAB	DM

Stantec

Map: NAD83 CSRS NB Double Stereographic



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Baseline Soil – Bismuth

Sisson Project

Napadogan, N.B.

Client: Northcliff Resources Ltd.

Scale: NTS

0 0.5 1 1.5

Kilometres

Project No.: 121810356

Date: (dd/mm/yyyy) 02/02/2012

Dwn. By: JAB

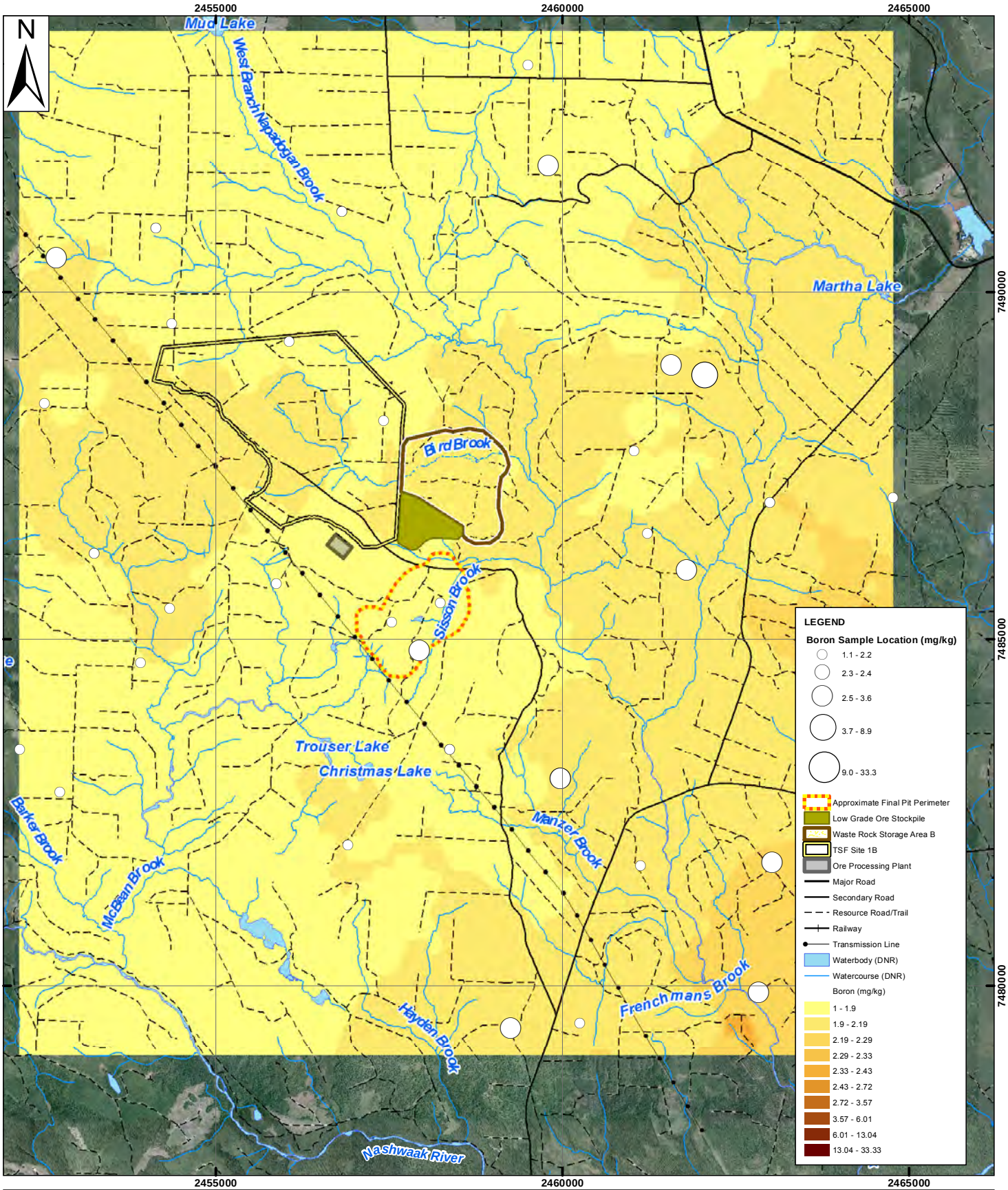
Appd. By: DM

Data Sources:
NBDNR, SNB
NHN, NB Aquatic Data Warehouse
Imagery Provided By:
NBDNR
Google Earth Pro

Fig. No.: D6

Stantec

Map: NAD83 CSRS NB Double Stereographic



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Baseline Soil – Boron

Sisson Project

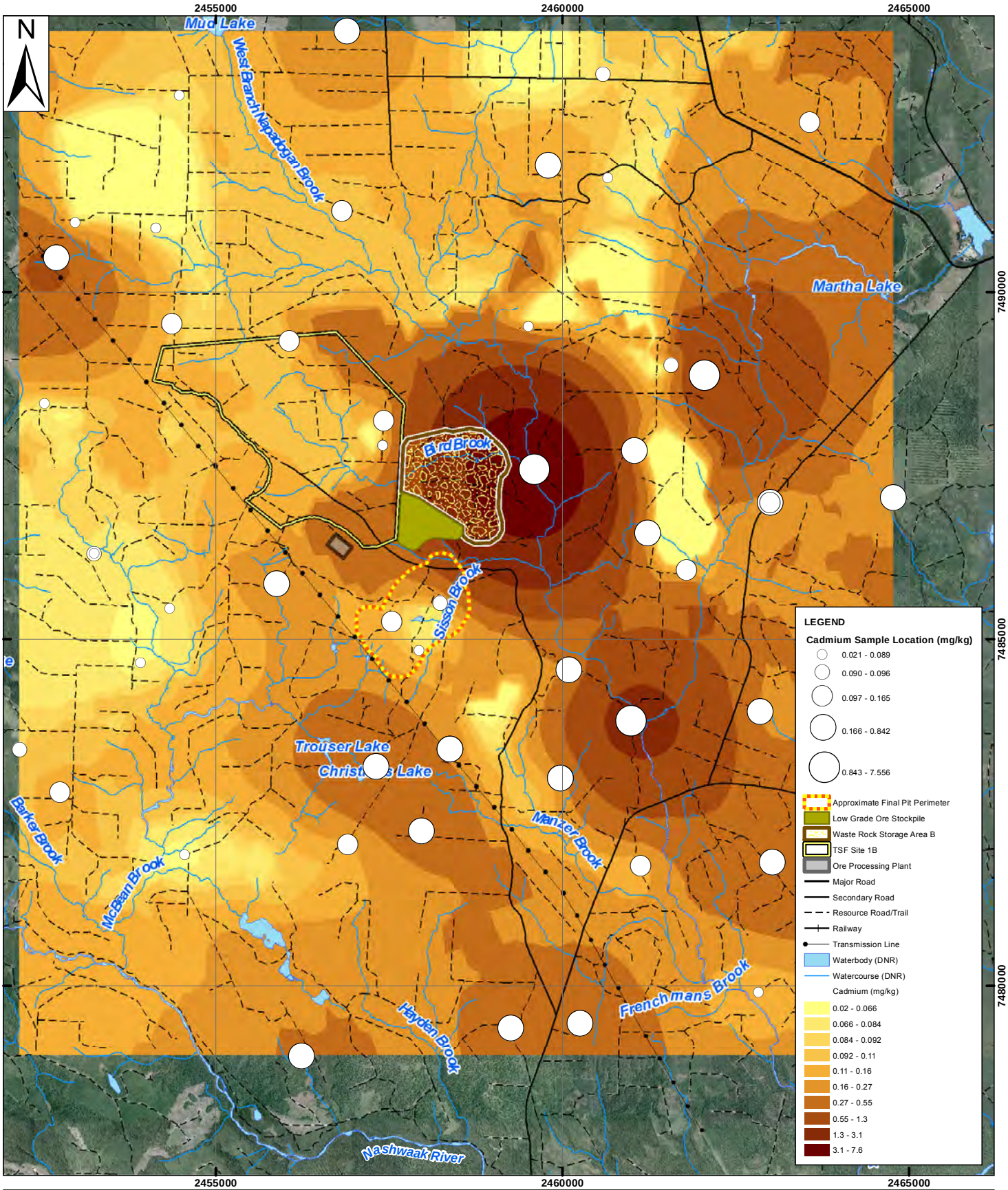
Napadogan, N.B.

Client: Northcliff Resources Ltd.

Scale: NTS	Project No.:	Data Sources:	Fig. No.:
0 0.5 1 1.5 Kilometres	121810356	NBDNR, SNB NHN, NB Aquatic Data Warehouse Imagery Provided By: NBDNR Google Earth Pro	D7
Date: (dd/mm/yyyy) 02/02/2012	Dwn. By: JAB	Appd. By: DM	

Stantec

Map: NAD83 CSRS NB Double Stereographic



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Baseline Soil – Cadmium

Sisson Project

Napadogan, N.B.

Client: Northcliff Resources Ltd.

Scale: NTS

0 0.5 1 1.5

Kilometres

Project No.: 121810356

Data Sources: NBDNR, SNB NHN, NB Aquatic Data Warehouse Imagery Provided By: NBDNR Google Earth Pro

Fig. No.: D8

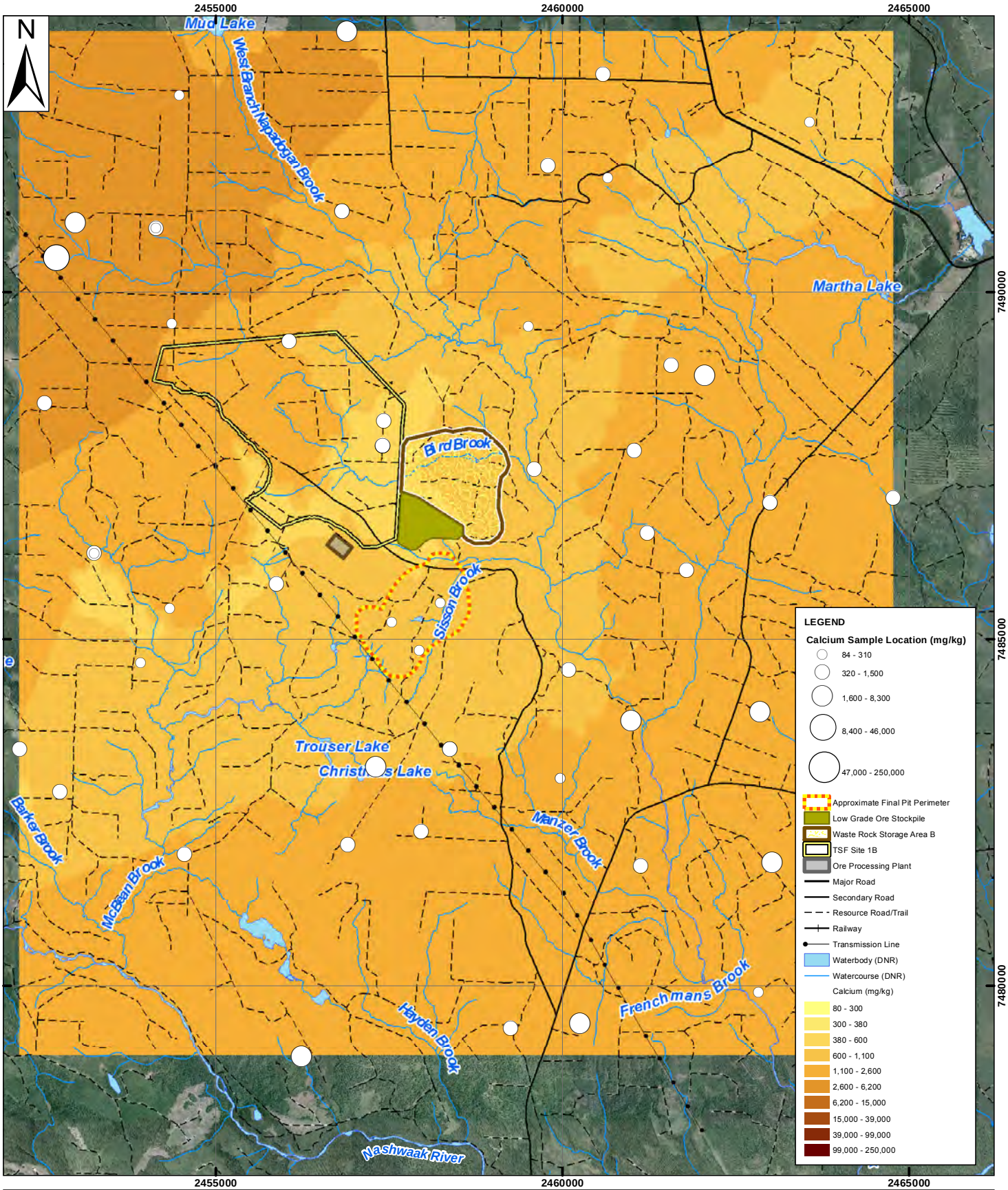
Date: (dd/mm/yyyy) 02/02/2012

Dwn. By: JAB

Appd. By: DM

Stantec

Map: NAD83 CSRS NB Double Stereographic



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Baseline Soil – Calcium

Sisson Project

Napadogan, N.B.

Client: Northcliff Resources Ltd.

Scale: NTS

0 0.5 1 1.5

Kilometres

Project No.: 121810356

Date: (dd/mm/yyyy) 02/02/2012

Dwn. By: JAB

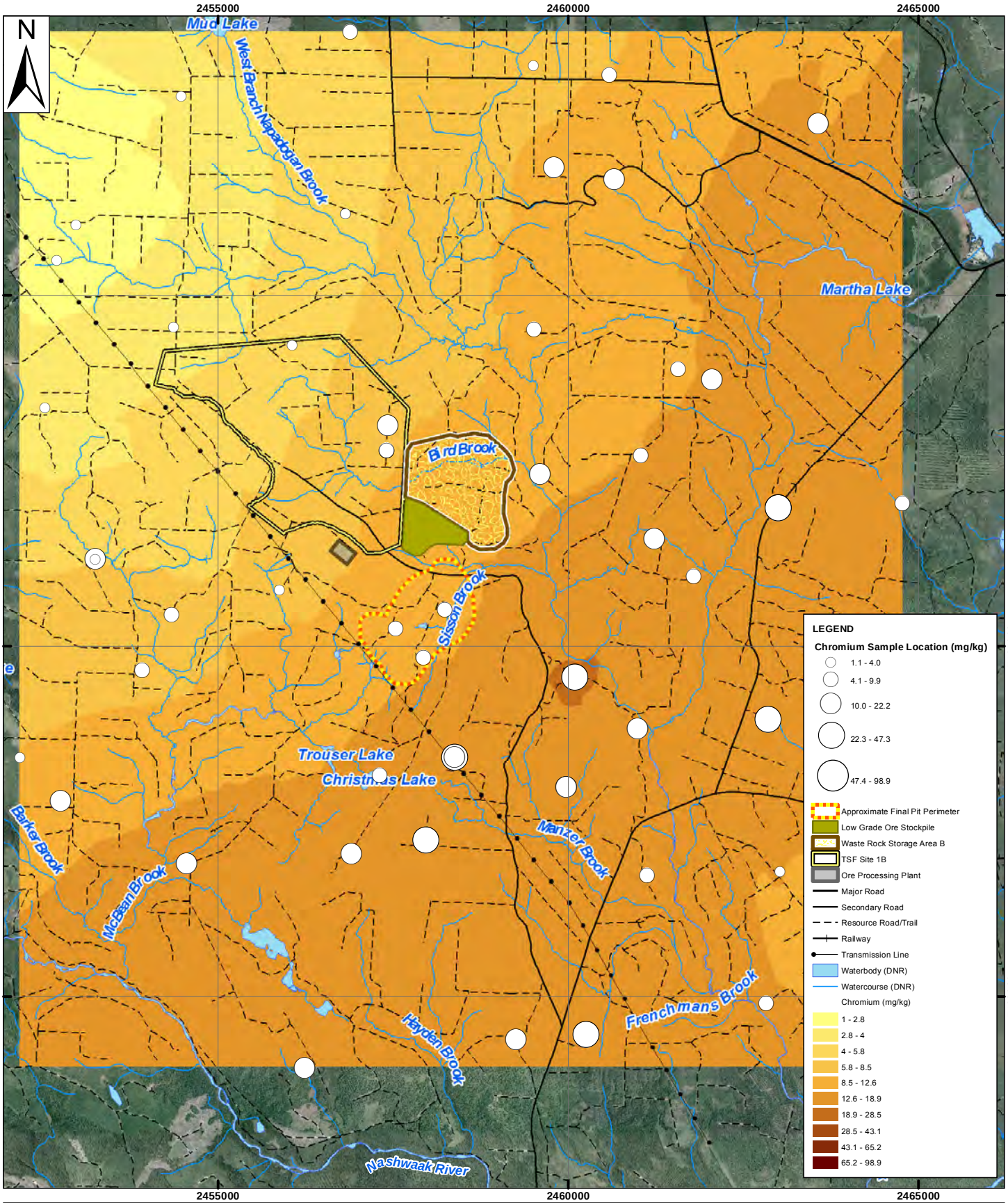
Appd. By: DM

Data Sources:
NBDNR, SNB
NHN, NB Aquatic Data Warehouse
Imagery Provided By:
NBDNR
Google Earth Pro

Fig. No.: D9

Stantec

Map: NAD83 CSRS NB Double Stereographic



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Baseline Soil – Chromium

Sisson Project

Napadogan, N.B.

Client: Northcliff Resources Ltd.

Scale: NTS

0 0.5 1 1.5

Kilometres

Project No.: 121810356

Date: (dd/mm/yyyy) 02/02/2012

Dwn. By: JAB

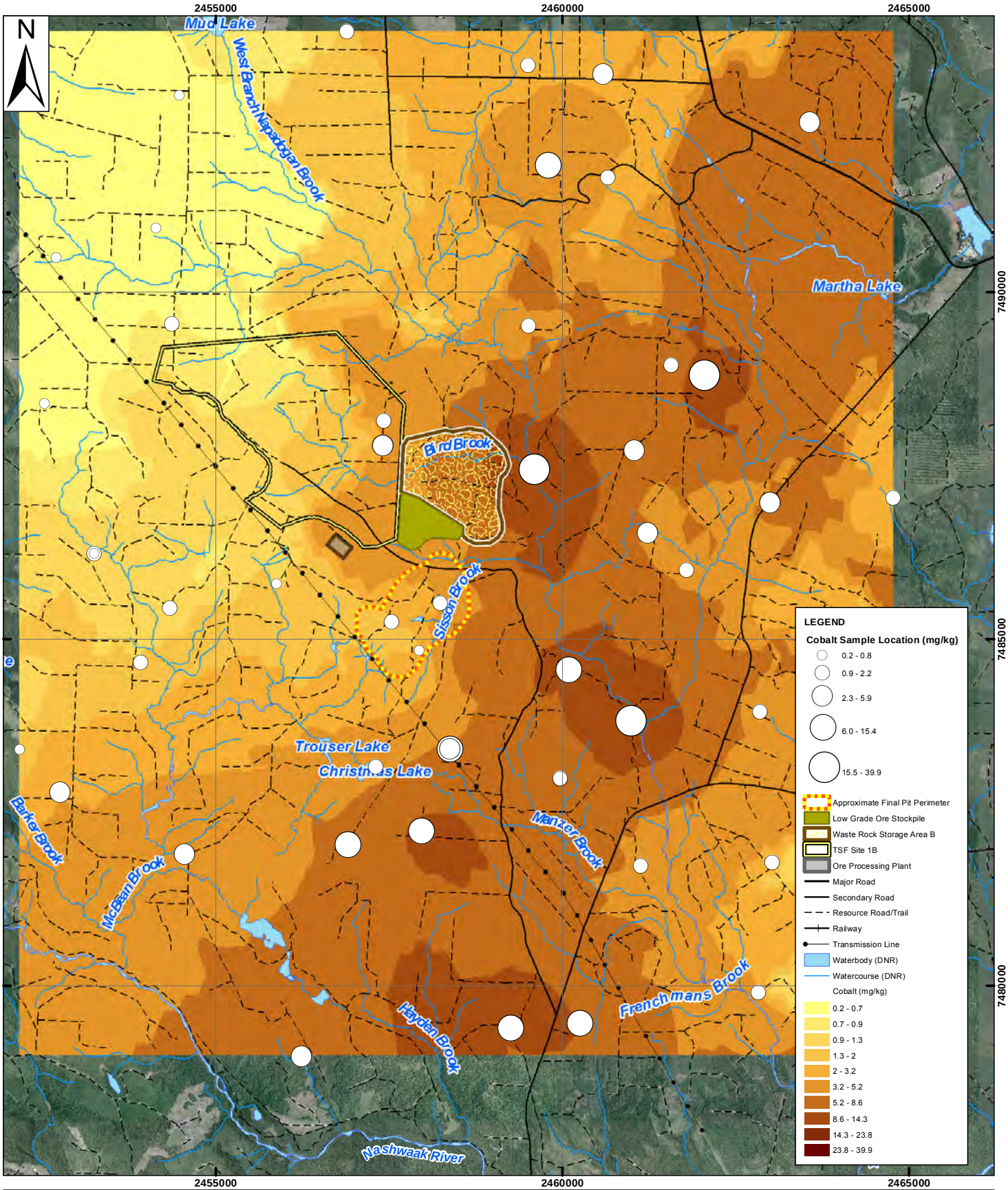
Appd. By: DM

Data Sources:
NBDNR, SNB
NHN, NB Aquatic Data Warehouse
Imagery Provided By:
NBDNR
Google Earth Pro

Fig. No.: D10

Stantec

Map: NAD83 CSRS NB Double Stereographic



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Baseline Soil – Cobalt

Sisson Project

Napadogan, N.B.

Client: Northcliff Resources Ltd.

Scale: NTS

0 0.5 1 1.5

Kilometres

Project No.: 121810356

Date: (dd/mm/yyyy) 02/02/2012

Dwn. By: JAB

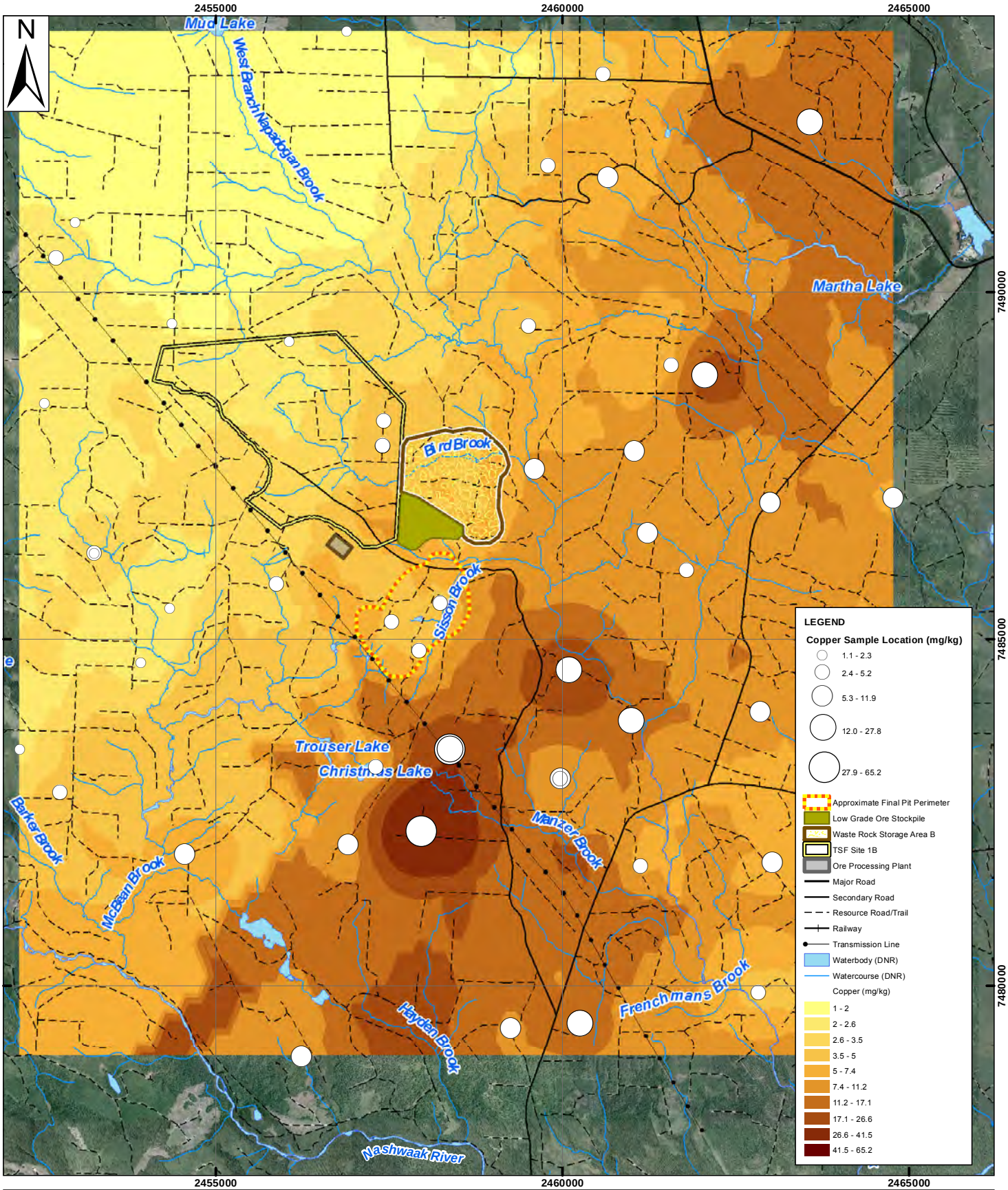
Appd. By: DM

Data Sources:
NBDNR, SNB
NHN, NB Aquatic Data Warehouse
Imagery Provided By:
NBDNR
Google Earth Pro

Fig. No.: D11

Stantec

Map: NAD83 CSRS NB Double Stereographic



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Baseline Soil – Copper

Sisson Project

Napadogan, N.B.

Client: Northcliff Resources Ltd.

Scale: NTS

0 0.5 1 1.5

Kilometres

Project No.: 121810356

Date: (dd/mm/yyyy) 02/02/2012

Dwn. By: JAB

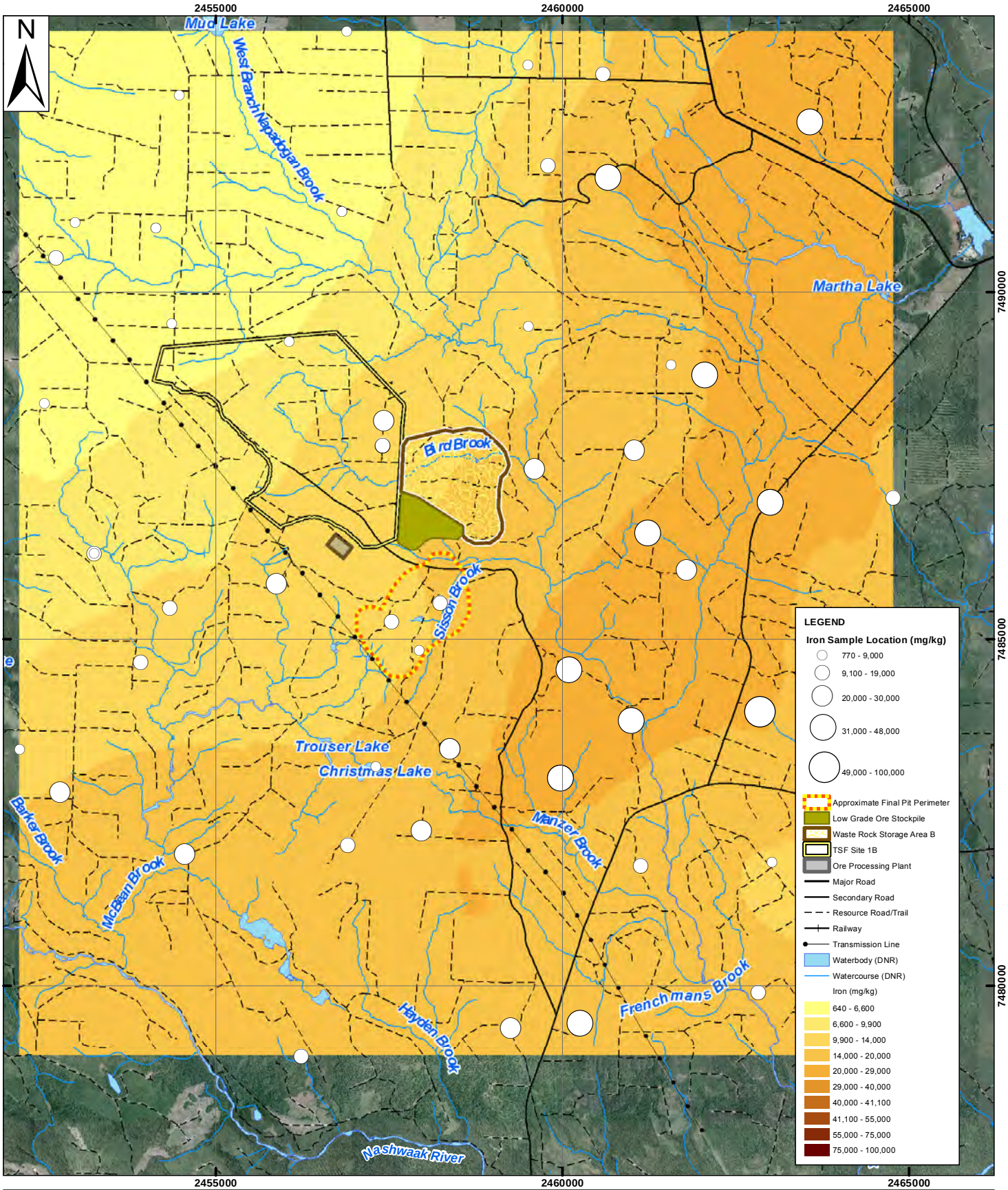
Appd. By: DM

Data Sources:
NBDNR, SNB
NHN, NB Aquatic Data Warehouse
Imagery Provided By:
NBDNR
Google Earth Pro

Fig. No.: D12

Stantec

Map: NAD83 CSRS NB Double Stereographic



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Baseline Soil – Iron

Sisson Project

Napadogan, N.B.

Client: Northcliff Resources Ltd.

Scale: NTS

0 0.5 1 1.5

Kilometres

Project No.: 121810356

Date: (dd/mm/yyyy) 02/02/2012

Dwn. By: JAB

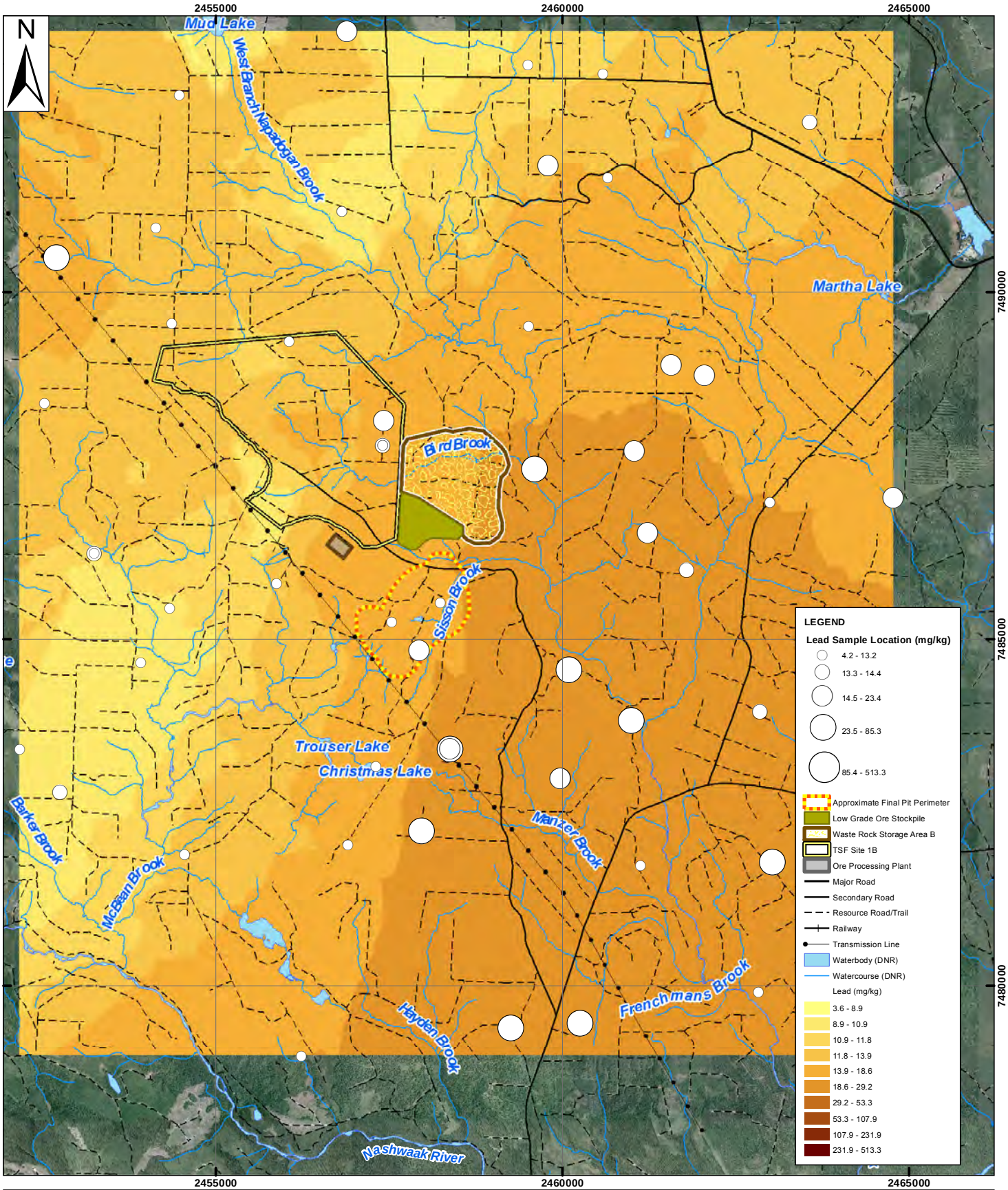
Appd. By: DM

Data Sources:
NBDNR, SNB
NHN, NB Aquatic Data Warehouse
Imagery Provided By:
NBDNR
Google Earth Pro

Fig. No.: D13

Stantec

Map: NAD83 CSRS NB Double Stereographic



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Baseline Soil – Lead

Sisson Project

Napadogan, N.B.

Client: Northcliff Resources Ltd.

Scale: NTS

0 0.5 1 1.5

Kilometres

Project No.: 121810356

Date: (dd/mm/yyyy) 02/02/2012

Dwn. By: JAB

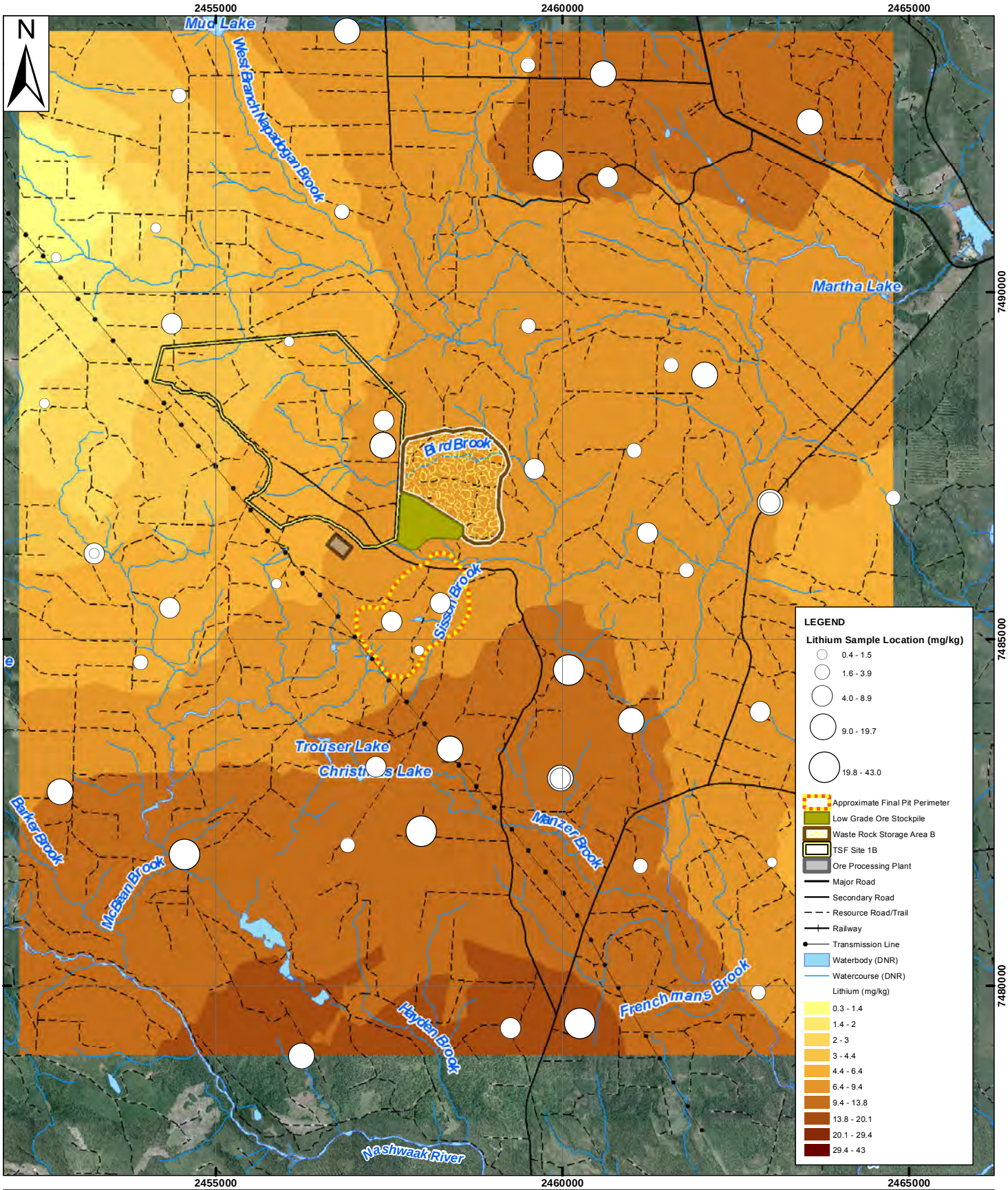
Appd. By: DM

Data Sources:
NBDNR, SNB
NHN, NB Aquatic Data Warehouse
Imagery Provided By:
NBDNR
Google Earth Pro

Fig. No.: D14

Stantec

Map: NAD83 CSRS NB Double Stereographic



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Baseline Soil – Lithium

Sisson Project

Napadogan, N.B.

Client: Northcliff Resources Ltd.

Scale: NTS

0 0.5 1 1.5

Kilometres

Project No.: 121810356

Date: (dd/mm/yyyy) 02/02/2012

Dwn. By: JAB

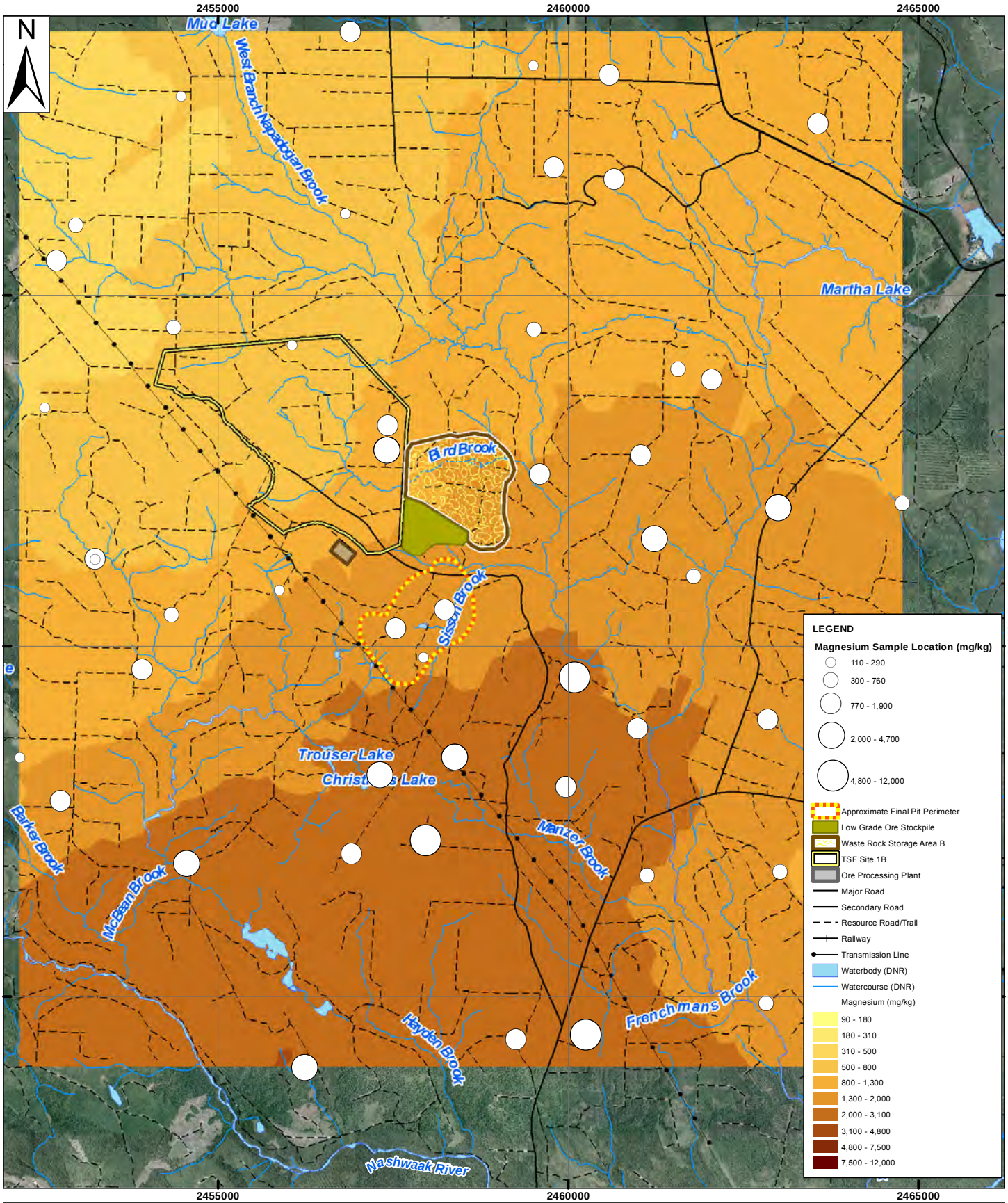
Appd. By: DM

Data Sources:
NBDNR, SNB
NHN, NB Aquatic Data Warehouse
Imagery Provided By:
NBDNR
Google Earth Pro

Fig. No.: D15

Stantec

Map: NAD83 CSRS NB Double Stereographic



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Baseline Soil – Magnesium

Sisson Project

Napadogan, N.B.

Client: Northcliff Resources Ltd.

Scale: NTS

0 0.5 1 1.5

Kilometres

Project No.: 121810356

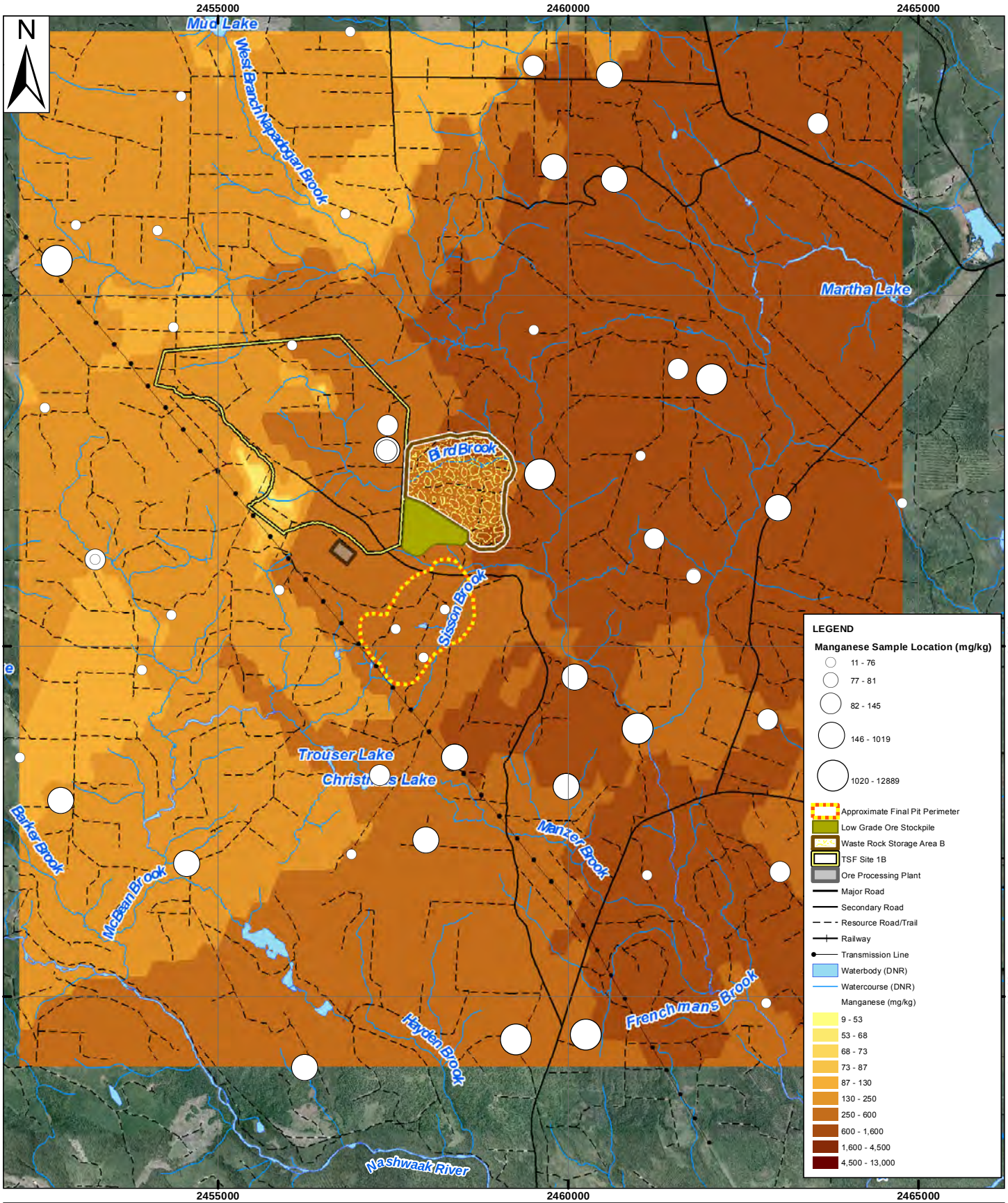
Data Sources: NBDNR, SNB NHN, NB Aquatic Data Warehouse Imagery Provided By: NBDNR Google Earth Pro

Fig. No.: D16

Date: (dd/mm/yyyy)	Dwn. By:	Appd. By:
02/02/2012	JAB	DM

Stantec

Map: NAD83 CSRS NB Double Stereographic



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Baseline Soil – Manganese

Sisson Project

Napadogan, N.B.

Client: Northcliff Resources Ltd.

Scale: NTS

0 0.5 1 1.5

Kilometres

Project No.: 121810356

Data Sources: NBDNR, SNB NHN, NB Aquatic Data Warehouse Imagery Provided By: NBDNR Google Earth Pro

Fig. No.: D17

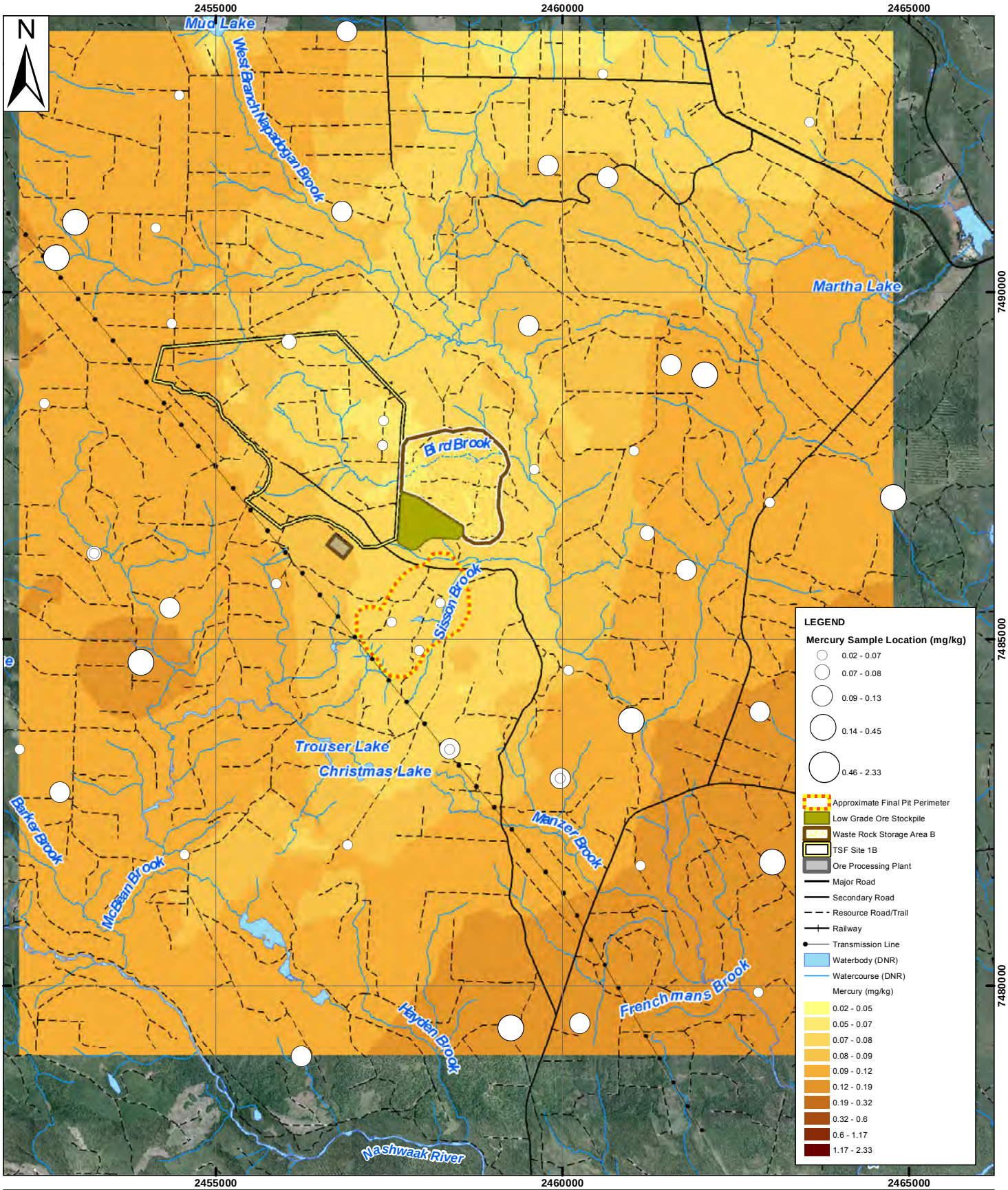
Date: (dd/mm/yyyy) 02/02/2012

Dwn. By: JAB

Appd. By: DM

Stantec

Map: NAD83 CSRS NB Double Stereographic



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Baseline Soil – Mercury

Sisson Project

Napadogan, N.B.

Client: Northcliff Resources Ltd.

Scale: NTS

0 0.5 1 1.5

Kilometres

Project No.: 121810356

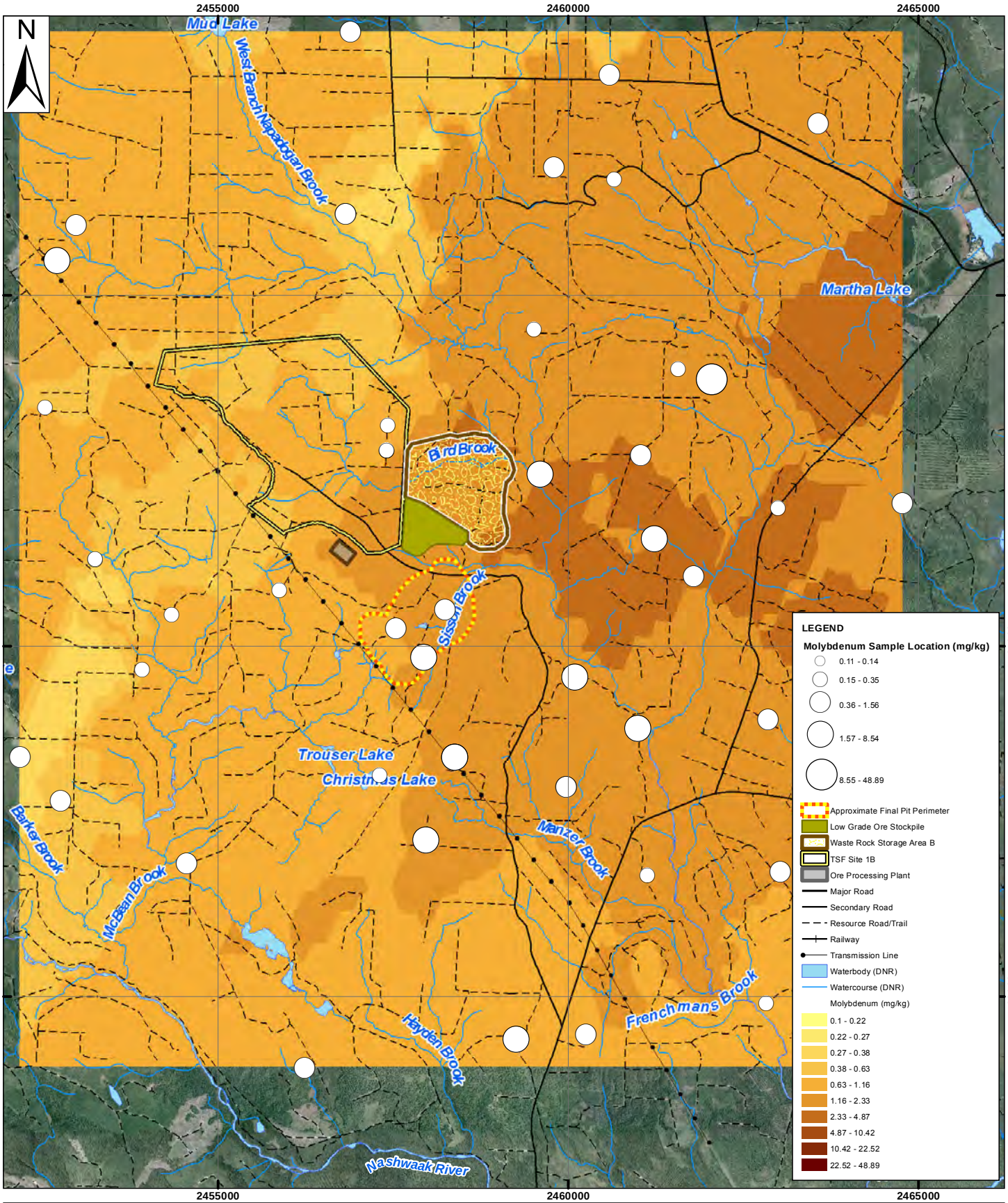
Data Sources: NBDNR, SNB NHN, NB Aquatic Data Warehouse Imagery Provided By: NBDNR Google Earth Pro

Fig. No.: D18

Date: (dd/mm/yyyy)	Dwn. By:	Appd. By:
02/02/2012	JAB	DM

Stantec

Map: NAD83 CSRS NB Double Stereographic



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Baseline Soil – Molybdenum

Sisson Project

Napadogan, N.B.

Client: Northcliff Resources Ltd.

Scale: NTS

0 0.5 1 1.5

Kilometres

Project No.: 121810356

Date: (dd/mm/yyyy) 02/02/2012

Dwn. By: JAB

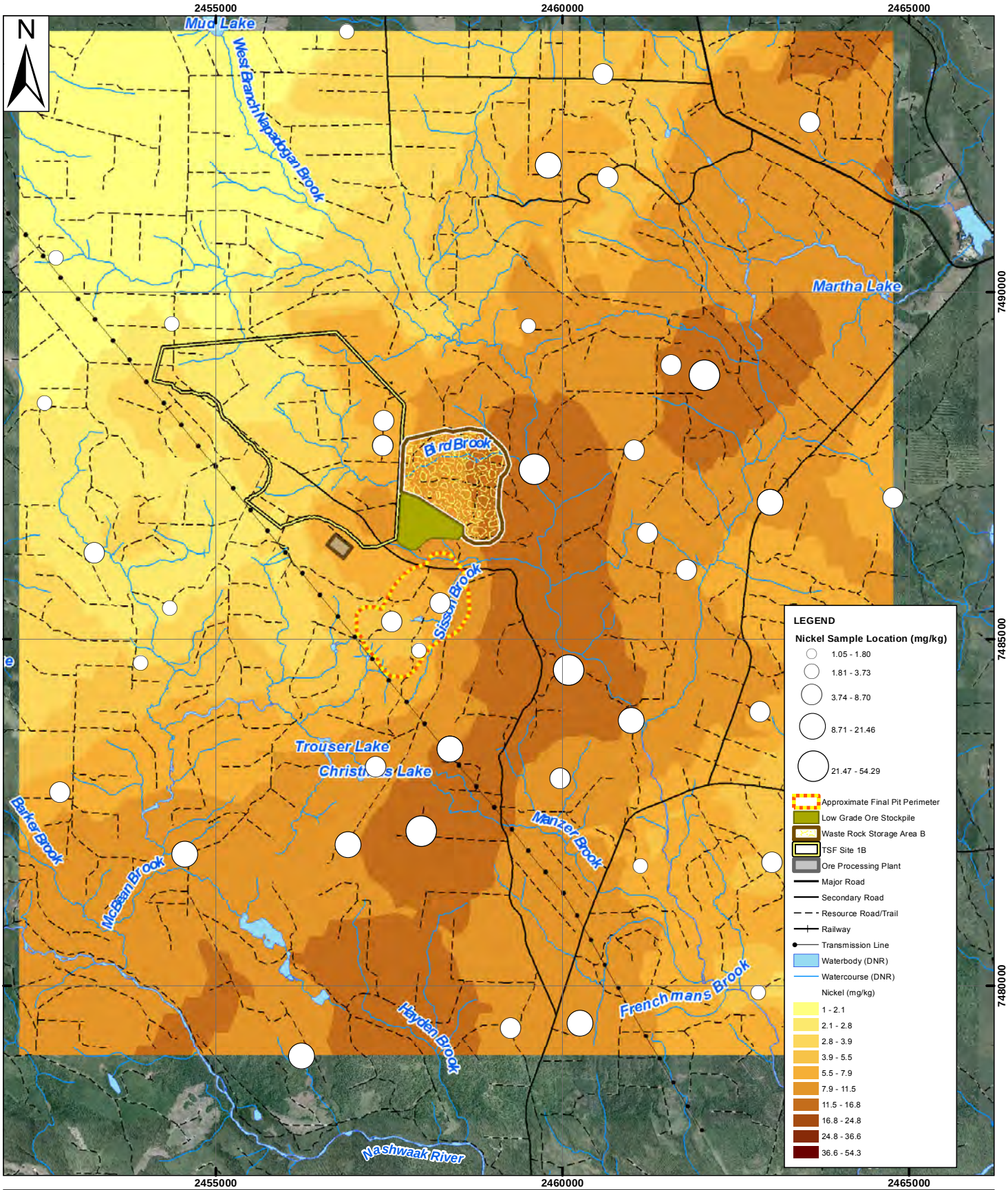
Appd. By: DM

Data Sources:
NBDNR, SNB
NHN, NB Aquatic Data Warehouse
Imagery Provided By:
NBDNR
Google Earth Pro

Fig. No.: D19

Stantec

Map: NAD83 CSRS NB Double Stereographic



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Baseline Soil – Nickel

Sisson Project

Napadogan, N.B.

Client: Northcliff Resources Ltd.

Scale: NTS

0 0.5 1 1.5

Kilometres

Project No.: 121810356

Date: (dd/mm/yyyy) 02/02/2012

Dwn. By: JAB

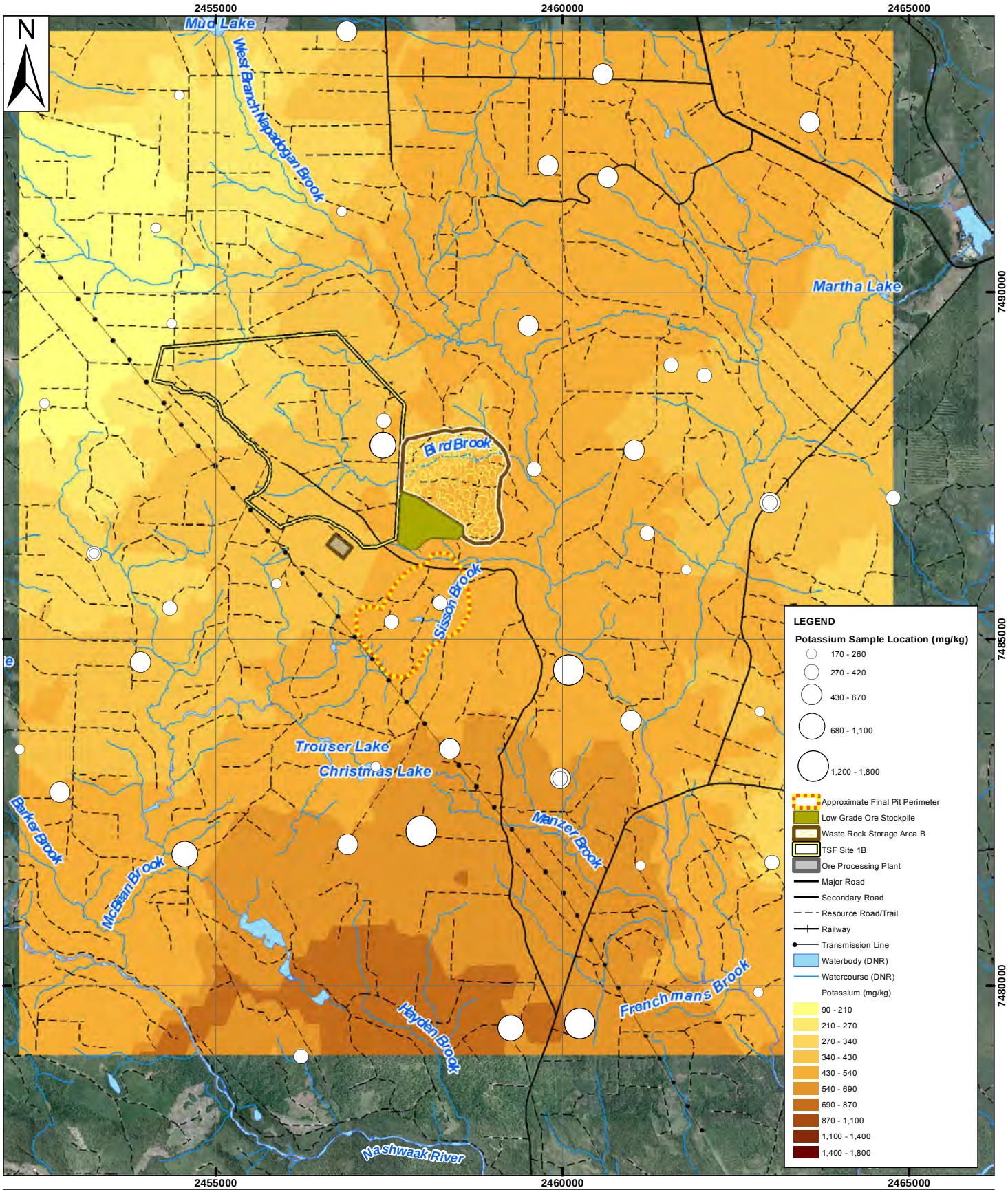
Appd. By: DM

Data Sources: NBDNR, SNB NHN, NB Aquatic Data Warehouse Imagery Provided By: NBDNR Google Earth Pro

Fig. No.: D20

Stantec

Map: NAD83 CSRS NB Double Stereographic



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Baseline Soil – Potassium

Sisson Project

Napadogan, N.B.

Client: Northcliff Resources Ltd.

Scale: NTS

0 0.5 1 1.5

Kilometres

Project No.: 121810356

Date: (dd/mm/yyyy) 02/02/2012

Dwn. By: JAB

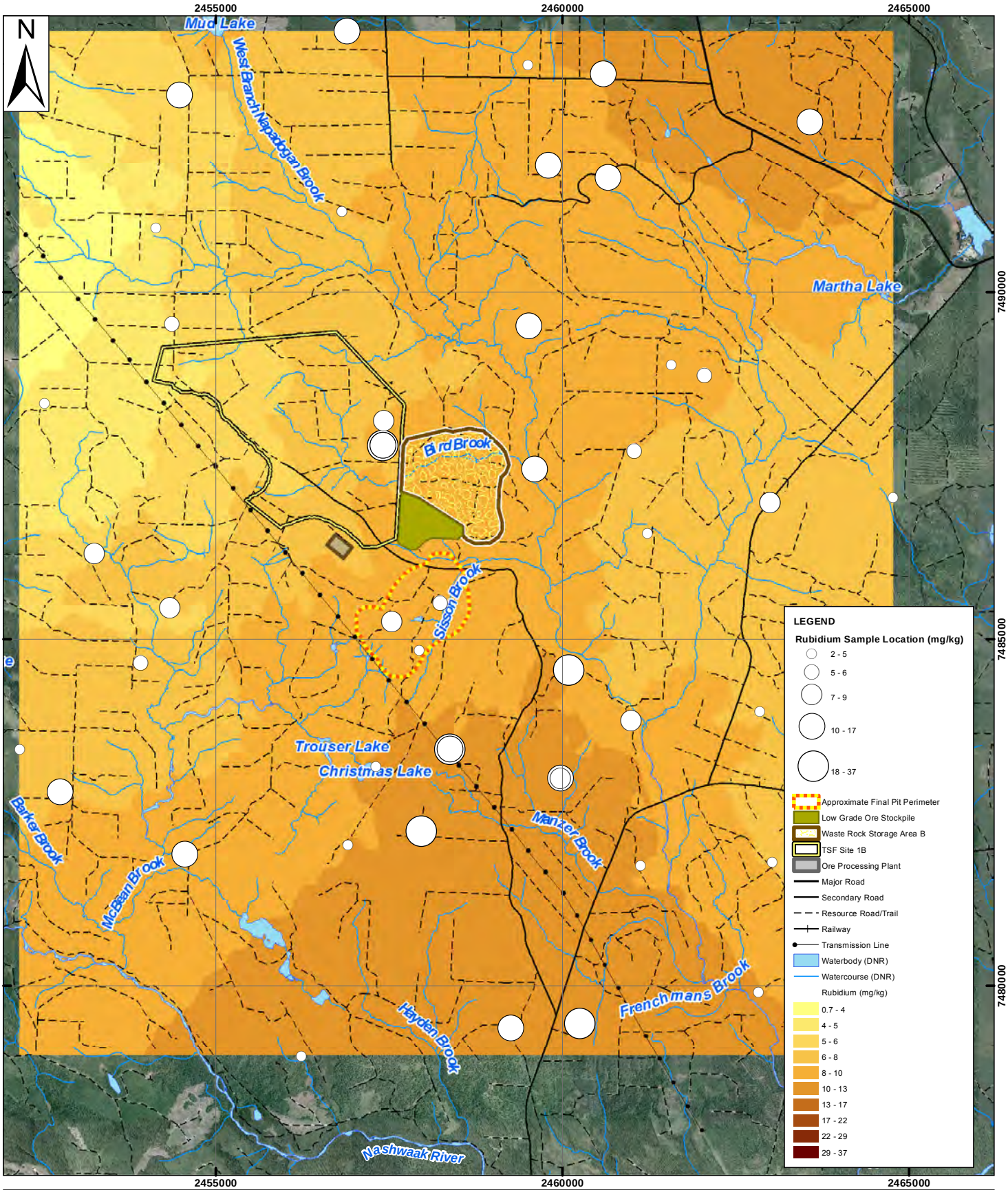
Appd. By: DM

Data Sources:
NBDNR, SNB
NHN, NB Aquatic Data Warehouse
Imagery Provided By:
NBDNR
Google Earth Pro

Fig. No.: D21

Stantec

Map: NAD83 CSRS NB Double Stereographic



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Baseline Soil – Rubidium

Sisson Project

Napadogan, N.B.

Client: Northcliff Resources Ltd.

Scale: NTS

0 0.5 1 1.5

Kilometres

Project No.: 121810356

Date: (dd/mm/yyyy) 02/02/2012

Dwn. By: JAB

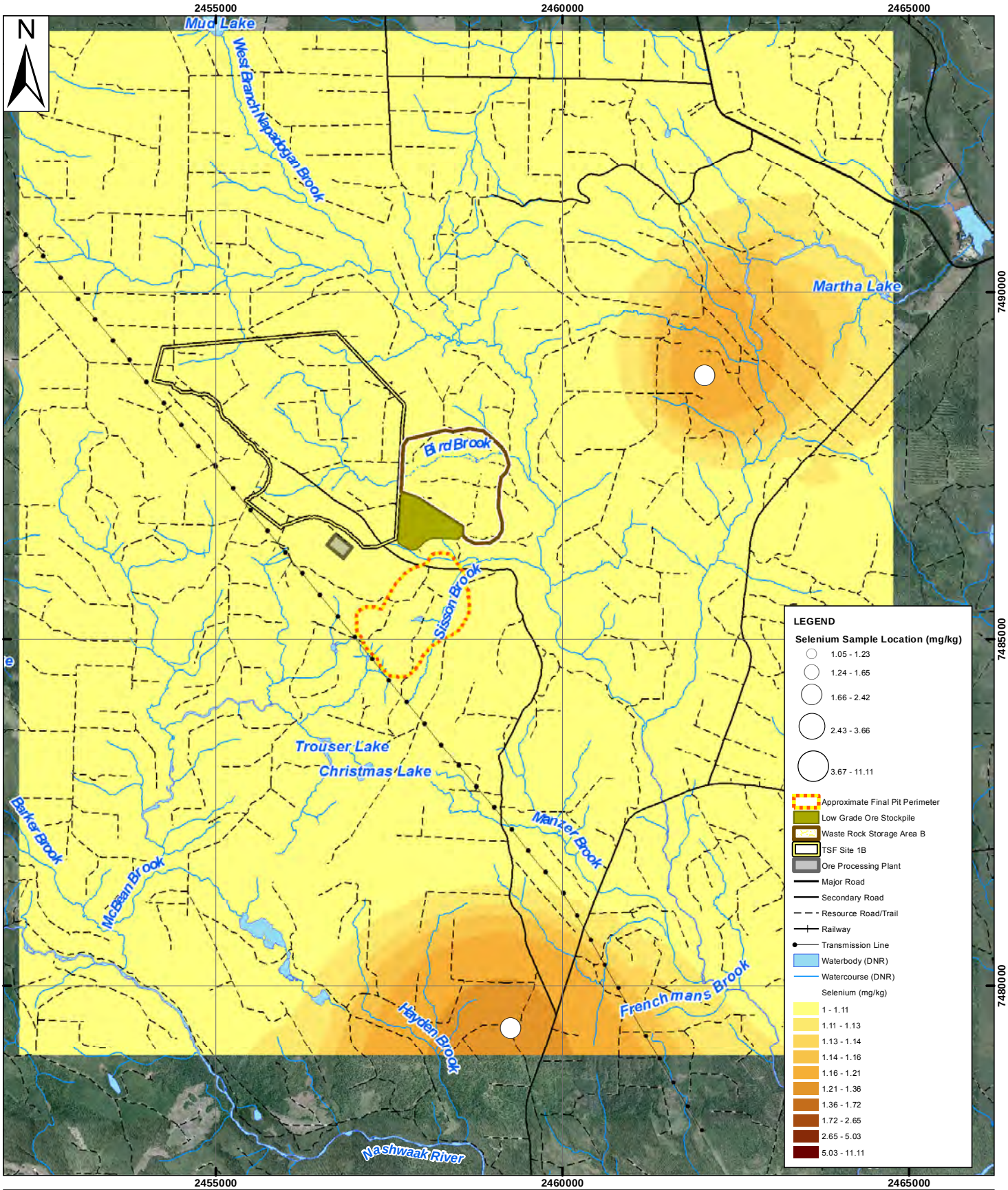
Appd. By: DM

Data Sources:
NBDNR, SNB
NHN, NB Aquatic Data Warehouse
Imagery Provided By:
NBDNR
Google Earth Pro

Fig. No.: D22

Stantec

Map: NAD83 CSRS NB Double Stereographic



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Baseline Soil – Selenium

Sisson Project

Napadogan, N.B.

Client: Northcliff Resources Ltd.

Scale: NTS

0 0.5 1 1.5

Kilometres

Project No.: 121810356

Data Sources: NBDNR, SNB NHN, NB Aquatic Data Warehouse Imagery Provided By: NBDNR Google Earth Pro

Fig. No.: D23

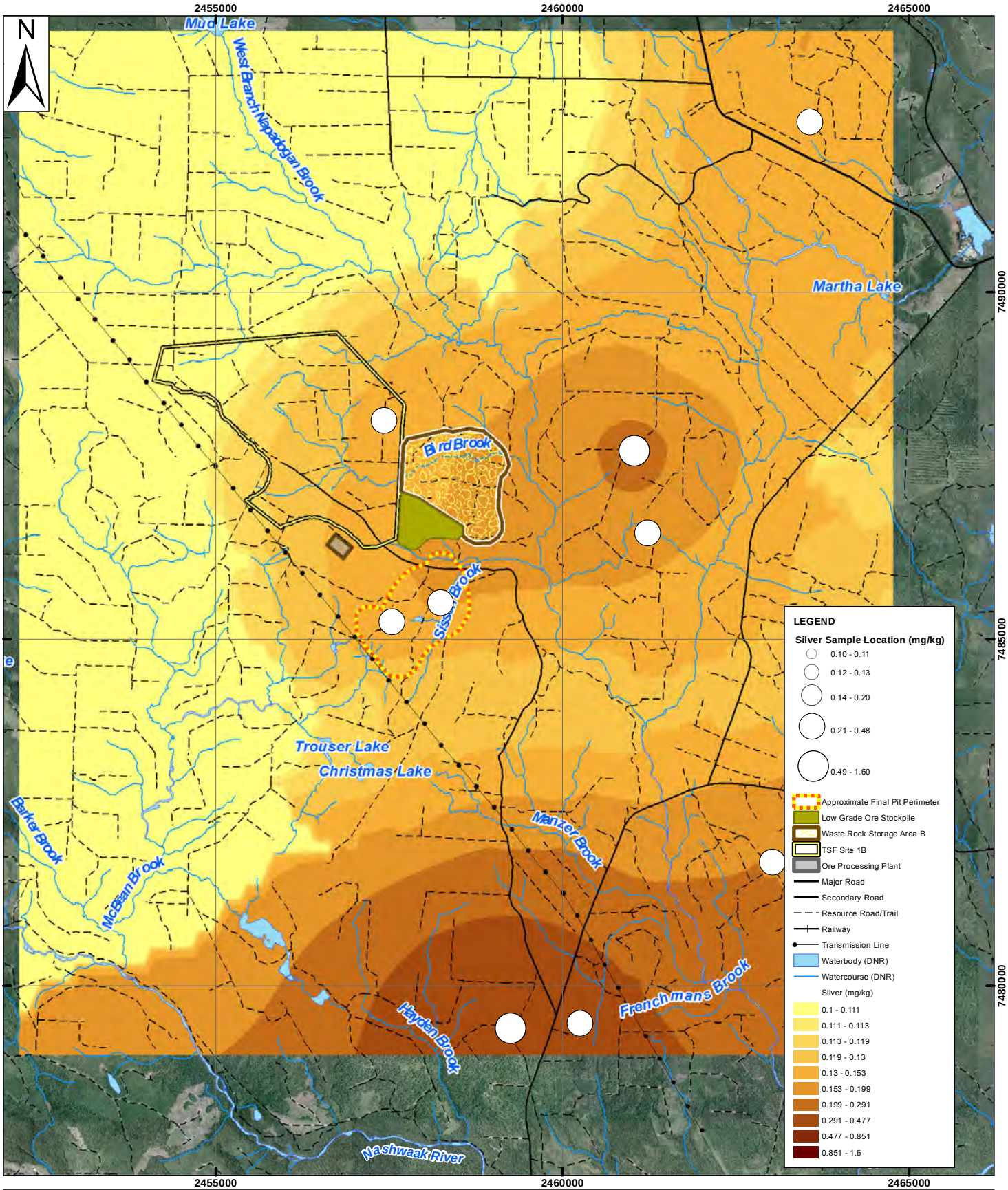
Date: (dd/mm/yyyy) 02/02/2012

Dwn. By: JAB

Appd. By: DM

Stantec

Map: NAD83 CSRS NB Double Stereographic



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Baseline Soil – Silver

Sisson Project

Napadogan, N.B.

Client: Northcliff Resources Ltd.

Scale: NTS

0 0.5 1 1.5

Kilometres

Project No.: 121810356

Date: (dd/mm/yyyy) 02/02/2012

Dwn. By: JAB

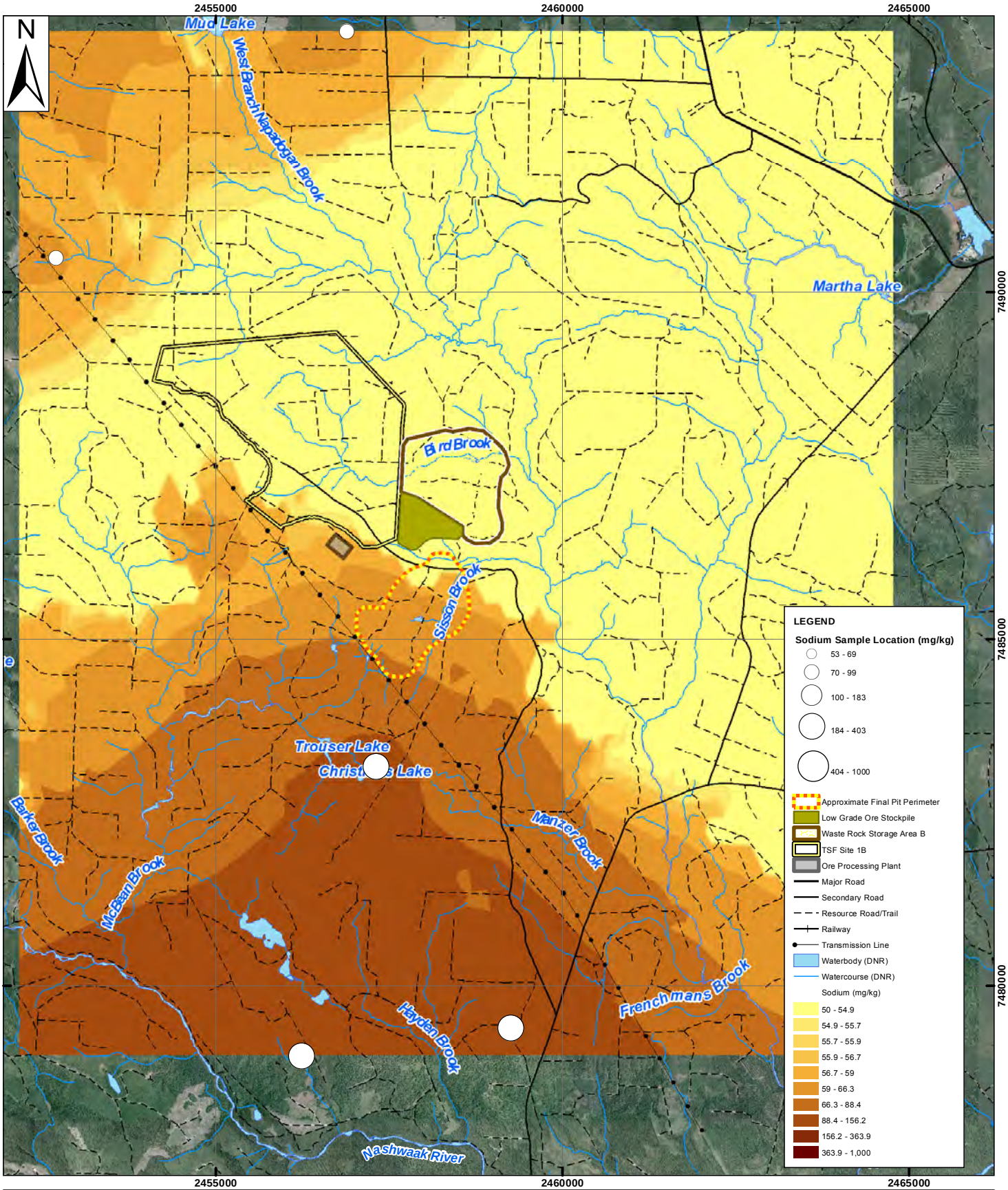
Appd. By: DM

Data Sources:
NBDNR, SNB
NHN, NB Aquatic Data Warehouse
Imagery Provided By:
NBDNR
Google Earth Pro

Fig. No.: D24

Stantec

Map: NAD83 CSRS NB Double Stereographic



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Baseline Soil – Sodium

Sisson Project

Napadogan, N.B.

Client: Northcliff Resources Ltd.

Scale: NTS

0 0.5 1 1.5

Kilometres

Project No.: 121810356

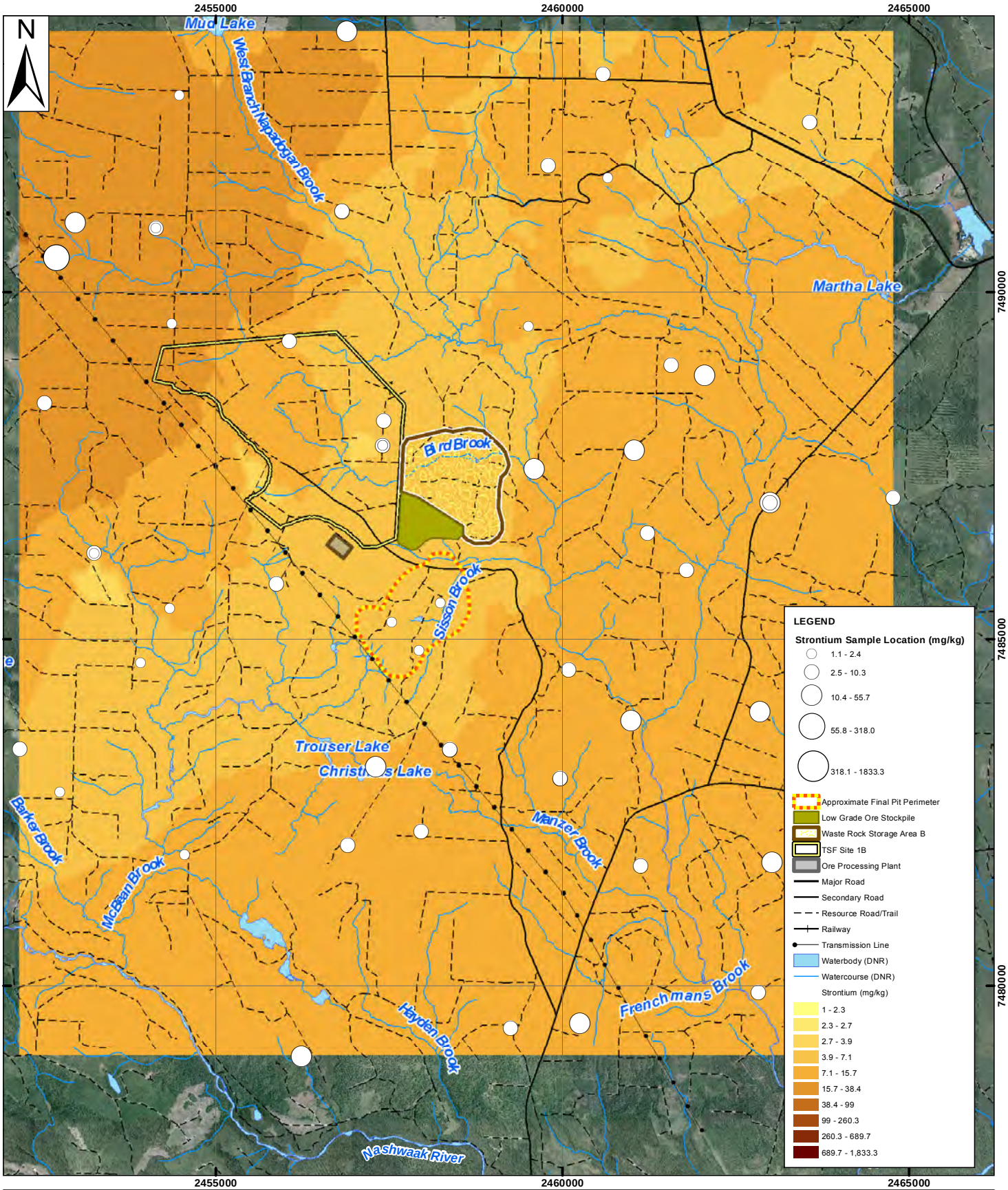
Data Sources: NBDNR, SNB NHN, NB Aquatic Data Warehouse Imagery Provided By: NBDNR Google Earth Pro

Fig. No.: D25

Date: (dd/mm/yyyy)	Dwn. By:	Appd. By:
02/02/2012	JAB	DM

Stantec

Map: NAD83 CSRS NB Double Stereographic



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Baseline Soil – Strontium

Sisson Project

Napadogan, N.B.

Client: Northcliff Resources Ltd.

Scale: NTS

0 0.5 1 1.5

Kilometres

Project No.: 121810356

Date: (dd/mm/yyyy) 02/02/2012

Dwn. By: JAB

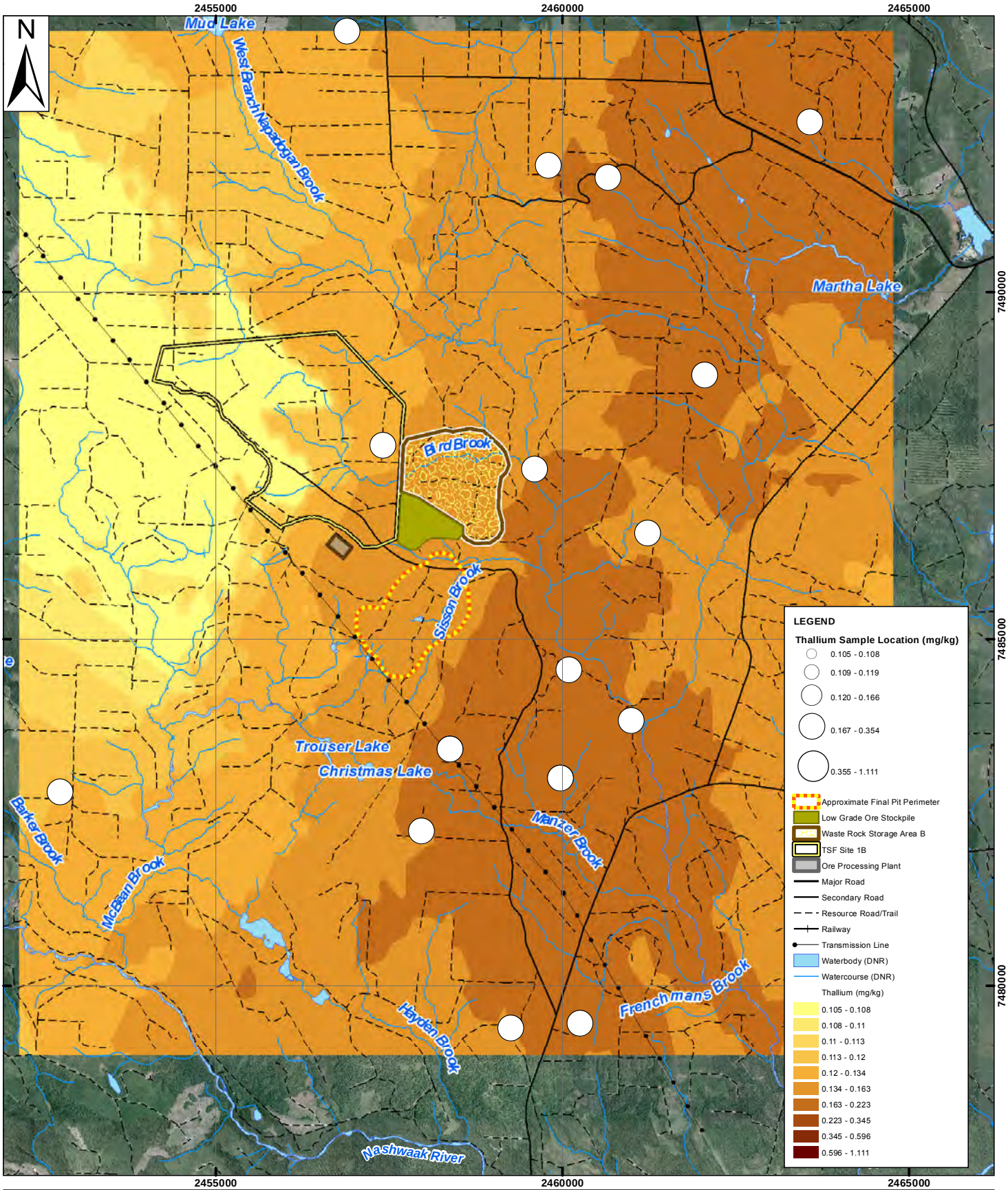
Appd. By: DM

Data Sources:
NBDNR, SNB
NHN, NB Aquatic Data Warehouse
Imagery Provided By:
NBDNR
Google Earth Pro

Fig. No.: D26

Stantec

Map: NAD83 CSRS NB Double Stereographic



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Baseline Soil – Thallium

Sisson Project

Napadogan, N.B.

Client: Northcliff Resources Ltd.

Scale: NTS

0 0.5 1 1.5

Kilometres

Project No.: 121810356

Date: (dd/mm/yyyy) 02/02/2012

Dwn. By: JAB

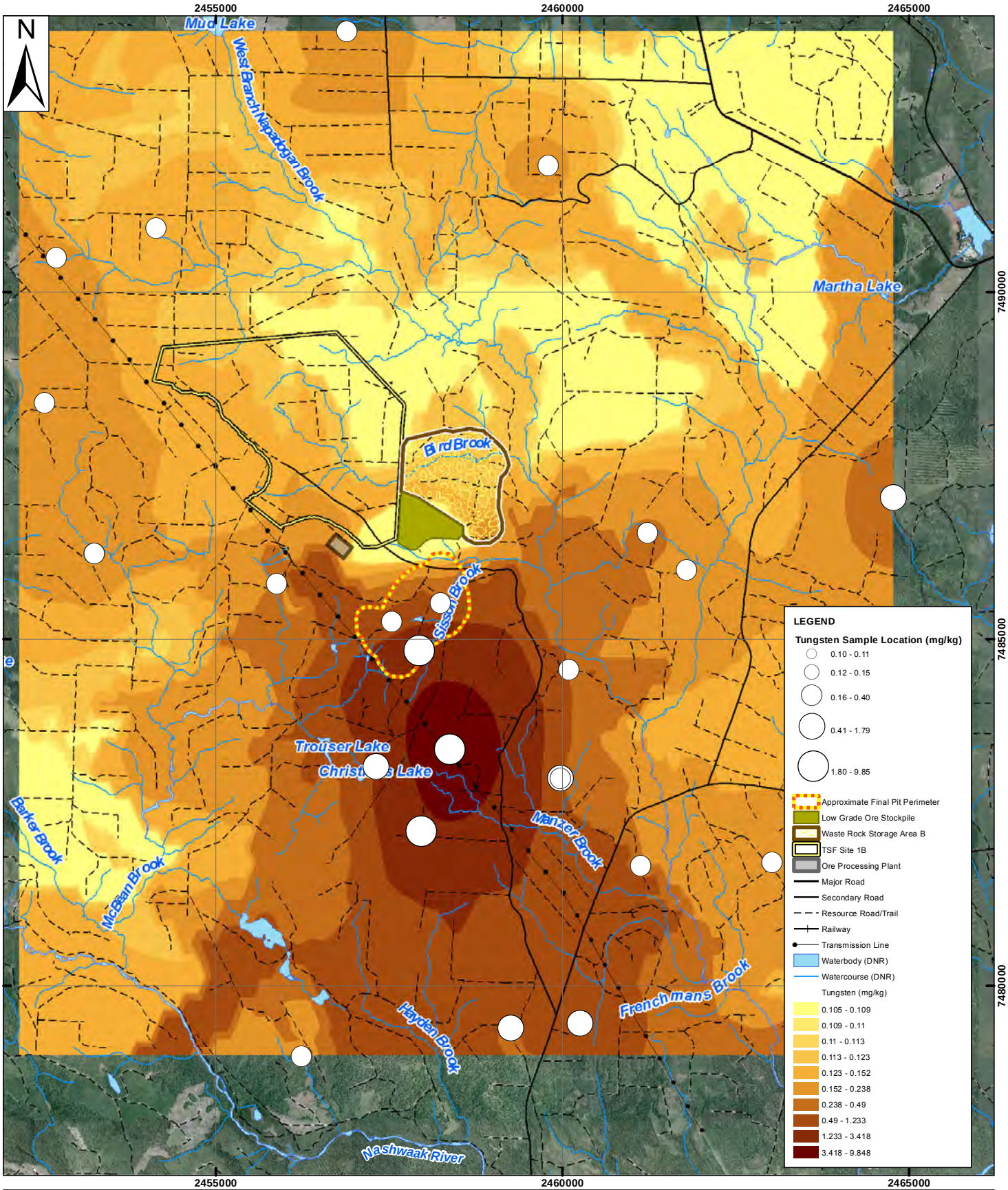
Appd. By: DM

Data Sources:
NBDNR, SNB
NHN, NB Aquatic Data Warehouse
Imagery Provided By:
NBDNR
Google Earth Pro

Fig. No.: D27

Stantec

Map: NAD83 CSRS NB Double Stereographic



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Baseline Soil – Tungsten

Sisson Project

Napadogan, N.B.

Client: Northcliff Resources Ltd.

Scale: NTS

0 0.5 1 1.5

Kilometres

Project No.: 121810356

Date: (dd/mm/yyyy) 02/02/2012

Dwn. By: JAB

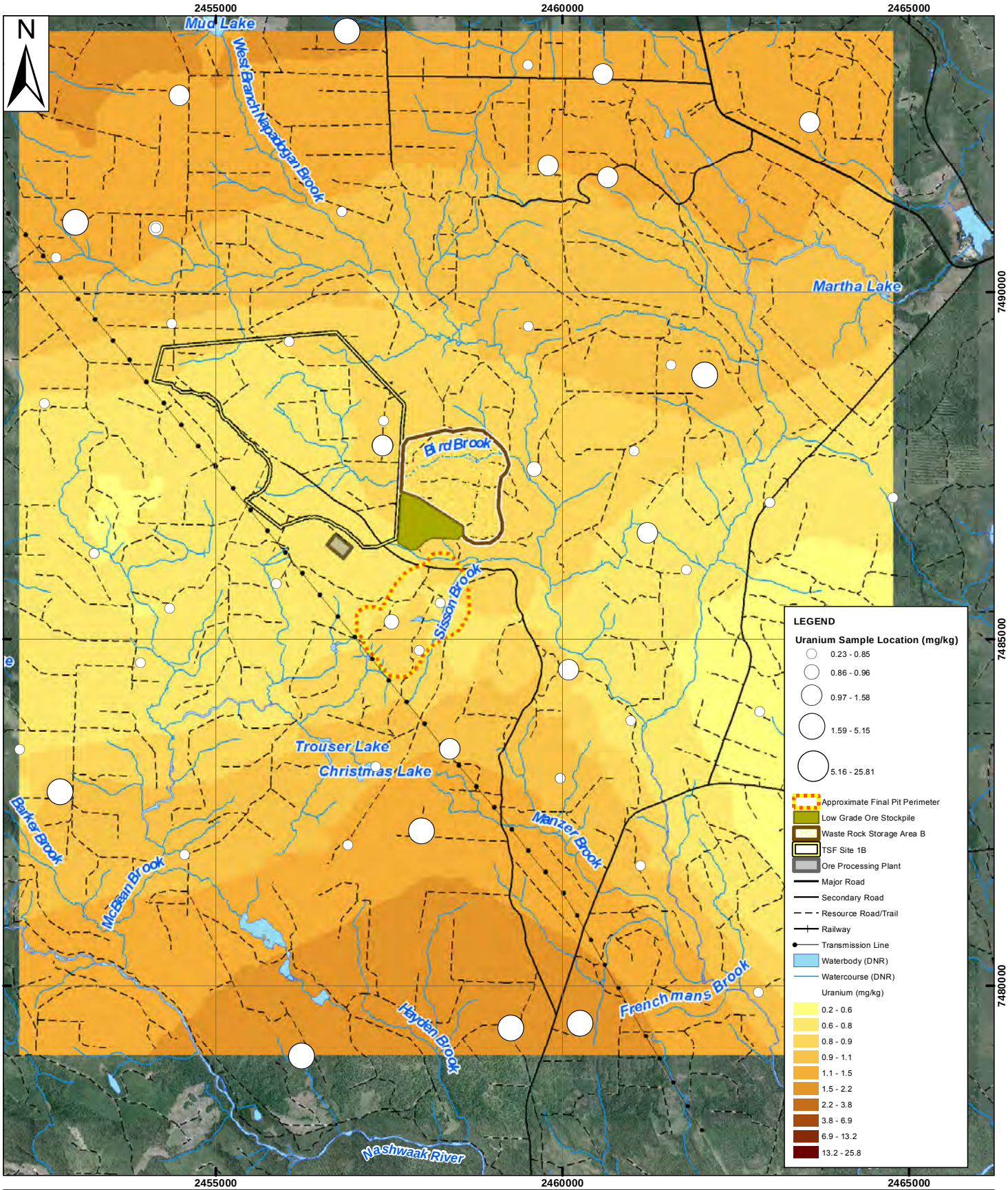
Appd. By: DM

Data Sources: NBDNR, SNB NHN, NB Aquatic Data Warehouse Imagery Provided By: NBDNR Google Earth Pro

Fig. No.: D28

Stantec

Map: NAD83 CSRS NB Double Stereographic



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Baseline Soil – Uranium

Sisson Project

Napadogan, N.B.

Client: Northcliff Resources Ltd.

Scale: NTS

0 0.5 1 1.5

Kilometres

Project No.: 121810356

Date: (dd/mm/yyyy) 02/02/2012

Dwn. By: JAB

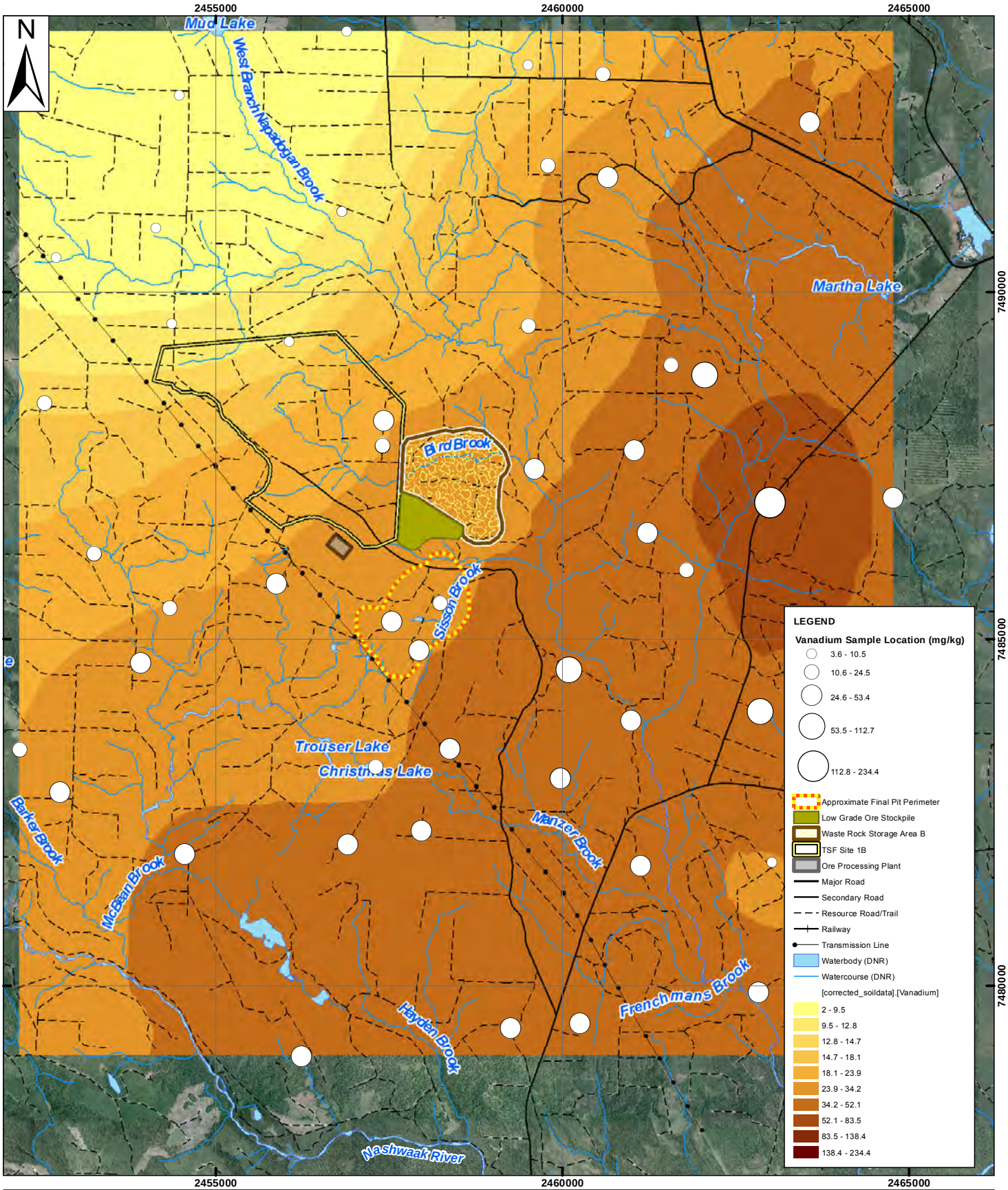
Appd. By: DM

Data Sources:
NBDNR, SNB
NHN, NB Aquatic Data Warehouse
Imagery Provided By:
NBDNR
Google Earth Pro

Fig. No.: D29

Stantec

Map: NAD83 CSRS NB Double Stereographic



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Baseline Soil – Vanadium

Sisson Project

Napadogan, N.B.

Client: Northcliff Resources Ltd.

Scale: NTS

0 0.5 1 1.5

Kilometres

Project No.: 121810356

Date: (dd/mm/yyyy) 02/02/2012

Dwn. By: JAB

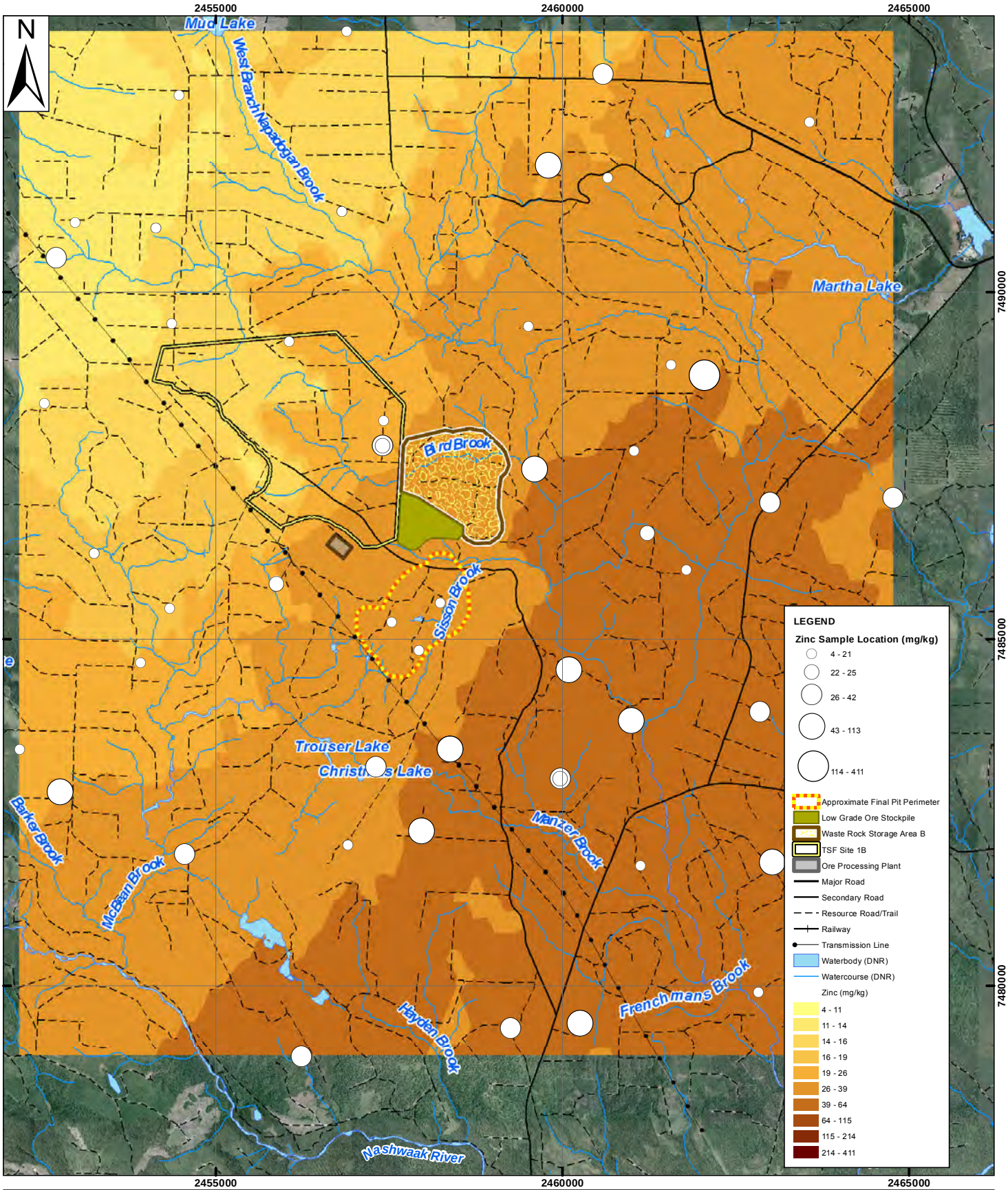
Appd. By: DM

Data Sources:
NBDNR, SNB
NHN, NB Aquatic Data Warehouse
Imagery Provided By:
NBDNR
Google Earth Pro

Fig. No.: D30

Stantec

Map: NAD83 CSRS NB Double Stereographic



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Baseline Soil – Zinc

Sisson Project

Napadogan, N.B.

Client: Northcliff Resources Ltd.

Scale: NTS

0 0.5 1 1.5

Kilometres

Project No.: 121810356

Date: (dd/mm/yyyy) 02/02/2012

Dwn. By: JAB

Appd. By: DM

Data Sources: NBDNR, SNB NHN, NB Aquatic Data Warehouse Imagery Provided By: NBDNR Google Earth Pro

Fig. No.: D31

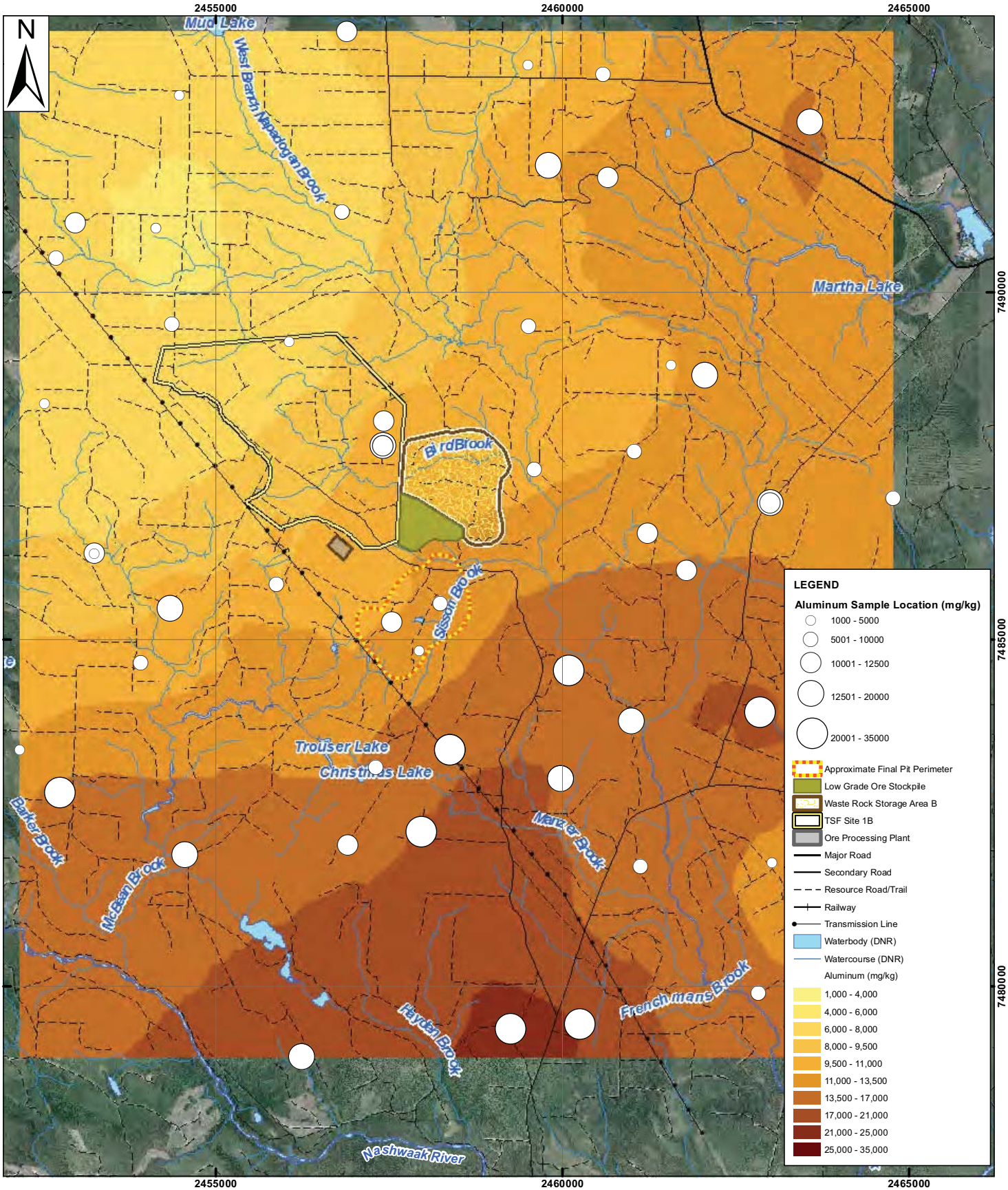
Stantec

Map: NAD83 CSRS NB Double Stereographic

Appendix E

Baseline Soil Maps (Data Corrected for Loss on Ignition)

Note: The figures presented in this appendix presented soil data only for those metals that were above the detection limit in at least one sample. As tellurium and tin were not detected in any soil samples, they are not included in this appendix.



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Baseline Soil – Aluminum Corrected for Loss on Ignition

Sisson Project

Napadogan, N.B.

Client: Northcliff Resources Ltd.

Scale: NTS

0 0.5 1 1.5

Kilometres

Project No.: 121810356

Date: (dd/mm/yyyy) 02/02/2012

Dwn. By: JAB

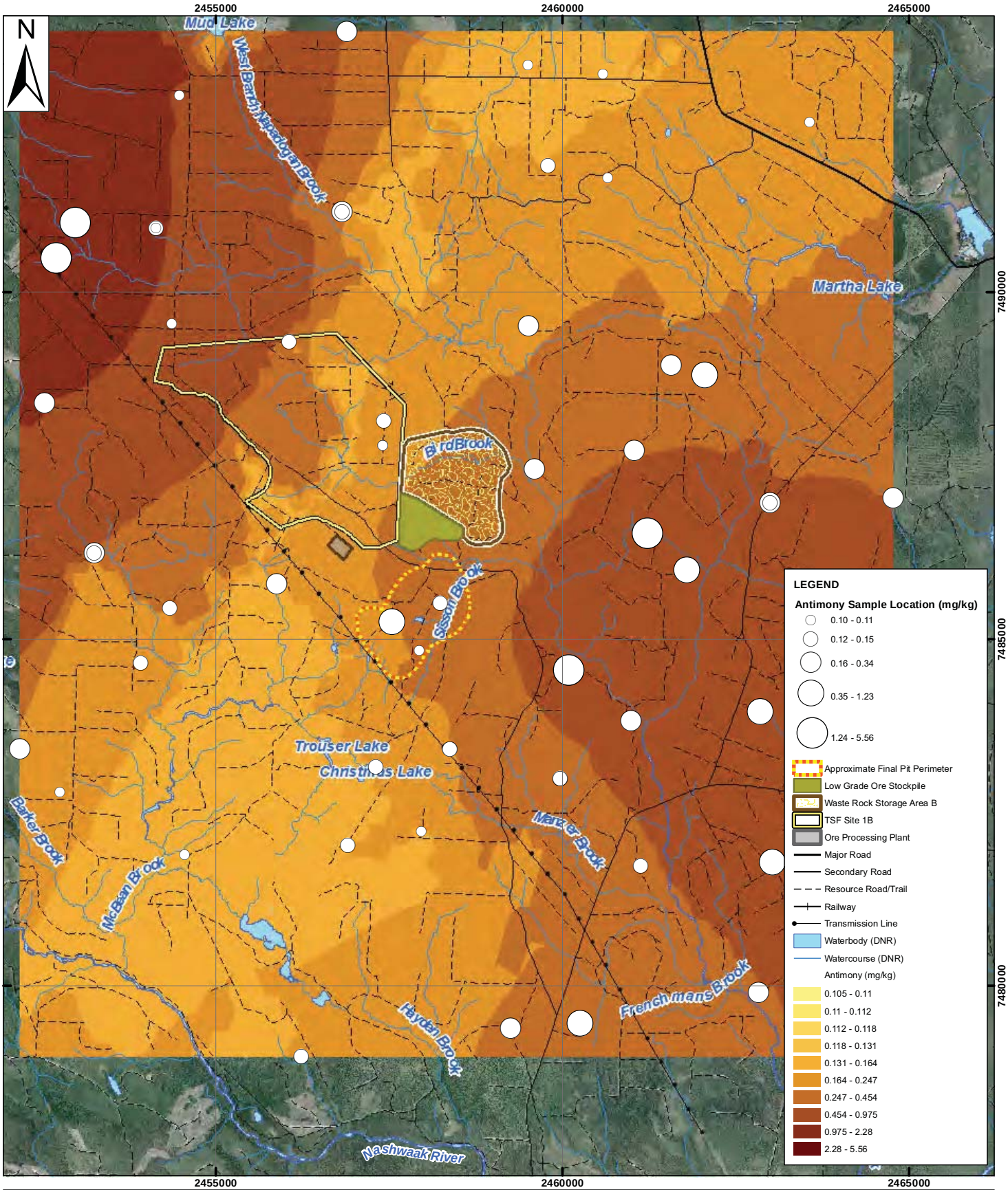
Appd. By: DM

Data Sources: NBDNR, SNB NHN, NB Aquatic Data Warehouse Imagery Provided By: NBDNR Google Earth Pro

Fig. No.: E1

Stantec

Map: NAD83 CSRS NB Double Stereographic



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Baseline Soil – Antimony Corrected for Loss on Ignition

Sisson Project

Napadogan, N.B.

Client: Northcliff Resources Ltd.

Scale: NTS

0 0.5 1 1.5

Kilometres

Project No.: 121810356

Date: (dd/mm/yyyy) 02/02/2012

Dwn. By: JAB

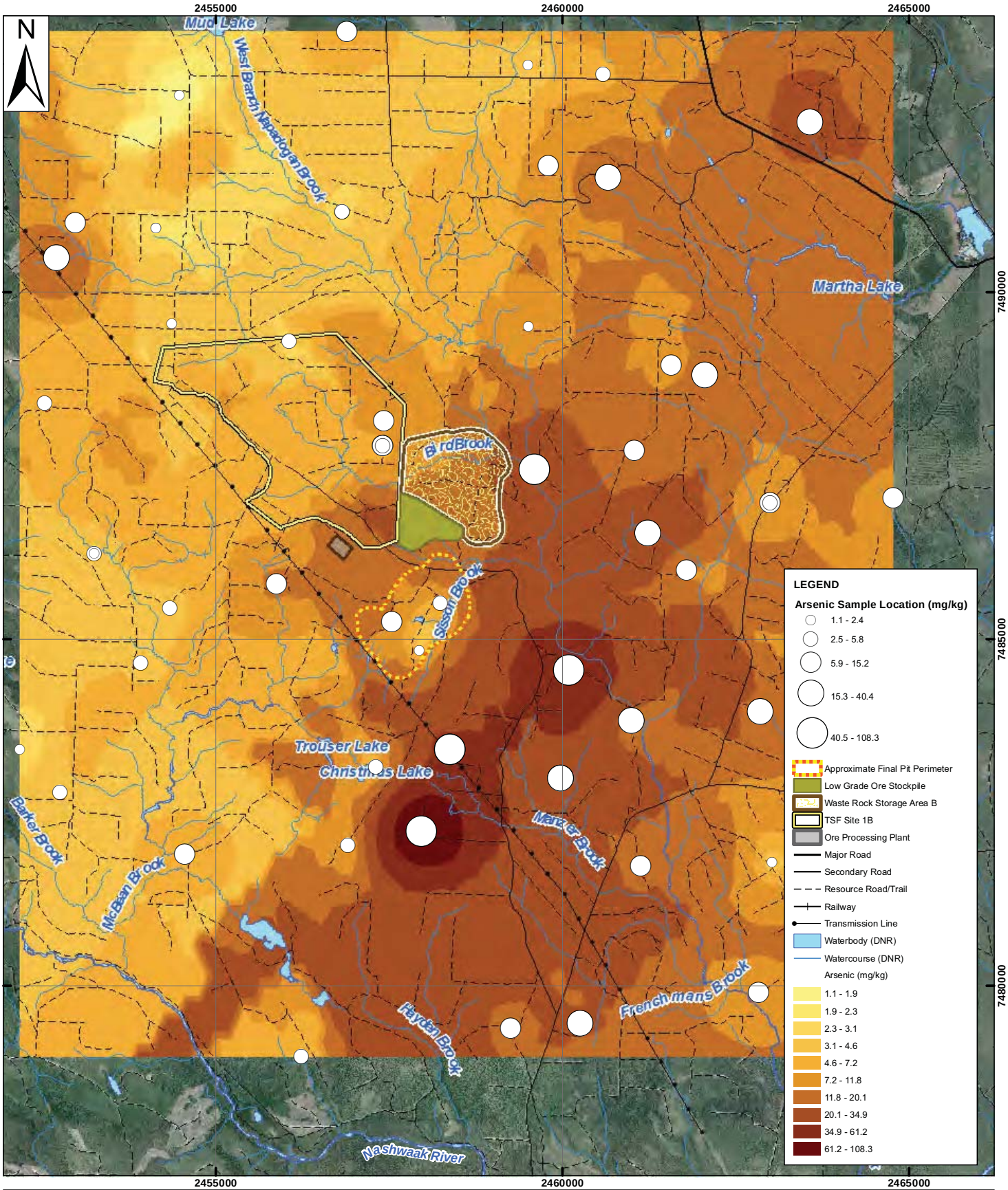
Appd. By: DM

Data Sources: NBDNR, SNB NHN, NB Aquatic Data Warehouse Imagery Provided By: NBDNR Google Earth Pro

Fig. No.: E2

Stantec

Map: NAD83 CSRS NB Double Stereographic



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Baseline Soil – Arsenic Corrected for Loss on Ignition

Sisson Project

Napadogan, N.B.

Client: Northcliff Resources Ltd.

Scale: NTS

0 0.5 1 1.5

Kilometres

Project No.: 121810356

Date: (dd/mm/yyyy) 02/02/2012

Dwn. By: JAB

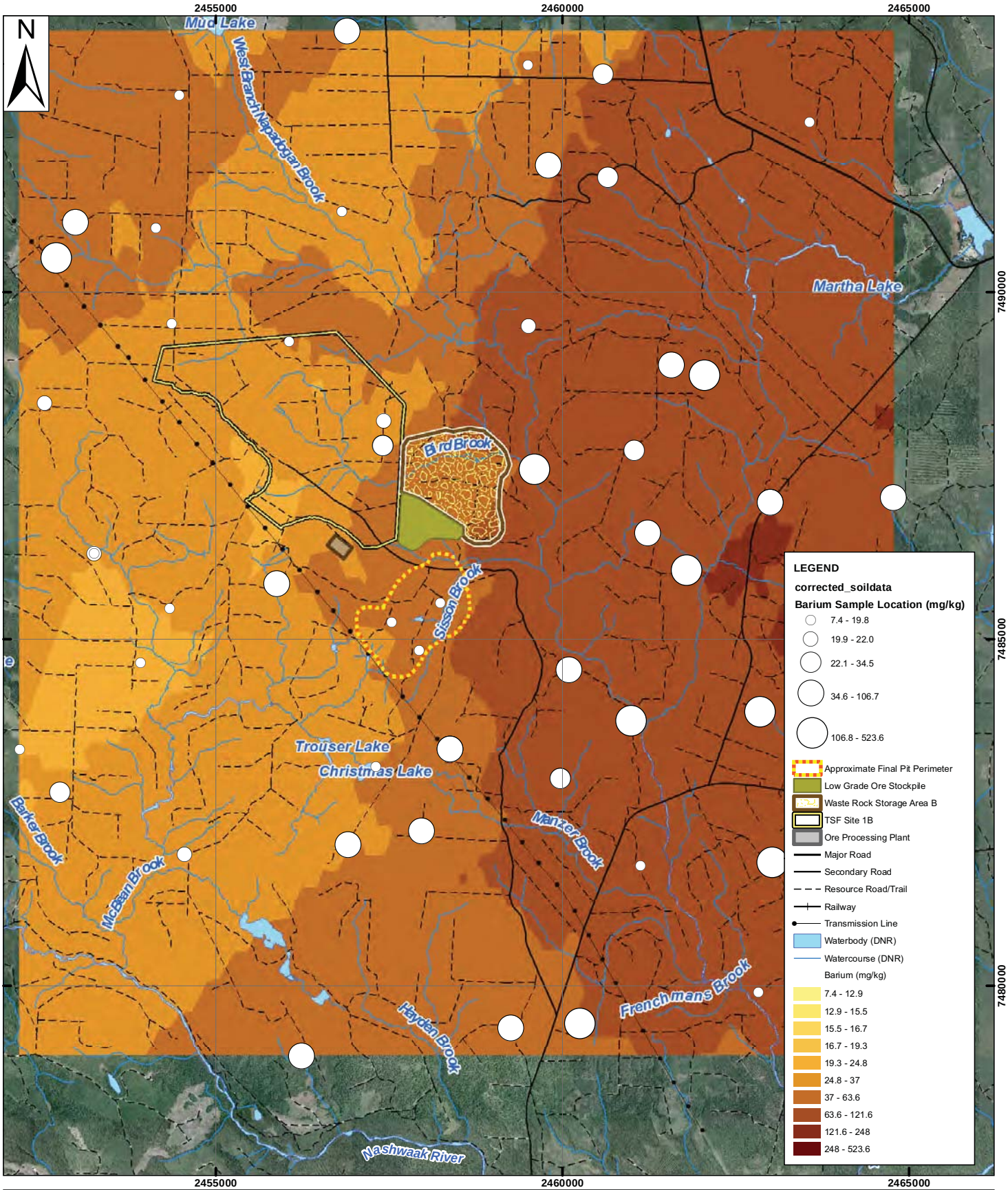
Appd. By: DM

Data Sources:
NBDNR, SNB
NHN, NB Aquatic Data Warehouse
Imagery Provided By:
NBDNR
Google Earth Pro

Fig. No.: E3

Stantec

Map: NAD83 CSRS NB Double Stereographic



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Baseline Soil – Barium Corrected for Loss on Ignition

Sisson Project

Napadogan, N.B.

Client: Northcliff Resources Ltd.

Scale: NTS

0 0.5 1 1.5

Kilometres

Project No.: 121810356

Date: (dd/mm/yyyy) 02/02/2012

Dwn. By: JAB

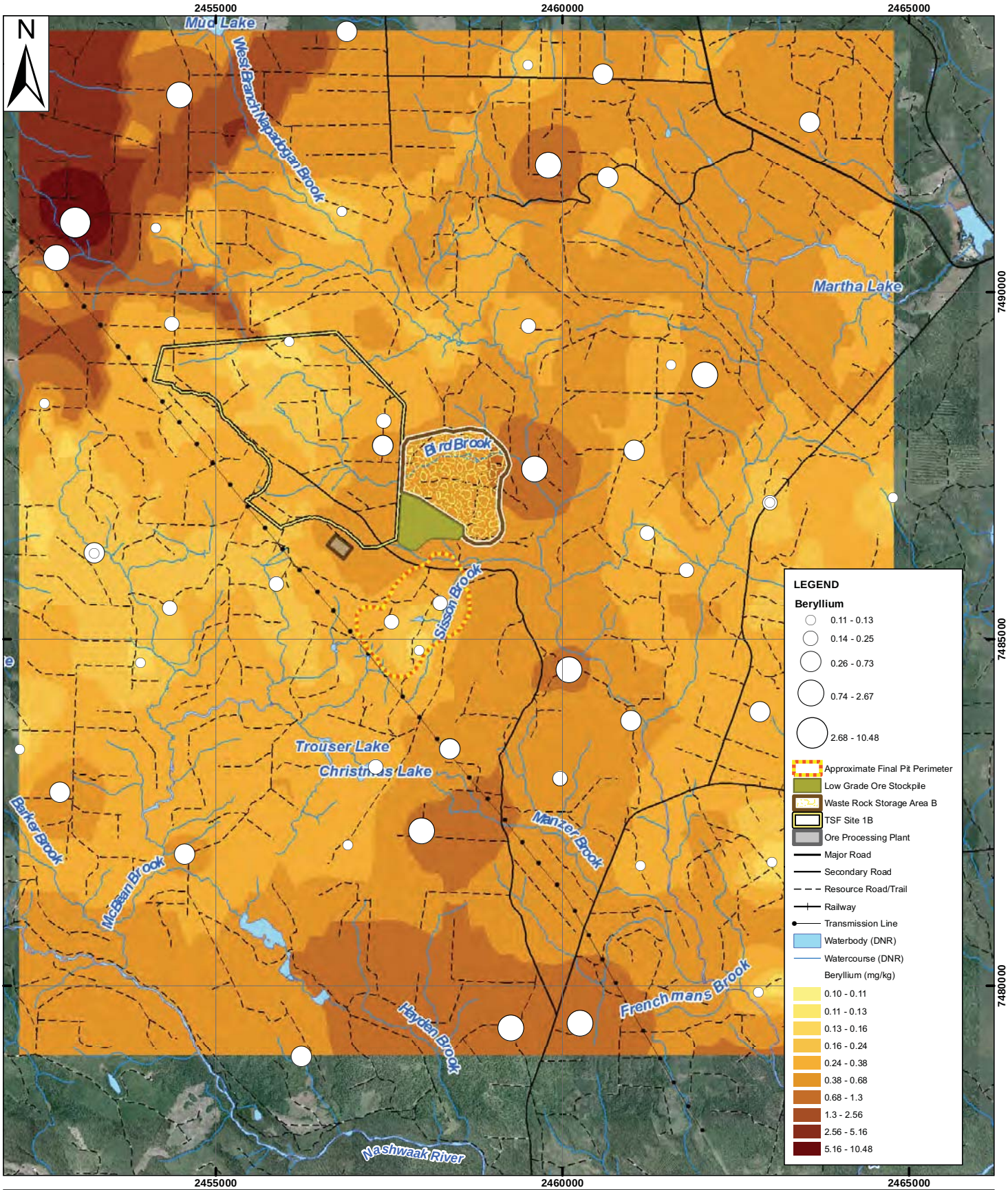
Appd. By: DM

Data Sources: NBDNR, SNB NHN, NB Aquatic Data Warehouse Imagery Provided By: NBDNR Google Earth Pro

Fig. No.: E4

Stantec

Map: NAD83 CSRS NB Double Stereographic



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Baseline Soil – Beryllium Corrected for Loss on Ignition

Sisson Project

Napadogan, N.B.

Client: Northcliff Resources Ltd.

Scale: NTS

0 0.5 1 1.5

Kilometres

Project No.: 121810356

Date: (dd/mm/yyyy) 02/02/2012

Dwn. By: JAB

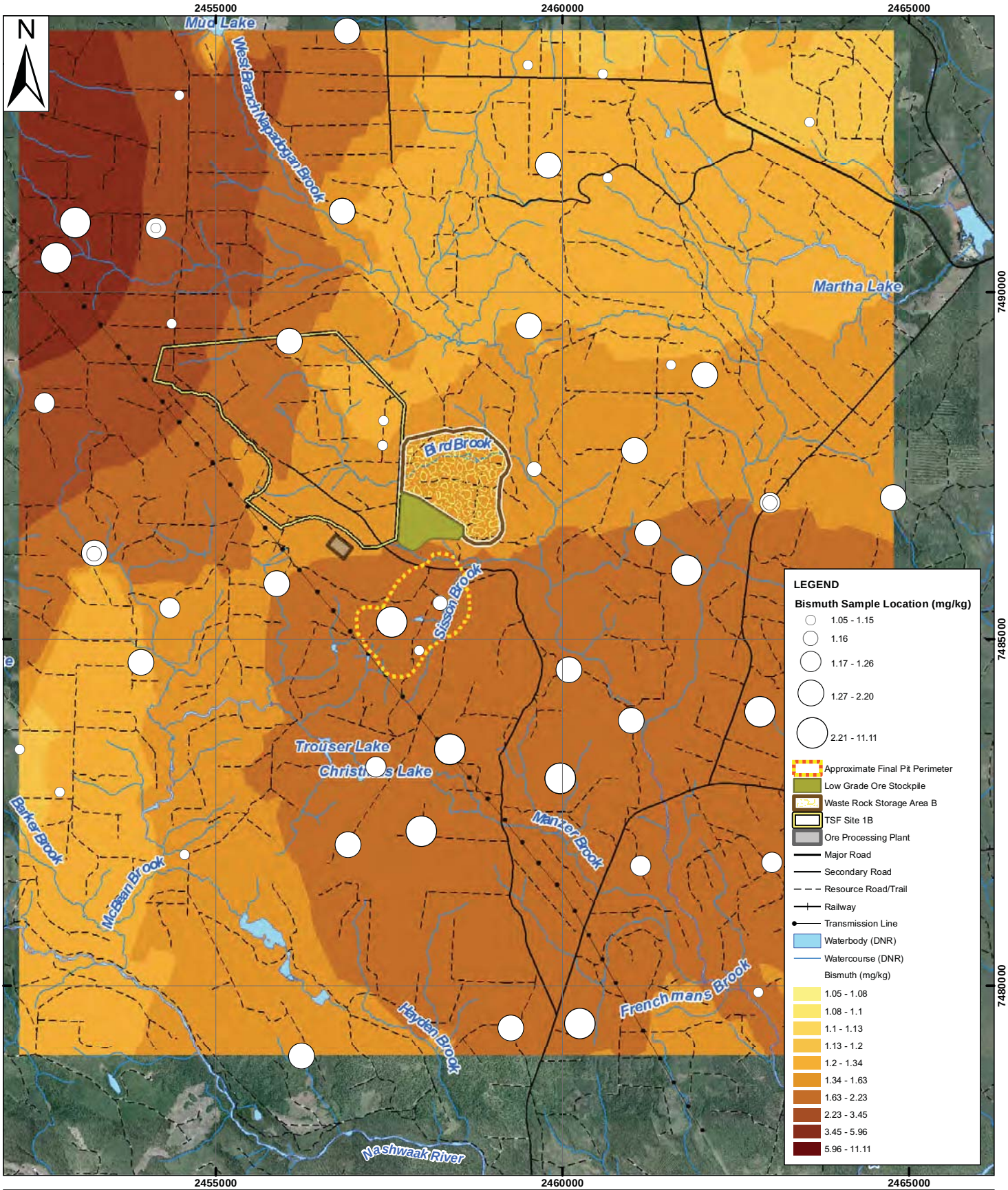
Appd. By: DM

Data Sources:
NBDNR, SNB
NHN, NB Aquatic Data Warehouse
Imagery Provided By:
NBDNR
Google Earth Pro

Fig. No.: E5

Stantec

Map: NAD83 CSRS NB Double Stereographic



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Baseline Soil – Bismuth Corrected for Loss on Ignition

Sisson Project

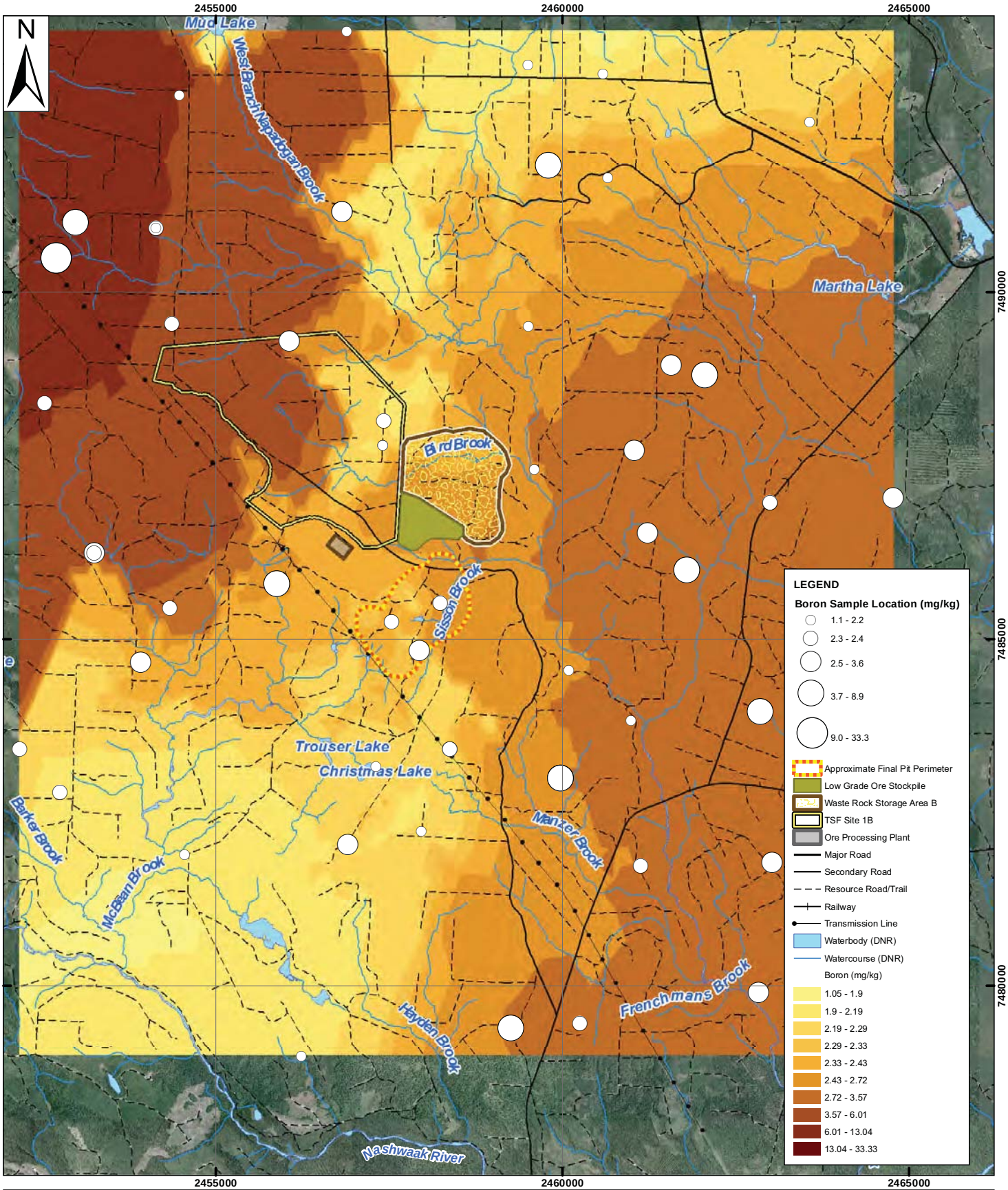
Napadogan, N.B.

Client: Northcliff Resources Ltd.

Scale: NTS	Project No.:	Data Sources:	Fig. No.:
0 0.5 1 1.5 Kilometres	121810356	NBDNR, SNB NHN, NB Aquatic Data Warehouse Imagery Provided By: NBDNR Google Earth Pro	E6
Date: (dd/mm/yyyy) 02/02/2012	Dwn. By: JAB	Appd. By: DM	

Stantec

Map: NAD83 CSRS NB Double Stereographic



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Baseline Soil – Boron Corrected for Loss on Ignition

Sisson Project

Napadogan, N.B.

Client: Northcliff Resources Ltd.

Scale: NTS

0 0.5 1 1.5

Kilometres

Project No.: 121810356

Date: (dd/mm/yyyy) 02/02/2012

Dwn. By: JAB

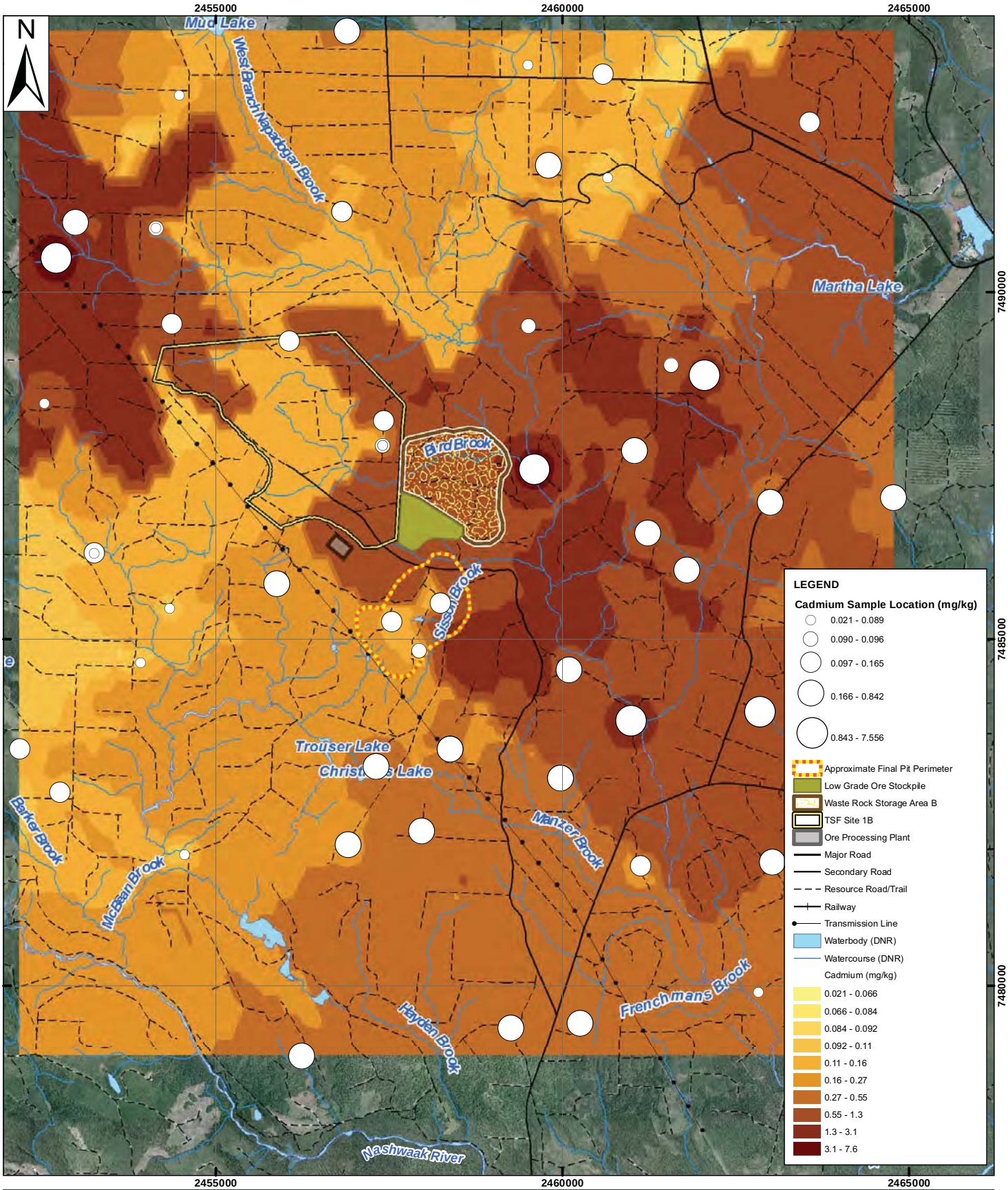
Appd. By: DM

Data Sources:
NBDNR, SNB
NHN, NB Aquatic Data Warehouse
Imagery Provided By:
NBDNR
Google Earth Pro

Fig. No.: E7

Stantec

Map: NAD83 CSRS NB Double Stereographic



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Baseline Soil – Cadmium Corrected for Loss on Ignition

Sisson Project

Napadogan, N.B.

Client: Northcliff Resources Ltd.

Scale: NTS

0 0.5 1 1.5

Kilometres

Project No.: 121810356

Date: (dd/mm/yyyy) 02/02/2012

Dwn. By: JAB

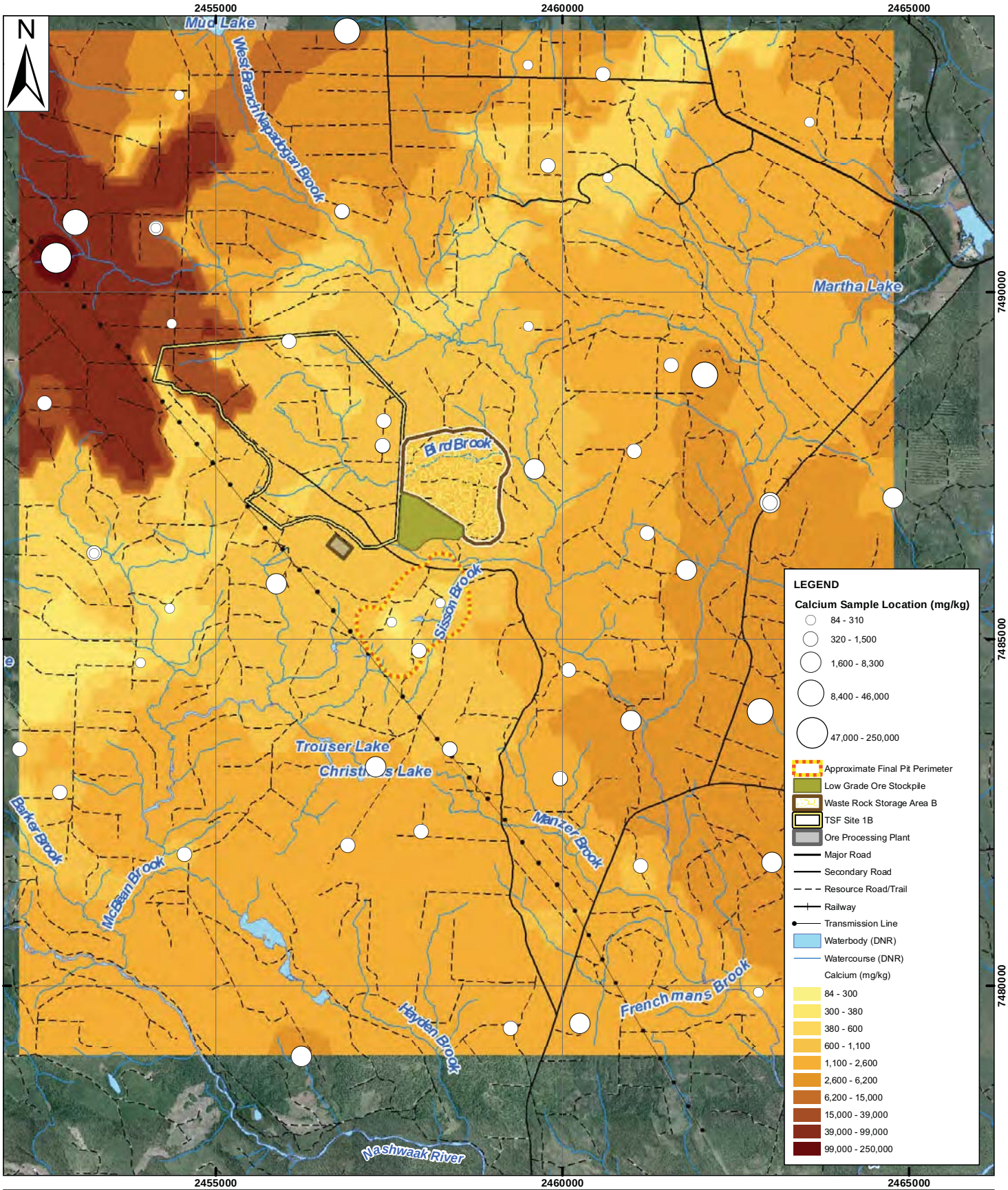
Appd. By: DM

Data Sources: NBDNR, SNB NHN, NB Aquatic Data Warehouse Imagery Provided By: NBDNR Google Earth Pro

Fig. No.: E8

Stantec

Map: NAD83 CSRS NB Double Stereographic



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Baseline Soil – Calcium Corrected for Loss on Ignition

Sisson Project

Napadogan, N.B.

Client: Northcliff Resources Ltd.

Scale: NTS

0 0.5 1 1.5

Kilometres

Project No.: 121810356

Date: (dd/mm/yyyy) 02/02/2012

Dwn. By: JAB

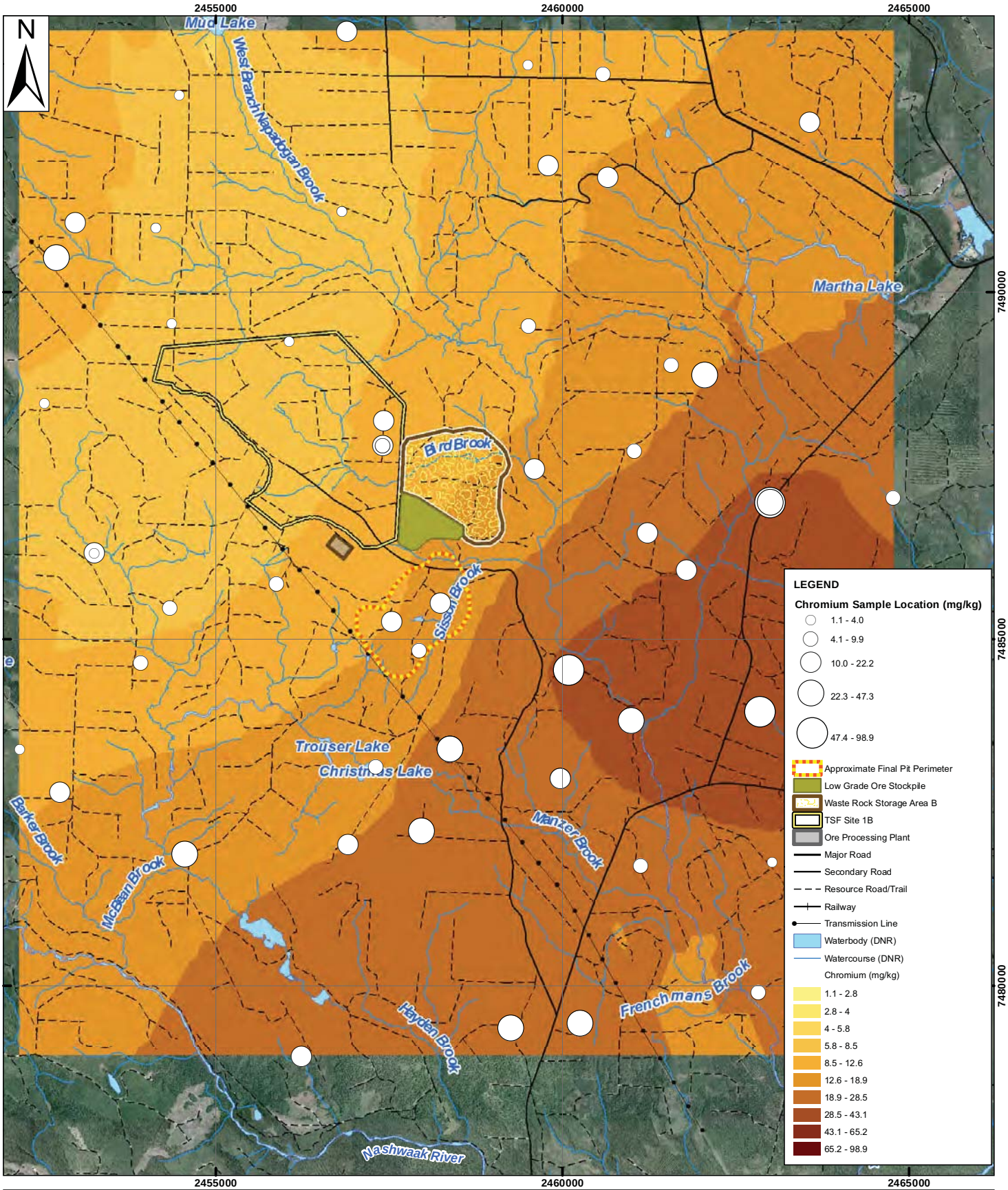
Appd. By: DM

Data Sources:
NBDNR, SNB
NHN, NB Aquatic Data Warehouse
Imagery Provided By:
NBDNR
Google Earth Pro

Fig. No.: E9

Stantec

Map: NAD83 CSRS NB Double Stereographic



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Baseline Soil – Chromium Corrected for Loss on Ignition

Sisson Project

Napadogan, N.B.

Client: Northcliff Resources Ltd.

Scale: NTS

0 0.5 1 1.5

Kilometres

Project No.: 121810356

Date: (dd/mm/yyyy) 02/02/2012

Dwn. By: JAB

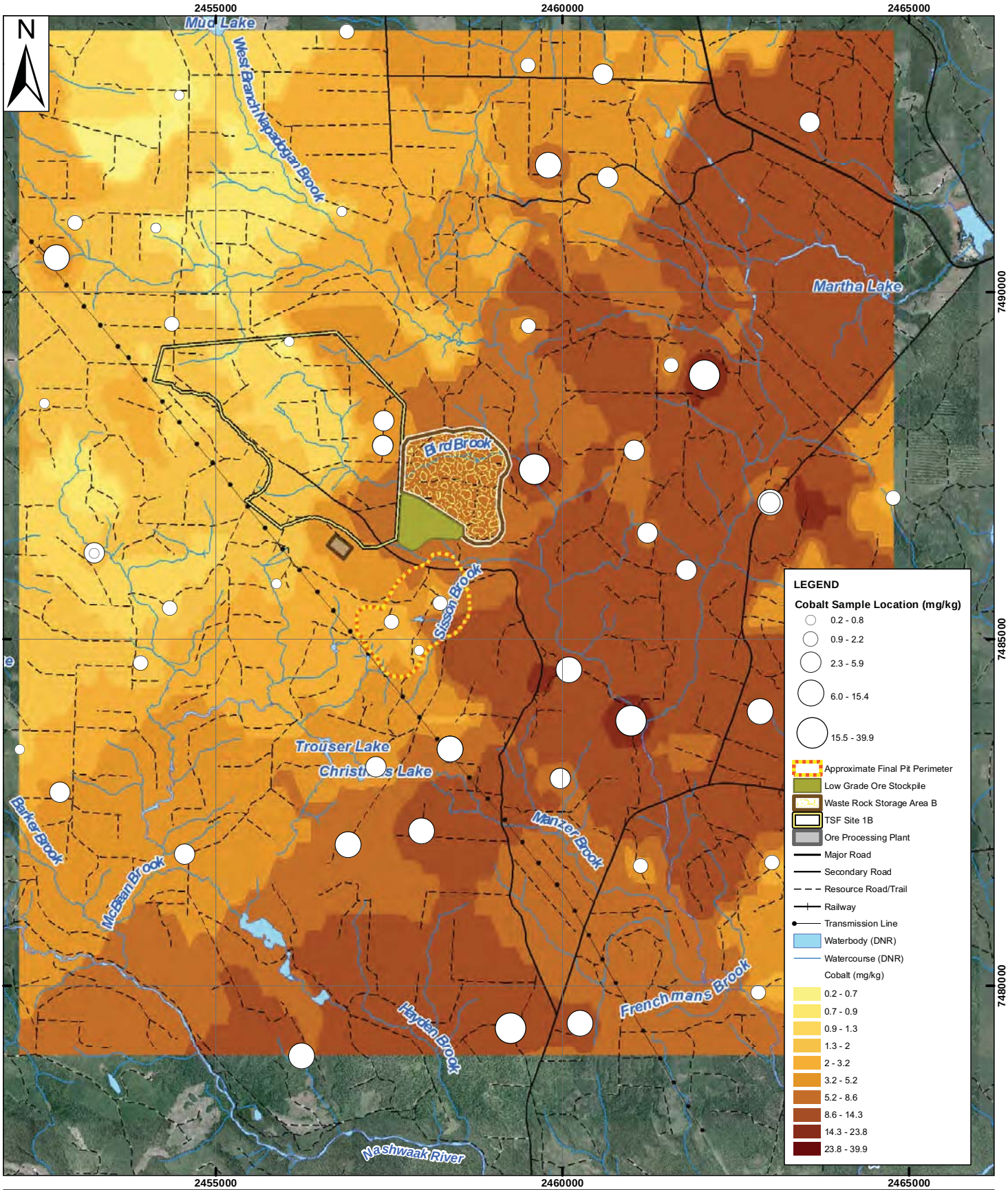
Appd. By: DM

Data Sources: NBDNR, SNB NHN, NB Aquatic Data Warehouse Imagery Provided By: NBDNR Google Earth Pro

Fig. No.: E10

Stantec

Map: NAD83 CSRS NB Double Stereographic



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Baseline Soil – Cobalt Corrected for Loss on Ignition

Sisson Project

Napadogan, N.B.

Client: Northcliff Resources Ltd.

Scale: NTS

0 0.5 1 1.5

Kilometres

Project No.: 121810356

Date: (dd/mm/yyyy) 02/02/2012

Dwn. By: JAB

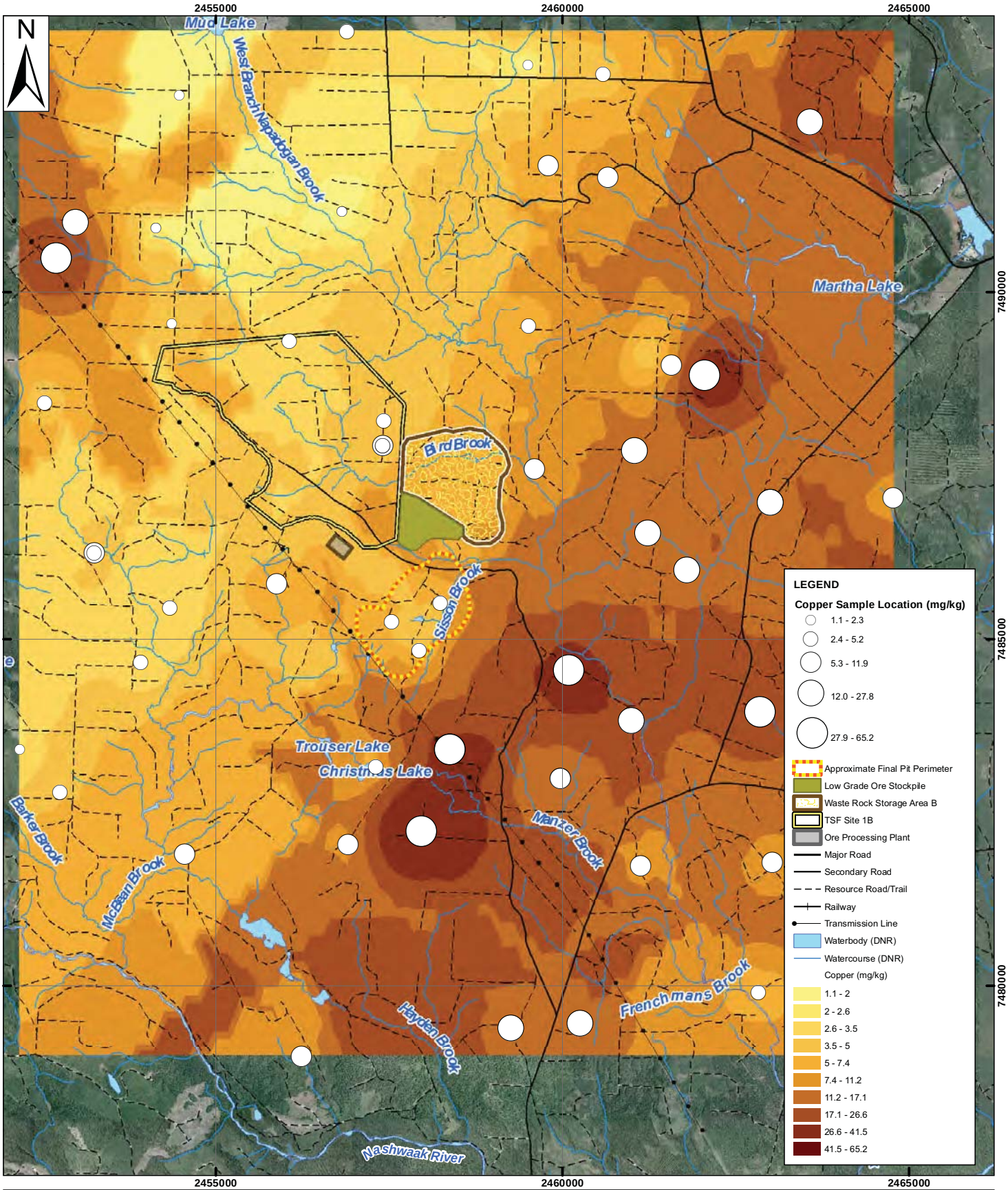
Appd. By: DM

Data Sources:
NBDNR, SNB
NHN, NB Aquatic Data Warehouse
Imagery Provided By:
NBDNR
Google Earth Pro

Fig. No.: E11

Stantec

Map: NAD83 CSRS NB Double Stereographic



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Baseline Soil – Copper Corrected for Loss on Ignition

Sisson Project

Napadogan, N.B.

Client: Northcliff Resources Ltd.

Scale: NTS

0 0.5 1 1.5

Kilometres

Project No.: 121810356

Date: (dd/mm/yyyy) 02/02/2012

Dwn. By: JAB

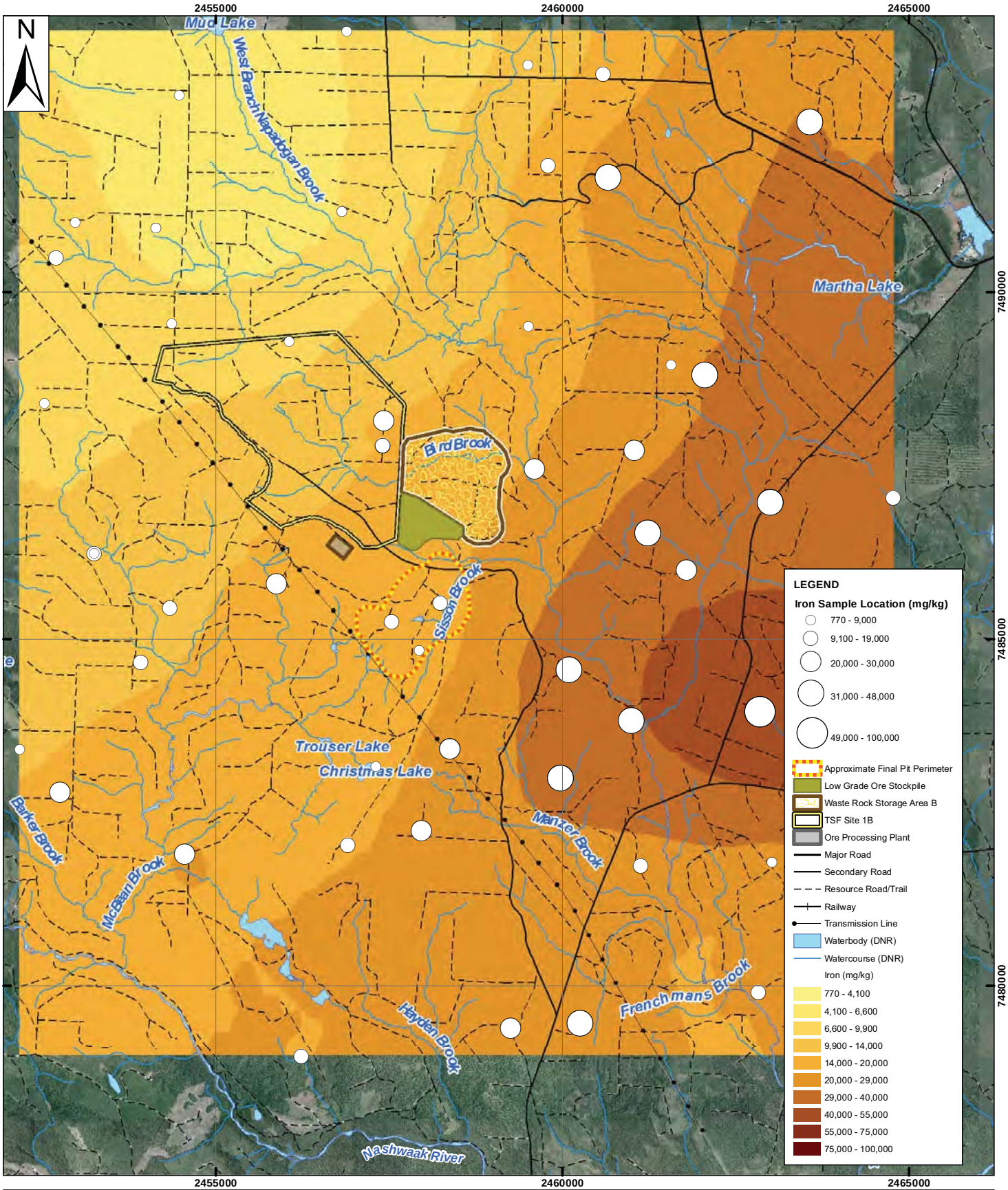
Appd. By: DM

Data Sources: NBDNR, SNB NHN, NB Aquatic Data Warehouse Imagery Provided By: NBDNR Google Earth Pro

Fig. No.: E12

Stantec

Map: NAD83 CSRS NB Double Stereographic



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Baseline Soil – Iron Corrected for Loss on Ignition

Sisson Project

Napadogan, N.B.

Client: Northcliff Resources Ltd.

Scale: NTS

0 0.5 1 1.5

Kilometres

Project No.: 121810356

Date: (dd/mm/yyyy) 02/02/2012

Dwn. By: JAB

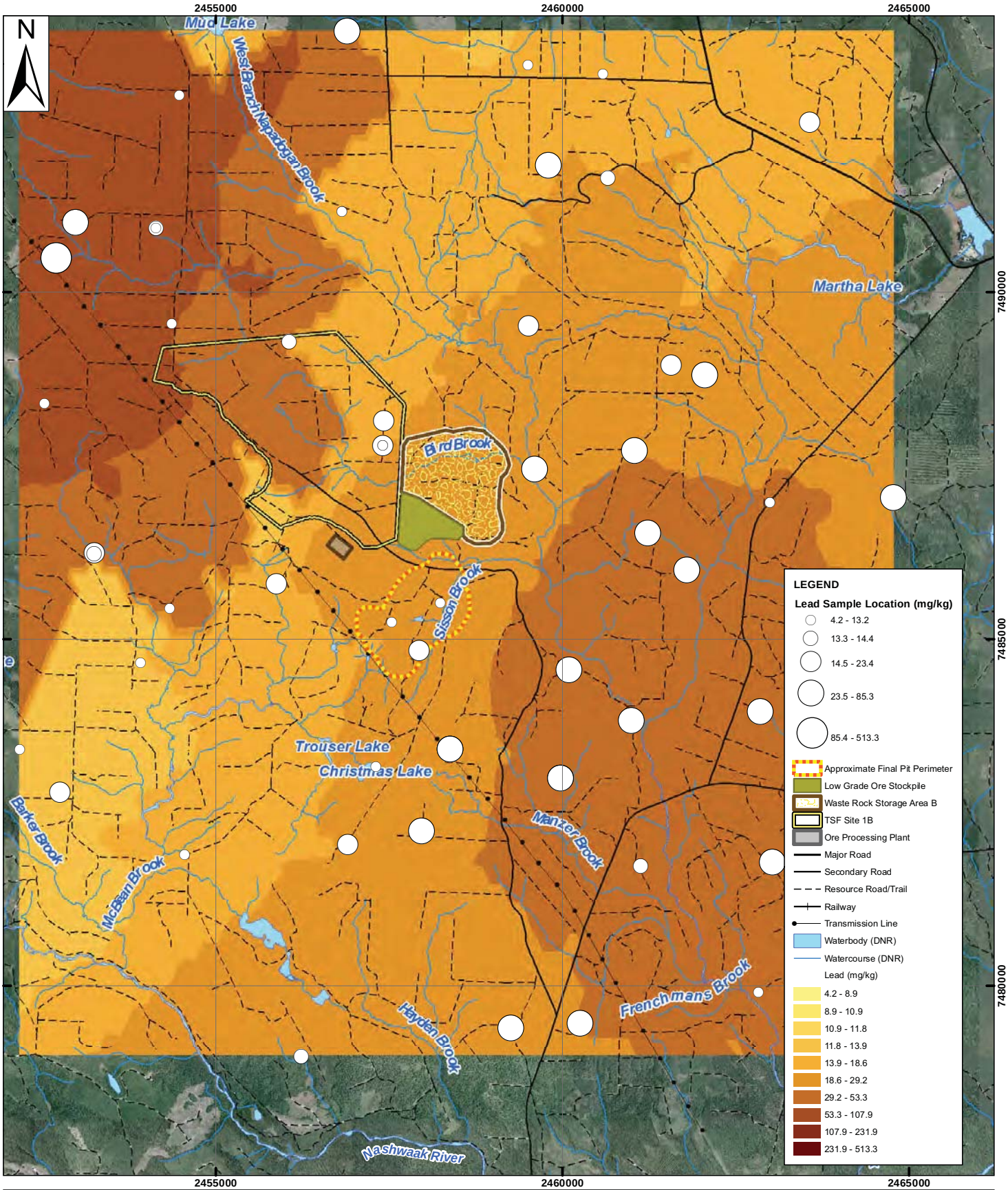
Appd. By: DM

Data Sources:
NBDNR, SNB
NHN, NB Aquatic Data Warehouse
Imagery Provided By:
NBDNR
Google Earth Pro

Fig. No.: E13

Stantec

Map: NAD83 CSRS NB Double Stereographic



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Baseline Soil – Lead Corrected for Loss on Ignition

Sisson Project

Napadogan, N.B.

Client: Northcliff Resources Ltd.

Scale: NTS

0 0.5 1 1.5

Kilometres

Project No.: 121810356

Date: (dd/mm/yyyy) 02/02/2012

Dwn. By: JAB

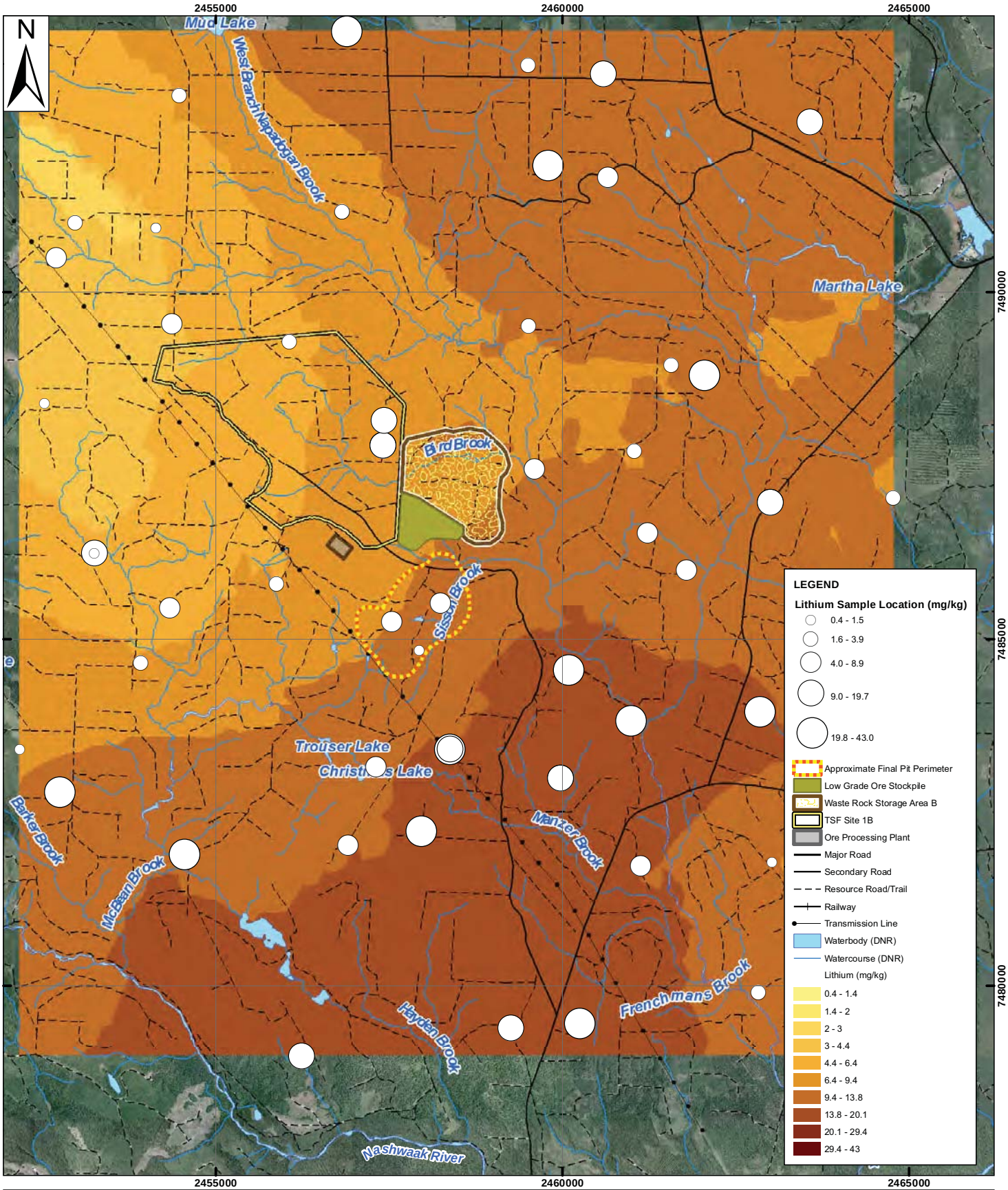
Appd. By: DM

Data Sources:
NBDNR, SNB
NHN, NB Aquatic Data Warehouse
Imagery Provided By:
NBDNR
Google Earth Pro

Fig. No.: E14

Stantec

Map: NAD83 CSRS NB Double Stereographic



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Baseline Soil – Lithium Corrected for Loss on Ignition

Sisson Project

Napadogan, N.B.

Client: Northcliff Resources Ltd.

Scale: NTS

0 0.5 1 1.5

Kilometres

Project No.: 121810356

Date: (dd/mm/yyyy) 02/02/2012

Dwn. By: JAB

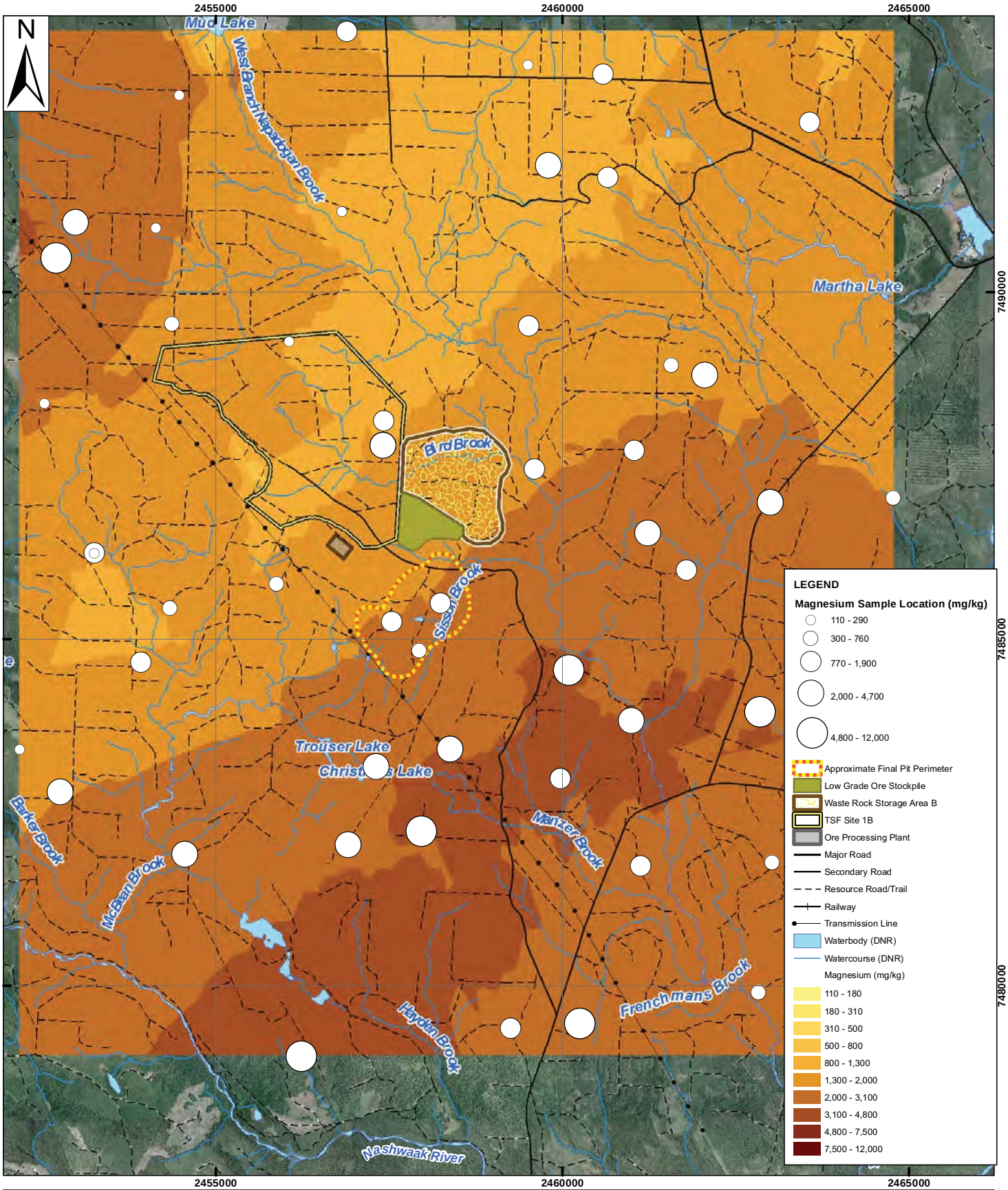
Appd. By: DM

Data Sources: NBDNR, SNB NHN, NB Aquatic Data Warehouse Imagery Provided By: NBDNR Google Earth Pro

Fig. No.: E15

Stantec

Map: NAD83 CSRS NB Double Stereographic



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Baseline Soil – Magnesium Corrected for Loss on Ignition

Sisson Project

Napadogan, N.B.

Client: Northcliff Resources Ltd.

Scale: NTS

0 0.5 1 1.5

Kilometres

Project No.: 121810356

Date: (dd/mm/yyyy) 02/02/2012

Dwn. By: JAB

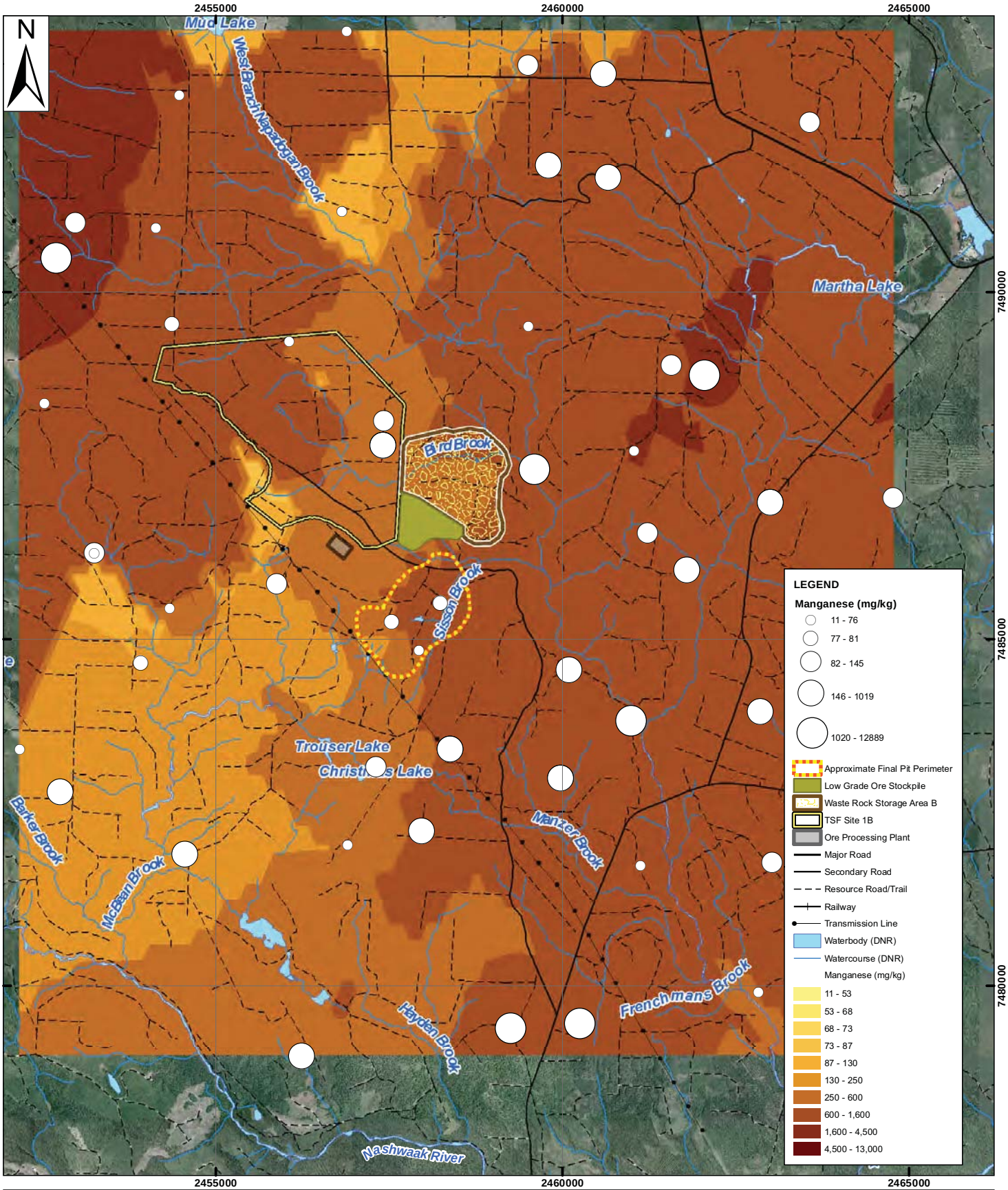
Appd. By: DM

Data Sources:
NBDNR, SNB
NHN, NB Aquatic Data Warehouse
Imagery Provided By:
NBDNR
Google Earth Pro

Fig. No.: E16

Stantec

Map: NAD83 CSRS NB Double Stereographic



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Baseline Soil – Manganese Corrected for Loss on Ignition

Sisson Project

Napadogan, N.B.

Client: Northcliff Resources Ltd.

Scale: NTS

0 0.5 1 1.5

Kilometres

Project No.: 121810356

Date: (dd/mm/yyyy) 02/02/2012

Dwn. By: JAB

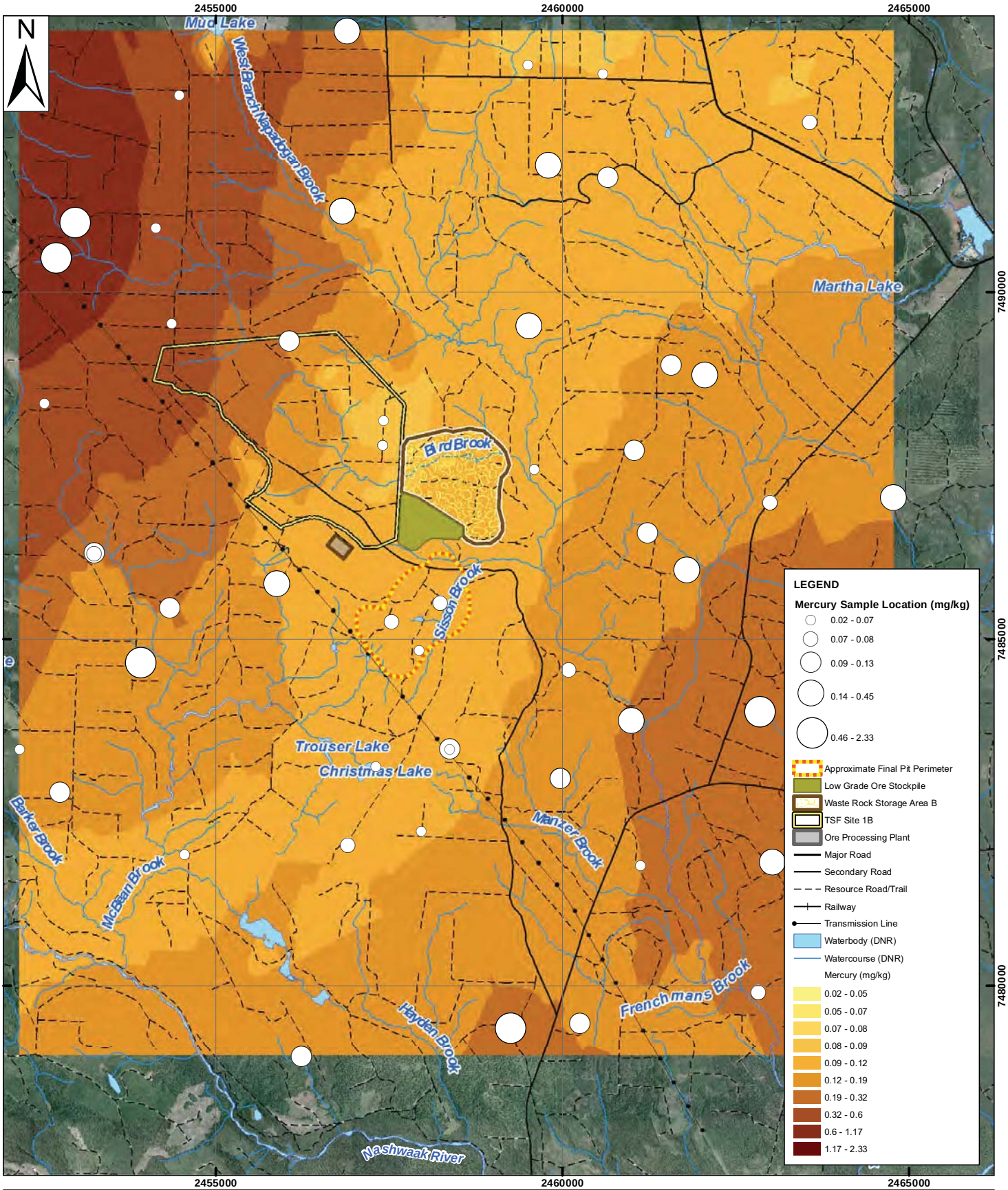
Appd. By: DM

Data Sources: NBDNR, SNB NHN, NB Aquatic Data Warehouse Imagery Provided By: NBDNR Google Earth Pro

Fig. No.: E17

Stantec

Map: NAD83 CSRS NB Double Stereographic



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Baseline Soil – Mercury Corrected for Loss on Ignition

Sisson Project

Napadogan, N.B.

Client: Northcliff Resources Ltd.

Scale: NTS

0 0.5 1 1.5

Kilometres

Project No.: 121810356

Date: (dd/mm/yyyy) 02/02/2012

Dwn. By: JAB

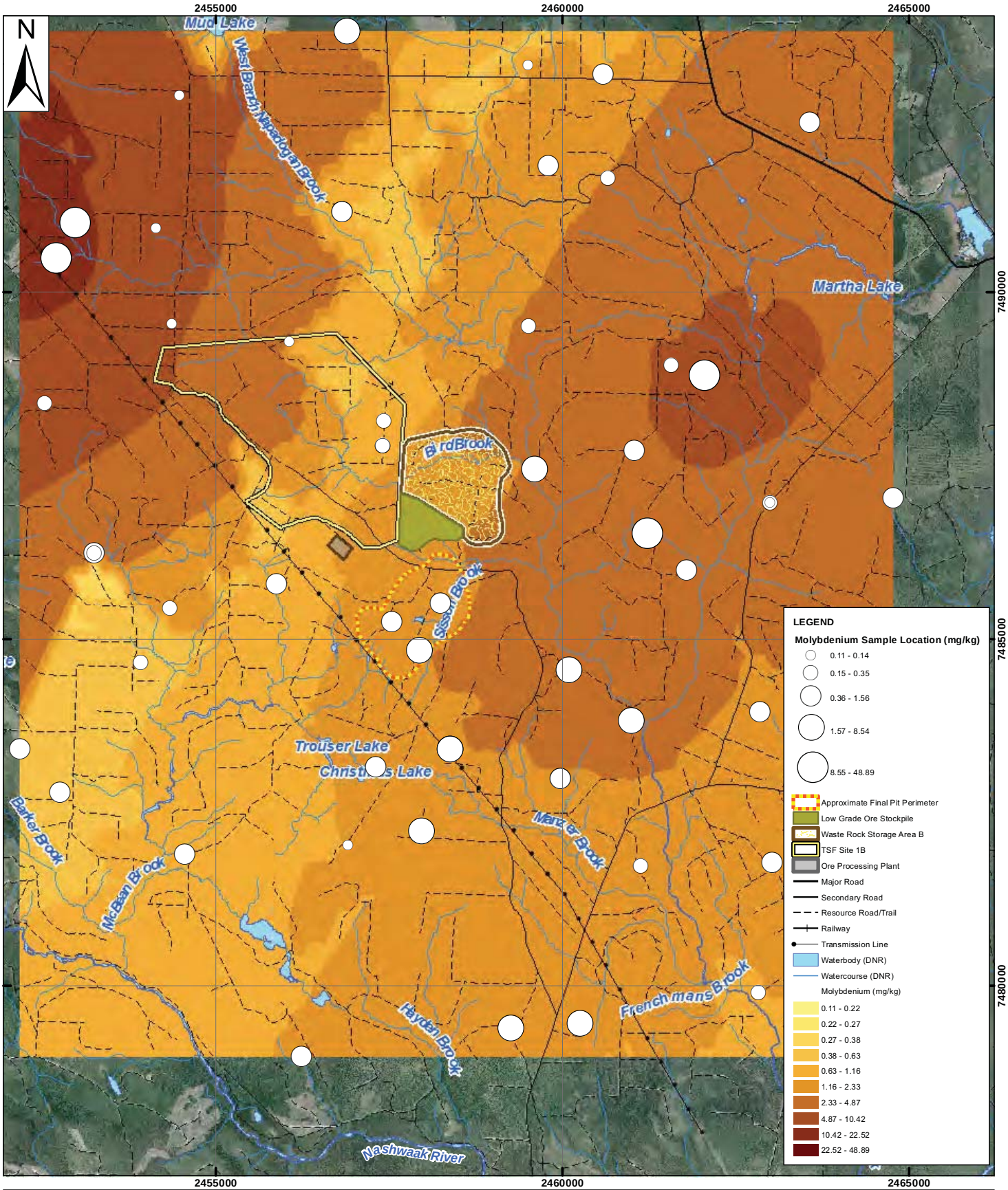
Appd. By: DM

Data Sources:
NBDNR, SNB
NHN, NB Aquatic Data Warehouse
Imagery Provided By:
NBDNR
Google Earth Pro

Fig. No.: E18

Stantec

Map: NAD83 CSRS NB Double Stereographic



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Baseline Soil – Molybdenium Corrected for Loss on Ignition

Sisson Project

Napadogan, N.B.

Client: Northcliff Resources Ltd.

Scale: NTS

0 0.5 1 1.5

Kilometres

Project No.: 121810356

Date: (dd/mm/yyyy) 02/02/2012

Dwn. By: JAB

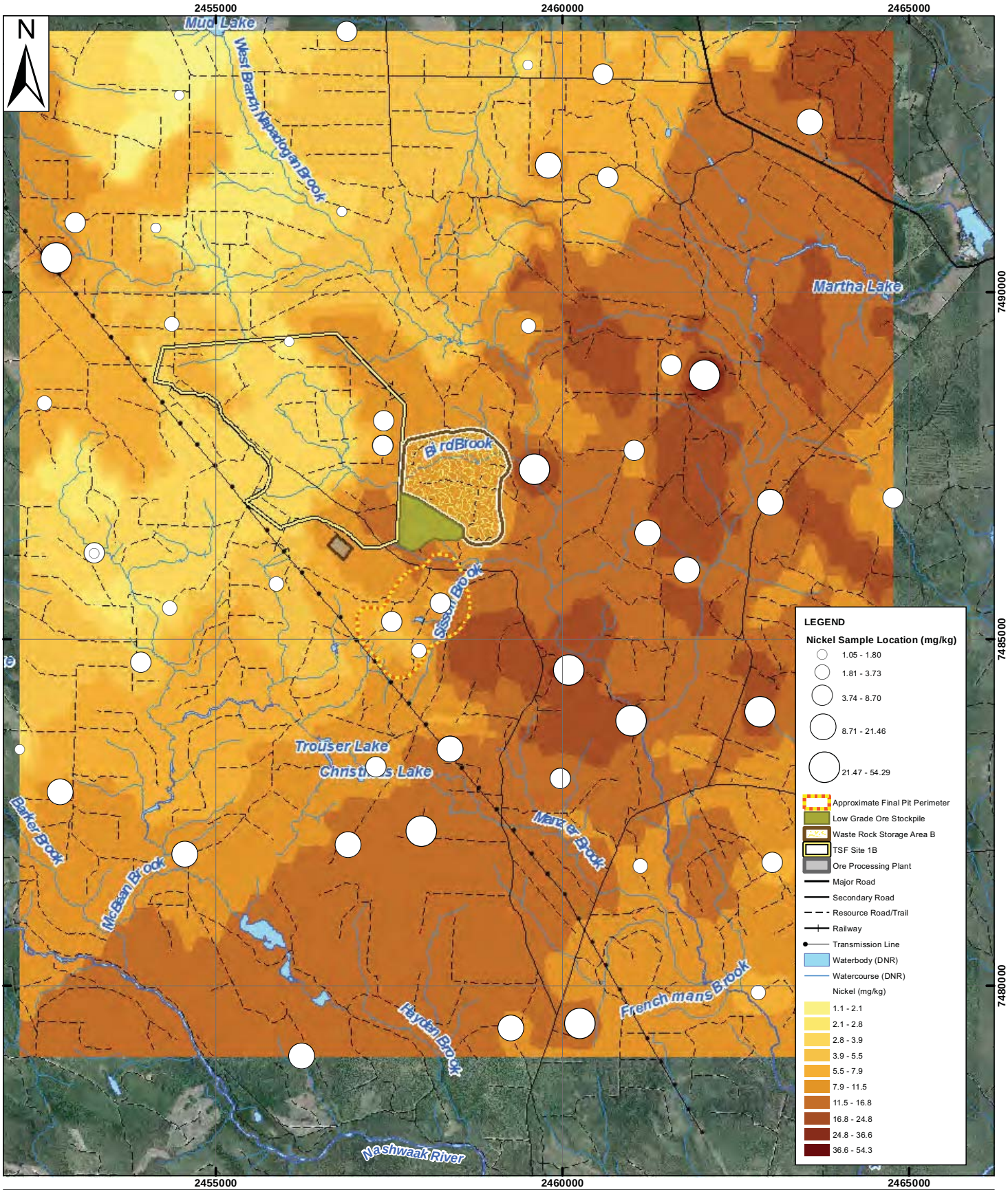
Appd. By: DM

Data Sources:
NBDNR, SNB
NHN, NB Aquatic Data Warehouse
Imagery Provided By:
NBDNR
Google Earth Pro

Fig. No.: E19

Stantec

Map: NAD83 CSRS NB Double Stereographic



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Baseline Soil – Nickel Corrected for Loss on Ignition

Sisson Project

Napadogan, N.B.

Client: Northcliff Resources Ltd.

Scale: NTS

0 0.5 1 1.5

Kilometres

Project No.: 121810356

Date: (dd/mm/yyyy) 02/02/2012

Dwn. By: JAB

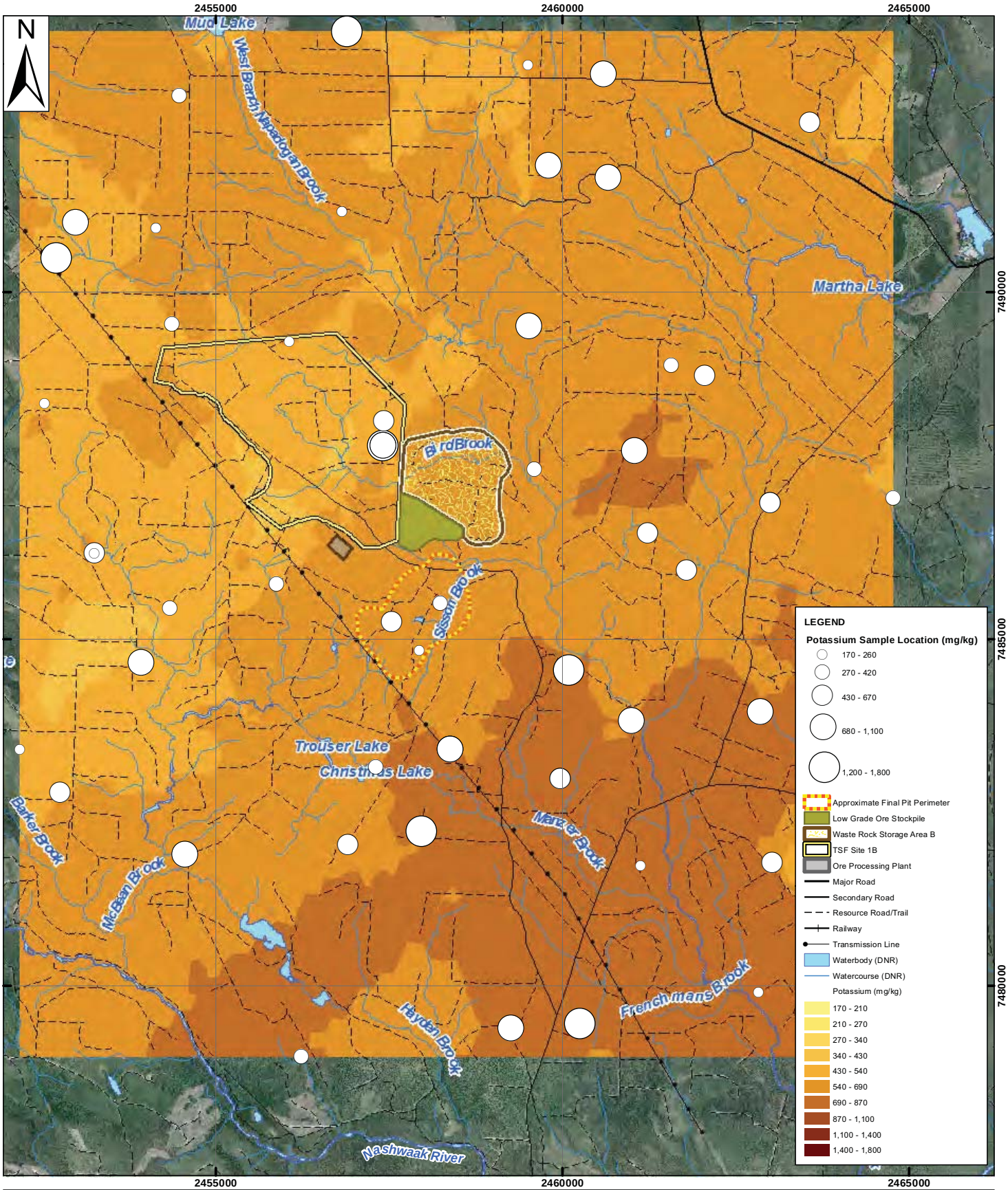
Appd. By: DM

Data Sources:
NBDNR, SNB
NHN, NB Aquatic Data Warehouse
Imagery Provided By:
NBDNR
Google Earth Pro

Fig. No.: E20

Stantec

Map: NAD83 CSRS NB Double Stereographic



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Baseline Soil – Potassium Corrected for Loss on Ignition

Sisson Project

Napadogan, N.B.

Client: Northcliff Resources Ltd.

Scale: NTS

0 0.5 1 1.5

Kilometres

Project No.: 121810356

Date: (dd/mm/yyyy) 02/02/2012

Dwn. By: JAB

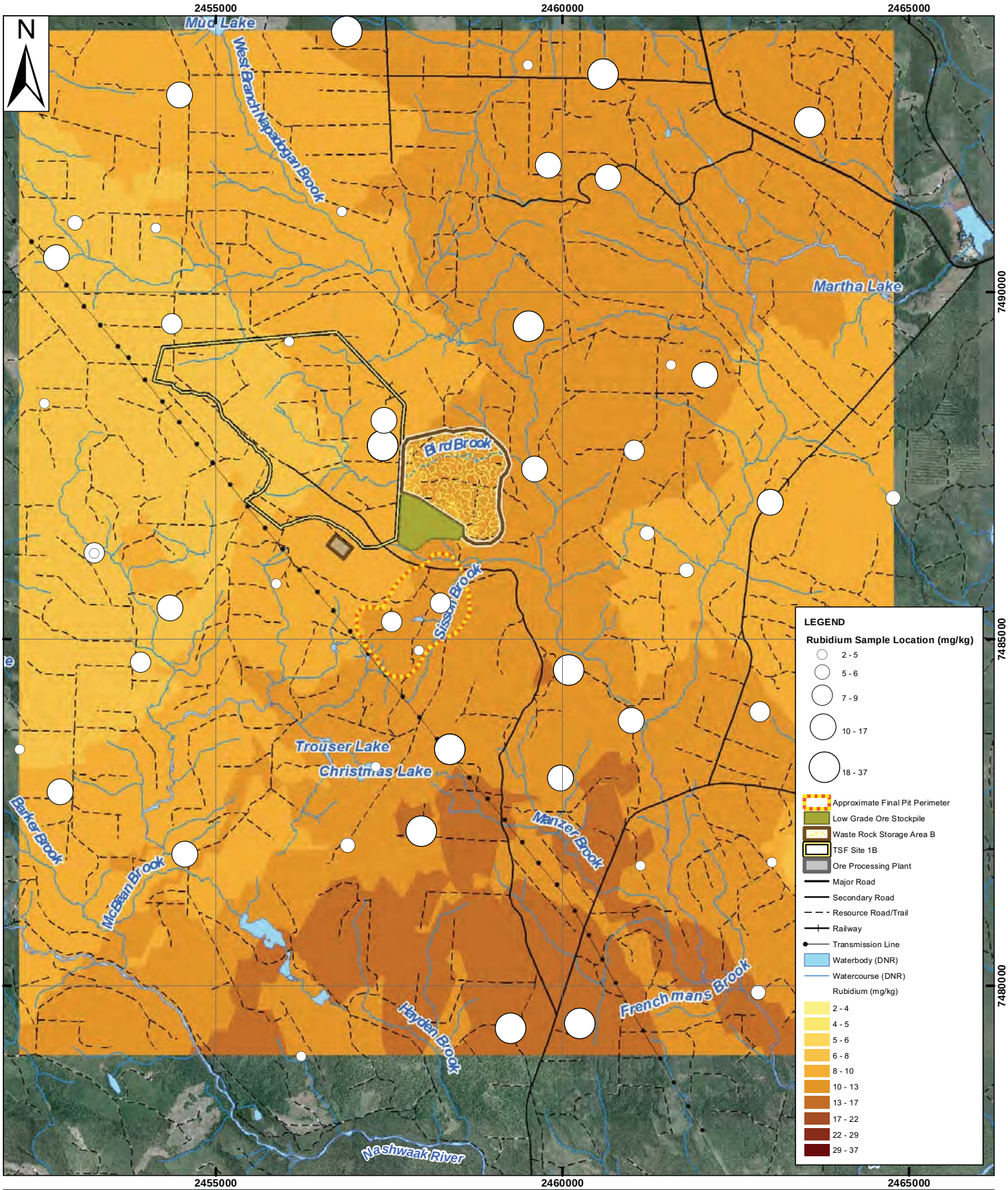
Appd. By: DM

Data Sources: NBDNR, SNB NHN, NB Aquatic Data Warehouse Imagery Provided By: NBDNR Google Earth Pro

Fig. No.: E21

Stantec

Map: NAD83 CSRS NB Double Stereographic



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Baseline Soil – Rubidium Corrected for Loss on Ignition

Sisson Project

Napadogan, N.B.

Client: Northcliff Resources Ltd.

Scale: NTS

0 0.5 1 1.5

Kilometres

Project No.: 121810356

Date: (dd/mm/yyyy) 02/02/2012

Dwn. By: JAB

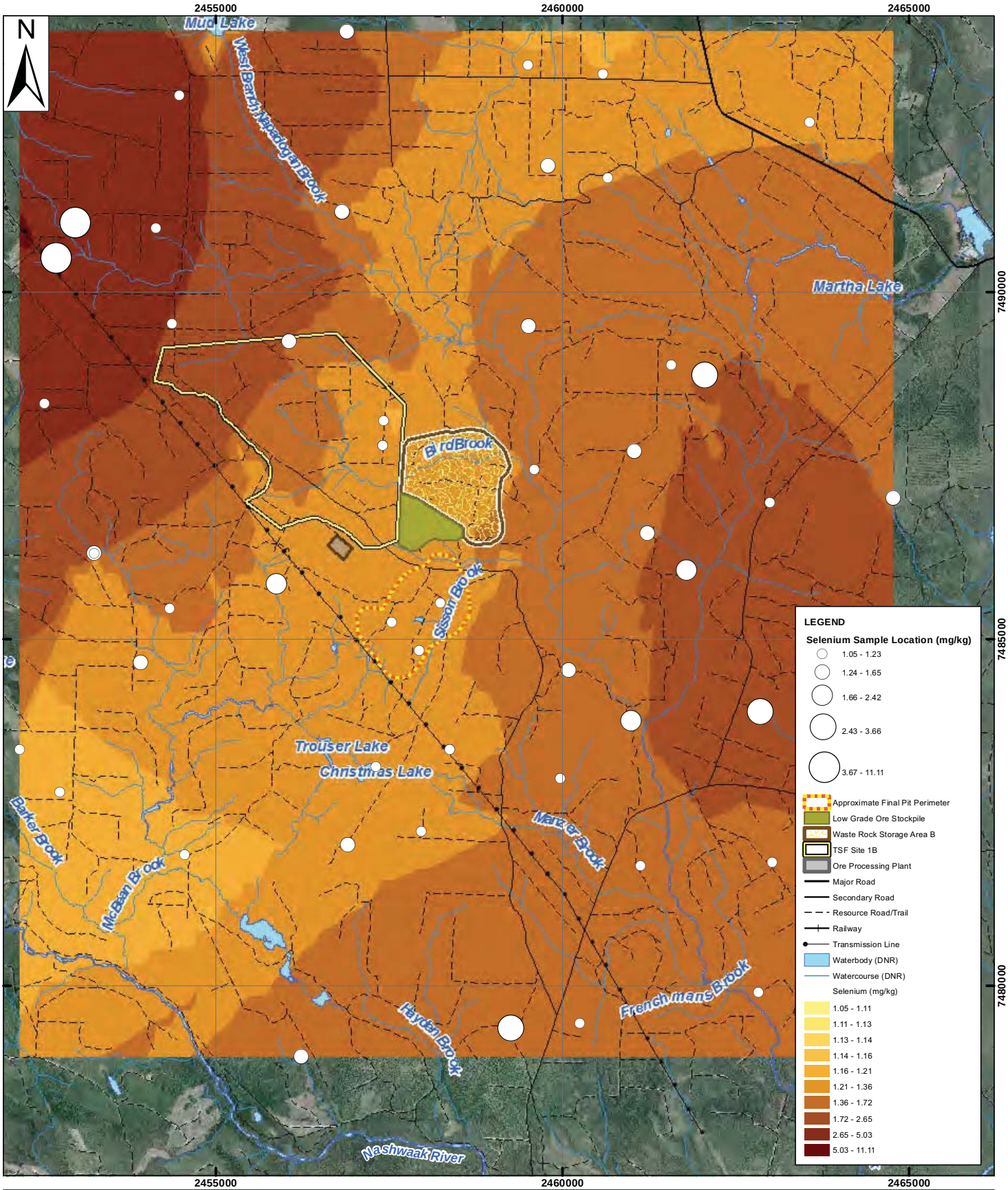
Appd. By: DM

Data Sources:
NBDNR, SNB
NHN, NB Aquatic Data Warehouse
Imagery Provided By:
NBDNR
Google Earth Pro

Fig. No.: E22

Stantec

Map: NAD83 CSRS NB Double Stereographic



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Baseline Soil – Selenium Corrected for Loss on Ignition

Sisson Project

Napadogan, N.B.

Client: Northcliff Resources Ltd.

Scale: NTS

0 0.5 1 1.5

Kilometres

Project No.: 121810356

Date: (dd/mm/yyyy) 02/02/2012

Dwn. By: JAB

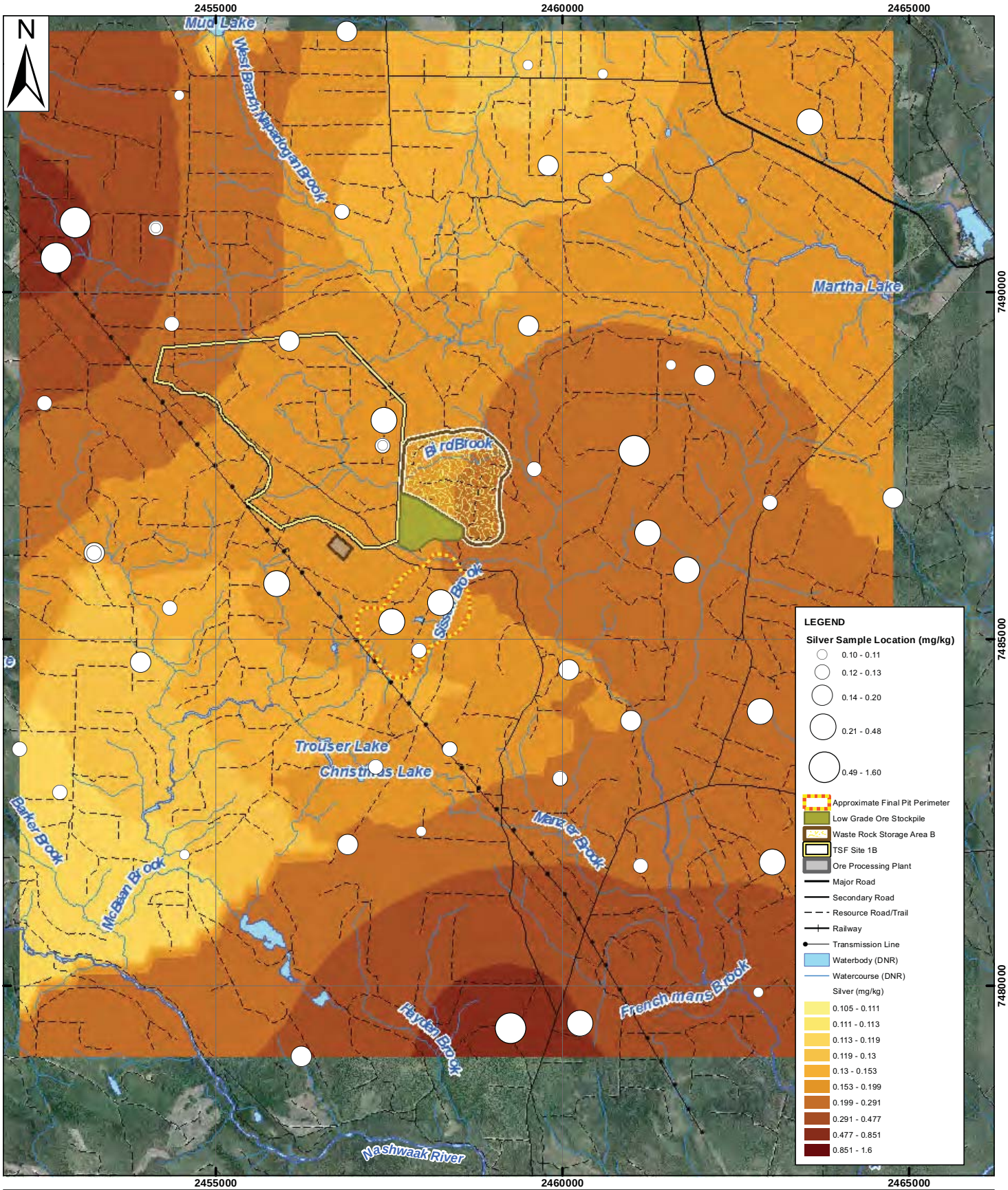
Appd. By: DM

Data Sources: NBDNR, SNB NHN, NB Aquatic Data Warehouse Imagery Provided By: NBDNR Google Earth Pro

Fig. No.: E23

Stantec

Map: NAD83 CSRS NB Double Stereographic



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Baseline Soil – Silver Corrected for Loss on Ignition

Sisson Project

Napadogan, N.B.

Client: Northcliff Resources Ltd.

Scale: NTS

0 0.5 1 1.5

Kilometres

Project No.: 121810356

Date: (dd/mm/yyyy) 02/02/2012

Dwn. By: JAB

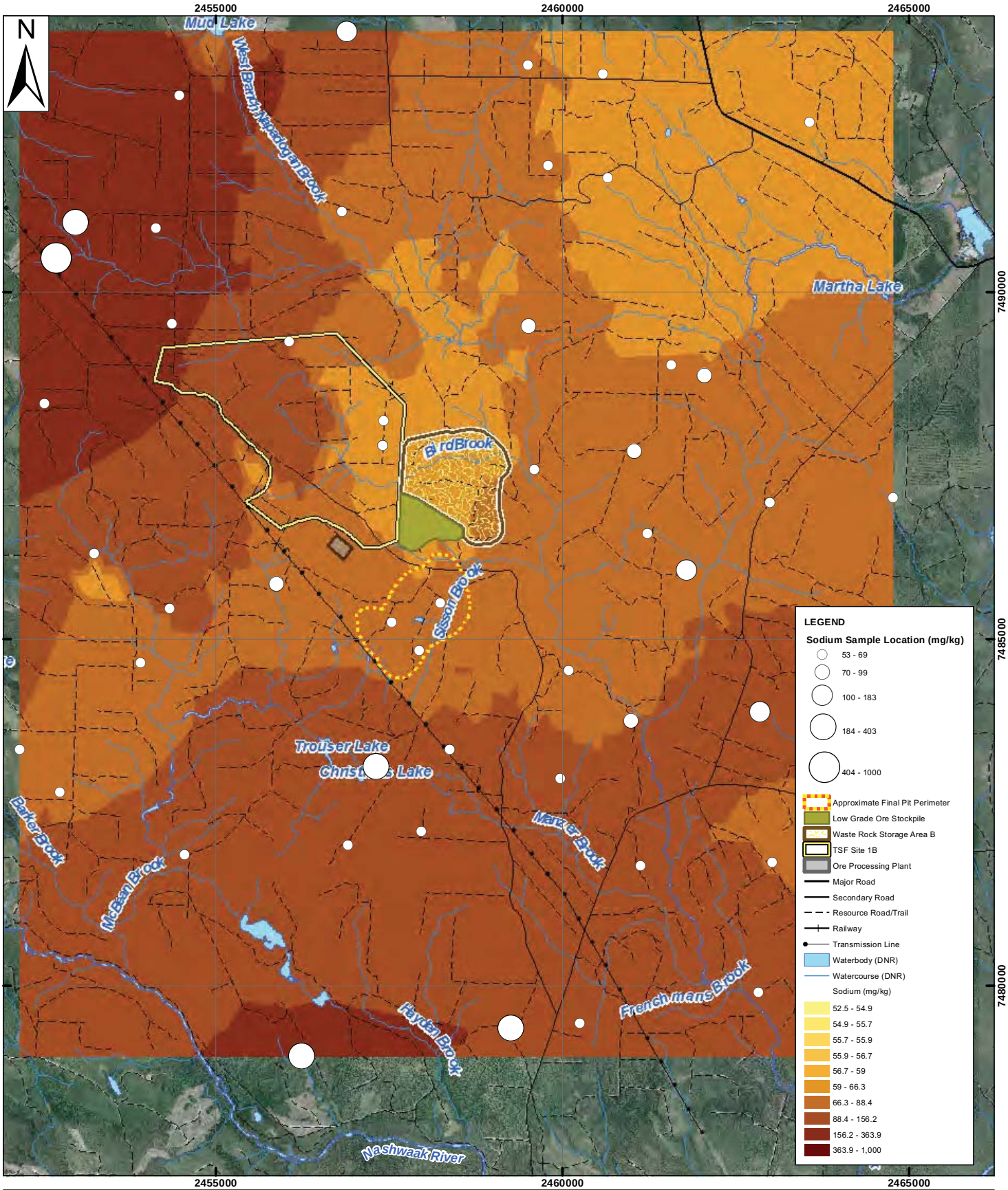
Appd. By: DM

Data Sources: NBDNR, SNB NHN, NB Aquatic Data Warehouse Imagery Provided By: NBDNR Google Earth Pro

Fig. No.: E24

Stantec

Map: NAD83 CSRS NB Double Stereographic



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Baseline Soil – Sodium Corrected for Loss on Ignition

Sisson Project

Napadogan, N.B.

Client: Northcliff Resources Ltd.

Scale: NTS

0 0.5 1 1.5

Kilometres

Project No.: 121810356

Date: (dd/mm/yyyy) 02/02/2012

Dwn. By: JAB

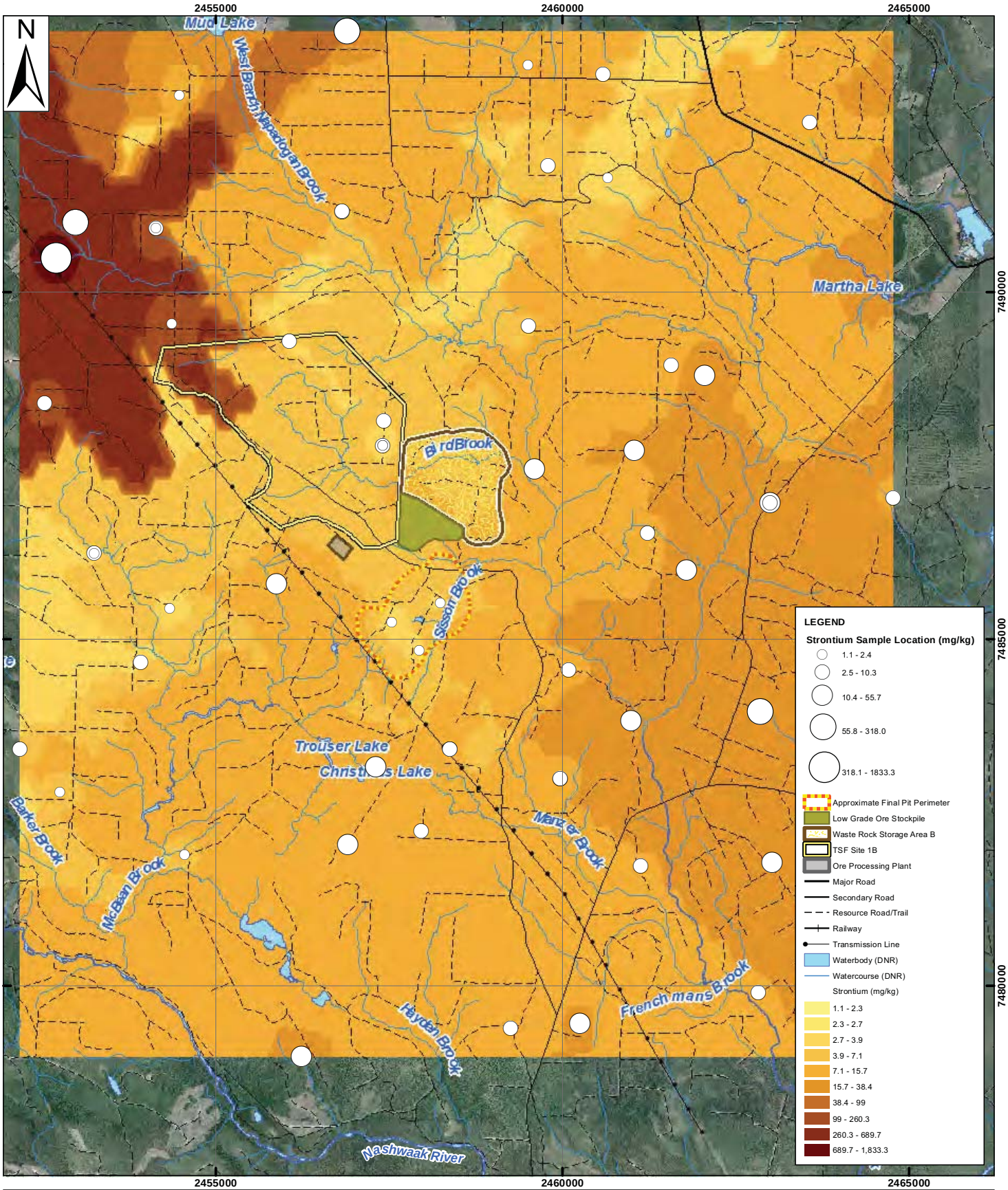
Appd. By: DM

Data Sources:
NBDNR, SNB
NHN, NB Aquatic Data Warehouse
Imagery Provided By:
NBDNR
Google Earth Pro

Fig. No.: E25

Stantec

Map: NAD83 CSRS NB Double Stereographic



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Baseline Soil – Strontium Corrected for Loss on Ignition

Sisson Project

Napadogan, N.B.

Client: Northcliff Resources Ltd.

Scale: NTS

0 0.5 1 1.5

Kilometres

Project No.: 121810356

Date: (dd/mm/yyyy) 02/02/2012

Dwn. By: JAB

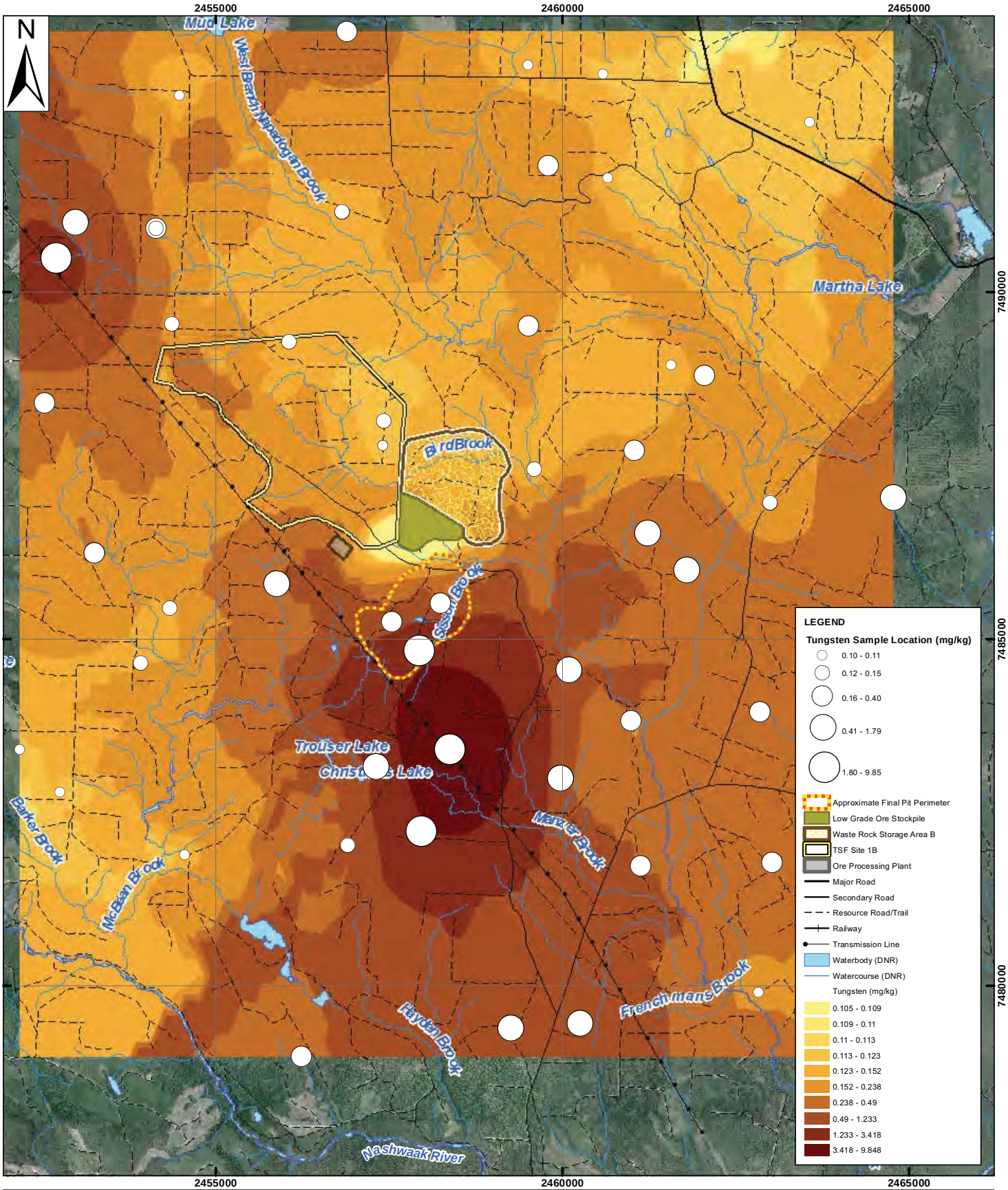
Appd. By: DM

Data Sources: NBDNR, SNB NHN, NB Aquatic Data Warehouse Imagery Provided By: NBDNR Google Earth Pro

Fig. No.: E26

Stantec

Map: NAD83 CSRS NB Double Stereographic



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Baseline Soil – Tungsten Corrected for Loss on Ignition

Sisson Project

Napadogan, N.B.

Client: Northcliff Resources Ltd.

Scale: NTS

0 0.5 1 1.5

Kilometres

Project No.: 121810356

Date: (dd/mm/yyyy) 02/02/2012

Dwn. By: JAB

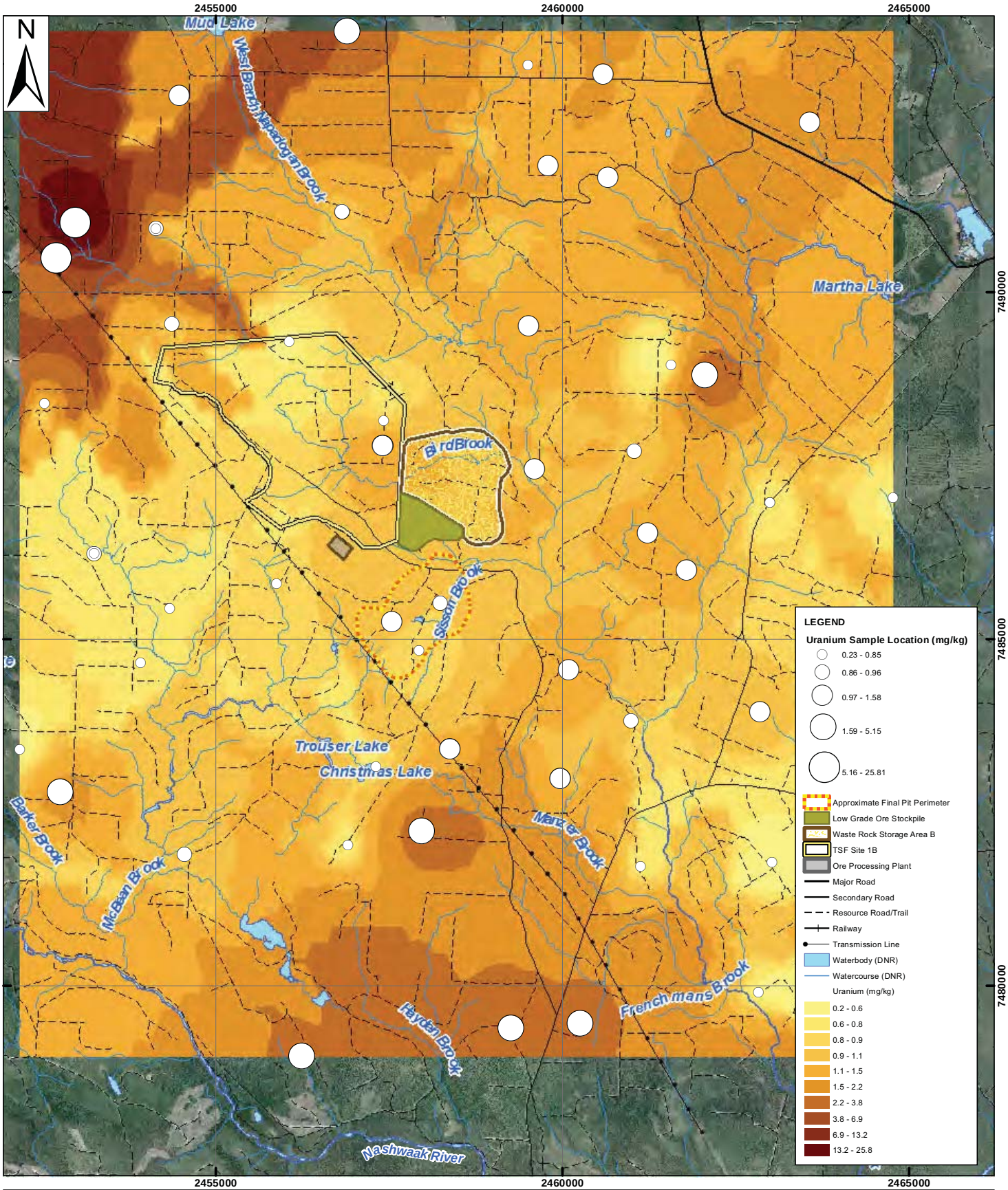
Appd. By: DM

Data Sources:
NBDNR, SNB
NHN, NB Aquatic Data Warehouse
Imagery Provided By:
NBDNR
Google Earth Pro

Fig. No.: E27

Stantec

Map: NAD83 CSRS NB Double Stereographic



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Baseline Soil – Uranium Corrected for Loss on Ignition

Sisson Project

Napadogan, N.B.

Client: Northcliff Resources Ltd.

Scale: NTS

0 0.5 1 1.5

Kilometres

Project No.: 121810356

Date: (dd/mm/yyyy) 02/02/2012

Dwn. By: JAB

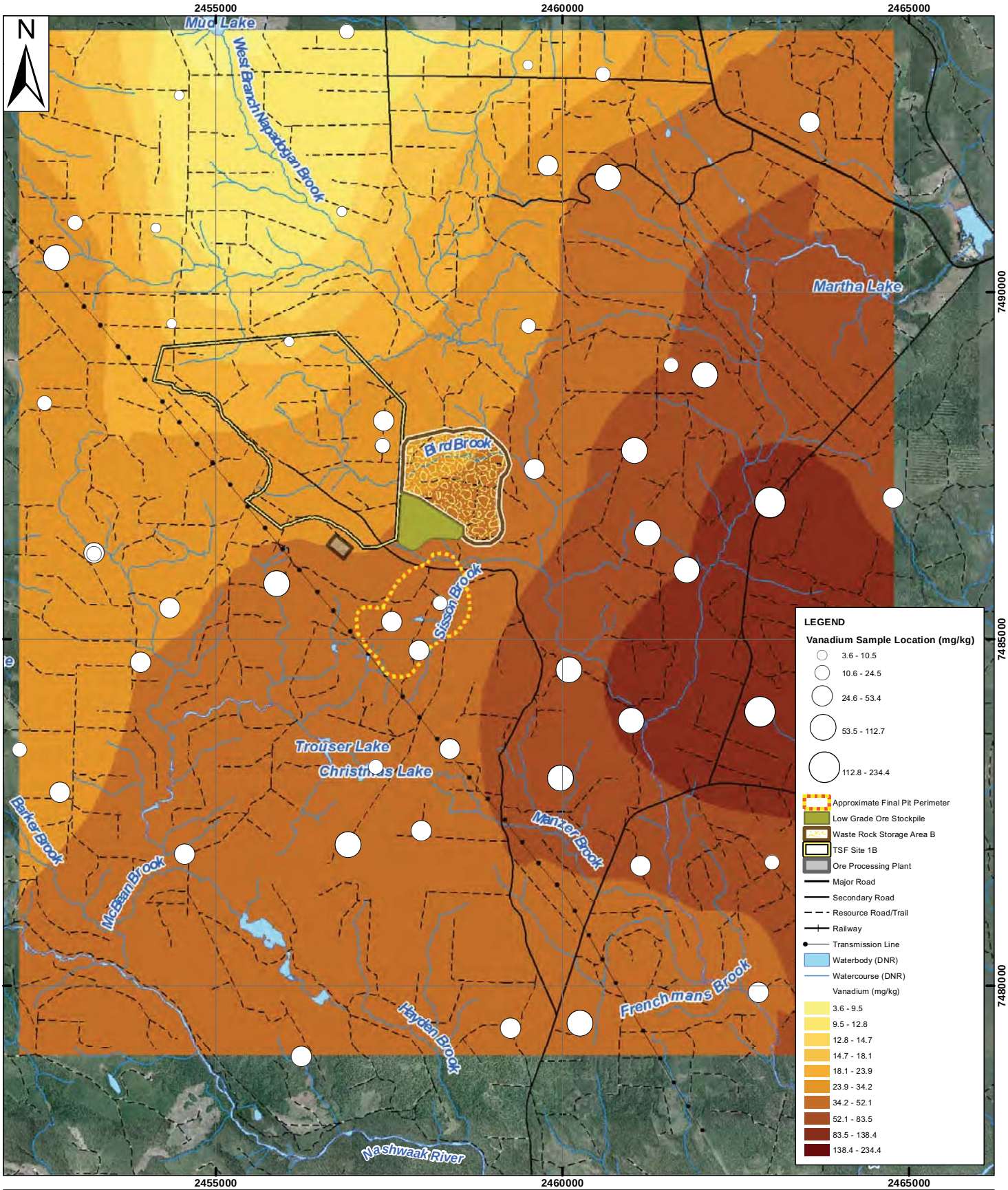
Appd. By: DM

Data Sources: NBDNR, SNB NHN, NB Aquatic Data Warehouse Imagery Provided By: NBDNR Google Earth Pro

Fig. No.: E28

Stantec

Map: NAD83 CSRS NB Double Stereographic



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Baseline Soil – Vanadium Corrected for Loss on Ignition

Sisson Project

Napadogan, N.B.

Client: Northcliff Resources Ltd.

Scale: NTS

0 0.5 1 1.5

Kilometres

Project No.: 121810356

Date: (dd/mm/yyyy) 02/02/2012

Dwn. By: JAB

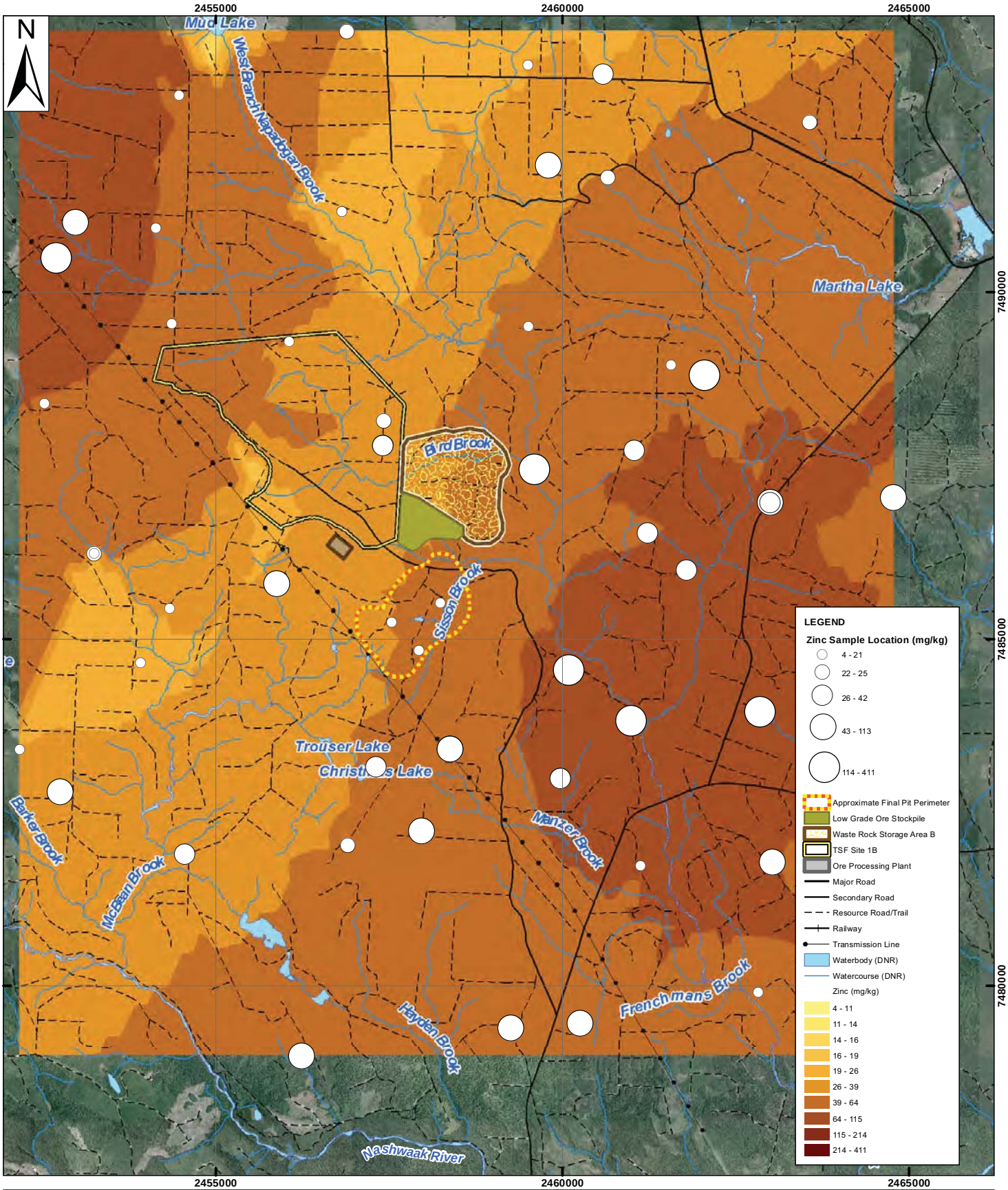
Appd. By: DM

Data Sources:
NBDNR, SNB
NHN, NB Aquatic Data Warehouse
Imagery Provided By:
NBDNR
Google Earth Pro

Fig. No.: E29

Stantec

Map: NAD83 CSRS NB Double Stereographic



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Baseline Soil – Zinc Corrected for Loss on Ignition

Sisson Project

Napadogan, N.B.

Client: Northcliff Resources Ltd.

Scale: NTS

0 0.5 1 1.5

Kilometres

Project No.: 121810356

Date: (dd/mm/yyyy) 02/02/2012

Dwn. By: JAB

Appd. By: DM

Data Sources:
NBDNR, SNB
NHN, NB Aquatic Data Warehouse
Imagery Provided By:
NBDNR
Google Earth Pro

Fig. No.: E30

Stantec

Map: NAD83 CSRS NB Double Stereographic

Appendix F

Fish Trace Metal Concentration Data and Statistical Analysis

Table F.1 Metal Concentrations in Fish Carcasses

Sample ID	Site ID	Fish ID	Aluminum mg/kg	Antimony mg/kg	Arsenic mg/kg	Barium mg/kg	Beryllium mg/kg	Bismuth mg/kg	Boron mg/kg	Cadmium mg/kg	Calcium mg/kg	Chromium mg/kg	Cobalt mg/kg	Copper mg/kg	Iron mg/kg	Lead mg/kg	Lithium mg/kg	Magnesium mg/kg	Manganese mg/kg	Mercury mg/kg	Molybdenum mg/kg	Nickel mg/kg	Potassium mg/kg	Rubidium mg/kg	Selenium mg/kg	Silver mg/kg	Sodium mg/kg	Strontium mg/kg	Tellurium mg/kg	Thallium mg/kg	Tin mg/kg	Tungsten mg/kg	Uranium mg/kg	Vanadium mg/kg	Zinc mg/kg
B2A2-BT1	B2A2	BT1	1.39	0.0025	0.06	0.25	0.0025	0.025	0.025	0.0114	4140	0.1	0.022	0.38	6	0.023	0.011	310	3.31	0.15	0.008	0.025	4210	10.6	0.28	0.0025	609	7.3	0.0025	0.008	0.019	0.0025	0.0025	0.025	11.6
B2A2-BT16	B2A2	BT16	0.39	0.0025	0.025	0.41	0.0025	0.025	0.025	0.0026	5120	0.025	0.017	0.39	5	0.012	0.006	349	1.39	0.21	0.008	0.025	4210	5.5	0.15	0.0025	606	9.93	0.0025	0.006	0.007	0.0025	0.0025	0.025	18.1
B2A2-BT18	B2A2	BT18	0.56	0.0025	0.2	0.33	0.0025	0.025	0.025	0.0076	2950	0.025	0.04	0.37	4	0.02	0.0025	313	2.22	0.15	0.005	0.025	4060	8.31	0.39	0.0025	565	6.66	0.0025	0.008	0.01	0.012	0.0025	0.025	13.5
B2A2-BT3	B2A2	BT3	1.03	0.0025	0.025	0.29	0.0025	0.025	0.025	0.002	3070	0.15	0.026	0.43	8	0.018	0.006	295	1.32	0.15	0.006	0.025	4080	6.89	0.21	0.0025	661	5.17	0.0025	0.0025	0.016	0.0025	0.0025	0.025	14.8
B2A2-BT4	B2A2	BT4	7.82	0.0025	0.19	0.7	0.0025	0.025	0.025	0.0102	7230	0.025	0.056	0.39	10	0.035	0.02	356	9.81	0.13	0.007	0.025	4010	11.4	0.38	0.0025	746	14	0.0025	0.01	0.007	0.01	0.0025	0.025	13.2
B2A2-BT5	B2A2	BT5	1.13	0.0025	0.3	0.52	0.0025	0.025	0.025	0.0047	4840	0.025	0.061	0.36	5	0.028	0.008	337	5.55	0.16	0.007	0.025	4240	11.2	0.42	0.0025	730	9.68	0.0025	0.01	0.007	0.012	0.0025	0.025	13.1
B2A2-BT6	B2A2	BT6	2.4	0.0025	0.2	0.54	0.0025	0.025	0.025	0.0067	5450	0.1	0.074	0.46	7	0.028	0.009	360	8.34	0.12	0.008	0.025	3900	8.87	0.38	0.0025	727	10.1	0.0025	0.01	0.007	0.007	0.0025	0.025	22
B2A2-BT8	B2A2	BT8	1.39	0.007	0.13	0.48	0.0025	0.025	0.025	0.0065	3380	0.025	0.04	0.35	5	0.014	0.008	313	3.54	0.27	0.007	0.025	3890	7.37	0.26	0.0025	673	9.1	0.0025	0.011	0.017	0.006	0.0025	0.025	14.3
B2A2-Comp.1	B2A2	Comp.1	0.78	0.0025	0.2	0.41	0.0025	0.025	0.025	0.00765	3765	0.025	0.036	0.4	5	0.0165	0.0065	335.5	2.885	0.13	0.006	0.025	3965	7.57	0.445	0.0025	676	8.335	0.0025	0.0095	0.0105	0.0075	0.0025	0.025	16.55
B2A2-Comp.2	B2A2	Comp.2	0.91	0.0025	0.24	0.46	0.0025	0.025	0.025	0.0067	3870	0.025	0.052	0.42	5	0.019	0.007	338	3.31	0.12	0.006	0.025	4050	9.48	0.38	0.0025	687	8.85	0.0025	0.009	0.017	0.008	0.0025	0.025	15.9
B3A9-BT1	B3A9	BT1	0.88	0.0025	0.08	0.26	0.0025	0.025	0.025	0.0194	4680	0.025	0.032	0.4	6	0.026	0.008	318	2.87	0.22	0.007	0.025	4020	13.6	0.33	0.0025	734	7.87	0.0025	0.006	0.008	0.0025	0.0025	0.025	15.1
B3A9-BT13	B3A9	BT13	0.41	0.017	0.11	0.32	0.0025	0.28	0.025	0.0161	4740	0.025	0.028	0.32	4	0.017	0.007	360	2.62	0.15	0.013	0.025	4160	12.1	0.3	0.0025	623	9.17	0.0025	0.01	0.012	0.0025	0.0025	0.025	14.3
B3A9-BT14	B3A9	BT14	0.52	0.0025	0.11	0.28	0.0025	0.025	0.025	0.0132	5580	0.025	0.038	0.3	3	0.03	0.006	348	2.55	0.2	0.007	0.025	4060	12.5	0.3	0.0025	627	9.15	0.0025	0.01	0.005	0.0025	0.0025	0.025	14.6
B3A9-BT2	B3A9	BT2	0.56	0.0025	0.11	0.25	0.0025	0.025	0.025	0.0124	3500	0.025	0.035	0.32	5	0.015	0.006	329	2.42	0.13	0.005	0.025	4100	13	0.31	0.0025	635	6.19	0.0025	0.009	0.0025	0.0025	0.0025	0.025	14.1
B3A9-BT4	B3A9	BT4	0.65	0.0025	0.1	0.29	0.0025	0.025	0.025	0.0129	4590	0.025	0.027	0.31	5	0.014	0.007	323	2.31	0.16	0.005	0.025	4090	12	0.32	0.0025	657	8.14	0.0025	0.01	0.006	0.0025	0.0025	0.025	18.1
B3A9-BT5	B3A9	BT5	0.61	0.0025	0.09	0.21	0.0025	0.025	0.025	0.0114	3290	0.025	0.018	0.3	6	0.006	0.005	332	1.37	0.12	0.0025	0.025	4090	11.8	0.26	0.0025	636	5.92	0.0025	0.008	0.006	0.0025	0.0025	0.025	17.1
B3A9-BT7	B3A9	BT7	0.46	0.0025	0.4	0.41	0.0025	0.025	0.025	0.0085	4540	0.025	0.046	0.39	6	0.006	0.007	347	4.92	0.09	0.005	0.025	4080	12.2	0.55	0.0025	645	6.24	0.0025	0.011	0.007	0.0025	0.0025	0.025	13.7
B3A9-BT9	B3A9	BT9	0.43	0.0025	0.1	0.13	0.0025	0.025	0.025	0.015	1810	0.025	0.049	0.38	4	0.021	0.0025	284	1.44	0.15	0.0025	0.025	4070	12.5	0.29	0.0025	583	3.13	0.0025	0.01	0.008	0.0025	0.0025	0.025	11.3
B3A9-Comp1	B3A9	Comp1	0.745	0.0025	0.12	0.255	0.0025	0.025	0.025	0.02045	4105	0.025	0.019	0.315	4	0.013	0.005	339	1.85	0.14	0.0055	0.025	3865	9.615	0.31	0.0025	646	7.535	0.0025	0.009	0.0085	0.0025	0.0025	0.025	19.1
B3A9-Comp2	B3A9	Comp2	0.57	0.0025	0.09	0.43	0.0025	0.025	0.025	0.0139	4410	0.025	0.027	0.29	4	0.011	0.007	318	1.51	0.15	0.006	0.025	3810	11.1	0.28	0.0025	638	8.03	0.0025	0.01	0.01	0.0025	0.0025	0.025	19.7
EBNB1-BT1	EBNB1	BT1	0.76	0.0025	0.51	0.51	0.0025	0.025	0.025	0.0085	4070	0.025	0.044	0.29	5	0.008	0.0025	345	6.11	0.05	0.0025	0.025	4130	10.5	0.99	0.0025	551	5.63	0.0025	0.031	0.009	0.0025	0.0025	0.025	11.6
EBNB1-BT2	EBNB1	BT2	1.09	0.0025	0.41	0.31	0.0025	0.025	0.025	0.0071	2890	0.025	0.043	0.32	5	0.0025	0.0025	308	4.59	0.05	0.0025	0.025	4100	10.8	0.84	0.0025	573	3.72	0.0025	0.026	0.0025	0.0025	0.0025	0.025	14
EBNB1-BT3	EBNB1	BT3	0.25	0.0025	0.24	0.29	0.0025	0.025	0.025	0.0054	2900	0.025	0.038	0.3	4	0.0025	0.0025	318	4.31	0.04	0.0025	0.025	4200	9.35	0.55	0.0025	529	3.97	0.0025	0.021	0.0025	0.0025	0.0025	0.025	16.5
M3C3-BT1	M3C3	BT1	0.54	0.0025	0.09	0.3	0.0025	0.025	0.025	0.0034	4370	0.025	0.028	0.33	5	0.018	0.0025	345	4.22	0.13	0.02	0.025	4200	13.1	0.29	0.0025	562	10.5	0.0025	0.008	0.0025	0.033	0.0025	0.025	13.6
M3C3-BT10	M3C3	BT10	0.51	0.0025	0.07	0.24	0.0025	0.025	0.025	0.015	2500	0.025	0.05	0.33	4	0.027	0.006	268	2.22	0.09	0.0025	0.025	3930	8.79	0.26	0.0025	728	4.32	0.0025	0.012	0.006	0.0025	0.0025	0.025	12
M3C3-BT2	M3C3	BT2	0.69	0.0025	0.07	0.21	0.0025	0.025	0.025	0.0188	3300	0.025	0.04	0.27	5	0.012	0.0025	290	1.83	0.12	0.007	0.025	3870	10.8	0.22	0.0025	650	5.37	0.0025	0.011	0.0025	0.0025	0.0025	0.025	14.4
M3C3-BT3	M3C3	BT3	0.79	0.0025	0.09	0.32	0.0025	0.025	0.025	0.0214	3910	0.025	0.041	0.29	4	0.011	0.006	331	1.89	0.07	0.006	0.025	3970	9.04	0.23	0.0025	541	6.72	0.0025	0.01	0.0025	0.0025	0.0025	0.025	18.1
M3C3-BT4	M3C3	BT4	0.65	0.0025	0.06	0.41	0.0025	0.025	0.025	0.0135	5480	0.025	0.041	0.29	4	0.022	0.007	354	2.7	0.06	0.005	0.025	3930	10.3	0.21	0.0025	655	10.4	0.0025	0.013	0.007	0.0025	0.0025	0.025	17.9
M3C3-BT5	M3C3	BT5	0.48	0.0025	0.025	0.16	0.0025	0.025	0.025	0.0085	2800	0.025	0.024	0.46	3	0.046	0.0025	296	4.74	0.1	0.0025	0.025	4070	7.14	0.31	0.0025	590	3.55	0.0025	0.005	0.018	0.0025	0.0025	0.025	11.9
M3C3-BT6	M3C3	BT6	0.515	0.0025	0.025	0.21	0.0025	0.025	0.025	0.00645	3765	0.025	0.014	0.33	4.5	0.0285	0.006	304.5	1.93	0.08	0.0025	0.025	3955	8.765	0.175	0.0025	694	5.17	0.0025	0.0065	0.00375	0.0025	0.0025	0.025	12.55
M3C3-BT7	M3C3	BT7	0.29	0.017	0.025	0.32	0.0025	0.2	0.025	0.0053	5980	0.025	0.022	0.37	5	0.026	0.006	355	4.39	0.16	0.02	0.025	3800	9.67	0.18	0.0025	614	14.1	0.0025	0.008	0.019	0.052	0.0025	0.025	15.6
M3C3-BT8	M3C3	BT8	0.37	0.006	0.05	0.19	0.0025	0.025	0.025	0.0135	3860	0.025	0.018	0.38	3	0.013	0.006	332	5.07	0.11	0.0025	0.025	4000	9.72	0.28	0.0025	535	5.7	0.0025	0.007	0.009	0.006	0.0025	0.025	14.6
M3C3-BT9	M3C3	BT9	0.21	0.0025	0.05	0.12	0.0025	0.025	0.025	0.0126	1920	0.025	0.033	0.35	4	0.01	0.0025	284	2.44	0.13	0.0025	0.025	3970	9.33	0.26	0.0025	554	3.14	0.0025	0.008	0.0025	0.0025	0.0025	0.025	10.1
S2A2-BT11	S2A2	BT11	0.48	0.0025	0.06	0.28	0.0025	0.025	0.025	0.0075	4290	0.025	0.015	0.48	5	0.019	0.0025	316	2.6	0.16	0.006	0.025	3930	12.9	0.29	0.0025	675	9.82	0.0025	0.009	0.0025	0.033	0.0025	0.025	10.4
S2A2-BT13	S2A2	BT13	0.33	0.0025	0.06	0.55	0.0025	0.025	0.025	0.0045	3940	0.025	0.009	0.31	3	0.006	0.0025	340	1.81	0.1	0.007	0.025	3880	11.2	0.24	0.0025	550	12.2	0.0025	0.009	0.0025	0.035	0.0025	0.025	13
S2A2-BT15	S2A2	BT15	0.42	0.0025	0.05	0.33	0.0025	0.025	0.025	0.008	5040	0.05	0.024	0.48	6	0.009	0.0025	341	3.76	0.19	0.012	0.025	4050	12	0.2	0.0025	644	12.3	0.0025	0.009	0.0025	0.066	0.0025	0.025	11.6
S2A2-BT22	S2A2	BT22	0.245	0.0025	0.085	0.24	0.0025	0.025	0.025	0.00525	4040	0.025	0.0125	0.32	3	0.00475	0.0025	353.5	2.495	0.125	0.0095	0.025	3995	13.35	0.31	0.0025	592	10.46	0.0025	0.009	0.00475	0.046	0.0025	0.025	13.3
S2A2-BT23	S2A2	BT23	0.24	0.0025	0.025	0.25	0.0025	0.025	0.025	0.0072	3050	0.025	0.014	0.51	5	0.009	0.0025	290	1.99	0.14	0.007	0.025	4000	9.77	0.17	0.0025	665	6.83	0.0025	0.008	0.0025	0.029	0.0025	0.025	10.9
S2A2-BT24	S2A2	BT24	0.3	0.006	0.11	0.3	0.0025	0.025	0.025	0.0094	4080	0.025	0.025	0.31	4	0.009	0.005	299	3.81	0.09	0.02	0.025	3740	12.2	0.31	0.0025	602	10.4	0.0025	0.013	0.008	0.066	0.0025	0.025	12.8
S2A2-BT3	S2A2	BT3	0.47	0.0025	0.025	0.43	0.0025	0.025	0.025	0.0077	4930	0.025	0.007	0.45	6	0.01	0.006	347	2.12	0.09	0.007	0.025	4030	14.7	0.22	0.0025	678	15.5	0.0025	0.008	0.0025	0.024	0.0025	0.025	14.2
S2A2-BT4	S2A2	BT4	0.39	0.0025	0.06	0.31	0.0025	0.025	0.025	0.0095	4540	0.025	0.015	0.34	5	0.01	0.006	312	2.64	0.17	0.013	0.025	4030	11.2	0.25	0.0025	677	11.7	0.0025	0.013	0.005	0.048	0.0025	0.025	12.2
S2A2-Comp1	S2A2	Comp1	0.76	0.0025	0.08	0.29	0.0025	0.025	0.025	0.0114	5160	0.025	0.025	0.4	5	0.008	0.006	347	2.52	0.11	0.026	0.025	3900	9.13	0.34	0.0025	634	11	0.0025	0.012	0.009	0.071	0.0025	0.025	14.9
S2A2-Comp2	S2A2	Comp2	0.4	0.0025	0.12	0.34	0.0025	0.025	0.025	0.0101	5040	0.025	0.022	0.35	4	0.032	0.006	338	2.97	0.1	0.01	0.025	3850	11.9	0.35	0.0025	606	11.9	0.0025	0.011	0.005	0.056	0.0025	0.025	14.7
S3A3-BT1	S3A3	BT1	0.84	0.0025	0.11	0.29	0.0025	0.025	0.025	0.0224	3440	0.025	0.063	0.52	5	0.014	0.0025	280	4.03	0.13	0.006	0.06	4000	16.2	0.34	0.0025	665	7.77	0.0025	0.022	0.006	0.048	0.0025	0.025	10.3
S3A3-BT10	S3A3	BT10	0.89	0.0025	0.235	0.19	0.0025	0.025	0.025	0.0145	3550	0.025	0.0595	0.385	4.5	0.0125	0.0025	307.5	2.27	0.145	0.0115	0.025	3950	14.85	0.36	0.0025	634.5	6.52	0.0025	0.0155	0.0155	0.0365	0.0025	0.025	13.2
S3A3-BT12	S3A3	BT12	0.97	0.019	0.22	0.22	0.0025	0.2	0.025	0.0188	3400	0.025	0.085	0.35	4	0.011	0.0025	305	4.02	0.13	0.018	0.025	3870	16.3	0.32	0.0025	560	6.99	0.0025	0.027	0.018	0.045	0.0025	0.025	13
S3A3-BT23	S3A3	BT23	0.38	0.005	0.16	0.2	0.0025	0.025	0.025	0.0247	3700	0.025	0.06	0.39	5	0.013	0.0025	320	2.75	0.11	0.009	0.025	3900	13.5	0.32	0.0025	604	7.56	0.0025	0.019	0.0025	0.031	0.0025	0.025	12.6
S3A3-BT4	S3A3	BT4	1.04	0.007	0.16	0.28	0.0025	0.025	0.025	0.0291	5100	0.025	0.08	0.46	6	0.011	0.005	340	3.1	0.17	0.01	0.025	4030	16.3	0.38	0.0025	659	10.2	0.0025	0.025	0.0025	0.079	0.0025	0.025	12.3
S3A3-BT5	S3A3	BT5	1.38	0.006	0.13	0.5	0.0025	0.025	0.025	0.0238	5390	0.025	0.043	0.55	7	0.016	0.005	348	5.18	0.11	0.007	0.025	3780	13	0.36	0.0025	689	12.6	0.0025	0.015	0.031	0.061	0.0025	0.025	13.6
S3A3-BT8	S3A3	BT8	0.74	0.0025	0.2	0.29	0.0025	0.025	0.025	0.0248	5190	0.025	0.04	0.46	6	0.019	0.007	306	4.1	0.19	0.01	0.025	3710	15.4	0.4	0.0025	846	9.49	0.0025	0.022	0.01	0.124	0.0025	0.025	10.9
S3A3-BT9	S3A3	BT9	1.35	0.0025	0.22	0.2	0.0025	0.025	0.025	0.0244	3540	0.025	0.157	0.35	5	0.024	0.007	328	2.97	0.12	0.02	0.025	3810	17.3	0.35	0.0025	600	6.66	0.0025	0.048	0.016	0.064	0.0025	0.025	12.3
S3A3-Comp1	S3A3	Comp1	0.77	0.0025	0.19	0.2	0.0025	0.025	0.025	0.0233	2880	0.025	0.068	0.36	5	0.012	0.0025	312	1.74	0.12	0.009	0.025	3820	14.3	0.32	0.0025	644	5.65	0.0025	0.019	0.008	0.028	0.0025	0.025	14.5
S3A3-Comp2	S3A3	Comp2	1.35	0.0025	0.23	0.29	0.0025	0.025	0.025	0.0193	4500	0.025	0.054	0.32	5	0.02	0.006	366	3.19	0.1	0.017	0.025	3830	14.6	0.37	0.0025	665	9.07	0.0025	0.023	0.457	0.042	0.0025	0.025	13.6
W4A17-BT1	W4A17	BT1	0.39	0.0025	0.025	0.21	0.0025	0.025	0.025	0.0025	3920	0.025	0.016	0.31	4	0.021	0.015	332	1.65	0.15	0.0025	0.025	4040	15.3	0.21	0.0025	597	5.88	0.0025	0.008	0.008	0.0025	0.0025	0.025	11.9
W4A17-BT12	W4A17	BT12	4.17	0.0025	0.025	0.29	0.0025	0.025	0.025	0.0024	3620	0.025	0.031	0.27	6	0.064	0.021	338	4.58	0.14	0.005	0.025	4120	16.1	0.21	0.0025	588	6.78	0.0025	0.01	0.006	0.0025	0.0025	0.025	16.1
W4A17-BT13	W4A17	BT13	2.95	0.00475	0.095	0.365	0.0025	0.025	0.025	0.00215	3860	0.065	0.032	0.32	6.5	0.0895	0.017	340.5	2.36	0.1	0.0025	0.025	4150	10.7	0.33	0.0025	648.5	9.745	0.0025	0.0095	0.0125	0.0025	0.0025	0.025	18.5
W4A17-BT2	W4A17	BT2	0.7	0.0025	0.025	0.26	0.0025	0.025	0.025	0.0026	4780	0.025	0.033	0.32	4	0.049	0.014	337	2.97	0.22	0.0025	0.025	3970	14.9	0.21	0.0025	634	8.18	0.0025	0.007	0.008	0.0025	0.0025	0.025	15.6

Table F.1 Metal Concentrations in Fish Carcasses

Sample ID	Site ID	Fish ID	Aluminum mg/kg	Antimony mg/kg	Arsenic mg/kg	Barium mg/kg	Beryllium mg/kg	Bismuth mg/kg	Boron mg/kg	Cadmium mg/kg	Calcium mg/kg	Chromium mg/kg	Cobalt mg/kg	Copper mg/kg	Iron mg/kg	Lead mg/kg	Lithium mg/kg	Magnesium mg/kg	Manganese mg/kg	Mercury mg/kg	Molybdenum mg/kg	Nickel mg/kg	Potassium mg/kg	Rubidium mg/kg	Selenium mg/kg	Silver mg/kg	Sodium mg/kg	Strontium mg/kg	Tellurium mg/kg	Thallium mg/kg	Tin mg/kg	Tungsten mg/kg	Uranium mg/kg	Vanadium mg/kg	Zinc mg/kg
W4A17-BT20	W4A17	BT20	0.43	0.0025	0.025	0.17	0.0025	0.025	0.025	0.0024	3330	0.025	0.029	0.28	4	0.0025	0.012	320	1.32	0.18	0.0025	0.025	4110	15.7	0.2	0.0025	547	5.37	0.0025	0.01	0.0025	0.0025	0.0025	0.025	14.5
W4A17-BT23	W4A17	BT23	0.47	0.0025	0.025	0.32	0.0025	0.025	0.025	0.0045	5240	0.025	0.03	0.38	4	0.0025	0.015	357	2.14	0.14	0.0025	0.025	4180	17.4	0.17	0.0025	589	10.4	0.0025	0.011	0.0025	0.0025	0.0025	0.025	15.6
W4A17-BT24	W4A17	BT24	0.42	0.0025	0.09	0.24	0.0025	0.025	0.025	0.0023	4960	0.025	0.01	0.4	5	0.0025	0.011	322	1.69	0.15	0.0025	0.025	4110	17.7	0.2	0.0025	616	7.61	0.0025	0.006	0.005	0.0025	0.0025	0.025	14.4
W4A17-BT6	W4A17	BT6	0.33	0.0025	0.025	0.21	0.0025	0.025	0.025	0.0018	3160	0.025	0.016	0.26	3	0.013	0.012	317	1.82	0.14	0.0025	0.025	4080	17.3	0.18	0.0025	552	6.23	0.0025	0.007	0.007	0.0025	0.0025	0.025	10.4
W4A17-BT9	W4A17	BT9	0.45	0.0025	0.025	0.28	0.0025	0.025	0.025	0.0026	4290	0.025	0.043	0.26	5	0.032	0.013	328	3.16	0.12	0.0025	0.025	4000	13.4	0.16	0.0025	573	7.97	0.0025	0.014	0.006	0.0025	0.0025	0.025	14.2
W4A17-Comp1	W4A17	Comp1	0.41	0.0025	0.025	0.27	0.0025	0.025	0.025	0.0022	4160	0.025	0.016	0.37	4	0.008	0.017	334	1.97	0.17	0.005	0.025	4150	13.5	0.21	0.0025	627	6.83	0.0025	0.009	0.006	0.0025	0.0025	0.025	17.1
W4A21-BT1	W4A21	BT1	13.2	0.0025	0.34	0.59	0.0025	0.025	0.025	0.0162	5140	0.08	0.076	0.51	63	0.04	0.022	342	5.57	0.11	0.01	0.06	3770	11.1	0.49	0.0025	549	7.4	0.0025	0.025	0.013	0.012	0.007	0.025	19.1
W4A21-BT2	W4A21	BT2	0.67	0.0025	0.45	0.63	0.0025	0.025	0.025	0.0071	5500	0.025	0.026	0.44	6	0.016	0.013	356	3.13	0.08	0.0025	0.025	4100	10.7	0.37	0.0025	514	9.92	0.0025	0.009	0.011	0.0025	0.0025	0.025	15.5
W4A21-BT3	W4A21	BT3	0.65	0.0025	0.06	0.21	0.0025	0.025	0.025	0.0053	3260	0.025	0.017	0.39	4	0.0025	0.012	322	1.58	0.13	0.0025	0.025	4040	15.8	0.21	0.0025	563	6.29	0.0025	0.008	0.006	0.0025	0.0025	0.025	11.9
W4A21-BT4	W4A21	BT4	0.28	0.0025	0.14	0.36	0.0025	0.025	0.025	0.004	3160	0.025	0.017	0.43	4	0.0025	0.01	306	1.64	0.13	0.0025	0.025	4200	11.9	0.27	0.0025	483	6.12	0.0025	0.005	0.0025	0.0025	0.0025	0.025	12
W4A21-BT5	W4A21	BT5	0.62	0.0025	0.11	0.19	0.0025	0.025	0.025	0.005	3480	0.025	0.02	0.44	8	0.01	0.01	338	1.25	0.13	0.0025	0.025	4140	15.4	0.27	0.0025	589	5.56	0.0025	0.007	0.0025	0.0025	0.0025	0.025	16.6
W4A21-BT6	W4A21	BT6	0.64	0.0155	0.125	0.345	0.0025	0.2075	0.025	0.0123	4995	0.025	0.033	0.39	5	0.00375	0.0095	360.5	2.77	0.155	0.014	0.025	4240	13.05	0.27	0.0025	615	9.34	0.0025	0.012	0.01	0.0025	0.0025	0.025	21.5
W4A21-BT9	W4A21	BT9	0.54	0.0025	0.34	0.28	0.0025	0.025	0.025	0.0087	3970	0.025	0.031	0.37	4	0.01	0.01	332	2.63	0.16	0.006	0.025	4180	14.8	0.35	0.0025	601	6.66	0.0025	0.009	0.009	0.0025	0.0025	0.025	16
W4A21-Comp1	W4A21	Comp1	0.4	0.0025	0.06	0.34	0.0025	0.025	0.025	0.0064	4450	0.025	0.032	0.41	5	0.0025	0.015	354	1.82	0.08	0.006	0.025	4020	16	0.23	0.0025	637	8.53	0.0025	0.009	0.0025	0.0025	0.0025	0.025	20.4
W4A21-Comp2	W4A21	Comp2	0.55	0.0025	0.09	0.42	0.0025	0.025	0.025	0.0089	5270	0.025	0.037	0.39	5	0.0025	0.013	357	2.19	0.11	0.0025	0.025	4120	15.2	0.25	0.0025	633	9.77	0.0025	0.007	0.0025	0.0025	0.0025	0.025	18.7
W4A21-Comp3	W4A21	Comp3	0.75	0.0025	0.22	0.52	0.0025	0.025	0.025	0.0115	4700	0.025	0.031	0.48	5	0.008	0.012	351	2.64	0.09	0.0025	0.025	4070	13.1	0.35	0.0025	616	8.06	0.0025	0.012	0.006	0.0025	0.0025	0.025	15.4
W4A31-BT1	W4A31	BT1	0.35	0.0025	1.32	0.43	0.0025	0.025	0.025	0.012	2530	0.025	0.028	0.4	5	0.019	0.006	309	2.1	0.07	0.0025	0.025	4260	15.5	0.92	0.0025	548	4.95	0.0025	0.016	0.01	0.0025	0.0025	0.025	13
W4A31-BT10	W4A31	BT10	0.53	0.0025	0.95	0.3	0.0025	0.025	0.025	0.0082	3020	0.025	0.076	0.48	6	0.012	0.005	311	2.46	0.09	0.006	0.025	4290	14.3	0.67	0.0025	570	4.99	0.0025	0.014	0.0025	0.0025	0.0025	0.025	12.3
W4A31-BT2	W4A31	BT2	0.35	0.0025	1.32	0.55	0.0025	0.025	0.025	0.0102	4150	0.025	0.03	0.31	4	0.009	0.01	341	2.54	0.08	0.0025	0.025	4310	16.2	0.54	0.0025	600	7.09	0.0025	0.017	0.0025	0.0025	0.0025	0.025	15.8
W4A31-BT3	W4A31	BT3	0.42	0.0025	1.45	0.44	0.0025	0.025	0.025	0.0138	5050	0.025	0.062	0.39	5	0.016	0.009	340	3.43	0.07	0.007	0.025	4130	15.2	0.76	0.0025	566	9.05	0.0025	0.016	0.0025	0.005	0.0025	0.025	13.8
W4A31-BT6	W4A31	BT6	0.49	0.0025	0.98	0.58	0.0025	0.025	0.025	0.0101	3900	0.025	0.032	0.35	4	0.007	0.009	332	3.17	0.07	0.0025	0.025	4150	13.4	0.58	0.0025	604	7.59	0.0025	0.015	0.0025	0.0025	0.0025	0.025	12.7
W4A31-BT7	W4A31	BT7	0.27	0.0025	1.77	0.47	0.0025	0.025	0.025	0.0102	4500	0.025	0.036	0.35	4	0.017	0.007	344	3.57	0.07	0.0025	0.025	4280	12.9	0.98	0.0025	548	7.8	0.0025	0.022	0.0025	0.0025	0.0025	0.025	12.5
W4A31-BT8	W4A31	BT8	0.98	0.0025	0.91	0.415	0.0025	0.025	0.025	0.01975	3155	0.0725	0.05	0.405	5.5	0.013	0.0075	339	2.16	0.06	0.00425	0.025	4200	14.6	0.64	0.0025	528.5	5.8	0.0025	0.016	0.0025	0.0025	0.0025	0.025	15.6
W4A31-BT9	W4A31	BT9	0.75	0.009	1.29	0.46	0.0025	0.025	0.025	0.0092	3390	0.025	0.041	0.56	5	0.01	0.009	331	2.12	0.07	0.005	0.025	4230	15.2	0.68	0.0025	588	5.71	0.0025	0.018	0.0025	0.0025	0.0025	0.025	18.2
W4A31-Comp1	W4A31	Comp1	0.95	0.006	0.72	0.5	0.0025	0.025	0.025	0.0093	4300	0.025	0.063	0.43	4	0.014	0.009	356	2.46	0.07	0.007	0.025	4200	14.9	0.49	0.0025	606	7.86	0.0025	0.026	0.009	0.0025	0.0025	0.025	20.4

Table F.2 Metal Concentrations in Whole Fish

Sample ID	Site ID	Fish ID	Aluminum	Antimony	Arsenic	Barium	Beryllium	Bismuth	Boron	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Lithium	Magnesium	Manganese	Mercury	Molybdenum	Nickel	Potassium	Rubidium	Selenium	Silver	Sodium	Strontium	Tellurium	Thallium	Tin	Tungsten	Uranium
			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
B2A2-BT1	B2A2	BT1	2.119	0.002739	0.06768	0.4247	0.002565	0.02565	0.02565	0.03687	6270	0.144	0.03457	0.9061	13.35	0.03675	0.0127	316.7	5.87	0.1393	0.01234	0.02565	3734	9.596	0.3081	0.02396	877.2	11.42	0.002565	0.008593	0.02243	0.007332	0.002565
B2A2-BT16	B2A2	BT16	3.2	0.002544	0.03587	0.529	0.002544	0.02544	0.02544	0.01201	6662	0.1254	0.03177	0.6782	16.17	0.03659	0.008857	335.5	2.373	0.1934	0.01476	0.02544	3712	5.091	0.1798	0.007513	965.5	12.86	0.002544	0.007855	0.009487	0.004184	0.003066
B2A2-BT18	B2A2	BT18	12.35	0.002633	0.1921	0.6075	0.002633	0.02633	0.02633	0.03033	5301	0.07684	0.08247	1.116	21.3	0.05471	0.01595	311.7	7.629	0.1381	0.01415	0.04011	3552	7.759	0.4287	0.03987	926.4	12.03	0.002633	0.01147	0.01092	0.01472	0.006765
B2A2-BT3	B2A2	BT3	1.14	0.002635	0.03175	0.3708	0.002527	0.02527	0.02527	0.01447	4095	0.1563	0.03556	0.6362	15.55	0.0538	0.00673	289.5	1.974	0.1467	0.011	0.02527	3758	6.509	0.23	0.008848	846.3	6.825	0.002527	0.004186	0.01551	0.005109	0.002527
B2A2-BT4	B2A2	BT4	57.79	0.002568	0.2337	0.93	0.005272	0.02568	0.03681	0.03767	8011	0.6285	0.1079	0.9491	40.88	0.09181	0.08703	339.4	16.14	0.1188	0.01411	0.04954	3577	10.73	0.4156	0.02348	1056	15.53	0.002568	0.01195	0.0108	0.01986	0.006545
B2A2-BT5	B2A2	BT5	5.679	0.002679	0.2719	0.7661	0.002679	0.02679	0.02679	0.02634	7102	0.06317	0.1061	0.9145	14.84	0.0589	0.01416	331.5	9.416	0.1435	0.01438	0.02679	3693	10.44	0.4394	0.02661	1057	14.41	0.002679	0.01294	0.01701	0.02127	0.002679
B2A2-BT6	B2A2	BT6	63.16	0.003915	0.2235	0.7704	0.005381	0.07092	0.05137	0.02101	6078	1.011	0.1233	0.6934	42.87	0.1002	0.0806	345.8	12.64	0.1111	0.01758	0.07336	3584	8.635	0.4109	0.01385	958.6	11.35	0.002571	0.01302	0.005929	0.01485	0.01247
B2A2-BT8	B2A2	BT8	40.99	0.006772	0.2328	0.8288	0.00394	0.03688	0.03437	0.02604	5595	0.2328	0.1123	0.7493	33.6	0.08757	0.06102	318.3	13.19	0.2419	0.01697	0.04442	3568	7.048	0.3171	0.01609	940.7	14.93	0.002558	0.01374	0.01542	0.02236	0.00821
B2A2-Comp.1	B2A2	Comp.1	17.12	0.002547	0.2423	0.7286	0.002547	0.02547	0.02547	0.03146	6364	0.1395	0.0716	0.7553	22.95	0.05297	0.02519	333.2	6.654	0.1174	0.01486	0.02547	3531	7.029	0.4931	0.01726	1009	14.19	0.002547	0.01164	0.01397	0.0209	0.005026
B2A2-Comp.2	B2A2	Comp.2	13.83	0.002555	0.2327	0.6882	0.002555	0.02555	0.02555	0.02778	5973	0.05519	0.09019	0.8799	20.04	0.0442	0.02449	332.9	5.853	0.1083	0.01292	0.02555	3617	8.813	0.4306	0.01819	979.9	13.42	0.002555	0.01116	0.01539	0.01675	0.006767
B3A9-BT1	B3A9	BT1	1.293	0.002645	0.08772	0.3302	0.002645	0.02645	0.02645	0.09983	6281	0.05699	0.04783	0.9865	16.6	0.03614	0.01024	313.1	3.798	0.2141	0.01533	0.02645	3581	12.48	0.3528	0.02685	1033	10.44	0.002645	0.009041	0.01565	0.005943	0.002645
B3A9-BT13	B3A9	BT13	1.472	0.01172	0.1423	0.4332	0.002568	0.1866	0.02568	0.06282	6734	0.02568	0.05331	0.6151	12.66	0.03025	0.01135	341.8	4.119	0.1362	0.01732	0.02568	3554	10.79	0.3324	0.01672	1013	12.73	0.002568	0.0109	0.0127	0.004907	0.002568
B3A9-BT14	B3A9	BT14	7.26	0.00266	0.1438	0.4362	0.00266	0.0266	0.0266	0.1079	7785	0.08962	0.07216	0.896	17.84	0.04908	0.01426	337.1	4.072	0.1806	0.01828	0.0266	3452	11.35	0.3281	0.03153	1014	12.58	0.00266	0.01209	0.008513	0.006918	0.003853
B3A9-BT4	B3A9	BT4	4.443	0.002541	0.1158	0.4309	0.002541	0.02541	0.02541	0.06561	6998	0.09008	0.04812	0.6136	15.93	0.02944	0.0149	329.2	4.328	0.1449	0.01309	0.02541	3598	11.15	0.3542	0.01263	1024	12.31	0.002541	0.01212	0.01044	0.004907	0.002541
B3A9-BT5	B3A9	BT5	3.735	0.002577	0.09696	0.3667	0.002577	0.02577	0.02577	0.08024	5731	0.04464	0.03534	0.5505	14.81	0.02148	0.0102	323.2	3.905	0.1035	0.01693	0.02577	3518	10.63	0.3002	0.009204	1001	9.971	0.002577	0.01021	0.01084	0.01819	0.002577
B3A9-BT7	B3A9	BT7	1.144	0.002632	0.3629	0.4637	0.002632	0.02632	0.02632	0.04269	5374	0.06842	0.06395	0.7849	14.01	0.01153	0.009101	330.8	5.832	0.08527	0.01332	0.02632	3761	11.87	0.5868	0.02919	870.5	7.352	0.002632	0.01475	0.009784	0.002632	0.002632
B3A9-BT9	B3A9	BT9	5.279	0.002565	0.1147	0.212	0.002565	0.02565	0.02565	0.05828	3143	0.07232	0.07025	0.5676	16.15	0.03423	0.0119	280.1	3.057	0.1409	0.009845	0.02565	3727	11.99	0.3194	0.0114	795.3	5.319	0.002565	0.01266	0.007895	0.004162	0.002565
B3A9-Comp1	B3A9	Comp1	4.211	0.00254	0.1199	0.3862	0.00254	0.0254	0.0254	0.08133	6350	0.03841	0.036	0.5644	13.1	0.0338	0.01023	323	3.837	0.1255	0.02062	0.0254	3358	8.799	0.3418	0.01168	992.2	11.54	0.00254	0.01086	0.01023	0.006072	0.003841
B3A9-Comp2	B3A9	Comp2	3.507	0.002592	0.1085	0.6035	0.002592	0.02592	0.02592	0.07318	6733	0.0383	0.05493	0.6116	12.91	0.0369	0.01274	314.7	3.345	0.1324	0.01404	0.02592	3335	10.23	0.3274	0.01625	1035	12.04	0.002592	0.01124	0.00937	0.004892	0.002592
EBNB1-BT1	EBNB1	BT1	76.33	0.003885	0.4778	1.141	0.005375	0.02622	0.04472	0.05707	5515	0.144	0.09714	0.6926	88.95	0.04049	0.06612	331.4	9.656	0.04692	0.01517	0.1079	3629	9.702	1.178	0.04047	857	7.477	0.002517	0.03702	0.02305	0.00357	0.004773
EBNB1-BT2	EBNB1	BT2	11.56	0.002549	0.3665	0.5892	0.002549	0.02549	0.02549	0.05614	5266	0.08767	0.09261	0.5788	27.38	0.01546	0.02025	308.5	10.22	0.04668	0.01648	0.04941	3621	9.924	1.017	0.03165	902.7	6.624	0.002549	0.03064	0.005335	0.003984	0.002549
EBNB1-BT3	EBNB1	BT3	0.7893	0.002866	0.2041	0.5005	0.002866	0.02866	0.02866	0.03887	4742	0.05156	0.07949	0.5971	11.63	0.008678	0.004451	293.2	8.895	0.0367	0.01232	0.04099	3573	8.308	0.6437	0.01391	896.2	6.505	0.002866	0.02529	0.01339	0.004803	0.002866
M3C3-BT1	M3C3	BT1	2.292	0.004455	0.09019	0.3707	0.002644	0.06585	0.02644	0.02521	5470	0.3535	0.04197	0.5738	12.24	0.02594	0.005946	332.4	6.044	0.1221	0.1078	0.02644	3789	12.3	0.3059	0.008655	802	13.05	0.002644	0.009658	0.004455	0.05024	0.002644
M3C3-BT10	M3C3	BT10	1.05	0.002554	0.06687	0.5038	0.002554	0.02554	0.02554	0.05371	6739	0.04398	0.08724	0.4892	11.19	0.03961	0.01106	297.8	5.397	0.07987	0.01184	0.03392	3407	7.867	0.2833	0.005243	1109	11.12	0.002554	0.01501	0.01005	0.01144	0.006409
M3C3-BT2	M3C3	BT2	55.94	0.003669	0.08934	0.5789	0.003669	0.02554	0.03669	0.1031	6655	0.2407	0.09717	0.7284	52.58	0.06489	0.07984	315.6	6.44	0.1078	0.028	0.0845	3430	10	0.2553	0.01152	991.2	10.47	0.002554	0.01287	0.006856	0.01992	0.009406
M3C3-BT3	M3C3	BT3	16.64	0.002607	0.09403	0.4406	0.002607	0.02607	0.02607	0.08435	5575	0.09307	0.07621	0.9151	23.01	0.04146	0.02537	330	4.191	0.06385	0.02361	0.04078	3456	8.113	0.2654	0.007482	888.4	9.46	0.002607	0.01099	0.005058	0.01061	0.008
M3C3-BT4	M3C3	BT4	4.137	0.002545	0.07226	0.5824	0.002545	0.02545	0.02545	0.06888	8188	0.054	0.0702	0.5773	18.38	0.04086	0.01273	352.8	7.686	0.05423	0.01616	0.03297	3485	9.407	0.252	0.007651	972.8	14.96	0.002545	0.01431	0.007319	0.007803	0.004799
M3C3-BT5	M3C3	BT5	2.631	0.002563	0.03729	0.2928	0.002563	0.02563	0.02563	0.04351	6308	0.04396	0.04255	0.6856	11.44	0.0467	0.007394	308	9.931	0.0836	0.01408	0.02563	3532	6.377	0.3366	0.01226	967.6	7.702	0.002563	0.006379	0.01427	0.01073	0.002563
M3C3-BT6	M3C3	BT6	1.252	0.002588	0.03422	0.3421	0.002588	0.02588	0.02588	0.0417	6635	0.04423	0.0289	0.7766	13.56	0.03412	0.009383	313.8	4.3	0.07034	0.02202	0.02588	3460	7.808	0.2184	0.01104	1000	8.89	0.002588	0.007728	0.00424	0.005757	0.003756
M3C3-BT7	M3C3	BT7	1.632	0.01294	0.04814	0.4708	0.002653	0.1507	0.02653	0.0596	7755	0.04409	0.03713	0.8105	13.36	0.03566	0.009727	346.2	23.41	0.1432	0.03451	0.02653	3383	9.117	0.2129	0.009647	921.8	17.95	0.002653	0.009399	0.01693	0.06586	0.002653
M3C3-BT8	M3C3	BT8	2.491	0.005079	0.06256	0.3319	0.002659	0.02659	0.02659	0.06178	6580	0.03666	0.03219	0.6674	11.95	0.02846	0.01126	333.7	10.94	0.09871	0.01761	0.02659	3515	9.023	0.3113	0.0134	871.6	9.751	0.002659	0.008776	0.01506	0.01442	0.002659
M3C3-BT9	M3C3	BT9	2.977	0.002555	0.06207	0.2803	0.002555	0.02555	0.02555	0.09157	5160	0.02555	0.05852	0.7276	11.95	0.02603	0.007403	295.4	6.8	0.1103	0.01396	0.02555	3553	8.699	0.2993	0.0103	919.6	8.488	0.002555	0.01161	0.00874	0.009242	0.002555
S2A2-BT13	S2A2	BT13	1.763	0.004236	0.06641	0.6778	0.002557	0.02557	0.02557	0.03008	6034	0.04846	0.01694	0.8476	11.44	0.01427	0.006982	327.6	3.868	0.08825	0.03632	0.02557	3380	9.994	0.2664	0.01163	904.7	18.94	0.002557	0.01137	0.01034	0.07494	0.002557
S2A2-BT15	S2A2	BT15	0.7143	0.003275	0.05611	0.4296	0.002511	0.02511	0.02511	0.04693	6870	0.04236	0.03661	0.6774	11.66	0.01937	0.004803	326.8	5.607	0.1696	0.026	0.02511	3534	10.79	0.2223	0.006123	973.2	16.62	0.002511	0.01115	0.0103	0.09666	0.002511
S2A2-BT22	S2A2	BT22	0.6944	0.002558	0.07786	0.3376	0.002558	0.02558	0.02558	0.03433	6059	0.02558	0.02143	0.5788	10.65	0.008057	0.005316	334	4.465	0.1094	0.02425	0.02558	3485	11.89	0.3544	0.01013	909.3	15.62	0.002558	0.01034	0.05132	0.07563	0.002558
S2A2-BT23	S2A2	BT23	0.4758	0.002575	0.02575	0.3641	0.002575	0.02575	0.02575	0.02393	4995	0.03247	0.02213	0.675	13.67	0.01412	0.004053	286.8	3.437	0.127	0.01837	0.02575	3533	8.793	0.1884	0.006016	992.7	11.08	0.002575	0.009524	0.01292	0.05327	0.002575
S2A2-BT24	S2A2	BT24	1.159	0.005038	0.1046	0.4554	0.002602	0.02602	0.02602	0.03285	6552	0.02602	0.0421	0.6751	12.41	0.01895	0.008083	303.9	6.611	0.08111	0.07029	0.03948	3313	11.1	0.3601	0.01223	975.4	16.85	0.002602	0.01473	0.006431	0.1128	0.002602
S2A2-BT3	S2A2	BT3	0.9176	0.002594	0.03262	0.5541	0.002594	0.02594	0.02594	0.0305	6651	0.02594	0.01183	1.408	12.73	0.01585	0.008187	333.8	8.522	0.08566	0.02366	0.02594	3590	13.51	0.2461	0.01152	1025	20.78	0.002594	0.00933	0.007803	0.03878	0.002594
S2A2-BT4	S2A2	BT4	4.762	0.007577	0.06342	0.4553	0.002597	0.08899	0.02597	0.03897	6647	0.04483	0.02383	0.7639	11.46	0.01871	0.009534	310.5	4.961	0.1527	0.0542	0.02597	3489	9.794	0.2793	0.008599	922.1	17.06	0.002597	0.01628	0.01329	0.08114	0.002597
S2A2-Comp1	S2A2	Comp1	3.296	0.002547	0.08659	0.3761	0.002547	0.02547	0.02547	0.04845	6725	0.02547	0.04233	0.7194	15.05	0.01512	0.008933	329.9	4.164	0.1007	0.09705	0.02547	3427	8.265	0.4094	0.01032	951.6	14.65	0.002547	0.01395	0.009976	0.1129	0.002921
S2A2-Comp2	S2A2	Comp2	1.726	0.003348	0.1103	0.4871	0.002556	0.02556	0.02556	0.04825	7113	0.02556	0.03994	0.7326	12.65	0.02993	0.009199	332.2	5.696	0.0877	0.03254	0.02556	3350	10.72	0.3929	0.01319	930.8	17.1	0.002556	0.01405	0.009157	0.08742	0.002556
S3A3-BT1	S3A3	BT1	1.847	0.003821	0.1208	0.5426	0.002552	0.02552	0.02552	0.1197	7247	0.02552	0.1097	0.6229	14.83	0.02086	0.00636	298.1	7.379	0.1166	0.02193	0.04758	3376	14.25	0.3743	0.005545	1100	16.4	0.002552	0.02602	0.01537	0.1065	0.002552
S3A3-BT10	S3A3	BT10	3.702	0.003518	0.2833	0.431	0.002685	0.02685	0.02685	0.154	5230	0.02685	0.1025	1.075	15.75	0.0226	0.006517	298.6	5.594	0.1204	0.05156	0.02685	3375	13.44	0.4084	0.01426	944.5	9.587	0.002685	0.02049	0.01553	0.07524	0.002685
S3A3-BT12	S3A3	BT12	4.209	0.01497	0.2949	0.4259	0.002556	0.1389	0.02556	0.108	7167	0.03762	0.1618	0.9322	13.01	0.01757	0.009621	320.1	8.45	0.1095	0.04722	0.03762	3344	14.67	0.3767	0.01577	928.2	14.66	0.002556	0.03084	0.01587	0.1135	0.002556
S3A3-BT23	S3A3	BT23	1.375	0.01138	0.1982	0.3717	0.00256	0.1189	0.0256	0.1745	6875	0.0256	0.1081	0.8038	10.97	0.01403	0.006257	328.9	5.166	0.09248	0.02331	0.0344	3397	12.14	0.3739	0.01046	936.8	13.92	0.00256	0.02264	0.006257	0.06322	0.00256
S3A3-BT4	S3A3	BT4	3.044	0.006371	0.1868	0.4104	0.002518	0.02518	0.02518	0.1466	7428	0.04208	0.1345	0.9328	17.57	0.01649	0.0093	333	4.79	0.1525	0.03824	0.02518	3449	14.36	0.4198	0.01225	1045	15.13	0.002518	0.03008	0.01527	0.1292	0.002518
S3A3-BT5	S3A3	BT5	18.36	0.004818	0.1522	0.6285	0.002537	0.02537	0.02537	0.103	7376	0.05626	0.0703	0.832	39.57	0.02078	0.01773	343.6	7.161	0.09818	0.02578	0.05025	3279	11.64	0.3871	0.01162	1055	17.47	0.002537	0.01671	0.0357	0.09861	0.002537
S3A3-BT8	S3A3	BT8	1.686	0.002554	0.2171	0.4242	0.002554	0.02554	0.02554	0.1257	7762	0.02554	0.06327	1.252	12.47	0.02336	0.009877	310.4	6.18	0.1654	0.02721	0.03446	3117	13.31	0.4122	0.01585	1186	14.42	0.002554	0.02335	0.02713	0.2142	0.002554
S3A3-Comp1	S3A3	Comp1	2.909	0.0051	0.2268	0.3556	0.002551	0.02551	0.02551	0.1001	6130	0.02551	0.114	0.7373	12.29	0.01301	0.00714	322.6	3.665	0.1031	0.02399	0.03401	3385	13.23	0.3994	0.00715	966	11.98	0.002551	0.02324	0.009033	0.0688	0.002551
S3A3-Comp2	S3A3	Comp2	44.27	0.004563	0.3931	0.6386	0.004198	0.02557	0.02557	0.1455	6370	0.1514	0.1325	0.8034	47.14	0.04509	0.05563	349.4	8.507	0.08215	0.06859	0.05657	3327	13.26	0.4368	0.01159	977.3	13.02	0.002557	0.02868	0.2964	0.1798	0.004928
W4A17-BT1	W4A17	BT1	32.64	0.003364	0.0472	0.3718	0.003364	0.02515	0.02515	0.01348	5107	0.2066	0.04523	0.7003	37.24	0.0494	0.0727	312.1	5.672	0.1335	0.01305	0.0472	3407	13.58	0.2491	0.01247	917.1	7.751	0.002515	0.01042	0.01239	0.007774	0.00947
W4A17-BT12	W4A17	BT12	53.16	0.002545	0.1614	0.6221	0.004268	0.02545	0.02545	0.01505	6425	0.1346	0.06753	0.9618	41.51	0.08474	0.1052	338.7	21.89	0.1212	0.01356	0.04268	3386	14.45	0.2353	0.01897	996	11.88	0.002545	0.01248	0.04164	0.005034	0.01346
W4A17-BT13	W4A17	BT13	24.64	0.01214	0.09339	0.6487	0.002559	0.1396	0.02559	0.01455	6519	0.1033	0.0659	0.5191	21.45	0.09036	0.04503	339.8	6.61	0.08655	0.01359	0.04706	3609	9.62	0.3329	0.007264	1013	16.46	0.002559	0.01123	0.01562	0.004046	0.00801
W4A17-BT2	W4A17	BT2	11.02	0.002607	0.04235	0.3553	0.002607	0.02607	0.02607	0.01633	6014	0.2448	0.0621	0.747	18.14	0.0517	0.04359	311.4	4.92	0.1951	0.01216	0.02607	3321	13.42	0.2503	0.0137	996.8	10.35	0.002607	0.01021	0.01201	0.005319	0.007851
W4A17-BT20	W4A17	BT20	2.86	0.003679	0.02553	0.2692	0.002553	0.02553	0.02553	0.01365	5807	0.05931	0.05309	0.4354	11.45	0.01301	0.0226	322	2.656	0.161	0.01101	0.03357	3580	13.94	0.2118	0.005582	907.6	9.364	0.002553	0.01093	0.004322	0.002553	0.005931
W4A17-BT23	W4A17	BT23	46.22	0.00261	0.04236	0.6884	0.003875	0.0261	0.03514	0.01868	6192	0.08574	0.06251	0.6911	49.68	0.03532	0.09059	335.9	4.364	0.1293	0.01481	0.06405	3550	15.37	0.2029	0.008432	942.1	12.23	0.00261	0.01251	0.006044	0.003875	0.01616
W4A17-BT24	W4A17	BT24	2.126	0.002639	0.07288	0.3013	0.002639	0.02639	0.02639	0.01274	6344	0.02639	0.01536	0.5419	10.4	0.007297	0.01684	320.2	2.429	0.1365	0.009917	0.02639	3729	16.59	0.2117	0.005772	913.8	9.624	0.002639	0.007788	0.004427	0.003304	0.004369
W4A17-BT6	W4A17	BT6	28.66	0.003465	0.04567	0.5142	0.002546	0.02546	0.02546	0.01609	6536	0.1008	0.03617	0.4917	19.15	0.02437	0.03256	325	4.337	0.1218	0.01083	0.02546	3449	15.3	0.2261	0.00685	1043	12.79	0.002546	0.009346	0.01326	0.005669	0.006036
W4A17-BT9	W4A17	BT9	19.89	0.002564	0.05352	0.5981	0.004237	0.02564	0.02564	0.02616	6135	0.09781	0.1145	0.4895	32.16	0.0898	0.0494	318.2	13.72	0.1088	0.01729	0.03865	3362	11.81	0.2187	0.006146	958.1	11.67	0.002564	0.01894	0.01049	0.01257	0.0191
W4A17-Comp1	W4A17	Comp1	23.74	0.002522	0.03873	0.4688	0.002522	0.02522	0.02522	0.01689	6262	0.05416	0.03954	0.7798	19.79	0.03422	0.09065	329	4.91	0.1477	0.01585	0.0503	3600	12.05	0.2357	0.007884	978	10.23	0.002522	0.01086	0.005605	0.003873	0.01082
W4A21-BT1	W4A21	BT1	30.6	0.002741	0.3798	0.8451	0.009927	0.02548	0.02516	0.04422	7093	0.09015	0.1304	0.7692	137.9	0.09251	0.04912	330.4	8.622	0.09615	0.02171	0.07717	3356	10.33	0.5247	0.008932	912.7	10.04	0.002516	0.02968	0.01305	0.02195	0.01664
W4A21-BT2	W4A21	BT2	2.182	0.002523	0.3335	0.7655	0.002523	0.02523	0.02523	0.0495	6943	0.03756	0.04139	0.6954	11.73	0.02625	0.01856	339	4.817	0.06971	0.008667	0.02523	3587	9.568	0.3757	0.006382	806.9	12.22	0.002523	0.009993	0.00795	0.002523	0.003404
W4A21-BT3	W4A21	BT3	0.5208	0.002552	0.06028	0.3046	0.002552	0.02552	0.02552	0.01668	5702	0.02552	0.02745	0.6869	9.766	0.006467	0.01845	325.1	2.573	0.1167	0.005772	0.02552	3578	14.07	0.2181	0.01424	909.6	10.44	0.002552	0.008564	0.004836	0.002552	0.002552
W4A21-BT4	W4A21	BT4	3.109	0.002557	0.1148	0.6757	0.002557	0.02557	0.02557	0.03744	5557	0.03226	0.03872	1.198	18.27	0.02189	0.01976	304.2	4.628	0.1074	0.0152	0.02557	3529	10.58	0.3	0.01664	912	10.37	0.002557	0.008019	0.002557	0.002557	0.004662
W4A21-BT5	W4A21	BT5	2.932	0.002553	0.096	0.3008	0.002553	0.02553	0.02553	0.02228	5935	0.02553	0.0365	1.224	17.38	0.01801	0.01766	342.1	3.228	0.1199	0.00984	0.02553	3633	13.84	0.2842	0.02077	919.6	9.33	0.002553	0.008416	0.002553	0.003771	0.004467
W4A21-BT6	W4A21	BT6	1.9	0.01032	0.1031	0.3999	0.002571	0.1344	0.02571	0.08061	5672	0.02571	0.05772	1.012	13.13	0.01654	0.01286	329	5.612	0.1334	0.02285	0.02571	3605	11.35	0.284	0.02308	1017	10.54	0.002571	0.01344	0.008421	0.003953	0.002571
W4A21-BT9	W4A21	BT9	1.971	0.002562	0.269	0.4234	0.002562	0.02562	0.02562	0.04492	6087	0.02562	0.06305	0.6115	11.43	0.02414	0.01655	319.7	4.371	0.1355	0.01053	0.02562	3570	13.05	0.3925	0.01236	1029	9.932	0.002562	0.009683	0.006766	0.002562	0.004114
W4A21-Comp1	W4A21	Comp1	4.005	0.002629	0.06109	0.4801	0.002629	0.02629	0.02629	0.06075	6018	0.02629	0.05114	0.8008	12.34	0.01089	0.02279	335.3	4.697	0.0732	0.01401	0.02629	3570	14.77	0.2819	0.009385	915.6	11.5	0.002629	0.0104	0.002629	0.002629	0.002629
W4A21-Comp2	W4A21	Comp2	21.28	0.002559	0.1106	0.6305	0.002559	0.02559	0.02559	0.05009	7076	0.03993	0.0886	0.7026	26.32	0.04987	0.04452	334.7	6.901	0.09811	0.01677	0.04402	3537	13.55	0.2773	0.00983	1048	13.02	0.002559	0.009136	0.004891	0.003583	0.01137
W4A21-Comp3	W4A21	Comp3	16.82	0.002549	0.1983	0.7856	0.002549	0.02549	0.02549	0.05122	7109	0.04117	0.06238	0.7048	22.6	0.03589	0.03952	335	5.163	0.07619	0.01083	0.04117	3527	11.73	0.3738	0.007905	1049	12	0.002549	0.01342	0.005133	0.006208	0.006905
W4A31-BT1	W4A31	BT1	4.372	0.002518	1.06	0.7571	0.002518	0.02518	0.02518	0.06927	4533	0.03496	0.05361	0.8152	19.42	0.03902	0.01522	301.5	5.701	0.06147	0.01226	0.03217	3713	14	1.052	0.01228	871.4	8.871	0.002518	0.01975	0.009684	0.005732	0.003776
W4A31-BT10	W4A31	BT10	2.089	0.002661	0.7831	0.5405	0.002661	0.02661	0.02661	0.05015	6091	0.03381	0.1298	0.7955	15.26	0.03269	0.01087	323.1	5.104	0.08136	0.01734	0.03957	3780	13.09	0.6749	0.009764	876.4	9.928	0.002661	0.0207	0.005397	0.007989	0.005397
W4A31-BT2	W4A31	BT2	1.175	0.002545	0.9873	0.9029	0.002545	0.02545	0.02545	0.05564	7482	0.02545	0.05721	0.7979	10.7	0.02134	0.01689	351.7	5.107	0.06899	0.01336	0.07806	3688	14.22	0.5972	0.02496	1009	12.6	0.002545	0.01986	0.007081	0.006355	0.003815
W4A31-BT3	W4A31	BT3	34.4	0.02069	1.315	0.944	0.005137	0.02595	0.02595	0.1516	7483	0.09921	0.1411	0.8428	71.88	0.1239	0.06373	341.3	7.209	0.06383	0.02599	0.09323	3600	13.83	0.9014	0.01796	939.3	13.5	0.002595	0.02191	0.005754	0.01523	0.0156
W4A31-BT6	W4A31	BT6	2.623	0.006586	0.7267	0.8418	0.00255	0.07727	0.0255	0.1403	6403	0.0255	0.06066	0.6546	11.13	0.01808	0.01568	329.2	5.306	0.0594	0.01429	0.03778	3555	11.89	0.6471	0.0183	1000	12.55	0.00255	0.01725	0.007487	0.005358	0.003164
W4A31-BT7	W4A31	BT7	2.236	0.00252	1.341	0.6927	0.00252	0.0252	0.0252	0.1058	6852	0.03315	0.06929	0.6241	11.71	0.02741	0.01176	334.1	5.566	0.06029	0.01073	0.03634	3733	11.71	1.114	0.03081	939.7	11.97	0.00252	0.02595	0.00427	0.005862	0.00252
W4A31-BT8	W4A31	BT8	11.44	0.002556	0.7276	0.6996	0.002556	0.02556	0.02556	0.05378	5743	0.0719	0.08912	0.6358	19.7	0.02837	0.02884	336.4	4.07	0.05038	0.01077	0.04319	3666	13.17	0.6933	0.008551	876.7	10.31	0.002556	0.01823	0.00464	0.007205	0.004319
W4A31-BT9	W4A31	BT9	1.523	0.007669	1.082	0.6766	0.002618	0.02618	0.02618	0.03211	5835	0.0338	0.05871	0.8025	10.8	0.01922	0.01387	340	3.652	0.06347	0.009468	0.0338	3853	14.02	0.7025	0.01109	832.2	9.729	0.002618	0.0192	0.002618	0.004904	0.00338
W4A31-Comp1	W4A31	Comp1	12.99	0.004972	0.5598	0.7999	0.002756	0.02756	0.02756	0.1401	5766	0.04382	0.1281	0.7017	28	0.03804	0.02873	330	5.977	0.06267	0.02339	0.04743	3639	13.65	0.5921	0.0124	974.8	10.69	0.002756	0.02874	0.006872	0.007272	0.008356

Table F.2 Metal Concentrations in Whole Fish

Sample ID	Site ID	Fish ID	Vanadium	Zinc
			mg/kg	mg/kg
B2A2-BT1	B2A2	BT1	0.03176	16.65
B2A2-BT16	B2A2	BT16	0.02544	27.04
B2A2-BT18	B2A2	BT18	0.05235	22.12
B2A2-BT3	B2A2	BT3	0.02527	21.43
B2A2-BT4	B2A2	BT4	0.0559	20.17
B2A2-BT5	B2A2	BT5	0.02679	22.64
B2A2-BT6	B2A2	BT6	0.09291	26.85
B2A2-BT8	B2A2	BT8	0.07708	23.85
B2A2-Comp.1	B2A2	Comp.1	0.05026	26.78
B2A2-Comp.2	B2A2	Comp.2	0.03959	26.26
B3A9-BT1	B3A9	BT1	0.02645	24.43
B3A9-BT13	B3A9	BT13	0.02568	24.77
B3A9-BT14	B3A9	BT14	0.03853	26.68
B3A9-BT4	B3A9	BT4	0.02541	27.66
B3A9-BT5	B3A9	BT5	0.02577	26.23
B3A9-BT7	B3A9	BT7	0.02632	20.79
B3A9-BT9	B3A9	BT9	0.03425	18.76
B3A9-Comp1	B3A9	Comp1	0.0254	31.32
B3A9-Comp2	B3A9	Comp2	0.02592	31.23
EBNB1-BT1	EBNB1	BT1	0.156	22.24
EBNB1-BT2	EBNB1	BT2	0.04941	24.11
EBNB1-BT3	EBNB1	BT3	0.02866	25.53
M3C3-BT1	M3C3	BT1	0.02644	20.18
M3C3-BT10	M3C3	BT10	0.02554	21.86
M3C3-BT2	M3C3	BT2	0.09725	23.36
M3C3-BT3	M3C3	BT3	0.06039	27.77
M3C3-BT4	M3C3	BT4	0.03597	27.56
M3C3-BT5	M3C3	BT5	0.02563	22.12
M3C3-BT6	M3C3	BT6	0.02588	24.31
M3C3-BT7	M3C3	BT7	0.02653	23.65
M3C3-BT8	M3C3	BT8	0.02659	23.22
M3C3-BT9	M3C3	BT9	0.02555	19.04
S2A2-BT13	S2A2	BT13	0.02557	21.7
S2A2-BT15	S2A2	BT15	0.02511	19.25
S2A2-BT22	S2A2	BT22	0.02558	23.44
S2A2-BT23	S2A2	BT23	0.02575	19.17
S2A2-BT24	S2A2	BT24	0.02602	23.27
S2A2-BT3	S2A2	BT3	0.02594	21.18
S2A2-BT4	S2A2	BT4	0.02597	22.63
S2A2-Comp1	S2A2	Comp1	0.02547	25.34
S2A2-Comp2	S2A2	Comp2	0.02556	25.01
S3A3-BT1	S3A3	BT1	0.02552	21.53
S3A3-BT10	S3A3	BT10	0.02685	25.27
S3A3-BT12	S3A3	BT12	0.02556	24.55
S3A3-BT23	S3A3	BT23	0.0256	22.43
S3A3-BT4	S3A3	BT4	0.02518	23.99
S3A3-BT5	S3A3	BT5	0.04339	25.5
S3A3-BT8	S3A3	BT8	0.03446	22.97
S3A3-Comp1	S3A3	Comp1	0.02551	26.54
S3A3-Comp2	S3A3	Comp2	0.09304	26.21
W4A17-BT1	W4A17	BT1	0.05399	25.2
W4A17-BT12	W4A17	BT12	0.07332	27.36
W4A17-BT13	W4A17	BT13	0.04046	26.39
W4A17-BT2	W4A17	BT2	0.02607	26.1
W4A17-BT20	W4A17	BT20	0.02553	19.52
W4A17-BT23	W4A17	BT23	0.08213	22.58
W4A17-BT24	W4A17	BT24	0.02639	23.14
W4A17-BT6	W4A17	BT6	0.05302	22.59
W4A17-BT9	W4A17	BT9	0.04694	25.26
W4A17-Comp1	W4A17	Comp1	0.03873	25.44
W4A21-BT1	W4A21	BT1	0.06135	26.44
W4A21-BT2	W4A21	BT2	0.02523	25.55
W4A21-BT3	W4A21	BT3	0.02552	18.96
W4A21-BT4	W4A21	BT4	0.02557	23.76
W4A21-BT5	W4A21	BT5	0.02553	23.7
W4A21-BT6	W4A21	BT6	0.02571	32.46
W4A21-BT9	W4A21	BT9	0.02562	25.89
W4A21-Comp1	W4A21	Comp1	0.02629	28.49
W4A21-Comp2	W4A21	Comp2	0.04402	28.96
W4A21-Comp3	W4A21	Comp3	0.04117	27.98
W4A31-BT1	W4A31	BT1	0.04055	22.38
W4A31-BT10	W4A31	BT10	0.03957	20.77
W4A31-BT2	W4A31	BT2	0.02545	27.7
W4A31-BT3	W4A31	BT3	0.1082	24.77
W4A31-BT6	W4A31	BT6	0.0255	21.9
W4A31-BT7	W4A31	BT7	0.0252	20.68
W4A31-BT8	W4A31	BT8	0.04319	22.16
W4A31-BT9	W4A31	BT9	0.02618	22.3
W4A31-Comp1	W4A31	Comp1	0.06188	30.14

ProUCL Outputs: Fish Carcasses - Bird Brook

General UCL Statistics for Full Data Sets	
User Selected Options	
From File	U:\121810356\1_environmental\4_field_data\3_hhera\6_reporting\fish_carcass_bird.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Aluminum

General Statistics

Number of Valid Observations	20	Number of Distinct Observations	18

Raw Statistics		**Log-transformed Statistics**	
Minimum	0.39	Minimum of Log Data	-0.942
Maximum	7.82	Maximum of Log Data	2.057
Mean	1.182	Mean of log Data	-0.189
Median	0.698	SD of log Data	0.708
SD	1.633		
Coefficient of Variation	1.382		
Skewness	3.907		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.46	Shapiro Wilk Test Statistic	0.836
Shapiro Wilk Critical Value	0.905	Shapiro Wilk Critical Value	0.905
Data not Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	1.813	95% H-UCL	1.533
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1.821
95% Adjusted-CLT UCL (Chen-1995)	2.123	97.5% Chebyshev (MVUE) UCL	2.155
95% Modified-t UCL (Johnson-1978)	1.866	99% Chebyshev (MVUE) UCL	2.812
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	1.351	**Data do not follow a Discernable Distribution (0.05)**	
Theta Star	0.874		
MLE of Mean	1.182		
MLE of Standard Deviation	1.017		
nu star	54.06		
Approximate Chi Square Value (.05)	38.17	**Nonparametric Statistics**	
Adjusted Level of Significance	0.038	95% CLT UCL	1.782
Adjusted Chi Square Value	37.11	95% Jackknife UCL	1.813
		95% Standard Bootstrap UCL	1.775
Anderson-Darling Test Statistic	1.89	95% Bootstrap-t UCL	3.624
Anderson-Darling 5% Critical Value	0.757	95% Hall's Bootstrap UCL	4.149
Kolmogorov-Smirnov Test Statistic	0.217	95% Percentile Bootstrap UCL	1.841
Kolmogorov-Smirnov 5% Critical Value	0.197	95% BCA Bootstrap UCL	2.223

51	Data not Gamma Distributed at 5% Significance Level										95% Chebyshev(Mean, Sd) UCL	2.774
52											97.5% Chebyshev(Mean, Sd) UCL	3.462
53	Assuming Gamma Distribution										99% Chebyshev(Mean, Sd) UCL	4.816
54					95% Approximate Gamma UCL	1.674						
55					95% Adjusted Gamma UCL	1.721						
56												
57	Potential UCL to Use										Use 95% Chebyshev (Mean, Sd) UCL	2.774
58												
59	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
60	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
61	and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.											
62												
63												
64	Antimony											
65												
66	General Statistics											
67	Number of Valid Observations					20					Number of Distinct Observations	3
68												
69	Raw Statistics										Log-transformed Statistics	
70	Minimum					0.0025					Minimum of Log Data	-5.991
71	Maximum					0.017					Maximum of Log Data	-4.075
72	Mean					0.00345					Mean of log Data	-5.844
73	Median					0.0025					SD of log Data	0.476
74	SD					0.00334						
75	Coefficient of Variation					0.969						
76	Skewness					3.937						
77												
78												
79	Warning: There are only 3 Distinct Values in this data											
80	There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.											
81	Those methods will return a 'N/A' value on your output display!											
82												
83	It is necessary to have 4 or more Distinct Values to compute bootstrap methods.											
84	However, results obtained using 4 to 9 distinct values may not be reliable.											
85	It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.											
86												
87	Relevant UCL Statistics											
88	Normal Distribution Test										Lognormal Distribution Test	
89	Shapiro Wilk Test Statistic					0.325					Shapiro Wilk Test Statistic	0.356
90	Shapiro Wilk Critical Value					0.905					Shapiro Wilk Critical Value	0.905
91	Data not Normal at 5% Significance Level										Data not Lognormal at 5% Significance Level	
92												
93	Assuming Normal Distribution										Assuming Lognormal Distribution	
94	95% Student's-t UCL					0.00474					95% H-UCL	0.00403
95	95% UCLs (Adjusted for Skewness)										95% Chebyshev (MVUE) UCL	0.00477
96	95% Adjusted-CLT UCL (Chen-1995)					0.00538					97.5% Chebyshev (MVUE) UCL	0.00544
97	95% Modified-t UCL (Johnson-1978)					0.00485					99% Chebyshev (MVUE) UCL	0.00675
98												
99	Gamma Distribution Test										Data Distribution	
100	k star (bias corrected)					2.598					Data do not follow a Discernable Distribution (0.05)	

101					Theta Star	0.00133						
102					MLE of Mean	0.00345						
103					MLE of Standard Deviation	0.00214						
104					nu star	103.9						
105					Approximate Chi Square Value (.05)	81.4			**Nonparametric Statistics**			
106					Adjusted Level of Significance	0.038					95% CLT UCL	0.00468
107					Adjusted Chi Square Value	79.83					95% Jackknife UCL	0.00474
108											95% Standard Bootstrap UCL	N/A
109					Anderson-Darling Test Statistic	6.299					95% Bootstrap-t UCL	N/A
110					Anderson-Darling 5% Critical Value	0.747					95% Hall's Bootstrap UCL	N/A
111					Kolmogorov-Smirnov Test Statistic	0.531					95% Percentile Bootstrap UCL	N/A
112					Kolmogorov-Smirnov 5% Critical Value	0.195					95% BCA Bootstrap UCL	N/A
113					**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.00671
114											97.5% Chebyshev(Mean, Sd) UCL	0.00812
115					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.0109
116					95% Approximate Gamma UCL	0.0044						
117					95% Adjusted Gamma UCL	0.00449						
118												
119					**Potential UCL to Use**						Use 95% Student's-t UCL	0.00474
120											or 95% Modified-t UCL	0.00485
121												
122	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
123	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
124	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
125												
126												
127	**Arsenic**											
128												
129	**General Statistics**											
130					Number of Valid Observations	20			Number of Distinct Observations			13
131												
132	**Raw Statistics**								**Log-transformed Statistics**			
133					Minimum	0.025			Minimum of Log Data			-3.689
134					Maximum	0.4			Maximum of Log Data			-0.916
135					Mean	0.144			Mean of log Data			-2.148
136					Median	0.11			SD of log Data			0.71
137					SD	0.0929						
138					Coefficient of Variation	0.645						
139					Skewness	1.257						
140												
141	**Relevant UCL Statistics**											
142	**Normal Distribution Test**								**Lognormal Distribution Test**			
143					Shapiro Wilk Test Statistic	0.889			Shapiro Wilk Test Statistic			0.931
144					Shapiro Wilk Critical Value	0.905			Shapiro Wilk Critical Value			0.905
145	**Data not Normal at 5% Significance Level**								**Data appear Lognormal at 5% Significance Level**			
146												
147	**Assuming Normal Distribution**								**Assuming Lognormal Distribution**			
148					95% Student's-t UCL	0.18					95% H-UCL	0.217
149	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.257
150					95% Adjusted-CLT UCL (Chen-1995)	0.184					97.5% Chebyshev (MVUE) UCL	0.305

151	95% Modified-t UCL (Johnson-1978)	0.181					99% Chebyshev (MVUE) UCL	0.398				
152												
153	**Gamma Distribution Test**						**Data Distribution**					
154	k star (bias corrected)	2.189					**Data appear Gamma Distributed at 5% Significance Level**					
155	Theta Star	0.0658										
156	MLE of Mean	0.144										
157	MLE of Standard Deviation	0.0973										
158	nu star	87.57										
159	Approximate Chi Square Value (.05)	67					**Nonparametric Statistics**					
160	Adjusted Level of Significance	0.038					95% CLT UCL	0.178				
161	Adjusted Chi Square Value	65.58					95% Jackknife UCL	0.18				
162							95% Standard Bootstrap UCL	0.178				
163	Anderson-Darling Test Statistic	0.422					95% Bootstrap-t UCL	0.19				
164	Anderson-Darling 5% Critical Value	0.75					95% Hall's Bootstrap UCL	0.196				
165	Kolmogorov-Smirnov Test Statistic	0.129					95% Percentile Bootstrap UCL	0.18				
166	Kolmogorov-Smirnov 5% Critical Value	0.196					95% BCA Bootstrap UCL	0.185				
167	**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.235				
168							97.5% Chebyshev(Mean, Sd) UCL	0.274				
169	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.351				
170	95% Approximate Gamma UCL	0.188										
171	95% Adjusted Gamma UCL	0.192										
172												
173	**Potential UCL to Use**						Use 95% Approximate Gamma UCL	0.188				
174												
175	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
176	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
177	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
178												
179												
180	**Barium**											
181												
182	**General Statistics**											
183	Number of Valid Observations	20					Number of Distinct Observations	16				
184												
185	**Raw Statistics**						**Log-transformed Statistics**					
186	Minimum	0.13					Minimum of Log Data	-2.04				
187	Maximum	0.7					Maximum of Log Data	-0.357				
188	Mean	0.361					Mean of log Data	-1.087				
189	Median	0.325					SD of log Data	0.389				
190	SD	0.136										
191	Coefficient of Variation	0.376										
192	Skewness	0.696										
193												
194	**Relevant UCL Statistics**											
195	**Normal Distribution Test**						**Lognormal Distribution Test**					
196	Shapiro Wilk Test Statistic	0.953					Shapiro Wilk Test Statistic	0.968				
197	Shapiro Wilk Critical Value	0.905					Shapiro Wilk Critical Value	0.905				
198	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
199												
200	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					

201					95% Student's-t UCL	0.414					95% H-UCL	0.432
202				**95% UCLs (Adjusted for Skewness)**							95% Chebyshev (MVUE) UCL	0.503
203					95% Adjusted-CLT UCL (Chen-1995)	0.416					97.5% Chebyshev (MVUE) UCL	0.564
204					95% Modified-t UCL (Johnson-1978)	0.414					99% Chebyshev (MVUE) UCL	0.683
205												
206				**Gamma Distribution Test**							**Data Distribution**	
207					k star (bias corrected)	6.348					**Data appear Normal at 5% Significance Level**	
208					Theta Star	0.0569						
209					MLE of Mean	0.361						
210					MLE of Standard Deviation	0.143						
211					nu star	253.9						
212					Approximate Chi Square Value (.05)	218					**Nonparametric Statistics**	
213					Adjusted Level of Significance	0.038					95% CLT UCL	0.411
214					Adjusted Chi Square Value	215.4					95% Jackknife UCL	0.414
215											95% Standard Bootstrap UCL	0.409
216					Anderson-Darling Test Statistic	0.298					95% Bootstrap-t UCL	0.421
217					Anderson-Darling 5% Critical Value	0.744					95% Hall's Bootstrap UCL	0.421
218					Kolmogorov-Smirnov Test Statistic	0.132					95% Percentile Bootstrap UCL	0.412
219					Kolmogorov-Smirnov 5% Critical Value	0.194					95% BCA Bootstrap UCL	0.413
220				**Data appear Gamma Distributed at 5% Significance Level**							95% Chebyshev(Mean, Sd) UCL	0.493
221											97.5% Chebyshev(Mean, Sd) UCL	0.551
222				**Assuming Gamma Distribution**							99% Chebyshev(Mean, Sd) UCL	0.663
223					95% Approximate Gamma UCL	0.421						
224					95% Adjusted Gamma UCL	0.426						
225												
226				**Potential UCL to Use**							Use 95% Student's-t UCL	0.414
227												
228												
229												
230												
231												
232												
233	**Beryllium**											
234												
235												
236					Number of Valid Observations	20					Number of Distinct Observations	1
237												
238												
239												
240												
241												
242												
243												
244												
245												
246												
247												
248	**Bismuth**											
249												
250												

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General Statistics

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!
ProUCL (or any other software) should not be used on such a data set!
The data set for variable Beryllium was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

General Statistics

251	Number of Valid Observations					20	Number of Distinct Observations					2
252												
253	**Raw Statistics**						**Log-transformed Statistics**					
254	Minimum					0.025	Minimum of Log Data					-3.689
255	Maximum					0.28	Maximum of Log Data					-1.273
256	Mean					0.0378	Mean of log Data					-3.568
257	Median					0.025	SD of log Data					0.54
258	SD					0.057						
259	Coefficient of Variation					1.51						
260	Skewness					4.472						
261												
262												
263	**Warning: There are only 2 Distinct Values in this data**											
264	**There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.**											
265	**Those methods will return a 'N/A' value on your output display!**											
266												
267	**It is necessary to have 4 or more Distinct Values to compute bootstrap methods.**											
268	**However, results obtained using 4 to 9 distinct values may not be reliable.**											
269	**It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.**											
270												
271	**Relevant UCL Statistics**											
272	**Normal Distribution Test**						**Lognormal Distribution Test**					
273	Shapiro Wilk Test Statistic					0.236	Shapiro Wilk Test Statistic					0.236
274	Shapiro Wilk Critical Value					0.905	Shapiro Wilk Critical Value					0.905
275	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
276												
277	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
278	95% Student's-t UCL					0.0598	95% H-UCL					0.0421
279	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					0.0501
280	95% Adjusted-CLT UCL (Chen-1995)					0.0723	97.5% Chebyshev (MVUE) UCL					0.0578
281	95% Modified-t UCL (Johnson-1978)					0.0619	99% Chebyshev (MVUE) UCL					0.0729
282												
283	**Gamma Distribution Test**						**Data Distribution**					
284	k star (bias corrected)					1.619	**Data do not follow a Discernable Distribution (0.05)**					
285	Theta Star					0.0233						
286	MLE of Mean					0.0378						
287	MLE of Standard Deviation					0.0297						
288	nu star					64.77						
289	Approximate Chi Square Value (.05)					47.25	**Nonparametric Statistics**					
290	Adjusted Level of Significance					0.038	95% CLT UCL					0.0587
291	Adjusted Chi Square Value					46.07	95% Jackknife UCL					N/A
292							95% Standard Bootstrap UCL					N/A
293	Anderson-Darling Test Statistic					7.399	95% Bootstrap-t UCL					N/A
294	Anderson-Darling 5% Critical Value					0.754	95% Hall's Bootstrap UCL					N/A
295	Kolmogorov-Smirnov Test Statistic					0.558	95% Percentile Bootstrap UCL					N/A
296	Kolmogorov-Smirnov 5% Critical Value					0.196	95% BCA Bootstrap UCL					N/A
297	**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					0.0933
298							97.5% Chebyshev(Mean, Sd) UCL					0.117
299	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL					0.165
300	95% Approximate Gamma UCL					0.0517						

301					95% Adjusted Gamma UCL	0.0531						
302												
303					**Potential UCL to Use**						Use 95% Chebyshev (Mean, Sd) UCL	0.0933
304												
305	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
306	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
307	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
308												
309												
310	**Boron**											
311												
312	**General Statistics**											
313					Number of Valid Observations	20					Number of Distinct Observations	1
314												
315												
316	**Warning: There is only one distinct observation value in this data set - resulting in '0' variance!**											
317	**ProUCL (or any other software) should not be used on such a data set!**											
318	**The data set for variable Boron was not processed!**											
319												
320	**If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.**											
321	**The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).**											
322												
323												
324												
325	**Cadmium**											
326												
327	**General Statistics**											
328					Number of Valid Observations	20					Number of Distinct Observations	18
329												
330					**Raw Statistics**						**Log-transformed Statistics**	
331					Minimum	0.002					Minimum of Log Data	-6.215
332					Maximum	0.0205					Maximum of Log Data	-3.89
333					Mean	0.0105					Mean of log Data	-4.707
334					Median	0.0108					SD of log Data	0.612
335					SD	0.0051						
336					Coefficient of Variation	0.487						
337					Skewness	0.247						
338												
339	**Relevant UCL Statistics**											
340					**Normal Distribution Test**						**Lognormal Distribution Test**	
341					Shapiro Wilk Test Statistic	0.974					Shapiro Wilk Test Statistic	0.914
342					Shapiro Wilk Critical Value	0.905					Shapiro Wilk Critical Value	0.905
343					**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**	
344												
345					**Assuming Normal Distribution**						**Assuming Lognormal Distribution**	
346					95% Student's-t UCL	0.0124					95% H-UCL	0.0147
347					**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL	0.0176
348					95% Adjusted-CLT UCL (Chen-1995)	0.0124					97.5% Chebyshev (MVUE) UCL	0.0205
349					95% Modified-t UCL (Johnson-1978)	0.0124					99% Chebyshev (MVUE) UCL	0.0262
350												

351	**Gamma Distribution Test**						**Data Distribution**					
352	k star (bias corrected)	3.06					**Data appear Normal at 5% Significance Level**					
353	Theta Star	0.00342										
354	MLE of Mean	0.0105										
355	MLE of Standard Deviation	0.00598										
356	nu star	122.4										
357	Approximate Chi Square Value (.05)	97.85					**Nonparametric Statistics**					
358	Adjusted Level of Significance	0.038					95% CLT UCL	0.0123				
359	Adjusted Chi Square Value	96.12					95% Jackknife UCL	0.0124				
360							95% Standard Bootstrap UCL	0.0123				
361	Anderson-Darling Test Statistic	0.322					95% Bootstrap-t UCL	0.0125				
362	Anderson-Darling 5% Critical Value	0.746					95% Hall's Bootstrap UCL	0.0125				
363	Kolmogorov-Smirnov Test Statistic	0.133					95% Percentile Bootstrap UCL	0.0123				
364	Kolmogorov-Smirnov 5% Critical Value	0.195					95% BCA Bootstrap UCL	0.0124				
365	**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.0154				
366							97.5% Chebyshev(Mean, Sd) UCL	0.0176				
367	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.0218				
368	95% Approximate Gamma UCL	0.0131										
369	95% Adjusted Gamma UCL	0.0133										
370												
371	**Potential UCL to Use**						Use 95% Student's-t UCL	0.0124				
372												
373	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
374	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
375	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
376												
377												
378	**Calcium**											
379												
380	**General Statistics**											
381	Number of Valid Observations	20					Number of Distinct Observations	20				
382												
383	**Raw Statistics**						**Log-transformed Statistics**					
384	Minimum	1810					Minimum of Log Data	7.501				
385	Maximum	7230					Maximum of Log Data	8.886				
386	Mean	4253					Mean of log Data	8.317				
387	Median	4275					SD of log Data	0.292				
388	SD	1159										
389	Coefficient of Variation	0.273										
390	Skewness	0.411										
391												
392	**Relevant UCL Statistics**											
393	**Normal Distribution Test**						**Lognormal Distribution Test**					
394	Shapiro Wilk Test Statistic	0.971					Shapiro Wilk Test Statistic	0.947				
395	Shapiro Wilk Critical Value	0.905					Shapiro Wilk Critical Value	0.905				
396	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
397												
398	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
399	95% Student's-t UCL	4701					95% H-UCL	4836				
400	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL	5495				

401	95% Adjusted-CLT UCL (Chen-1995)					4705	97.5% Chebyshev (MVUE) UCL					6027
402	95% Modified-t UCL (Johnson-1978)					4705	99% Chebyshev (MVUE) UCL					7074
403												
404	**Gamma Distribution Test**						**Data Distribution**					
405	k star (bias corrected)					11.37	**Data appear Normal at 5% Significance Level**					
406	Theta Star					374						
407	MLE of Mean					4253						
408	MLE of Standard Deviation					1261						
409	nu star					454.8						
410	Approximate Chi Square Value (.05)					406.4	**Nonparametric Statistics**					
411	Adjusted Level of Significance					0.038	95% CLT UCL					4679
412	Adjusted Chi Square Value					402.8	95% Jackknife UCL					4701
413							95% Standard Bootstrap UCL					4675
414	Anderson-Darling Test Statistic					0.265	95% Bootstrap-t UCL					4725
415	Anderson-Darling 5% Critical Value					0.741	95% Hall's Bootstrap UCL					4779
416	Kolmogorov-Smirnov Test Statistic					0.0888	95% Percentile Bootstrap UCL					4679
417	Kolmogorov-Smirnov 5% Critical Value					0.194	95% BCA Bootstrap UCL					4683
418	**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					5383
419							97.5% Chebyshev(Mean, Sd) UCL					5872
420	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL					6832
421	95% Approximate Gamma UCL					4760						
422	95% Adjusted Gamma UCL					4803						
423												
424	**Potential UCL to Use**						Use 95% Student's-t UCL					4701
425												
426	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
427	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
428	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
429												
430												
431	**Chromium**											
432												
433	**General Statistics**											
434	Number of Valid Observations					20	Number of Distinct Observations					3
435												
436	**Raw Statistics**						**Log-transformed Statistics**					
437	Minimum					0.025	Minimum of Log Data					-3.689
438	Maximum					0.15	Maximum of Log Data					-1.897
439	Mean					0.0388	Mean of log Data					-3.461
440	Median					0.025	SD of log Data					0.563
441	SD					0.0349						
442	Coefficient of Variation					0.9						
443	Skewness					2.473						
444												
445												
446	**Warning: There are only 3 Distinct Values in this data**											
447	**There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.**											
448	**Those methods will return a 'N/A' value on your output display!**											
449												
450	**It is necessary to have 4 or more Distinct Values to compute bootstrap methods.**											

451	**However, results obtained using 4 to 9 distinct values may not be reliable.**											
452	**It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.**											
453												
454	**Relevant UCL Statistics**											
455	**Normal Distribution Test**						**Lognormal Distribution Test**					
456	Shapiro Wilk Test Statistic				0.455		Shapiro Wilk Test Statistic				0.452	
457	Shapiro Wilk Critical Value				0.905		Shapiro Wilk Critical Value				0.905	
458	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
459												
460	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
461	95% Student's-t UCL				0.0522		95% H-UCL				0.0481	
462	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL				0.0574	
463	95% Adjusted-CLT UCL (Chen-1995)				0.0562		97.5% Chebyshev (MVUE) UCL				0.0664	
464	95% Modified-t UCL (Johnson-1978)				0.0529		99% Chebyshev (MVUE) UCL				0.0842	
465												
466	**Gamma Distribution Test**						**Data Distribution**					
467	k star (bias corrected)				2.188		**Data do not follow a Discernable Distribution (0.05)**					
468	Theta Star				0.0177							
469	MLE of Mean				0.0388							
470	MLE of Standard Deviation				0.0262							
471	nu star				87.52							
472	Approximate Chi Square Value (.05)				66.95		**Nonparametric Statistics**					
473	Adjusted Level of Significance				0.038		95% CLT UCL				0.0516	
474	Adjusted Chi Square Value				65.53		95% Jackknife UCL				0.0522	
475							95% Standard Bootstrap UCL				N/A	
476	Anderson-Darling Test Statistic				5.722		95% Bootstrap-t UCL				N/A	
477	Anderson-Darling 5% Critical Value				0.75		95% Hall's Bootstrap UCL				N/A	
478	Kolmogorov-Smirnov Test Statistic				0.517		95% Percentile Bootstrap UCL				N/A	
479	Kolmogorov-Smirnov 5% Critical Value				0.196		95% BCA Bootstrap UCL				N/A	
480	**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL				0.0727	
481							97.5% Chebyshev(Mean, Sd) UCL				0.0874	
482	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL				0.116	
483	95% Approximate Gamma UCL				0.0507							
484	95% Adjusted Gamma UCL				0.0518							
485												
486	**Potential UCL to Use**						Use 95% Chebyshev (Mean, Sd) UCL				0.0727	
487												
488	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
489	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
490	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
491												
492												
493	**Cobalt**											
494												
495	**General Statistics**											
496	Number of Valid Observations				20		Number of Distinct Observations				18	
497												
498	**Raw Statistics**						**Log-transformed Statistics**					
499	Minimum				0.017		Minimum of Log Data				-4.075	
500	Maximum				0.074		Maximum of Log Data				-2.604	

501					Mean	0.0372					Mean of log Data	-3.374
502					Median	0.0355					SD of log Data	0.417
503					SD	0.0154						
504					Coefficient of Variation	0.415						
505					Skewness	0.749						
506												
507	**Relevant UCL Statistics**											
508	**Normal Distribution Test**						**Lognormal Distribution Test**					
509					Shapiro Wilk Test Statistic	0.947					Shapiro Wilk Test Statistic	0.976
510					Shapiro Wilk Critical Value	0.905					Shapiro Wilk Critical Value	0.905
511	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
512												
513	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
514					95% Student's-t UCL	0.0431					95% H-UCL	0.045
515	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.0527
516					95% Adjusted-CLT UCL (Chen-1995)	0.0434					97.5% Chebyshev (MVUE) UCL	0.0594
517					95% Modified-t UCL (Johnson-1978)	0.0432					99% Chebyshev (MVUE) UCL	0.0726
518												
519	**Gamma Distribution Test**						**Data Distribution**					
520					k star (bias corrected)	5.398	**Data appear Normal at 5% Significance Level**					
521					Theta Star	0.00688						
522					MLE of Mean	0.0372						
523					MLE of Standard Deviation	0.016						
524					nu star	215.9						
525					Approximate Chi Square Value (.05)	182.9	**Nonparametric Statistics**					
526					Adjusted Level of Significance	0.038					95% CLT UCL	0.0428
527					Adjusted Chi Square Value	180.5					95% Jackknife UCL	0.0431
528											95% Standard Bootstrap UCL	0.0428
529					Anderson-Darling Test Statistic	0.174					95% Bootstrap-t UCL	0.0436
530					Anderson-Darling 5% Critical Value	0.744					95% Hall's Bootstrap UCL	0.0435
531					Kolmogorov-Smirnov Test Statistic	0.106					95% Percentile Bootstrap UCL	0.0426
532					Kolmogorov-Smirnov 5% Critical Value	0.194					95% BCA Bootstrap UCL	0.043
533	**Data appear Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	0.0522
534											97.5% Chebyshev(Mean, Sd) UCL	0.0587
535	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	0.0715
536					95% Approximate Gamma UCL	0.0439						
537					95% Adjusted Gamma UCL	0.0444						
538												
539	**Potential UCL to Use**										Use 95% Student's-t UCL	0.0431
540												
541	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
542	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
543	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
544												
545												
546	**Copper**											
547												
548	**General Statistics**											
549					Number of Valid Observations	20					Number of Distinct Observations	14
550												

	A	B	C	D	E	F	G	H	I	J	K	L
551	**Raw Statistics**						**Log-transformed Statistics**					
552	Minimum	0.29					Minimum of Log Data	-1.238				
553	Maximum	0.46					Maximum of Log Data	-0.777				
554	Mean	0.364					Mean of log Data	-1.02				
555	Median	0.375					SD of log Data	0.135				
556	SD	0.0486										
557	Coefficient of Variation	0.134										
558	Skewness	0.0804										
559												
560	**Relevant UCL Statistics**											
561	**Normal Distribution Test**						**Lognormal Distribution Test**					
562	Shapiro Wilk Test Statistic	0.947					Shapiro Wilk Test Statistic	0.942				
563	Shapiro Wilk Critical Value	0.905					Shapiro Wilk Critical Value	0.905				
564	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
565												
566	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
567	95% Student's-t UCL	0.383					95% H-UCL	0.384				
568	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL	0.412				
569	95% Adjusted-CLT UCL (Chen-1995)	0.382					97.5% Chebyshev (MVUE) UCL	0.432				
570	95% Modified-t UCL (Johnson-1978)	0.383					99% Chebyshev (MVUE) UCL	0.473				
571												
572	**Gamma Distribution Test**						**Data Distribution**					
573	k star (bias corrected)	49.71					**Data appear Normal at 5% Significance Level**					
574	Theta Star	0.00732										
575	MLE of Mean	0.364										
576	MLE of Standard Deviation	0.0516										
577	nu star	1989										
578	Approximate Chi Square Value (.05)	1886					**Nonparametric Statistics**					
579	Adjusted Level of Significance	0.038					95% CLT UCL	0.382				
580	Adjusted Chi Square Value	1878					95% Jackknife UCL	0.383				
581							95% Standard Bootstrap UCL	0.381				
582	Anderson-Darling Test Statistic	0.522					95% Bootstrap-t UCL	0.383				
583	Anderson-Darling 5% Critical Value	0.74					95% Hall's Bootstrap UCL	0.382				
584	Kolmogorov-Smirnov Test Statistic	0.17					95% Percentile Bootstrap UCL	0.382				
585	Kolmogorov-Smirnov 5% Critical Value	0.193					95% BCA Bootstrap UCL	0.382				
586	**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.411				
587							97.5% Chebyshev(Mean, Sd) UCL	0.432				
588	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.472				
589	95% Approximate Gamma UCL	0.384										
590	95% Adjusted Gamma UCL	0.385										
591												
592	**Potential UCL to Use**						Use 95% Student's-t UCL	0.383				
593												
594	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
595	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
596	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
597												
598												
599	**Iron**											
600												

	A	B	C	D	E	F	G	H	I	J	K	L
601	**General Statistics**											
602	Number of Valid Observations					20	Number of Distinct Observations					7
603												
604	**Raw Statistics**						**Log-transformed Statistics**					
605	Minimum					3	Minimum of Log Data					1.099
606	Maximum					10	Maximum of Log Data					2.303
607	Mean					5.35	Mean of log Data					1.64
608	Median					5	SD of log Data					0.275
609	SD					1.599						
610	Coefficient of Variation					0.299						
611	Skewness					1.42						
612												
613												
614	**Relevant UCL Statistics**											
615	**Normal Distribution Test**						**Lognormal Distribution Test**					
616	Shapiro Wilk Test Statistic					0.868	Shapiro Wilk Test Statistic					0.937
617	Shapiro Wilk Critical Value					0.905	Shapiro Wilk Critical Value					0.905
618	**Data not Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
619												
620	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
621	95% Student's-t UCL					5.968	95% H-UCL					6.009
622	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					6.791
623	95% Adjusted-CLT UCL (Chen-1995)					6.059	97.5% Chebyshev (MVUE) UCL					7.418
624	95% Modified-t UCL (Johnson-1978)					5.987	99% Chebyshev (MVUE) UCL					8.65
625												
626	**Gamma Distribution Test**						**Data Distribution**					
627	k star (bias corrected)					11.49	**Data Follow Appr. Gamma Distribution at 5% Significance Level**					
628	Theta Star					0.465						
629	MLE of Mean					5.35						
630	MLE of Standard Deviation					1.578						
631	nu star					459.8						
632	Approximate Chi Square Value (.05)					411.1	**Nonparametric Statistics**					
633	Adjusted Level of Significance					0.038	95% CLT UCL					5.938
634	Adjusted Chi Square Value					407.4	95% Jackknife UCL					5.968
635							95% Standard Bootstrap UCL					5.933
636	Anderson-Darling Test Statistic					0.733	95% Bootstrap-t UCL					6.144
637	Anderson-Darling 5% Critical Value					0.741	95% Hall's Bootstrap UCL					6.416
638	Kolmogorov-Smirnov Test Statistic					0.211	95% Percentile Bootstrap UCL					5.95
639	Kolmogorov-Smirnov 5% Critical Value					0.194	95% BCA Bootstrap UCL					6
640	**Data follow Appr. Gamma Distribution at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					6.908
641							97.5% Chebyshev(Mean, Sd) UCL					7.582
642	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL					8.906
643	95% Approximate Gamma UCL					5.984						
644	95% Adjusted Gamma UCL					6.037						
645												
646	**Potential UCL to Use**						Use 95% Approximate Gamma UCL					5.984
647												
648	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
649	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
650	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											

Lead

General Statistics

Number of Valid Observations	20	Number of Distinct Observations	17

Raw Statistics		**Log-transformed Statistics**	
Minimum	0.006	Minimum of Log Data	-5.116
Maximum	0.035	Maximum of Log Data	-3.352
Mean	0.0186	Mean of log Data	-4.081
Median	0.0175	SD of log Data	0.478
SD	0.00785		
Coefficient of Variation	0.421		
Skewness	0.34		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.971	Shapiro Wilk Test Statistic	0.939
Shapiro Wilk Critical Value	0.905	Shapiro Wilk Critical Value	0.905
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	0.0217	95% H-UCL	0.0236
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.0279
95% Adjusted-CLT UCL (Chen-1995)	0.0217	97.5% Chebyshev (MVUE) UCL	0.0318
95% Modified-t UCL (Johnson-1978)	0.0217	99% Chebyshev (MVUE) UCL	0.0395
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	4.537	**Data appear Normal at 5% Significance Level**	
Theta Star	0.00411		
MLE of Mean	0.0186		
MLE of Standard Deviation	0.00874		
nu star	181.5		
Approximate Chi Square Value (.05)	151.3	**Nonparametric Statistics**	
Adjusted Level of Significance	0.038	95% CLT UCL	0.0215
Adjusted Chi Square Value	149.1	95% Jackknife UCL	0.0217
		95% Standard Bootstrap UCL	0.0215
Anderson-Darling Test Statistic	0.227	95% Bootstrap-t UCL	0.0219
Anderson-Darling 5% Critical Value	0.745	95% Hall's Bootstrap UCL	0.0216
Kolmogorov-Smirnov Test Statistic	0.08	95% Percentile Bootstrap UCL	0.0215
Kolmogorov-Smirnov 5% Critical Value	0.194	95% BCA Bootstrap UCL	0.0213
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.0263
		97.5% Chebyshev(Mean, Sd) UCL	0.0296
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.0361
95% Approximate Gamma UCL	0.0223		
95% Adjusted Gamma UCL	0.0227		
Potential UCL to Use		Use 95% Student's-t UCL	0.0217

	A	B	C	D	E	F	G	H	I	J	K	L
701	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
702	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
703	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
704												
705												
706	**Lithium**											
707												
708	**General Statistics**											
709	Number of Valid Observations					20	Number of Distinct Observations					9
710												
711	**Raw Statistics**						**Log-transformed Statistics**					
712	Minimum					0.0025	Minimum of Log Data					-5.991
713	Maximum					0.02	Maximum of Log Data					-3.912
714	Mean					0.00723	Mean of log Data					-5.025
715	Median					0.007	SD of log Data					0.447
716	SD					0.00358						
717	Coefficient of Variation					0.496						
718	Skewness					2.424						
719												
720												
721	**Relevant UCL Statistics**											
722	**Normal Distribution Test**						**Lognormal Distribution Test**					
723	Shapiro Wilk Test Statistic					0.744	Shapiro Wilk Test Statistic					0.879
724	Shapiro Wilk Critical Value					0.905	Shapiro Wilk Critical Value					0.905
725	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
726												
727	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
728	95% Student's-t UCL					0.00861	95% H-UCL					0.00888
729	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					0.0105
730	95% Adjusted-CLT UCL (Chen-1995)					0.00901	97.5% Chebyshev (MVUE) UCL					0.0119
731	95% Modified-t UCL (Johnson-1978)					0.00868	99% Chebyshev (MVUE) UCL					0.0146
732												
733	**Gamma Distribution Test**						**Data Distribution**					
734	k star (bias corrected)					4.639	**Data do not follow a Discernable Distribution (0.05)**					
735	Theta Star					0.00156						
736	MLE of Mean					0.00723						
737	MLE of Standard Deviation					0.00335						
738	nu star					185.6						
739	Approximate Chi Square Value (.05)					155.1	**Nonparametric Statistics**					
740	Adjusted Level of Significance					0.038	95% CLT UCL					0.00854
741	Adjusted Chi Square Value					152.9	95% Jackknife UCL					0.00861
742							95% Standard Bootstrap UCL					0.00848
743	Anderson-Darling Test Statistic					1.073	95% Bootstrap-t UCL					0.00943
744	Anderson-Darling 5% Critical Value					0.745	95% Hall's Bootstrap UCL					0.0155
745	Kolmogorov-Smirnov Test Statistic					0.201	95% Percentile Bootstrap UCL					0.0087
746	Kolmogorov-Smirnov 5% Critical Value					0.194	95% BCA Bootstrap UCL					0.00935
747	**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					0.0107
748							97.5% Chebyshev(Mean, Sd) UCL					0.0122
749	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL					0.0152
750	95% Approximate Gamma UCL					0.00865						

751					95% Adjusted Gamma UCL	0.00877						
752												
753					**Potential UCL to Use**						Use 95% Student's-t UCL	0.00861
754											or 95% Modified-t UCL	0.00868
755												
756	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
757	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
758	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
759												
760												
761	**Magnesium**											
762												
763	**General Statistics**											
764	Number of Valid Observations					20	Number of Distinct Observations					17
765												
766	**Raw Statistics**						**Log-transformed Statistics**					
767	Minimum					284	Minimum of Log Data					5.649
768	Maximum					360	Maximum of Log Data					5.886
769	Mean					330.2	Mean of log Data					5.798
770	Median					333.8	SD of log Data					0.0646
771	SD					20.94						
772	Coefficient of Variation					0.0634						
773	Skewness					-0.487						
774												
775	**Relevant UCL Statistics**											
776	**Normal Distribution Test**						**Lognormal Distribution Test**					
777	Shapiro Wilk Test Statistic					0.961	Shapiro Wilk Test Statistic					0.953
778	Shapiro Wilk Critical Value					0.905	Shapiro Wilk Critical Value					0.905
779	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
780												
781	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
782	95% Student's-t UCL					338.3	95% H-UCL					N/A
783	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					351
784	95% Adjusted-CLT UCL (Chen-1995)					337.4	97.5% Chebyshev (MVUE) UCL					360
785	95% Modified-t UCL (Johnson-1978)					338.2	99% Chebyshev (MVUE) UCL					377.7
786												
787	**Gamma Distribution Test**						**Data Distribution**					
788	k star (bias corrected)					217.5	**Data appear Normal at 5% Significance Level**					
789	Theta Star					1.519						
790	MLE of Mean					330.2						
791	MLE of Standard Deviation					22.39						
792	nu star					8698						
793	Approximate Chi Square Value (.05)					8482	**Nonparametric Statistics**					
794	Adjusted Level of Significance					0.038	95% CLT UCL					337.9
795	Adjusted Chi Square Value					8466	95% Jackknife UCL					338.3
796							95% Standard Bootstrap UCL					337.8
797	Anderson-Darling Test Statistic					0.283	95% Bootstrap-t UCL					337.6
798	Anderson-Darling 5% Critical Value					0.74	95% Hall's Bootstrap UCL					337.7
799	Kolmogorov-Smirnov Test Statistic					0.108	95% Percentile Bootstrap UCL					337.7
800	Kolmogorov-Smirnov 5% Critical Value					0.193	95% BCA Bootstrap UCL					337.2

801	**Data appear Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	350.6
802											97.5% Chebyshev(Mean, Sd) UCL	359.5
803	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	376.8
804					95% Approximate Gamma UCL	338.6						
805					95% Adjusted Gamma UCL	339.3						
806												
807	**Potential UCL to Use**										Use 95% Student's-t UCL	338.3
808												
809	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
810	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
811	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
812												
813												
814	**Manganese**											
815												
816	**General Statistics**											
817	Number of Valid Observations					20					Number of Distinct Observations	19
818												
819	**Raw Statistics**										**Log-transformed Statistics**	
820	Minimum					1.32					Minimum of Log Data	0.278
821	Maximum					9.81					Maximum of Log Data	2.283
822	Mean					3.277					Mean of log Data	1.011
823	Median					2.585					SD of log Data	0.578
824	SD					2.293						
825	Coefficient of Variation					0.7						
826	Skewness					1.871						
827												
828	**Relevant UCL Statistics**											
829	**Normal Distribution Test**										**Lognormal Distribution Test**	
830	Shapiro Wilk Test Statistic					0.768					Shapiro Wilk Test Statistic	0.928
831	Shapiro Wilk Critical Value					0.905					Shapiro Wilk Critical Value	0.905
832	**Data not Normal at 5% Significance Level**										**Data appear Lognormal at 5% Significance Level**	
833												
834	**Assuming Normal Distribution**										**Assuming Lognormal Distribution**	
835	95% Student's-t UCL					4.163					95% H-UCL	4.288
836	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	5.113
837	95% Adjusted-CLT UCL (Chen-1995)					4.349					97.5% Chebyshev (MVUE) UCL	5.934
838	95% Modified-t UCL (Johnson-1978)					4.199					99% Chebyshev (MVUE) UCL	7.547
839												
840	**Gamma Distribution Test**										**Data Distribution**	
841	k star (bias corrected)					2.579					**Data Follow Appr. Gamma Distribution at 5% Significance Level**	
842	Theta Star					1.27						
843	MLE of Mean					3.277						
844	MLE of Standard Deviation					2.04						
845	nu star					103.2						
846	Approximate Chi Square Value (.05)					80.74					**Nonparametric Statistics**	
847	Adjusted Level of Significance					0.038					95% CLT UCL	4.12
848	Adjusted Chi Square Value					79.17					95% Jackknife UCL	4.163
849											95% Standard Bootstrap UCL	4.094
850	Anderson-Darling Test Statistic					0.76					95% Bootstrap-t UCL	4.519

851			Anderson-Darling 5% Critical Value	0.748					95% Hall's Bootstrap UCL	5.349		
852			Kolmogorov-Smirnov Test Statistic	0.171					95% Percentile Bootstrap UCL	4.136		
853			Kolmogorov-Smirnov 5% Critical Value	0.195					95% BCA Bootstrap UCL	4.263		
854			**Data follow Appr. Gamma Distribution at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	5.511		
855									97.5% Chebyshev(Mean, Sd) UCL	6.478		
856			**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	8.378		
857			95% Approximate Gamma UCL	4.187								
858			95% Adjusted Gamma UCL	4.27								
859												
860			**Potential UCL to Use**						Use 95% Approximate Gamma UCL	4.187		
861												
862	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
863	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
864	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
865												
866												
867	**Mercury**											
868												
869				**General Statistics**								
870			Number of Valid Observations	20					Number of Distinct Observations	10		
871												
872			**Raw Statistics**						**Log-transformed Statistics**			
873			Minimum	0.09					Minimum of Log Data	-2.408		
874			Maximum	0.27					Maximum of Log Data	-1.309		
875			Mean	0.155					Mean of log Data	-1.895		
876			Median	0.15					SD of log Data	0.248		
877			SD	0.0415								
878			Coefficient of Variation	0.268								
879			Skewness	1.31								
880												
881				**Relevant UCL Statistics**								
882			**Normal Distribution Test**						**Lognormal Distribution Test**			
883			Shapiro Wilk Test Statistic	0.872					Shapiro Wilk Test Statistic	0.934		
884			Shapiro Wilk Critical Value	0.905					Shapiro Wilk Critical Value	0.905		
885			**Data not Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**			
886												
887			**Assuming Normal Distribution**						**Assuming Lognormal Distribution**			
888			95% Student's-t UCL	0.171					95% H-UCL	0.172		
889			**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL	0.193		
890			95% Adjusted-CLT UCL (Chen-1995)	0.173					97.5% Chebyshev (MVUE) UCL	0.209		
891			95% Modified-t UCL (Johnson-1978)	0.171					99% Chebyshev (MVUE) UCL	0.241		
892												
893			**Gamma Distribution Test**						**Data Distribution**			
894			k star (bias corrected)	14.1					**Data appear Lognormal at 5% Significance Level**			
895			Theta Star	0.011								
896			MLE of Mean	0.155								
897			MLE of Standard Deviation	0.0413								
898			nu star	564								
899			Approximate Chi Square Value (.05)	509.9					**Nonparametric Statistics**			
900			Adjusted Level of Significance	0.038					95% CLT UCL	0.17		

901					Adjusted Chi Square Value	505.9					95% Jackknife UCL	0.171
902											95% Standard Bootstrap UCL	0.17
903					Anderson-Darling Test Statistic	0.818					95% Bootstrap-t UCL	0.177
904					Anderson-Darling 5% Critical Value	0.741					95% Hall's Bootstrap UCL	0.179
905					Kolmogorov-Smirnov Test Statistic	0.22					95% Percentile Bootstrap UCL	0.171
906					Kolmogorov-Smirnov 5% Critical Value	0.194					95% BCA Bootstrap UCL	0.174
907					**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.195
908											97.5% Chebyshev(Mean, Sd) UCL	0.213
909					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.247
910					95% Approximate Gamma UCL	0.171						
911					95% Adjusted Gamma UCL	0.173						
912												
913					**Potential UCL to Use**						Use 95% Student's-t UCL	0.171
914											or 95% Modified-t UCL	0.171
915											or 95% H-UCL	0.172
916												
917	**ProUCL computes and outputs H-statistic based UCLs for historical reasons only.**											
918	**H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.**											
919	**It is therefore recommended to avoid the use of H-statistic based 95% UCLs.**											
920	**Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.**											
921												
922	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
923	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
924	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
925												
926												
927	**Molybdenum**											
928												
929	**General Statistics**											
930					Number of Valid Observations	20					Number of Distinct Observations	7
931												
932					**Raw Statistics**						**Log-transformed Statistics**	
933					Minimum	0.0025					Minimum of Log Data	-5.991
934					Maximum	0.013					Maximum of Log Data	-4.343
935					Mean	0.00633					Mean of log Data	-5.124
936					Median	0.006					SD of log Data	0.373
937					SD	0.00221						
938					Coefficient of Variation	0.349						
939					Skewness	1.038						
940												
941												
942	**Relevant UCL Statistics**											
943					**Normal Distribution Test**						**Lognormal Distribution Test**	
944					Shapiro Wilk Test Statistic	0.875					Shapiro Wilk Test Statistic	0.872
945					Shapiro Wilk Critical Value	0.905					Shapiro Wilk Critical Value	0.905
946					**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**	
947												
948					**Assuming Normal Distribution**						**Assuming Lognormal Distribution**	
949					95% Student's-t UCL	0.00718					95% H-UCL	0.00751
950					**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL	0.00871

951	95% Adjusted-CLT UCL (Chen-1995)					0.00726	97.5% Chebyshev (MVUE) UCL					0.00973
952	95% Modified-t UCL (Johnson-1978)					0.0072	99% Chebyshev (MVUE) UCL					0.0117
953												
954	**Gamma Distribution Test**						**Data Distribution**					
955	k star (bias corrected)					7.166	**Data do not follow a Discernable Distribution (0.05)**					
956	Theta Star					0.0008826						
957	MLE of Mean					0.00633						
958	MLE of Standard Deviation					0.00236						
959	nu star					286.7						
960	Approximate Chi Square Value (.05)					248.4	**Nonparametric Statistics**					
961	Adjusted Level of Significance					0.038	95% CLT UCL					0.00714
962	Adjusted Chi Square Value					245.6	95% Jackknife UCL					0.00718
963							95% Standard Bootstrap UCL					0.00712
964	Anderson-Darling Test Statistic					0.878	95% Bootstrap-t UCL					0.0073
965	Anderson-Darling 5% Critical Value					0.743	95% Hall's Bootstrap UCL					0.00774
966	Kolmogorov-Smirnov Test Statistic					0.195	95% Percentile Bootstrap UCL					0.00713
967	Kolmogorov-Smirnov 5% Critical Value					0.194	95% BCA Bootstrap UCL					0.00718
968	**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					0.00848
969							97.5% Chebyshev(Mean, Sd) UCL					0.00941
970	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL					0.0112
971	95% Approximate Gamma UCL					0.0073						
972	95% Adjusted Gamma UCL					0.00738						
973												
974	**Potential UCL to Use**						Use 95% Student's-t UCL					0.00718
975							or 95% Modified-t UCL					0.0072
976												
977	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
978	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
979	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
980												
981												
982	**Nickel**											
983												
984	**General Statistics**											
985	Number of Valid Observations					20	Number of Distinct Observations					1
986												
987												
988	**Warning: There is only one distinct observation value in this data set - resulting in '0' variance!**											
989	**ProUCL (or any other software) should not be used on such a data set!**											
990	**The data set for variable Nickel was not processed!**											
991												
992	**If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.**											
993	**The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).**											
994												
995												
996												
997	**Potassium**											
998												
999	**General Statistics**											
1000	Number of Valid Observations					20	Number of Distinct Observations					16

1001												
1002	**Raw Statistics**						**Log-transformed Statistics**					
1003					Minimum	3810					Minimum of Log Data	8.245
1004					Maximum	4240					Maximum of Log Data	8.352
1005					Mean	4048					Mean of log Data	8.306
1006					Median	4065					SD of log Data	0.0289
1007					SD	116.3						
1008					Coefficient of Variation	0.0287						
1009					Skewness	-0.375						
1010												
1011	**Relevant UCL Statistics**											
1012	**Normal Distribution Test**						**Lognormal Distribution Test**					
1013					Shapiro Wilk Test Statistic	0.95					Shapiro Wilk Test Statistic	0.947
1014					Shapiro Wilk Critical Value	0.905					Shapiro Wilk Critical Value	0.905
1015	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
1016												
1017	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1018					95% Student's-t UCL	4093					95% H-UCL	N/A
1019	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	4162
1020					95% Adjusted-CLT UCL (Chen-1995)	4088					97.5% Chebyshev (MVUE) UCL	4211
1021					95% Modified-t UCL (Johnson-1978)	4093					99% Chebyshev (MVUE) UCL	4308
1022												
1023	**Gamma Distribution Test**						**Data Distribution**					
1024					k star (bias corrected)	1076	**Data appear Normal at 5% Significance Level**					
1025					Theta Star	3.763						
1026					MLE of Mean	4048						
1027					MLE of Standard Deviation	123.4						
1028					nu star	43030						
1029					Approximate Chi Square Value (.05)	42549	**Nonparametric Statistics**					
1030					Adjusted Level of Significance	0.038					95% CLT UCL	4091
1031					Adjusted Chi Square Value	42511					95% Jackknife UCL	4093
1032											95% Standard Bootstrap UCL	4090
1033					Anderson-Darling Test Statistic	0.495					95% Bootstrap-t UCL	4091
1034					Anderson-Darling 5% Critical Value	0.74					95% Hall's Bootstrap UCL	4090
1035					Kolmogorov-Smirnov Test Statistic	0.158					95% Percentile Bootstrap UCL	4089
1036					Kolmogorov-Smirnov 5% Critical Value	0.193					95% BCA Bootstrap UCL	4087
1037	**Data appear Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	4161
1038											97.5% Chebyshev(Mean, Sd) UCL	4210
1039	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	4307
1040					95% Approximate Gamma UCL	4094						
1041					95% Adjusted Gamma UCL	4097						
1042												
1043	**Potential UCL to Use**										Use 95% Student's-t UCL	4093
1044												
1045	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1046	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1047	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1048												
1049												
1050	**Rubidium**											

1051												
1052	**General Statistics**											
1053	Number of Valid Observations				20		Number of Distinct Observations					19
1054												
1055	**Raw Statistics**						**Log-transformed Statistics**					
1056	Minimum				5.5		Minimum of Log Data					1.705
1057	Maximum				13.6		Maximum of Log Data					2.61
1058	Mean				10.38		Mean of log Data					2.313
1059	Median				11.15		SD of log Data					0.247
1060	SD				2.298							
1061	Coefficient of Variation				0.221							
1062	Skewness				-0.632							
1063												
1064	**Relevant UCL Statistics**											
1065	**Normal Distribution Test**						**Lognormal Distribution Test**					
1066	Shapiro Wilk Test Statistic				0.933		Shapiro Wilk Test Statistic					0.896
1067	Shapiro Wilk Critical Value				0.905		Shapiro Wilk Critical Value					0.905
1068	**Data appear Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
1069												
1070	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1071	95% Student's-t UCL				11.27		95% H-UCL					11.55
1072	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					12.93
1073	95% Adjusted-CLT UCL (Chen-1995)				11.15		97.5% Chebyshev (MVUE) UCL					14.03
1074	95% Modified-t UCL (Johnson-1978)				11.26		99% Chebyshev (MVUE) UCL					16.18
1075												
1076	**Gamma Distribution Test**						**Data Distribution**					
1077	k star (bias corrected)				15.99		**Data appear Normal at 5% Significance Level**					
1078	Theta Star				0.649							
1079	MLE of Mean				10.38							
1080	MLE of Standard Deviation				2.596							
1081	nu star				639.4							
1082	Approximate Chi Square Value (.05)				581.8		**Nonparametric Statistics**					
1083	Adjusted Level of Significance				0.038		95% CLT UCL					11.23
1084	Adjusted Chi Square Value				577.4		95% Jackknife UCL					11.27
1085							95% Standard Bootstrap UCL					11.19
1086	Anderson-Darling Test Statistic				0.737		95% Bootstrap-t UCL					11.22
1087	Anderson-Darling 5% Critical Value				0.741		95% Hall's Bootstrap UCL					11.15
1088	Kolmogorov-Smirnov Test Statistic				0.194		95% Percentile Bootstrap UCL					11.17
1089	Kolmogorov-Smirnov 5% Critical Value				0.194		95% BCA Bootstrap UCL					11.13
1090	**Data follow Appr. Gamma Distribution at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					12.62
1091							97.5% Chebyshev(Mean, Sd) UCL					13.59
1092	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL					15.49
1093	95% Approximate Gamma UCL				11.41							
1094	95% Adjusted Gamma UCL				11.49							
1095												
1096	**Potential UCL to Use**						Use 95% Student's-t UCL					11.27
1097												
1098	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1099	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1100	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											

Selenium

General Statistics

Number of Valid Observations	20	Number of Distinct Observations	14

Raw Statistics		**Log-transformed Statistics**	
Minimum	0.15	Minimum of Log Data	-1.897
Maximum	0.55	Maximum of Log Data	-0.598
Mean	0.327	Mean of log Data	-1.153
Median	0.31	SD of log Data	0.28
SD	0.0878		
Coefficient of Variation	0.268		
Skewness	0.524		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.961	Shapiro Wilk Test Statistic	0.952
Shapiro Wilk Critical Value	0.905	Shapiro Wilk Critical Value	0.905
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	0.361	95% H-UCL	0.37
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.418
95% Adjusted-CLT UCL (Chen-1995)	0.362	97.5% Chebyshev (MVUE) UCL	0.458
95% Modified-t UCL (Johnson-1978)	0.362	99% Chebyshev (MVUE) UCL	0.535

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	12.1	**Data appear Normal at 5% Significance Level**	
Theta Star	0.0271		
MLE of Mean	0.327		
MLE of Standard Deviation	0.0941		
nu star	483.9		
Approximate Chi Square Value (.05)	433.9	**Nonparametric Statistics**	
Adjusted Level of Significance	0.038	95% CLT UCL	0.36
Adjusted Chi Square Value	430.1	95% Jackknife UCL	0.361
		95% Standard Bootstrap UCL	0.359
Anderson-Darling Test Statistic	0.352	95% Bootstrap-t UCL	0.363
Anderson-Darling 5% Critical Value	0.741	95% Hall's Bootstrap UCL	0.367
Kolmogorov-Smirnov Test Statistic	0.128	95% Percentile Bootstrap UCL	0.36
Kolmogorov-Smirnov 5% Critical Value	0.194	95% BCA Bootstrap UCL	0.362
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.413
		97.5% Chebyshev(Mean, Sd) UCL	0.45
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.523
95% Approximate Gamma UCL	0.365		
95% Adjusted Gamma UCL	0.368		
Potential UCL to Use		Use 95% Student's-t UCL	0.361

1151	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1152	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1153	and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.											
1154												
1155												
1156	Silver											
1157												
1158	General Statistics											
1159	Number of Valid Observations					20	Number of Distinct Observations					1
1160												
1161												
1162	Warning: There is only one distinct observation value in this data set - resulting in '0' variance!											
1163	ProUCL (or any other software) should not be used on such a data set!											
1164	The data set for variable Silver was not processed!											
1165												
1166	If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.											
1167	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
1168												
1169												
1170												
1171	Sodium											
1172												
1173	General Statistics											
1174	Number of Valid Observations					20	Number of Distinct Observations					20
1175												
1176	Raw Statistics						Log-transformed Statistics					
1177	Minimum					565	Minimum of Log Data					6.337
1178	Maximum					746	Maximum of Log Data					6.615
1179	Mean					655.2	Mean of log Data					6.482
1180	Median					645.5	SD of log Data					0.0763
1181	SD					50.26						
1182	Coefficient of Variation					0.0767						
1183	Skewness					0.307						
1184												
1185	Relevant UCL Statistics											
1186	Normal Distribution Test						Lognormal Distribution Test					
1187	Shapiro Wilk Test Statistic					0.957	Shapiro Wilk Test Statistic					0.964
1188	Shapiro Wilk Critical Value					0.905	Shapiro Wilk Critical Value					0.905
1189	Data appear Normal at 5% Significance Level						Data appear Lognormal at 5% Significance Level					
1190												
1191	Assuming Normal Distribution						Assuming Lognormal Distribution					
1192	95% Student's-t UCL					674.6	95% H-UCL					N/A
1193	95% UCLs (Adjusted for Skewness)						95% Chebyshev (MVUE) UCL					704
1194	95% Adjusted-CLT UCL (Chen-1995)					674.5	97.5% Chebyshev (MVUE) UCL					725.1
1195	95% Modified-t UCL (Johnson-1978)					674.8	99% Chebyshev (MVUE) UCL					766.5
1196												
1197	Gamma Distribution Test						Data Distribution					
1198	k star (bias corrected)					153.4	Data appear Normal at 5% Significance Level					
1199	Theta Star					4.272						
1200	MLE of Mean					655.2						

1201	MLE of Standard Deviation	52.9										
1202	nu star	6135										
1203	Approximate Chi Square Value (.05)	5954					**Nonparametric Statistics**					
1204	Adjusted Level of Significance	0.038									95% CLT UCL	673.7
1205	Adjusted Chi Square Value	5940									95% Jackknife UCL	674.6
1206											95% Standard Bootstrap UCL	673.7
1207	Anderson-Darling Test Statistic	0.333									95% Bootstrap-t UCL	678
1208	Anderson-Darling 5% Critical Value	0.74									95% Hall's Bootstrap UCL	674.8
1209	Kolmogorov-Smirnov Test Statistic	0.126									95% Percentile Bootstrap UCL	673.5
1210	Kolmogorov-Smirnov 5% Critical Value	0.193									95% BCA Bootstrap UCL	675.9
1211	**Data appear Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	704.2
1212											97.5% Chebyshev(Mean, Sd) UCL	725.4
1213	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	767
1214	95% Approximate Gamma UCL	675.1										
1215	95% Adjusted Gamma UCL	676.7										
1216												
1217	**Potential UCL to Use**										Use 95% Student's-t UCL	674.6
1218												
1219	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1220	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1221	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1222												
1223												
1224	**Strontium**											
1225												
1226	**General Statistics**											
1227	Number of Valid Observations	20					Number of Distinct Observations	20				
1228												
1229	**Raw Statistics**						**Log-transformed Statistics**					
1230	Minimum	3.13					Minimum of Log Data	1.141				
1231	Maximum	14					Maximum of Log Data	2.639				
1232	Mean	8.025					Mean of log Data	2.041				
1233	Median	8.085					SD of log Data	0.31				
1234	SD	2.255										
1235	Coefficient of Variation	0.281										
1236	Skewness	0.375										
1237												
1238	**Relevant UCL Statistics**											
1239	**Normal Distribution Test**						**Lognormal Distribution Test**					
1240	Shapiro Wilk Test Statistic	0.955					Shapiro Wilk Test Statistic	0.919				
1241	Shapiro Wilk Critical Value	0.905					Shapiro Wilk Critical Value	0.905				
1242	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
1243												
1244	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1245	95% Student's-t UCL	8.897					95% H-UCL	9.215				
1246	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL	10.52				
1247	95% Adjusted-CLT UCL (Chen-1995)	8.9					97.5% Chebyshev (MVUE) UCL	11.59				
1248	95% Modified-t UCL (Johnson-1978)	8.904					99% Chebyshev (MVUE) UCL	13.69				
1249												
1250	**Gamma Distribution Test**						**Data Distribution**					

1251					k star (bias corrected)	10.38		Data appear Normal at 5% Significance Level				
1252					Theta Star	0.773						
1253					MLE of Mean	8.025						
1254					MLE of Standard Deviation	2.49						
1255					nu star	415.4						
1256					Approximate Chi Square Value (.05)	369.1		Nonparametric Statistics				
1257					Adjusted Level of Significance	0.038					95% CLT UCL	8.855
1258					Adjusted Chi Square Value	365.7					95% Jackknife UCL	8.897
1259											95% Standard Bootstrap UCL	8.835
1260					Anderson-Darling Test Statistic	0.428					95% Bootstrap-t UCL	8.942
1261					Anderson-Darling 5% Critical Value	0.742					95% Hall's Bootstrap UCL	9.033
1262					Kolmogorov-Smirnov Test Statistic	0.127					95% Percentile Bootstrap UCL	8.843
1263					Kolmogorov-Smirnov 5% Critical Value	0.194					95% BCA Bootstrap UCL	8.874
1264					Data appear Gamma Distributed at 5% Significance Level						95% Chebyshev(Mean, Sd) UCL	10.22
1265											97.5% Chebyshev(Mean, Sd) UCL	11.17
1266					Assuming Gamma Distribution						99% Chebyshev(Mean, Sd) UCL	13.04
1267					95% Approximate Gamma UCL	9.03						
1268					95% Adjusted Gamma UCL	9.115						
1269												
1270					Potential UCL to Use						Use 95% Student's-t UCL	8.897
1271												
1272	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1273	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1274	and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.											
1275												
1276												
1277	Tellurium											
1278												
1279	General Statistics											
1280					Number of Valid Observations	20					Number of Distinct Observations	1
1281												
1282												
1283	Warning: There is only one distinct observation value in this data set - resulting in '0' variance!											
1284	ProUCL (or any other software) should not be used on such a data set!											
1285	The data set for variable Tellurium was not processed!											
1286												
1287	If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.											
1288	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
1289												
1290												
1291												
1292	Thallium											
1293												
1294	General Statistics											
1295					Number of Valid Observations	20					Number of Distinct Observations	7
1296												
1297					Raw Statistics			Log-transformed Statistics				
1298					Minimum	0.0025					Minimum of Log Data	-5.991
1299					Maximum	0.011					Maximum of Log Data	-4.51
1300					Mean	0.00885					Mean of log Data	-4.768

1301					Median	0.00975					SD of log Data	0.334
1302					SD	0.00204						
1303					Coefficient of Variation	0.23						
1304					Skewness	-1.873						
1305												
1306												
1307					**Relevant UCL Statistics**							
1308					**Normal Distribution Test**						**Lognormal Distribution Test**	
1309					Shapiro Wilk Test Statistic	0.789					Shapiro Wilk Test Statistic	0.64
1310					Shapiro Wilk Critical Value	0.905					Shapiro Wilk Critical Value	0.905
1311					**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**	
1312												
1313					**Assuming Normal Distribution**						**Assuming Lognormal Distribution**	
1314					95% Student's-t UCL	0.00964					95% H-UCL	0.0104
1315					**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL	0.0119
1316					95% Adjusted-CLT UCL (Chen-1995)	0.0094					97.5% Chebyshev (MVUE) UCL	0.0132
1317					95% Modified-t UCL (Johnson-1978)	0.00961					99% Chebyshev (MVUE) UCL	0.0157
1318												
1319					**Gamma Distribution Test**						**Data Distribution**	
1320					k star (bias corrected)	10.66					**Data do not follow a Discernable Distribution (0.05)**	
1321					Theta Star	0.0008305						
1322					MLE of Mean	0.00885						
1323					MLE of Standard Deviation	0.00271						
1324					nu star	426.3						
1325					Approximate Chi Square Value (.05)	379.4					**Nonparametric Statistics**	
1326					Adjusted Level of Significance	0.038					95% CLT UCL	0.0096
1327					Adjusted Chi Square Value	375.9					95% Jackknife UCL	0.00964
1328											95% Standard Bootstrap UCL	0.00958
1329					Anderson-Darling Test Statistic	2.125					95% Bootstrap-t UCL	0.00946
1330					Anderson-Darling 5% Critical Value	0.742					95% Hall's Bootstrap UCL	0.00946
1331					Kolmogorov-Smirnov Test Statistic	0.261					95% Percentile Bootstrap UCL	0.00953
1332					Kolmogorov-Smirnov 5% Critical Value	0.194					95% BCA Bootstrap UCL	0.0094
1333					**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.0108
1334											97.5% Chebyshev(Mean, Sd) UCL	0.0117
1335					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.0134
1336					95% Approximate Gamma UCL	0.00994						
1337					95% Adjusted Gamma UCL	0.01						
1338												
1339					**Potential UCL to Use**						Use 95% Student's-t UCL	0.00964
1340											or 95% Modified-t UCL	0.00961
1341												
1342					**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**							
1343					**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**							
1344					**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**							
1345												
1346												
1347	**Tin**											
1348												
1349					**General Statistics**							
1350					Number of Valid Observations	20					Number of Distinct Observations	12

	A	B	C	D	E	F	G	H	I	J	K	L
1351												
1352	**Raw Statistics**						**Log-transformed Statistics**					
1353	Minimum	0.0025					Minimum of Log Data	-5.991				
1354	Maximum	0.019					Maximum of Log Data	-3.963				
1355	Mean	0.00953					Mean of log Data	-4.76				
1356	Median	0.008					SD of log Data	0.483				
1357	SD	0.00449										
1358	Coefficient of Variation	0.472										
1359	Skewness	0.877										
1360												
1361	**Relevant UCL Statistics**											
1362	**Normal Distribution Test**						**Lognormal Distribution Test**					
1363	Shapiro Wilk Test Statistic	0.889					Shapiro Wilk Test Statistic	0.937				
1364	Shapiro Wilk Critical Value	0.905					Shapiro Wilk Critical Value	0.905				
1365	**Data not Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
1366												
1367	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1368	95% Student's-t UCL	0.0113					95% H-UCL	0.012				
1369	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL	0.0142				
1370	95% Adjusted-CLT UCL (Chen-1995)	0.0114					97.5% Chebyshev (MVUE) UCL	0.0163				
1371	95% Modified-t UCL (Johnson-1978)	0.0113					99% Chebyshev (MVUE) UCL	0.0202				
1372												
1373	**Gamma Distribution Test**						**Data Distribution**					
1374	k star (bias corrected)	4.187					**Data appear Gamma Distributed at 5% Significance Level**					
1375	Theta Star	0.00227										
1376	MLE of Mean	0.00953										
1377	MLE of Standard Deviation	0.00465										
1378	nu star	167.5										
1379	Approximate Chi Square Value (.05)	138.6					**Nonparametric Statistics**					
1380	Adjusted Level of Significance	0.038					95% CLT UCL	0.0112				
1381	Adjusted Chi Square Value	136.5					95% Jackknife UCL	0.0113				
1382							95% Standard Bootstrap UCL	0.0112				
1383	Anderson-Darling Test Statistic	0.601					95% Bootstrap-t UCL	0.0114				
1384	Anderson-Darling 5% Critical Value	0.745					95% Hall's Bootstrap UCL	0.0113				
1385	Kolmogorov-Smirnov Test Statistic	0.139					95% Percentile Bootstrap UCL	0.0113				
1386	Kolmogorov-Smirnov 5% Critical Value	0.194					95% BCA Bootstrap UCL	0.0113				
1387	**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.0139				
1388							97.5% Chebyshev(Mean, Sd) UCL	0.0158				
1389	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.0195				
1390	95% Approximate Gamma UCL	0.0115										
1391	95% Adjusted Gamma UCL	0.0117										
1392												
1393	**Potential UCL to Use**						Use 95% Approximate Gamma UCL	0.0115				
1394												
1395	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1396	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1397	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1398												
1399												
1400	**Tungsten**											

	A	B	C	D	E	F	G	H	I	J	K	L
1401												
1402	**General Statistics**											
1403	Number of Valid Observations					20	Number of Distinct Observations					7
1404												
1405	**Raw Statistics**						**Log-transformed Statistics**					
1406	Minimum					0.0025	Minimum of Log Data					-5.991
1407	Maximum					0.012	Maximum of Log Data					-4.423
1408	Mean					0.00475	Mean of log Data					-5.557
1409	Median					0.0025	SD of log Data					0.626
1410	SD					0.00343						
1411	Coefficient of Variation					0.722						
1412	Skewness					1.201						
1413												
1414												
1415	**Relevant UCL Statistics**											
1416	**Normal Distribution Test**						**Lognormal Distribution Test**					
1417	Shapiro Wilk Test Statistic					0.691	Shapiro Wilk Test Statistic					0.683
1418	Shapiro Wilk Critical Value					0.905	Shapiro Wilk Critical Value					0.905
1419	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
1420												
1421	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1422	95% Student's-t UCL					0.00608	95% H-UCL					0.0064
1423	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					0.00764
1424	95% Adjusted-CLT UCL (Chen-1995)					0.00623	97.5% Chebyshev (MVUE) UCL					0.00893
1425	95% Modified-t UCL (Johnson-1978)					0.00611	99% Chebyshev (MVUE) UCL					0.0115
1426												
1427	**Gamma Distribution Test**						**Data Distribution**					
1428	k star (bias corrected)					2.214	**Data do not follow a Discernable Distribution (0.05)**					
1429	Theta Star					0.00215						
1430	MLE of Mean					0.00475						
1431	MLE of Standard Deviation					0.00319						
1432	nu star					88.58						
1433	Approximate Chi Square Value (.05)					67.88	**Nonparametric Statistics**					
1434	Adjusted Level of Significance					0.038	95% CLT UCL					0.00601
1435	Adjusted Chi Square Value					66.45	95% Jackknife UCL					0.00608
1436							95% Standard Bootstrap UCL					0.00599
1437	Anderson-Darling Test Statistic					3.058	95% Bootstrap-t UCL					0.0065
1438	Anderson-Darling 5% Critical Value					0.75	95% Hall's Bootstrap UCL					0.0061
1439	Kolmogorov-Smirnov Test Statistic					0.411	95% Percentile Bootstrap UCL					0.00595
1440	Kolmogorov-Smirnov 5% Critical Value					0.195	95% BCA Bootstrap UCL					0.00623
1441	**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					0.00809
1442							97.5% Chebyshev(Mean, Sd) UCL					0.00954
1443	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL					0.0124
1444	95% Approximate Gamma UCL					0.0062						
1445	95% Adjusted Gamma UCL					0.00633						
1446												
1447	**Potential UCL to Use**						Use 95% Chebyshev (Mean, Sd) UCL					0.00809
1448												
1449	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1450	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Uranium

General Statistics

Number of Valid Observations	20	Number of Distinct Observations	1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Uranium was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Vanadium

General Statistics

Number of Valid Observations	20	Number of Distinct Observations	1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Vanadium was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Zinc

General Statistics

Number of Valid Observations	20	Number of Distinct Observations	18

Raw Statistics		**Log-transformed Statistics**	
Minimum	11.3	Minimum of Log Data	2.425
Maximum	22	Maximum of Log Data	3.091
Mean	15.51	Mean of log Data	2.727
Median	14.7	SD of log Data	0.175
SD	2.787		
Coefficient of Variation	0.18		
Skewness	0.68		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.952	Shapiro Wilk Test Statistic	0.973

1501					Shapiro Wilk Critical Value	0.905					Shapiro Wilk Critical Value	0.905
1502	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
1503												
1504	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1505					95% Student's-t UCL	16.59					95% H-UCL	16.66
1506	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	18.16
1507					95% Adjusted-CLT UCL (Chen-1995)	16.63					97.5% Chebyshev (MVUE) UCL	19.31
1508					95% Modified-t UCL (Johnson-1978)	16.6					99% Chebyshev (MVUE) UCL	21.58
1509												
1510	**Gamma Distribution Test**						**Data Distribution**					
1511					k star (bias corrected)	28.91	**Data appear Normal at 5% Significance Level**					
1512					Theta Star	0.536						
1513					MLE of Mean	15.51						
1514					MLE of Standard Deviation	2.884						
1515					nu star	1157						
1516					Approximate Chi Square Value (.05)	1079	**Nonparametric Statistics**					
1517					Adjusted Level of Significance	0.038					95% CLT UCL	16.53
1518					Adjusted Chi Square Value	1073					95% Jackknife UCL	16.59
1519											95% Standard Bootstrap UCL	16.52
1520					Anderson-Darling Test Statistic	0.314					95% Bootstrap-t UCL	16.65
1521					Anderson-Darling 5% Critical Value	0.74					95% Hall's Bootstrap UCL	16.76
1522					Kolmogorov-Smirnov Test Statistic	0.139					95% Percentile Bootstrap UCL	16.55
1523					Kolmogorov-Smirnov 5% Critical Value	0.193					95% BCA Bootstrap UCL	16.55
1524	**Data appear Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	18.22
1525											97.5% Chebyshev(Mean, Sd) UCL	19.4
1526	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	21.71
1527					95% Approximate Gamma UCL	16.63						
1528					95% Adjusted Gamma UCL	16.72						
1529												
1530	**Potential UCL to Use**										Use 95% Student's-t UCL	16.59
1531												
1532	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1533	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1534	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1535												

ProUCL Outputs: While Fish - Bird Brook

	General UCL Statistics for Full Data Sets
User Selected Options	
From File	U:\121810356\1_environmental\4_field_data\3_hhera\6_reporting\fish_whole_bird.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Aluminum

General Statistics

Number of Valid Observations	19	Number of Distinct Observations	19

Raw Statistics		**Log-transformed Statistics**	
Minimum	1.14	Minimum of Log Data	0.131
Maximum	63.16	Maximum of Log Data	4.146
Mean	13.14	Mean of log Data	1.769
Median	4.443	SD of log Data	1.264
SD	19.09		
Coefficient of Variation	1.453		
Skewness	1.985		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.646	Shapiro Wilk Test Statistic	0.928
Shapiro Wilk Critical Value	0.901	Shapiro Wilk Critical Value	0.901
Data not Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	20.74	95% H-UCL	31.93
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	29.97
95% Adjusted-CLT UCL (Chen-1995)	22.48	97.5% Chebyshev (MVUE) UCL	37.67
95% Modified-t UCL (Johnson-1978)	21.07	99% Chebyshev (MVUE) UCL	52.79
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	0.66	**Data appear Lognormal at 5% Significance Level**	
Theta Star	19.9		
MLE of Mean	13.14		
MLE of Standard Deviation	16.17		
nu star	25.1		
Approximate Chi Square Value (.05)	14.68	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0369	95% CLT UCL	20.35
Adjusted Chi Square Value	13.99	95% Jackknife UCL	20.74
		95% Standard Bootstrap UCL	20.14
Anderson-Darling Test Statistic	1.089	95% Bootstrap-t UCL	25.51
Anderson-Darling 5% Critical Value	0.779	95% Hall's Bootstrap UCL	21.29
Kolmogorov-Smirnov Test Statistic	0.221	95% Percentile Bootstrap UCL	20.67
Kolmogorov-Smirnov 5% Critical Value	0.206	95% BCA Bootstrap UCL	22.35

51	**Data not Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	32.24
52											97.5% Chebyshev(Mean, Sd) UCL	40.5
53	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	56.73
54					95% Approximate Gamma UCL	22.46						
55					95% Adjusted Gamma UCL	23.58						
56												
57	**Potential UCL to Use**										Use 95% Chebyshev (Mean, Sd) UCL	32.24
58												
59	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
60	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
61	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
62												
63												
64	**Antimony**											
65												
66	**General Statistics**											
67	Number of Valid Observations					19					Number of Distinct Observations	19
68												
69	**Raw Statistics**										**Log-transformed Statistics**	
70	Minimum					0.00254					Minimum of Log Data	-5.976
71	Maximum					0.0117					Maximum of Log Data	-4.446
72	Mean					0.00337					Mean of log Data	-5.8
73	Median					0.00263					SD of log Data	0.403
74	SD					0.00225						
75	Coefficient of Variation					0.667						
76	Skewness					3.351						
77												
78	**Relevant UCL Statistics**											
79	**Normal Distribution Test**										**Lognormal Distribution Test**	
80	Shapiro Wilk Test Statistic					0.424					Shapiro Wilk Test Statistic	0.489
81	Shapiro Wilk Critical Value					0.901					Shapiro Wilk Critical Value	0.901
82	**Data not Normal at 5% Significance Level**										**Data not Lognormal at 5% Significance Level**	
83												
84	**Assuming Normal Distribution**										**Assuming Lognormal Distribution**	
85	95% Student's-t UCL					0.00427					95% H-UCL	0.00394
86	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.00461
87	95% Adjusted-CLT UCL (Chen-1995)					0.00464					97.5% Chebyshev (MVUE) UCL	0.0052
88	95% Modified-t UCL (Johnson-1978)					0.00433					99% Chebyshev (MVUE) UCL	0.00634
89												
90	**Gamma Distribution Test**										**Data Distribution**	
91	k star (bias corrected)					4.075					**Data do not follow a Discernable Distribution (0.05)**	
92	Theta Star					0.0008273						
93	MLE of Mean					0.00337						
94	MLE of Standard Deviation					0.00167						
95	nu star					154.9						
96	Approximate Chi Square Value (.05)					127.1					**Nonparametric Statistics**	
97	Adjusted Level of Significance					0.0369					95% CLT UCL	0.00422
98	Adjusted Chi Square Value					124.9					95% Jackknife UCL	0.00427
99											95% Standard Bootstrap UCL	0.00421
100	Anderson-Darling Test Statistic					4.645					95% Bootstrap-t UCL	0.00852

101				Anderson-Darling 5% Critical Value	0.743					95% Hall's Bootstrap UCL	0.00941	
102				Kolmogorov-Smirnov Test Statistic	0.454					95% Percentile Bootstrap UCL	0.00432	
103				Kolmogorov-Smirnov 5% Critical Value	0.199					95% BCA Bootstrap UCL	0.00483	
104				**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.00562	
105										97.5% Chebyshev(Mean, Sd) UCL	0.00659	
106				**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.00851	
107				95% Approximate Gamma UCL	0.00411							
108				95% Adjusted Gamma UCL	0.00418							
109												
110				**Potential UCL to Use**						Use 95% Student's-t UCL	0.00427	
111										or 95% Modified-t UCL	0.00433	
112												
113	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
114	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
115	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
116												
117												
118	**Arsenic**											
119												
120				**General Statistics**								
121				Number of Valid Observations	19					Number of Distinct Observations	19	
122												
123				**Raw Statistics**						**Log-transformed Statistics**		
124				Minimum	0.0318					Minimum of Log Data	-3.45	
125				Maximum	0.363					Maximum of Log Data	-1.014	
126				Mean	0.161					Mean of log Data	-2.002	
127				Median	0.142					SD of log Data	0.659	
128				SD	0.0882							
129				Coefficient of Variation	0.548							
130				Skewness	0.505							
131												
132				**Relevant UCL Statistics**								
133				**Normal Distribution Test**						**Lognormal Distribution Test**		
134				Shapiro Wilk Test Statistic	0.946					Shapiro Wilk Test Statistic	0.927	
135				Shapiro Wilk Critical Value	0.901					Shapiro Wilk Critical Value	0.901	
136				**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**		
137												
138				**Assuming Normal Distribution**						**Assuming Lognormal Distribution**		
139				95% Student's-t UCL	0.196					95% H-UCL	0.235	
140				**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL	0.281	
141				95% Adjusted-CLT UCL (Chen-1995)	0.197					97.5% Chebyshev (MVUE) UCL	0.331	
142				95% Modified-t UCL (Johnson-1978)	0.196					99% Chebyshev (MVUE) UCL	0.429	
143												
144				**Gamma Distribution Test**						**Data Distribution**		
145				k star (bias corrected)	2.571					**Data appear Normal at 5% Significance Level**		
146				Theta Star	0.0626							
147				MLE of Mean	0.161							
148				MLE of Standard Deviation	0.1							
149				nu star	97.7							
150				Approximate Chi Square Value (.05)	75.9					**Nonparametric Statistics**		

151	Adjusted Level of Significance	0.0369								95% CLT UCL	0.194	
152	Adjusted Chi Square Value	74.22								95% Jackknife UCL	0.196	
153										95% Standard Bootstrap UCL	0.193	
154	Anderson-Darling Test Statistic	0.378								95% Bootstrap-t UCL	0.199	
155	Anderson-Darling 5% Critical Value	0.748								95% Hall's Bootstrap UCL	0.198	
156	Kolmogorov-Smirnov Test Statistic	0.154								95% Percentile Bootstrap UCL	0.196	
157	Kolmogorov-Smirnov 5% Critical Value	0.2								95% BCA Bootstrap UCL	0.196	
158	**Data appear Gamma Distributed at 5% Significance Level**									95% Chebyshev(Mean, Sd) UCL	0.249	
159										97.5% Chebyshev(Mean, Sd) UCL	0.287	
160	**Assuming Gamma Distribution**									99% Chebyshev(Mean, Sd) UCL	0.362	
161	95% Approximate Gamma UCL	0.207										
162	95% Adjusted Gamma UCL	0.212										
163												
164	**Potential UCL to Use**									Use 95% Student's-t UCL	0.196	
165												
166	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
167	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
168	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
169												
170												
171	**Barium**											
172												
173	**General Statistics**											
174	Number of Valid Observations	19								Number of Distinct Observations	19	
175												
176	**Raw Statistics**									**Log-transformed Statistics**		
177	Minimum	0.212								Minimum of Log Data	-1.551	
178	Maximum	0.93								Maximum of Log Data	-0.0726	
179	Mean	0.542								Mean of log Data	-0.677	
180	Median	0.464								SD of log Data	0.379	
181	SD	0.196										
182	Coefficient of Variation	0.362										
183	Skewness	0.401										
184												
185	**Relevant UCL Statistics**											
186	**Normal Distribution Test**									**Lognormal Distribution Test**		
187	Shapiro Wilk Test Statistic	0.948								Shapiro Wilk Test Statistic	0.958	
188	Shapiro Wilk Critical Value	0.901								Shapiro Wilk Critical Value	0.901	
189	**Data appear Normal at 5% Significance Level**									**Data appear Lognormal at 5% Significance Level**		
190												
191	**Assuming Normal Distribution**									**Assuming Lognormal Distribution**		
192	95% Student's-t UCL	0.621								95% H-UCL	0.647	
193	**95% UCLs (Adjusted for Skewness)**									95% Chebyshev (MVUE) UCL	0.754	
194	95% Adjusted-CLT UCL (Chen-1995)	0.621								97.5% Chebyshev (MVUE) UCL	0.845	
195	95% Modified-t UCL (Johnson-1978)	0.621								99% Chebyshev (MVUE) UCL	1.024	
196												
197	**Gamma Distribution Test**									**Data Distribution**		
198	k star (bias corrected)	6.646								**Data appear Normal at 5% Significance Level**		
199	Theta Star	0.0816										
200	MLE of Mean	0.542										

201	MLE of Standard Deviation	0.21										
202	nu star	252.5										
203	Approximate Chi Square Value (.05)	216.8					**Nonparametric Statistics**					
204	Adjusted Level of Significance	0.0369									95% CLT UCL	0.616
205	Adjusted Chi Square Value	213.9									95% Jackknife UCL	0.621
206											95% Standard Bootstrap UCL	0.612
207	Anderson-Darling Test Statistic	0.384									95% Bootstrap-t UCL	0.629
208	Anderson-Darling 5% Critical Value	0.742									95% Hall's Bootstrap UCL	0.619
209	Kolmogorov-Smirnov Test Statistic	0.154									95% Percentile Bootstrap UCL	0.62
210	Kolmogorov-Smirnov 5% Critical Value	0.199									95% BCA Bootstrap UCL	0.617
211	**Data appear Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	0.739
212											97.5% Chebyshev(Mean, Sd) UCL	0.824
213	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	0.99
214	95% Approximate Gamma UCL	0.632										
215	95% Adjusted Gamma UCL	0.641										
216												
217	**Potential UCL to Use**										Use 95% Student's-t UCL	0.621
218												
219	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
220	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
221	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
222												
223												
224	**Beryllium**											
225												
226	**General Statistics**											
227	Number of Valid Observations	19					Number of Distinct Observations	18				
228												
229	**Raw Statistics**						**Log-transformed Statistics**					
230	Minimum	0.00253					Minimum of Log Data	-5.981				
231	Maximum	0.00538					Maximum of Log Data	-5.225				
232	Mean	0.00295					Mean of log Data	-5.86				
233	Median	0.00258					SD of log Data	0.241				
234	SD	0.0008957										
235	Coefficient of Variation	0.304										
236	Skewness	2.354										
237												
238	**Relevant UCL Statistics**											
239	**Normal Distribution Test**						**Lognormal Distribution Test**					
240	Shapiro Wilk Test Statistic	0.498					Shapiro Wilk Test Statistic	0.522				
241	Shapiro Wilk Critical Value	0.901					Shapiro Wilk Critical Value	0.901				
242	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
243												
244	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
245	95% Student's-t UCL	0.0033					95% H-UCL	0.00325				
246	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL	0.00364				
247	95% Adjusted-CLT UCL (Chen-1995)	0.0034					97.5% Chebyshev (MVUE) UCL	0.00395				
248	95% Modified-t UCL (Johnson-1978)	0.00332					99% Chebyshev (MVUE) UCL	0.00456				
249												
250	**Gamma Distribution Test**						**Data Distribution**					

251				k star (bias corrected)	13.26		**Data do not follow a Discernable Distribution (0.05)**					
252				Theta Star	0.0002222							
253				MLE of Mean	0.00295							
254				MLE of Standard Deviation	0.0008089							
255				nu star	503.8							
256				Approximate Chi Square Value (.05)	452.7		**Nonparametric Statistics**					
257				Adjusted Level of Significance	0.0369						95% CLT UCL	0.00328
258				Adjusted Chi Square Value	448.5						95% Jackknife UCL	0.0033
259											95% Standard Bootstrap UCL	0.00328
260				Anderson-Darling Test Statistic	4.456						95% Bootstrap-t UCL	0.0038
261				Anderson-Darling 5% Critical Value	0.741						95% Hall's Bootstrap UCL	0.00334
262				Kolmogorov-Smirnov Test Statistic	0.454						95% Percentile Bootstrap UCL	0.00329
263				Kolmogorov-Smirnov 5% Critical Value	0.198						95% BCA Bootstrap UCL	0.00345
264				**Data not Gamma Distributed at 5% Significance Level**							95% Chebyshev(Mean, Sd) UCL	0.00384
265											97.5% Chebyshev(Mean, Sd) UCL	0.00423
266				**Assuming Gamma Distribution**							99% Chebyshev(Mean, Sd) UCL	0.00499
267				95% Approximate Gamma UCL	0.00328							
268				95% Adjusted Gamma UCL	0.00331							
269												
270				**Potential UCL to Use**							Use 95% Student's-t UCL	0.0033
271											or 95% Modified-t UCL	0.00332
272												
273	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
274	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
275	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
276												
277												
278	**Bismuth**											
279												
280	**General Statistics**											
281				Number of Valid Observations	19		Number of Distinct Observations	18				
282												
283	**Raw Statistics**						**Log-transformed Statistics**					
284				Minimum	0.0253		Minimum of Log Data	-3.678				
285				Maximum	0.187		Maximum of Log Data	-1.679				
286				Mean	0.0373		Mean of log Data	-3.48				
287				Median	0.0258		SD of log Data	0.498				
288				SD	0.0377							
289				Coefficient of Variation	1.01							
290				Skewness	3.89							
291												
292	**Relevant UCL Statistics**											
293	**Normal Distribution Test**						**Lognormal Distribution Test**					
294				Shapiro Wilk Test Statistic	0.36		Shapiro Wilk Test Statistic	0.448				
295				Shapiro Wilk Critical Value	0.901		Shapiro Wilk Critical Value	0.901				
296	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
297												
298	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
299				95% Student's-t UCL	0.0522		95% H-UCL	0.0442				
300	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL	0.0525				

301					95% Adjusted-CLT UCL (Chen-1995)	0.0597					97.5% Chebyshev (MVUE) UCL	0.0603
302					95% Modified-t UCL (Johnson-1978)	0.0535					99% Chebyshev (MVUE) UCL	0.0754
303												
304					**Gamma Distribution Test**						**Data Distribution**	
305					k star (bias corrected)	2.383					**Data do not follow a Discernable Distribution (0.05)**	
306					Theta Star	0.0156						
307					MLE of Mean	0.0373						
308					MLE of Standard Deviation	0.0241						
309					nu star	90.56						
310					Approximate Chi Square Value (.05)	69.61					**Nonparametric Statistics**	
311					Adjusted Level of Significance	0.0369					95% CLT UCL	0.0515
312					Adjusted Chi Square Value	68.01					95% Jackknife UCL	0.0522
313											95% Standard Bootstrap UCL	0.0511
314					Anderson-Darling Test Statistic	5.006					95% Bootstrap-t UCL	0.196
315					Anderson-Darling 5% Critical Value	0.749					95% Hall's Bootstrap UCL	0.203
316					Kolmogorov-Smirnov Test Statistic	0.466					95% Percentile Bootstrap UCL	0.0535
317					Kolmogorov-Smirnov 5% Critical Value	0.2					95% BCA Bootstrap UCL	0.0626
318					**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.0749
319											97.5% Chebyshev(Mean, Sd) UCL	0.0912
320					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.123
321					95% Approximate Gamma UCL	0.0485						
322					95% Adjusted Gamma UCL	0.0496						
323												
324					**Potential UCL to Use**						Use 95% Student's-t UCL	0.0522
325											or 95% Modified-t UCL	0.0535
326												
327	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
328	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
329	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
330												
331												
332	**Boron**											
333												
334					**General Statistics**							
335					Number of Valid Observations	19					Number of Distinct Observations	18
336												
337					**Raw Statistics**						**Log-transformed Statistics**	
338					Minimum	0.0253					Minimum of Log Data	-3.678
339					Maximum	0.0514					Maximum of Log Data	-2.969
340					Mean	0.0282					Mean of log Data	-3.586
341					Median	0.0258					SD of log Data	0.181
342					SD	0.00641						
343					Coefficient of Variation	0.227						
344					Skewness	3.066						
345												
346					**Relevant UCL Statistics**							
347					**Normal Distribution Test**						**Lognormal Distribution Test**	
348					Shapiro Wilk Test Statistic	0.499					Shapiro Wilk Test Statistic	0.54
349					Shapiro Wilk Critical Value	0.901					Shapiro Wilk Critical Value	0.901
350					**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**	

351												
352	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
353					95% Student's-t UCL	0.0308					95% H-UCL	0.0304
354	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.0333
355					95% Adjusted-CLT UCL (Chen-1995)	0.0317					97.5% Chebyshev (MVUE) UCL	0.0355
356					95% Modified-t UCL (Johnson-1978)	0.0309					99% Chebyshev (MVUE) UCL	0.0398
357												
358	**Gamma Distribution Test**						**Data Distribution**					
359					k star (bias corrected)	23.51	**Data do not follow a Discernable Distribution (0.05)**					
360					Theta Star	0.0012						
361					MLE of Mean	0.0282						
362					MLE of Standard Deviation	0.00582						
363					nu star	893.4						
364					Approximate Chi Square Value (.05)	825	**Nonparametric Statistics**					
365					Adjusted Level of Significance	0.0369					95% CLT UCL	0.0306
366					Adjusted Chi Square Value	819.3					95% Jackknife UCL	0.0308
367											95% Standard Bootstrap UCL	0.0306
368					Anderson-Darling Test Statistic	3.911					95% Bootstrap-t UCL	0.0347
369					Anderson-Darling 5% Critical Value	0.74					95% Hall's Bootstrap UCL	0.0352
370					Kolmogorov-Smirnov Test Statistic	0.425					95% Percentile Bootstrap UCL	0.0307
371					Kolmogorov-Smirnov 5% Critical Value	0.198					95% BCA Bootstrap UCL	0.032
372	**Data not Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	0.0346
373											97.5% Chebyshev(Mean, Sd) UCL	0.0374
374	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	0.0429
375					95% Approximate Gamma UCL	0.0306						
376					95% Adjusted Gamma UCL	0.0308						
377												
378	**Potential UCL to Use**										Use 95% Student's-t UCL	0.0308
379											or 95% Modified-t UCL	0.0309
380												
381	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
382	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
383	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
384												
385												
386	**Cadmium**											
387												
388	**General Statistics**											
389					Number of Valid Observations	19					Number of Distinct Observations	19
390												
391	**Raw Statistics**						**Log-transformed Statistics**					
392					Minimum	0.012					Minimum of Log Data	-4.422
393					Maximum	0.108					Maximum of Log Data	-2.227
394					Mean	0.0493					Mean of log Data	-3.189
395					Median	0.0377					SD of log Data	0.636
396					SD	0.0289						
397					Coefficient of Variation	0.586						
398					Skewness	0.639						
399												
400	**Relevant UCL Statistics**											

401	**Normal Distribution Test**						**Lognormal Distribution Test**					
402	Shapiro Wilk Test Statistic				0.922		Shapiro Wilk Test Statistic					0.961
403	Shapiro Wilk Critical Value				0.901		Shapiro Wilk Critical Value					0.901
404	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
405												
406	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
407	95% Student's-t UCL				0.0607		95% H-UCL					0.0696
408	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					0.0833
409	95% Adjusted-CLT UCL (Chen-1995)				0.0612		97.5% Chebyshev (MVUE) UCL					0.0978
410	95% Modified-t UCL (Johnson-1978)				0.0609		99% Chebyshev (MVUE) UCL					0.126
411												
412	**Gamma Distribution Test**						**Data Distribution**					
413	k star (bias corrected)				2.531		**Data appear Normal at 5% Significance Level**					
414	Theta Star				0.0195							
415	MLE of Mean				0.0493							
416	MLE of Standard Deviation				0.031							
417	nu star				96.16							
418	Approximate Chi Square Value (.05)				74.54		**Nonparametric Statistics**					
419	Adjusted Level of Significance				0.0369		95% CLT UCL					0.0602
420	Adjusted Chi Square Value				72.88		95% Jackknife UCL					0.0607
421							95% Standard Bootstrap UCL					0.0599
422	Anderson-Darling Test Statistic				0.325		95% Bootstrap-t UCL					0.062
423	Anderson-Darling 5% Critical Value				0.748		95% Hall's Bootstrap UCL					0.0611
424	Kolmogorov-Smirnov Test Statistic				0.122		95% Percentile Bootstrap UCL					0.0602
425	Kolmogorov-Smirnov 5% Critical Value				0.2		95% BCA Bootstrap UCL					0.0602
426	**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					0.0781
427							97.5% Chebyshev(Mean, Sd) UCL					0.0906
428	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL					0.115
429	95% Approximate Gamma UCL				0.0635							
430	95% Adjusted Gamma UCL				0.065							
431												
432	**Potential UCL to Use**						Use 95% Student's-t UCL					0.0607
433												
434	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
435	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
436	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
437												
438												
439	**Calcium**											
440												
441	**General Statistics**											
442	Number of Valid Observations				19		Number of Distinct Observations					19
443												
444	**Raw Statistics**						**Log-transformed Statistics**					
445	Minimum				3143		Minimum of Log Data					8.053
446	Maximum				8011		Maximum of Log Data					8.989
447	Mean				6136		Mean of log Data					8.702
448	Median				6281		SD of log Data					0.217
449	SD				1153							
450	Coefficient of Variation				0.188							

Skewness	-0.945	
Relevant UCL Statistics		
Normal Distribution Test		**Lognormal Distribution Test**
Shapiro Wilk Test Statistic	0.934	Shapiro Wilk Test Statistic 0.852
Shapiro Wilk Critical Value	0.901	Shapiro Wilk Critical Value 0.901
Data appear Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**
Assuming Normal Distribution		**Assuming Lognormal Distribution**
95% Student's-t UCL	6594	95% H-UCL 6749
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL 7496
95% Adjusted-CLT UCL (Chen-1995)	6510	97.5% Chebyshev (MVUE) UCL 8078
95% Modified-t UCL (Johnson-1978)	6585	99% Chebyshev (MVUE) UCL 9222
Gamma Distribution Test		**Data Distribution**
k star (bias corrected)	21.09	**Data appear Normal at 5% Significance Level**
Theta Star	290.9	
MLE of Mean	6136	
MLE of Standard Deviation	1336	
nu star	801.4	
Approximate Chi Square Value (.05)	736.7	**Nonparametric Statistics**
Adjusted Level of Significance	0.0369	95% CLT UCL 6571
Adjusted Chi Square Value	731.3	95% Jackknife UCL 6594
		95% Standard Bootstrap UCL 6548
Anderson-Darling Test Statistic	0.77	95% Bootstrap-t UCL 6528
Anderson-Darling 5% Critical Value	0.74	95% Hall's Bootstrap UCL 6523
Kolmogorov-Smirnov Test Statistic	0.158	95% Percentile Bootstrap UCL 6548
Kolmogorov-Smirnov 5% Critical Value	0.198	95% BCA Bootstrap UCL 6508
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 7289
		97.5% Chebyshev(Mean, Sd) UCL 7788
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 8768
95% Approximate Gamma UCL	6675	
95% Adjusted Gamma UCL	6724	
Potential UCL to Use		Use 95% Student's-t UCL 6594

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics		
Number of Valid Observations	19	Number of Distinct Observations 19
Raw Statistics		**Log-transformed Statistics**
Minimum	0.0257	Minimum of Log Data -3.662
Maximum	1.011	Maximum of Log Data 0.0109
Mean	0.166	Mean of log Data -2.33

501					Median	0.0768					SD of log Data	0.927
502					SD	0.244						
503					Coefficient of Variation	1.471						
504					Skewness	2.919						
505												
506					**Relevant UCL Statistics**							
507					**Normal Distribution Test**						**Lognormal Distribution Test**	
508					Shapiro Wilk Test Statistic	0.552					Shapiro Wilk Test Statistic	0.907
509					Shapiro Wilk Critical Value	0.901					Shapiro Wilk Critical Value	0.901
510					**Data not Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**	
511												
512					**Assuming Normal Distribution**						**Assuming Lognormal Distribution**	
513					95% Student's-t UCL	0.263					95% H-UCL	0.259
514					**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL	0.294
515					95% Adjusted-CLT UCL (Chen-1995)	0.299					97.5% Chebyshev (MVUE) UCL	0.358
516					95% Modified-t UCL (Johnson-1978)	0.27					99% Chebyshev (MVUE) UCL	0.484
517												
518					**Gamma Distribution Test**						**Data Distribution**	
519					k star (bias corrected)	0.937					**Data appear Lognormal at 5% Significance Level**	
520					Theta Star	0.177						
521					MLE of Mean	0.166						
522					MLE of Standard Deviation	0.172						
523					nu star	35.6						
524					Approximate Chi Square Value (.05)	22.95					**Nonparametric Statistics**	
525					Adjusted Level of Significance	0.0369					95% CLT UCL	0.258
526					Adjusted Chi Square Value	22.06					95% Jackknife UCL	0.263
527											95% Standard Bootstrap UCL	0.258
528					Anderson-Darling Test Statistic	1.545					95% Bootstrap-t UCL	0.568
529					Anderson-Darling 5% Critical Value	0.767					95% Hall's Bootstrap UCL	0.708
530					Kolmogorov-Smirnov Test Statistic	0.238					95% Percentile Bootstrap UCL	0.261
531					Kolmogorov-Smirnov 5% Critical Value	0.204					95% BCA Bootstrap UCL	0.316
532					**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.411
533											97.5% Chebyshev(Mean, Sd) UCL	0.516
534					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.724
535					95% Approximate Gamma UCL	0.258						
536					95% Adjusted Gamma UCL	0.268						
537												
538					**Potential UCL to Use**						Use 95% H-UCL	0.259
539												
540												
541												
542												
543												
544												
545												
546												
547												
548												
549												
550												

ProUCL computes and outputs H-statistic based UCLs for historical reasons only.

H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.

It is therefore recommended to avoid the use of H-statistic based 95% UCLs.

Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Cobalt

551												
552	**General Statistics**											
553	Number of Valid Observations				19		Number of Distinct Observations					19
554												
555	**Raw Statistics**						**Log-transformed Statistics**					
556	Minimum				0.0318		Minimum of Log Data					-3.449
557	Maximum				0.123		Maximum of Log Data					-2.093
558	Mean				0.0672		Mean of log Data					-2.792
559	Median				0.064		SD of log Data					0.446
560	SD				0.0294							
561	Coefficient of Variation				0.437							
562	Skewness				0.527							
563												
564	**Relevant UCL Statistics**											
565	**Normal Distribution Test**						**Lognormal Distribution Test**					
566	Shapiro Wilk Test Statistic				0.915		Shapiro Wilk Test Statistic					0.933
567	Shapiro Wilk Critical Value				0.901		Shapiro Wilk Critical Value					0.901
568	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
569												
570	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
571	95% Student's-t UCL				0.0789		95% H-UCL					0.0832
572	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					0.0982
573	95% Adjusted-CLT UCL (Chen-1995)				0.0792		97.5% Chebyshev (MVUE) UCL					0.112
574	95% Modified-t UCL (Johnson-1978)				0.0791		99% Chebyshev (MVUE) UCL					0.138
575												
576	**Gamma Distribution Test**						**Data Distribution**					
577	k star (bias corrected)				4.722		**Data appear Normal at 5% Significance Level**					
578	Theta Star				0.0142							
579	MLE of Mean				0.0672							
580	MLE of Standard Deviation				0.0309							
581	nu star				179.4							
582	Approximate Chi Square Value (.05)				149.5		**Nonparametric Statistics**					
583	Adjusted Level of Significance				0.0369		95% CLT UCL					0.0783
584	Adjusted Chi Square Value				147.1		95% Jackknife UCL					0.0789
585							95% Standard Bootstrap UCL					0.0779
586	Anderson-Darling Test Statistic				0.442		95% Bootstrap-t UCL					0.0798
587	Anderson-Darling 5% Critical Value				0.742		95% Hall's Bootstrap UCL					0.0788
588	Kolmogorov-Smirnov Test Statistic				0.146		95% Percentile Bootstrap UCL					0.0777
589	Kolmogorov-Smirnov 5% Critical Value				0.199		95% BCA Bootstrap UCL					0.079
590	**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					0.0967
591							97.5% Chebyshev(Mean, Sd) UCL					0.109
592	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL					0.134
593	95% Approximate Gamma UCL				0.0807							
594	95% Adjusted Gamma UCL				0.082							
595												
596	**Potential UCL to Use**						Use 95% Student's-t UCL					0.0789
597												
598	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
599	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
600	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											

Copper

General Statistics

Number of Valid Observations	19	Number of Distinct Observations	19

Raw Statistics		**Log-transformed Statistics**	
Minimum	0.551	Minimum of Log Data	-0.597
Maximum	1.116	Maximum of Log Data	0.11
Mean	0.761	Mean of log Data	-0.295
Median	0.749	SD of log Data	0.216
SD	0.167		
Coefficient of Variation	0.219		
Skewness	0.483		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.929	Shapiro Wilk Test Statistic	0.939
Shapiro Wilk Critical Value	0.901	Shapiro Wilk Critical Value	0.901
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	0.828	95% H-UCL	0.835
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.927
95% Adjusted-CLT UCL (Chen-1995)	0.829	97.5% Chebyshev (MVUE) UCL	0.999
95% Modified-t UCL (Johnson-1978)	0.829	99% Chebyshev (MVUE) UCL	1.14
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	19.04	**Data appear Normal at 5% Significance Level**	
Theta Star	0.04		
MLE of Mean	0.761		
MLE of Standard Deviation	0.175		
nu star	723.5		
Approximate Chi Square Value (.05)	662.1	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0369	95% CLT UCL	0.825
Adjusted Chi Square Value	656.9	95% Jackknife UCL	0.828
		95% Standard Bootstrap UCL	0.821
Anderson-Darling Test Statistic	0.501	95% Bootstrap-t UCL	0.83
Anderson-Darling 5% Critical Value	0.74	95% Hall's Bootstrap UCL	0.827
Kolmogorov-Smirnov Test Statistic	0.149	95% Percentile Bootstrap UCL	0.824
Kolmogorov-Smirnov 5% Critical Value	0.198	95% BCA Bootstrap UCL	0.826
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.929
		97.5% Chebyshev(Mean, Sd) UCL	1.001
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1.143
95% Approximate Gamma UCL	0.832		
95% Adjusted Gamma UCL	0.839		
Potential UCL to Use		Use 95% Student's-t UCL	0.828

	A	B	C	D	E	F	G	H	I	J	K	L
651	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
652	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
653	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
654												
655												
656	**Iron**											
657												
658	**General Statistics**											
659	Number of Valid Observations					19	Number of Distinct Observations					19
660												
661	**Raw Statistics**						**Log-transformed Statistics**					
662	Minimum					12.66	Minimum of Log Data					2.538
663	Maximum					42.87	Maximum of Log Data					3.758
664	Mean					19.77	Mean of log Data					2.907
665	Median					16.15	SD of log Data					0.376
666	SD					9.192						
667	Coefficient of Variation					0.465						
668	Skewness					1.798						
669												
670	**Relevant UCL Statistics**											
671	**Normal Distribution Test**						**Lognormal Distribution Test**					
672	Shapiro Wilk Test Statistic					0.716	Shapiro Wilk Test Statistic					0.818
673	Shapiro Wilk Critical Value					0.901	Shapiro Wilk Critical Value					0.901
674	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
675												
676	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
677	95% Student's-t UCL					23.42	95% H-UCL					23.24
678	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					27.06
679	95% Adjusted-CLT UCL (Chen-1995)					24.16	97.5% Chebyshev (MVUE) UCL					30.31
680	95% Modified-t UCL (Johnson-1978)					23.57	99% Chebyshev (MVUE) UCL					36.68
681												
682	**Gamma Distribution Test**						**Data Distribution**					
683	k star (bias corrected)					5.646	**Data do not follow a Discernable Distribution (0.05)**					
684	Theta Star					3.501						
685	MLE of Mean					19.77						
686	MLE of Standard Deviation					8.319						
687	nu star					214.6						
688	Approximate Chi Square Value (.05)					181.7	**Nonparametric Statistics**					
689	Adjusted Level of Significance					0.0369	95% CLT UCL					23.23
690	Adjusted Chi Square Value					179	95% Jackknife UCL					23.42
691							95% Standard Bootstrap UCL					23.1
692	Anderson-Darling Test Statistic					1.644	95% Bootstrap-t UCL					25.61
693	Anderson-Darling 5% Critical Value					0.742	95% Hall's Bootstrap UCL					24.07
694	Kolmogorov-Smirnov Test Statistic					0.252	95% Percentile Bootstrap UCL					23.29
695	Kolmogorov-Smirnov 5% Critical Value					0.199	95% BCA Bootstrap UCL					24.19
696	**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					28.96
697							97.5% Chebyshev(Mean, Sd) UCL					32.94
698	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL					40.75
699	95% Approximate Gamma UCL					23.35						
700	95% Adjusted Gamma UCL					23.69						

701												
702	**Potential UCL to Use**									Use 95% Student's-t UCL		23.42
703										or 95% Modified-t UCL		23.57
704												
705	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
706	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
707	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
708												
709												
710	**Lead**											
711												
712	**General Statistics**											
713	Number of Valid Observations					19				Number of Distinct Observations		19
714												
715	**Raw Statistics**									**Log-transformed Statistics**		
716	Minimum					0.0115				Minimum of Log Data		-4.463
717	Maximum					0.1				Maximum of Log Data		-2.301
718	Mean					0.0474				Mean of log Data		-3.167
719	Median					0.0369				SD of log Data		0.514
720	SD					0.0236						
721	Coefficient of Variation					0.499						
722	Skewness					1.027						
723												
724	**Relevant UCL Statistics**											
725	**Normal Distribution Test**									**Lognormal Distribution Test**		
726	Shapiro Wilk Test Statistic					0.891				Shapiro Wilk Test Statistic		0.947
727	Shapiro Wilk Critical Value					0.901				Shapiro Wilk Critical Value		0.901
728	**Data not Normal at 5% Significance Level**									**Data appear Lognormal at 5% Significance Level**		
729												
730	**Assuming Normal Distribution**									**Assuming Lognormal Distribution**		
731	95% Student's-t UCL					0.0568				95% H-UCL		0.0614
732	**95% UCLs (Adjusted for Skewness)**									95% Chebyshev (MVUE) UCL		0.0731
733	95% Adjusted-CLT UCL (Chen-1995)					0.0577				97.5% Chebyshev (MVUE) UCL		0.0841
734	95% Modified-t UCL (Johnson-1978)					0.057				99% Chebyshev (MVUE) UCL		0.106
735												
736	**Gamma Distribution Test**									**Data Distribution**		
737	k star (bias corrected)					3.746				**Data appear Gamma Distributed at 5% Significance Level**		
738	Theta Star					0.0127						
739	MLE of Mean					0.0474						
740	MLE of Standard Deviation					0.0245						
741	nu star					142.3						
742	Approximate Chi Square Value (.05)					115.8				**Nonparametric Statistics**		
743	Adjusted Level of Significance					0.0369				95% CLT UCL		0.0563
744	Adjusted Chi Square Value					113.7				95% Jackknife UCL		0.0568
745										95% Standard Bootstrap UCL		0.0561
746	Anderson-Darling Test Statistic					0.459				95% Bootstrap-t UCL		0.0592
747	Anderson-Darling 5% Critical Value					0.744				95% Hall's Bootstrap UCL		0.0585
748	Kolmogorov-Smirnov Test Statistic					0.16				95% Percentile Bootstrap UCL		0.0561
749	Kolmogorov-Smirnov 5% Critical Value					0.199				95% BCA Bootstrap UCL		0.0573
750	**Data appear Gamma Distributed at 5% Significance Level**									95% Chebyshev(Mean, Sd) UCL		0.071

751											97.5% Chebyshev(Mean, Sd) UCL	0.0812
752	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	0.101
753					95% Approximate Gamma UCL	0.0583						
754					95% Adjusted Gamma UCL	0.0593						
755												
756	**Potential UCL to Use**										Use 95% Approximate Gamma UCL	0.0583
757												
758	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
759	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
760	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
761												
762												
763	**Lithium**											
764												
765	**General Statistics**											
766					Number of Valid Observations	19					Number of Distinct Observations	19
767												
768	**Raw Statistics**						**Log-transformed Statistics**					
769					Minimum	0.00673					Minimum of Log Data	-5.001
770					Maximum	0.087					Maximum of Log Data	-2.442
771					Mean	0.0232					Mean of log Data	-4.096
772					Median	0.0127					SD of log Data	0.745
773					SD	0.0244						
774					Coefficient of Variation	1.052						
775					Skewness	2.028						
776												
777	**Relevant UCL Statistics**											
778	**Normal Distribution Test**						**Lognormal Distribution Test**					
779					Shapiro Wilk Test Statistic	0.621					Shapiro Wilk Test Statistic	0.817
780					Shapiro Wilk Critical Value	0.901					Shapiro Wilk Critical Value	0.901
781	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
782												
783	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
784					95% Student's-t UCL	0.033					95% H-UCL	0.0328
785	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.0388
786					95% Adjusted-CLT UCL (Chen-1995)	0.0353					97.5% Chebyshev (MVUE) UCL	0.0463
787					95% Modified-t UCL (Johnson-1978)	0.0334					99% Chebyshev (MVUE) UCL	0.0609
788												
789	**Gamma Distribution Test**						**Data Distribution**					
790					k star (bias corrected)	1.42	**Data do not follow a Discernable Distribution (0.05)**					
791					Theta Star	0.0164						
792					MLE of Mean	0.0232						
793					MLE of Standard Deviation	0.0195						
794					nu star	53.96						
795					Approximate Chi Square Value (.05)	38.09	**Nonparametric Statistics**					
796					Adjusted Level of Significance	0.0369					95% CLT UCL	0.0325
797					Adjusted Chi Square Value	36.92					95% Jackknife UCL	0.033
798											95% Standard Bootstrap UCL	0.0322
799					Anderson-Darling Test Statistic	2.143					95% Bootstrap-t UCL	0.0408
800					Anderson-Darling 5% Critical Value	0.755					95% Hall's Bootstrap UCL	0.0322

801					Kolmogorov-Smirnov Test Statistic	0.31					95% Percentile Bootstrap UCL	0.0333
802					Kolmogorov-Smirnov 5% Critical Value	0.202					95% BCA Bootstrap UCL	0.0355
803					**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.0477
804											97.5% Chebyshev(Mean, Sd) UCL	0.0583
805					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.079
806					95% Approximate Gamma UCL	0.0329						
807					95% Adjusted Gamma UCL	0.034						
808												
809					**Potential UCL to Use**						Use 95% Chebyshev (Mean, Sd) UCL	0.0477
810												
811	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
812	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
813	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
814												
815												
816	**Magnesium**											
817												
818	**General Statistics**											
819	Number of Valid Observations					19	Number of Distinct Observations					19
820												
821	**Raw Statistics**						**Log-transformed Statistics**					
822	Minimum					280.1	Minimum of Log Data					5.635
823	Maximum					345.8	Maximum of Log Data					5.846
824	Mean					323.6	Mean of log Data					5.778
825	Median					329.2	SD of log Data					0.0542
826	SD					16.97						
827	Coefficient of Variation					0.0525						
828	Skewness					-1.238						
829												
830	**Relevant UCL Statistics**											
831	**Normal Distribution Test**						**Lognormal Distribution Test**					
832	Shapiro Wilk Test Statistic					0.896	Shapiro Wilk Test Statistic					0.878
833	Shapiro Wilk Critical Value					0.901	Shapiro Wilk Critical Value					0.901
834	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
835												
836	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
837	95% Student's-t UCL					330.3	95% H-UCL					N/A
838	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					341.1
839	95% Adjusted-CLT UCL (Chen-1995)					328.8	97.5% Chebyshev (MVUE) UCL					348.7
840	95% Modified-t UCL (Johnson-1978)					330.1	99% Chebyshev (MVUE) UCL					363.6
841												
842	**Gamma Distribution Test**						**Data Distribution**					
843	k star (bias corrected)					309.6	**Data Follow Appr. Gamma Distribution at 5% Significance Level**					
844	Theta Star					1.045						
845	MLE of Mean					323.6						
846	MLE of Standard Deviation					18.39						
847	nu star					11764						
848	Approximate Chi Square Value (.05)					11513	**Nonparametric Statistics**					
849	Adjusted Level of Significance					0.0369	95% CLT UCL					330
850	Adjusted Chi Square Value					11491	95% Jackknife UCL					330.3

851											95% Standard Bootstrap UCL	329.8
852					Anderson-Darling Test Statistic	0.742					95% Bootstrap-t UCL	329.6
853					Anderson-Darling 5% Critical Value	0.738					95% Hall's Bootstrap UCL	329.1
854					Kolmogorov-Smirnov Test Statistic	0.163					95% Percentile Bootstrap UCL	329.5
855					Kolmogorov-Smirnov 5% Critical Value	0.198					95% BCA Bootstrap UCL	328.7
856					**Data follow Appr. Gamma Distribution at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	340.5
857											97.5% Chebyshev(Mean, Sd) UCL	347.9
858					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	362.3
859					95% Approximate Gamma UCL	330.6						
860					95% Adjusted Gamma UCL	331.2						
861												
862					**Potential UCL to Use**						Use 95% Approximate Gamma UCL	330.6
863												
864	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
865	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
866	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
867												
868												
869	**Manganese**											
870												
871	**General Statistics**											
872					Number of Valid Observations	19					Number of Distinct Observations	19
873												
874	**Raw Statistics**						**Log-transformed Statistics**					
875					Minimum	1.974					Minimum of Log Data	0.68
876					Maximum	16.14					Maximum of Log Data	2.781
877					Mean	6.212					Mean of log Data	1.661
878					Median	4.328					SD of log Data	0.577
879					SD	3.955						
880					Coefficient of Variation	0.637						
881					Skewness	1.371						
882												
883	**Relevant UCL Statistics**											
884	**Normal Distribution Test**						**Lognormal Distribution Test**					
885					Shapiro Wilk Test Statistic	0.836					Shapiro Wilk Test Statistic	0.959
886					Shapiro Wilk Critical Value	0.901					Shapiro Wilk Critical Value	0.901
887	**Data not Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
888												
889	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
890					95% Student's-t UCL	7.786					95% H-UCL	8.257
891	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	9.872
892					95% Adjusted-CLT UCL (Chen-1995)	8.01					97.5% Chebyshev (MVUE) UCL	11.48
893					95% Modified-t UCL (Johnson-1978)	7.833					99% Chebyshev (MVUE) UCL	14.64
894												
895	**Gamma Distribution Test**						**Data Distribution**					
896					k star (bias corrected)	2.714	**Data appear Gamma Distributed at 5% Significance Level**					
897					Theta Star	2.289						
898					MLE of Mean	6.212						
899					MLE of Standard Deviation	3.771						
900					nu star	103.1						

901	Approximate Chi Square Value (.05)					80.71	**Nonparametric Statistics**					
902	Adjusted Level of Significance					0.0369	95% CLT UCL					7.705
903	Adjusted Chi Square Value					78.97	95% Jackknife UCL					7.786
904							95% Standard Bootstrap UCL					7.661
905	Anderson-Darling Test Statistic					0.605	95% Bootstrap-t UCL					8.28
906	Anderson-Darling 5% Critical Value					0.748	95% Hall's Bootstrap UCL					8.09
907	Kolmogorov-Smirnov Test Statistic					0.187	95% Percentile Bootstrap UCL					7.703
908	Kolmogorov-Smirnov 5% Critical Value					0.2	95% BCA Bootstrap UCL					7.935
909	**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					10.17
910							97.5% Chebyshev(Mean, Sd) UCL					11.88
911	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL					15.24
912	95% Approximate Gamma UCL					7.939						
913	95% Adjusted Gamma UCL					8.113						
914												
915	**Potential UCL to Use**						Use 95% Approximate Gamma UCL					7.939
916												
917	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
918	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
919	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
920												
921												
922	**Mercury**											
923												
924	**General Statistics**											
925	Number of Valid Observations					19	Number of Distinct Observations					19
926												
927	**Raw Statistics**						**Log-transformed Statistics**					
928	Minimum					0.0853	Minimum of Log Data					-2.462
929	Maximum					0.242	Maximum of Log Data					-1.419
930	Mean					0.143	Mean of log Data					-1.975
931	Median					0.138	SD of log Data					0.256
932	SD					0.0392						
933	Coefficient of Variation					0.274						
934	Skewness					1.154						
935												
936	**Relevant UCL Statistics**											
937	**Normal Distribution Test**						**Lognormal Distribution Test**					
938	Shapiro Wilk Test Statistic					0.897	Shapiro Wilk Test Statistic					0.957
939	Shapiro Wilk Critical Value					0.901	Shapiro Wilk Critical Value					0.901
940	**Data not Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
941												
942	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
943	95% Student's-t UCL					0.159	95% H-UCL					0.16
944	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					0.18
945	95% Adjusted-CLT UCL (Chen-1995)					0.161	97.5% Chebyshev (MVUE) UCL					0.196
946	95% Modified-t UCL (Johnson-1978)					0.159	99% Chebyshev (MVUE) UCL					0.228
947												
948	**Gamma Distribution Test**						**Data Distribution**					
949	k star (bias corrected)					13.23	**Data Follow Appr. Gamma Distribution at 5% Significance Level**					
950	Theta Star					0.0108						

951					MLE of Mean	0.143						
952					MLE of Standard Deviation	0.0394						
953					nu star	502.8						
954					Approximate Chi Square Value (.05)	451.8				**Nonparametric Statistics**		
955					Adjusted Level of Significance	0.0369				95% CLT UCL	0.158	
956					Adjusted Chi Square Value	447.6				95% Jackknife UCL	0.159	
957										95% Standard Bootstrap UCL	0.157	
958					Anderson-Darling Test Statistic	0.559				95% Bootstrap-t UCL	0.163	
959					Anderson-Darling 5% Critical Value	0.741				95% Hall's Bootstrap UCL	0.164	
960					Kolmogorov-Smirnov Test Statistic	0.219				95% Percentile Bootstrap UCL	0.158	
961					Kolmogorov-Smirnov 5% Critical Value	0.198				95% BCA Bootstrap UCL	0.16	
962					**Data follow Appr. Gamma Distribution at 5% Significance Level**					95% Chebyshev(Mean, Sd) UCL	0.182	
963										97.5% Chebyshev(Mean, Sd) UCL	0.199	
964					**Assuming Gamma Distribution**					99% Chebyshev(Mean, Sd) UCL	0.233	
965					95% Approximate Gamma UCL	0.159						
966					95% Adjusted Gamma UCL	0.161						
967												
968					**Potential UCL to Use**					Use 95% Approximate Gamma UCL	0.159	
969												
970	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
971	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
972	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
973												
974												
975	**Molybdenum**											
976												
977	**General Statistics**											
978					Number of Valid Observations	19				Number of Distinct Observations	19	
979												
980	**Raw Statistics**						**Log-transformed Statistics**					
981					Minimum	0.00985				Minimum of Log Data	-4.621	
982					Maximum	0.0206				Maximum of Log Data	-3.881	
983					Mean	0.0148				Mean of log Data	-4.226	
984					Median	0.0144				SD of log Data	0.18	
985					SD	0.00263						
986					Coefficient of Variation	0.178						
987					Skewness	0.26						
988												
989	**Relevant UCL Statistics**											
990	**Normal Distribution Test**						**Lognormal Distribution Test**					
991					Shapiro Wilk Test Statistic	0.98				Shapiro Wilk Test Statistic	0.98	
992					Shapiro Wilk Critical Value	0.901				Shapiro Wilk Critical Value	0.901	
993	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
994												
995	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
996					95% Student's-t UCL	0.0159				95% H-UCL	0.016	
997	**95% UCLs (Adjusted for Skewness)**									95% Chebyshev (MVUE) UCL	0.0175	
998					95% Adjusted-CLT UCL (Chen-1995)	0.0159				97.5% Chebyshev (MVUE) UCL	0.0187	
999					95% Modified-t UCL (Johnson-1978)	0.0159				99% Chebyshev (MVUE) UCL	0.021	
1000												

1001	**Gamma Distribution Test**						**Data Distribution**					
1002	k star (bias corrected)					27.96	**Data appear Normal at 5% Significance Level**					
1003	Theta Star					0.0005305						
1004	MLE of Mean					0.0148						
1005	MLE of Standard Deviation					0.00281						
1006	nu star					1063						
1007	Approximate Chi Square Value (.05)					988	**Nonparametric Statistics**					
1008	Adjusted Level of Significance					0.0369	95% CLT UCL					0.0158
1009	Adjusted Chi Square Value					981.7	95% Jackknife UCL					0.0159
1010							95% Standard Bootstrap UCL					0.0158
1011	Anderson-Darling Test Statistic					0.224	95% Bootstrap-t UCL					0.0159
1012	Anderson-Darling 5% Critical Value					0.74	95% Hall's Bootstrap UCL					0.0159
1013	Kolmogorov-Smirnov Test Statistic					0.114	95% Percentile Bootstrap UCL					0.0158
1014	Kolmogorov-Smirnov 5% Critical Value					0.198	95% BCA Bootstrap UCL					0.0158
1015	**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					0.0175
1016							97.5% Chebyshev(Mean, Sd) UCL					0.0186
1017	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL					0.0208
1018	95% Approximate Gamma UCL					0.016						
1019	95% Adjusted Gamma UCL					0.0161						
1020												
1021	**Potential UCL to Use**						Use 95% Student's-t UCL					0.0159
1022												
1023	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1024	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1025	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1026												
1027												
1028	**Nickel**											
1029												
1030	**General Statistics**											
1031	Number of Valid Observations					19	Number of Distinct Observations					18
1032												
1033	**Raw Statistics**						**Log-transformed Statistics**					
1034	Minimum					0.0253	Minimum of Log Data					-3.678
1035	Maximum					0.0734	Maximum of Log Data					-2.612
1036	Mean					0.0313	Mean of log Data					-3.516
1037	Median					0.0258	SD of log Data					0.301
1038	SD					0.0125						
1039	Coefficient of Variation					0.399						
1040	Skewness					2.582						
1041												
1042	**Relevant UCL Statistics**											
1043	**Normal Distribution Test**						**Lognormal Distribution Test**					
1044	Shapiro Wilk Test Statistic					0.55	Shapiro Wilk Test Statistic					0.593
1045	Shapiro Wilk Critical Value					0.901	Shapiro Wilk Critical Value					0.901
1046	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
1047												
1048	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1049	95% Student's-t UCL					0.0363	95% H-UCL					0.0355
1050	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					0.0405

1051	95% Adjusted-CLT UCL (Chen-1995)					0.0378	97.5% Chebyshev (MVUE) UCL					0.0446
1052	95% Modified-t UCL (Johnson-1978)					0.0366	99% Chebyshev (MVUE) UCL					0.0526
1053												
1054	**Gamma Distribution Test**						**Data Distribution**					
1055	k star (bias corrected)					8.328	**Data do not follow a Discernable Distribution (0.05)**					
1056	Theta Star					0.00376						
1057	MLE of Mean					0.0313						
1058	MLE of Standard Deviation					0.0108						
1059	nu star					316.5						
1060	Approximate Chi Square Value (.05)					276.3	**Nonparametric Statistics**					
1061	Adjusted Level of Significance					0.0369	95% CLT UCL					0.036
1062	Adjusted Chi Square Value					273	95% Jackknife UCL					0.0363
1063							95% Standard Bootstrap UCL					0.0359
1064	Anderson-Darling Test Statistic					3.701	95% Bootstrap-t UCL					0.0413
1065	Anderson-Darling 5% Critical Value					0.741	95% Hall's Bootstrap UCL					0.0384
1066	Kolmogorov-Smirnov Test Statistic					0.433	95% Percentile Bootstrap UCL					0.0367
1067	Kolmogorov-Smirnov 5% Critical Value					0.199	95% BCA Bootstrap UCL					0.0386
1068	**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					0.0438
1069							97.5% Chebyshev(Mean, Sd) UCL					0.0492
1070	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL					0.0598
1071	95% Approximate Gamma UCL					0.0359						
1072	95% Adjusted Gamma UCL					0.0363						
1073												
1074	**Potential UCL to Use**						Use 95% Student's-t UCL					0.0363
1075							or 95% Modified-t UCL					0.0366
1076												
1077	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1078	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1079	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1080												
1081												
1082	**Potassium**											
1083												
1084	**General Statistics**											
1085	Number of Valid Observations					19	Number of Distinct Observations					19
1086												
1087	**Raw Statistics**						**Log-transformed Statistics**					
1088	Minimum					3335	Minimum of Log Data					8.112
1089	Maximum					3761	Maximum of Log Data					8.232
1090	Mean					3590	Mean of log Data					8.185
1091	Median					3581	SD of log Data					0.0346
1092	SD					123.2						
1093	Coefficient of Variation					0.0343						
1094	Skewness					-0.47						
1095												
1096	**Relevant UCL Statistics**											
1097	**Normal Distribution Test**						**Lognormal Distribution Test**					
1098	Shapiro Wilk Test Statistic					0.933	Shapiro Wilk Test Statistic					0.929
1099	Shapiro Wilk Critical Value					0.901	Shapiro Wilk Critical Value					0.901
1100	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					

1101												
1102	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1103					95% Student's-t UCL	3639					95% H-UCL	N/A
1104	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	3714
1105					95% Adjusted-CLT UCL (Chen-1995)	3633					97.5% Chebyshev (MVUE) UCL	3768
1106					95% Modified-t UCL (Johnson-1978)	3639					99% Chebyshev (MVUE) UCL	3874
1107												
1108	**Gamma Distribution Test**						**Data Distribution**					
1109					k star (bias corrected)	746.3	**Data appear Normal at 5% Significance Level**					
1110					Theta Star	4.81						
1111					MLE of Mean	3590						
1112					MLE of Standard Deviation	131.4						
1113					nu star	28360						
1114					Approximate Chi Square Value (.05)	27970	**Nonparametric Statistics**					
1115					Adjusted Level of Significance	0.0369					95% CLT UCL	3637
1116					Adjusted Chi Square Value	27936					95% Jackknife UCL	3639
1117											95% Standard Bootstrap UCL	3635
1118					Anderson-Darling Test Statistic	0.491					95% Bootstrap-t UCL	3635
1119					Anderson-Darling 5% Critical Value	0.738					95% Hall's Bootstrap UCL	3635
1120					Kolmogorov-Smirnov Test Statistic	0.12					95% Percentile Bootstrap UCL	3636
1121					Kolmogorov-Smirnov 5% Critical Value	0.198					95% BCA Bootstrap UCL	3631
1122	**Data appear Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	3713
1123											97.5% Chebyshev(Mean, Sd) UCL	3767
1124	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	3871
1125					95% Approximate Gamma UCL	3640						
1126					95% Adjusted Gamma UCL	3645						
1127												
1128	**Potential UCL to Use**										Use 95% Student's-t UCL	3639
1129												
1130	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1131	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1132	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1133												
1134												
1135	**Rubidium**											
1136												
1137	**General Statistics**											
1138					Number of Valid Observations	19					Number of Distinct Observations	19
1139												
1140	**Raw Statistics**						**Log-transformed Statistics**					
1141					Minimum	5.091					Minimum of Log Data	1.627
1142					Maximum	12.48					Maximum of Log Data	2.524
1143					Mean	9.523					Mean of log Data	2.228
1144					Median	10.23					SD of log Data	0.242
1145					SD	2.081						
1146					Coefficient of Variation	0.219						
1147					Skewness	-0.562						
1148												
1149	**Relevant UCL Statistics**											
1150	**Normal Distribution Test**						**Lognormal Distribution Test**					

1151					Shapiro Wilk Test Statistic	0.948					Shapiro Wilk Test Statistic	0.911
1152					Shapiro Wilk Critical Value	0.901					Shapiro Wilk Critical Value	0.901
1153					**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**	
1154												
1155					**Assuming Normal Distribution**						**Assuming Lognormal Distribution**	
1156					95% Student's-t UCL	10.35					95% H-UCL	10.6
1157					**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL	11.87
1158					95% Adjusted-CLT UCL (Chen-1995)	10.24					97.5% Chebyshev (MVUE) UCL	12.88
1159					95% Modified-t UCL (Johnson-1978)	10.34					99% Chebyshev (MVUE) UCL	14.87
1160												
1161					**Gamma Distribution Test**						**Data Distribution**	
1162					k star (bias corrected)	16.46					**Data appear Normal at 5% Significance Level**	
1163					Theta Star	0.579						
1164					MLE of Mean	9.523						
1165					MLE of Standard Deviation	2.347						
1166					nu star	625.5						
1167					Approximate Chi Square Value (.05)	568.5					**Nonparametric Statistics**	
1168					Adjusted Level of Significance	0.0369					95% CLT UCL	10.31
1169					Adjusted Chi Square Value	563.8					95% Jackknife UCL	10.35
1170											95% Standard Bootstrap UCL	10.29
1171					Anderson-Darling Test Statistic	0.556					95% Bootstrap-t UCL	10.27
1172					Anderson-Darling 5% Critical Value	0.74					95% Hall's Bootstrap UCL	10.24
1173					Kolmogorov-Smirnov Test Statistic	0.18					95% Percentile Bootstrap UCL	10.25
1174					Kolmogorov-Smirnov 5% Critical Value	0.198					95% BCA Bootstrap UCL	10.24
1175					**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	11.6
1176											97.5% Chebyshev(Mean, Sd) UCL	12.5
1177					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	14.27
1178					95% Approximate Gamma UCL	10.48						
1179					95% Adjusted Gamma UCL	10.57						
1180												
1181					**Potential UCL to Use**						Use 95% Student's-t UCL	10.35
1182												
1183					**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**							
1184					**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**							
1185					**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**							
1186												
1187												
1188	**Selenium**											
1189												
1190					**General Statistics**							
1191					Number of Valid Observations	19					Number of Distinct Observations	19
1192												
1193					**Raw Statistics**						**Log-transformed Statistics**	
1194					Minimum	0.18					Minimum of Log Data	-1.716
1195					Maximum	0.587					Maximum of Log Data	-0.533
1196					Mean	0.363					Mean of log Data	-1.045
1197					Median	0.342					SD of log Data	0.265
1198					SD	0.0922						
1199					Coefficient of Variation	0.254						
1200					Skewness	0.435						

1201												
1202	**Relevant UCL Statistics**											
1203	**Normal Distribution Test**						**Lognormal Distribution Test**					
1204					Shapiro Wilk Test Statistic	0.954					Shapiro Wilk Test Statistic	0.943
1205					Shapiro Wilk Critical Value	0.901					Shapiro Wilk Critical Value	0.901
1206	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
1207												
1208	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1209					95% Student's-t UCL	0.4					95% H-UCL	0.408
1210	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.461
1211					95% Adjusted-CLT UCL (Chen-1995)	0.4					97.5% Chebyshev (MVUE) UCL	0.503
1212					95% Modified-t UCL (Johnson-1978)	0.4					99% Chebyshev (MVUE) UCL	0.586
1213												
1214	**Gamma Distribution Test**						**Data Distribution**					
1215					k star (bias corrected)	13.38	**Data appear Normal at 5% Significance Level**					
1216					Theta Star	0.0271						
1217					MLE of Mean	0.363						
1218					MLE of Standard Deviation	0.0992						
1219					nu star	508.3						
1220					Approximate Chi Square Value (.05)	457.1	**Nonparametric Statistics**					
1221					Adjusted Level of Significance	0.0369					95% CLT UCL	0.398
1222					Adjusted Chi Square Value	452.8					95% Jackknife UCL	0.4
1223											95% Standard Bootstrap UCL	0.398
1224					Anderson-Darling Test Statistic	0.454					95% Bootstrap-t UCL	0.403
1225					Anderson-Darling 5% Critical Value	0.741					95% Hall's Bootstrap UCL	0.405
1226					Kolmogorov-Smirnov Test Statistic	0.153					95% Percentile Bootstrap UCL	0.398
1227					Kolmogorov-Smirnov 5% Critical Value	0.198					95% BCA Bootstrap UCL	0.399
1228	**Data appear Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	0.455
1229											97.5% Chebyshev(Mean, Sd) UCL	0.495
1230	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	0.573
1231					95% Approximate Gamma UCL	0.404						
1232					95% Adjusted Gamma UCL	0.407						
1233												
1234	**Potential UCL to Use**										Use 95% Student's-t UCL	0.4
1235												
1236	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1237	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1238	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1239												
1240												
1241	**Silver**											
1242												
1243	**General Statistics**											
1244					Number of Valid Observations	19					Number of Distinct Observations	19
1245												
1246	**Raw Statistics**						**Log-transformed Statistics**					
1247					Minimum	0.00751					Minimum of Log Data	-4.891
1248					Maximum	0.0399					Maximum of Log Data	-3.222
1249					Mean	0.019					Mean of log Data	-4.065
1250					Median	0.0167					SD of log Data	0.468

1251					SD	0.0088						
1252					Coefficient of Variation	0.463						
1253					Skewness	0.768						
1254												
1255	**Relevant UCL Statistics**											
1256	**Normal Distribution Test**						**Lognormal Distribution Test**					
1257					Shapiro Wilk Test Statistic	0.936					Shapiro Wilk Test Statistic	0.975
1258					Shapiro Wilk Critical Value	0.901					Shapiro Wilk Critical Value	0.901
1259	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
1260												
1261	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1262					95% Student's-t UCL	0.0225					95% H-UCL	0.0238
1263	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.0282
1264					95% Adjusted-CLT UCL (Chen-1995)	0.0227					97.5% Chebyshev (MVUE) UCL	0.0322
1265					95% Modified-t UCL (Johnson-1978)	0.0226					99% Chebyshev (MVUE) UCL	0.04
1266												
1267	**Gamma Distribution Test**						**Data Distribution**					
1268					k star (bias corrected)	4.311	**Data appear Normal at 5% Significance Level**					
1269					Theta Star	0.00441						
1270					MLE of Mean	0.019						
1271					MLE of Standard Deviation	0.00915						
1272					nu star	163.8						
1273					Approximate Chi Square Value (.05)	135.2	**Nonparametric Statistics**					
1274					Adjusted Level of Significance	0.0369					95% CLT UCL	0.0223
1275					Adjusted Chi Square Value	133					95% Jackknife UCL	0.0225
1276											95% Standard Bootstrap UCL	0.0222
1277					Anderson-Darling Test Statistic	0.249					95% Bootstrap-t UCL	0.0228
1278					Anderson-Darling 5% Critical Value	0.742					95% Hall's Bootstrap UCL	0.0228
1279					Kolmogorov-Smirnov Test Statistic	0.111					95% Percentile Bootstrap UCL	0.0222
1280					Kolmogorov-Smirnov 5% Critical Value	0.199					95% BCA Bootstrap UCL	0.0226
1281	**Data appear Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	0.0278
1282											97.5% Chebyshev(Mean, Sd) UCL	0.0316
1283	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	0.0391
1284					95% Approximate Gamma UCL	0.023						
1285					95% Adjusted Gamma UCL	0.0234						
1286												
1287	**Potential UCL to Use**										Use 95% Student's-t UCL	0.0225
1288												
1289	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1290	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1291	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1292												
1293												
1294	**Sodium**											
1295												
1296	**General Statistics**											
1297					Number of Valid Observations	19					Number of Distinct Observations	19
1298												
1299	**Raw Statistics**						**Log-transformed Statistics**					
1300					Minimum	795.3					Minimum of Log Data	6.679

1301					Maximum	1057				Maximum of Log Data		6.963
1302					Mean	968.1				Mean of log Data		6.872
1303					Median	992.2				SD of log Data		0.08
1304					SD	74.58						
1305					Coefficient of Variation	0.077						
1306					Skewness	-0.946						
1307												
1308	**Relevant UCL Statistics**											
1309	**Normal Distribution Test**						**Lognormal Distribution Test**					
1310					Shapiro Wilk Test Statistic	0.908				Shapiro Wilk Test Statistic		0.892
1311					Shapiro Wilk Critical Value	0.901				Shapiro Wilk Critical Value		0.901
1312	**Data appear Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
1313												
1314	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1315					95% Student's-t UCL	997.8				95% H-UCL		N/A
1316	**95% UCLs (Adjusted for Skewness)**									95% Chebyshev (MVUE) UCL		1046
1317					95% Adjusted-CLT UCL (Chen-1995)	992.3				97.5% Chebyshev (MVUE) UCL		1079
1318					95% Modified-t UCL (Johnson-1978)	997.2				99% Chebyshev (MVUE) UCL		1145
1319												
1320	**Gamma Distribution Test**						**Data Distribution**					
1321					k star (bias corrected)	142.5	**Data appear Normal at 5% Significance Level**					
1322					Theta Star	6.792						
1323					MLE of Mean	968.1						
1324					MLE of Standard Deviation	81.09						
1325					nu star	5417						
1326					Approximate Chi Square Value (.05)	5247	**Nonparametric Statistics**					
1327					Adjusted Level of Significance	0.0369				95% CLT UCL		996.3
1328					Adjusted Chi Square Value	5232				95% Jackknife UCL		997.8
1329										95% Standard Bootstrap UCL		995.5
1330					Anderson-Darling Test Statistic	0.75				95% Bootstrap-t UCL		993.6
1331					Anderson-Darling 5% Critical Value	0.738				95% Hall's Bootstrap UCL		993.2
1332					Kolmogorov-Smirnov Test Statistic	0.162				95% Percentile Bootstrap UCL		995.6
1333					Kolmogorov-Smirnov 5% Critical Value	0.198				95% BCA Bootstrap UCL		993.1
1334	**Data follow Appr. Gamma Distribution at 5% Significance Level**									95% Chebyshev(Mean, Sd) UCL		1043
1335										97.5% Chebyshev(Mean, Sd) UCL		1075
1336	**Assuming Gamma Distribution**									99% Chebyshev(Mean, Sd) UCL		1138
1337					95% Approximate Gamma UCL	999.5						
1338					95% Adjusted Gamma UCL	1002						
1339												
1340	**Potential UCL to Use**									Use 95% Student's-t UCL		997.8
1341												
1342	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1343	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1344	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1345												
1346												
1347	**Strontium**											
1348												
1349	**General Statistics**											
1350					Number of Valid Observations	19				Number of Distinct Observations		19

	A	B	C	D	E	F	G	H	I	J	K	L
1351												
1352	**Raw Statistics**						**Log-transformed Statistics**					
1353	Minimum	5.319					Minimum of Log Data	1.671				
1354	Maximum	15.53					Maximum of Log Data	2.743				
1355	Mean	11.64					Mean of log Data	2.422				
1356	Median	12.04					SD of log Data	0.279				
1357	SD	2.724										
1358	Coefficient of Variation	0.234										
1359	Skewness	-0.95										
1360												
1361	**Relevant UCL Statistics**											
1362	**Normal Distribution Test**						**Lognormal Distribution Test**					
1363	Shapiro Wilk Test Statistic	0.92					Shapiro Wilk Test Statistic	0.839				
1364	Shapiro Wilk Critical Value	0.901					Shapiro Wilk Critical Value	0.901				
1365	**Data appear Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
1366												
1367	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1368	95% Student's-t UCL	12.73					95% H-UCL	13.22				
1369	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL	15				
1370	95% Adjusted-CLT UCL (Chen-1995)	12.53					97.5% Chebyshev (MVUE) UCL	16.43				
1371	95% Modified-t UCL (Johnson-1978)	12.71					99% Chebyshev (MVUE) UCL	19.24				
1372												
1373	**Gamma Distribution Test**						**Data Distribution**					
1374	k star (bias corrected)	13.08					**Data appear Normal at 5% Significance Level**					
1375	Theta Star	0.89										
1376	MLE of Mean	11.64										
1377	MLE of Standard Deviation	3.22										
1378	nu star	497.1										
1379	Approximate Chi Square Value (.05)	446.4					**Nonparametric Statistics**					
1380	Adjusted Level of Significance	0.0369					95% CLT UCL	12.67				
1381	Adjusted Chi Square Value	442.2					95% Jackknife UCL	12.73				
1382							95% Standard Bootstrap UCL	12.64				
1383	Anderson-Darling Test Statistic	0.994					95% Bootstrap-t UCL	12.6				
1384	Anderson-Darling 5% Critical Value	0.741					95% Hall's Bootstrap UCL	12.56				
1385	Kolmogorov-Smirnov Test Statistic	0.231					95% Percentile Bootstrap UCL	12.6				
1386	Kolmogorov-Smirnov 5% Critical Value	0.198					95% BCA Bootstrap UCL	12.62				
1387	**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	14.37				
1388							97.5% Chebyshev(Mean, Sd) UCL	15.55				
1389	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	17.86				
1390	95% Approximate Gamma UCL	12.97										
1391	95% Adjusted Gamma UCL	13.09										
1392												
1393	**Potential UCL to Use**						Use 95% Student's-t UCL	12.73				
1394												
1395	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1396	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1397	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1398												
1399												
1400	**Tellurium**											

	A	B	C	D	E	F	G	H	I	J	K	L
1401												
1402	**General Statistics**											
1403	Number of Valid Observations					19	Number of Distinct Observations					17
1404												
1405	**Raw Statistics**						**Log-transformed Statistics**					
1406	Minimum					0.00253	Minimum of Log Data					-5.981
1407	Maximum					0.00268	Maximum of Log Data					-5.922
1408	Mean					0.00258	Mean of log Data					-5.959
1409	Median					0.00257	SD of log Data					0.0172
1410	SD					4.486E-05						
1411	Coefficient of Variation					0.0174						
1412	Skewness					0.954						
1413												
1414	**Relevant UCL Statistics**											
1415	**Normal Distribution Test**						**Lognormal Distribution Test**					
1416	Shapiro Wilk Test Statistic					0.872	Shapiro Wilk Test Statistic					0.875
1417	Shapiro Wilk Critical Value					0.901	Shapiro Wilk Critical Value					0.901
1418	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
1419												
1420	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1421	95% Student's-t UCL					0.0026	95% H-UCL					N/A
1422	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					0.00263
1423	95% Adjusted-CLT UCL (Chen-1995)					0.0026	97.5% Chebyshev (MVUE) UCL					0.00265
1424	95% Modified-t UCL (Johnson-1978)					0.0026	99% Chebyshev (MVUE) UCL					0.00268
1425												
1426	**Gamma Distribution Test**						**Data Distribution**					
1427	k star (bias corrected)					2975	**Data do not follow a Discernable Distribution (0.05)**					
1428	Theta Star					8.681E-07						
1429	MLE of Mean					0.00258						
1430	MLE of Standard Deviation					4.735E-05						
1431	nu star					113039						
1432	Approximate Chi Square Value (.05)					112259	**Nonparametric Statistics**					
1433	Adjusted Level of Significance					0.0369	95% CLT UCL					0.0026
1434	Adjusted Chi Square Value					112191	95% Jackknife UCL					0.0026
1435							95% Standard Bootstrap UCL					0.0026
1436	Anderson-Darling Test Statistic					1.299	95% Bootstrap-t UCL					0.0026
1437	Anderson-Darling 5% Critical Value					0.738	95% Hall's Bootstrap UCL					0.0026
1438	Kolmogorov-Smirnov Test Statistic					0.267	95% Percentile Bootstrap UCL					0.0026
1439	Kolmogorov-Smirnov 5% Critical Value					0.198	95% BCA Bootstrap UCL					0.0026
1440	**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					0.00263
1441							97.5% Chebyshev(Mean, Sd) UCL					0.00265
1442	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL					0.00268
1443	95% Approximate Gamma UCL					0.0026						
1444	95% Adjusted Gamma UCL					0.0026						
1445												
1446	**Potential UCL to Use**						Use 95% Student's-t UCL					0.0026
1447							or 95% Modified-t UCL					0.0026
1448												
1449	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1450	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Thallium

General Statistics

Number of Valid Observations	19	Number of Distinct Observations	19

Raw Statistics		**Log-transformed Statistics**	
Minimum	0.00419	Minimum of Log Data	-5.476
Maximum	0.0148	Maximum of Log Data	-4.217
Mean	0.0111	Mean of log Data	-4.533
Median	0.0115	SD of log Data	0.277
SD	0.00239		
Coefficient of Variation	0.216		
Skewness	-1.344		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.907	Shapiro Wilk Test Statistic	0.768
Shapiro Wilk Critical Value	0.901	Shapiro Wilk Critical Value	0.901
Data appear Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	0.012	95% H-UCL	0.0126
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.0143
95% Adjusted-CLT UCL (Chen-1995)	0.0118	97.5% Chebyshev (MVUE) UCL	0.0156
95% Modified-t UCL (Johnson-1978)	0.012	99% Chebyshev (MVUE) UCL	0.0183
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	14.07	**Data appear Normal at 5% Significance Level**	
Theta Star	0.0007869		
MLE of Mean	0.0111		
MLE of Standard Deviation	0.00295		
nu star	534.8		
Approximate Chi Square Value (.05)	482.2	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0369	95% CLT UCL	0.012
Adjusted Chi Square Value	477.8	95% Jackknife UCL	0.012
		95% Standard Bootstrap UCL	0.0119
Anderson-Darling Test Statistic	1.08	95% Bootstrap-t UCL	0.0119
Anderson-Darling 5% Critical Value	0.741	95% Hall's Bootstrap UCL	0.0118
Kolmogorov-Smirnov Test Statistic	0.238	95% Percentile Bootstrap UCL	0.0119
Kolmogorov-Smirnov 5% Critical Value	0.198	95% BCA Bootstrap UCL	0.0118
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.0135
		97.5% Chebyshev(Mean, Sd) UCL	0.0145
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.0165
95% Approximate Gamma UCL	0.0123		
95% Adjusted Gamma UCL	0.0124		
Potential UCL to Use		Use 95% Student's-t UCL	0.012

	A	B	C	D	E	F	G	H	I	J	K	L
1501												
1502	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1503	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1504	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1505												
1506												
1507	**Tin**											
1508												
1509	**General Statistics**											
1510	Number of Valid Observations					19	Number of Distinct Observations					19
1511												
1512	**Raw Statistics**						**Log-transformed Statistics**					
1513	Minimum					0.00593	Minimum of Log Data					-5.128
1514	Maximum					0.0224	Maximum of Log Data					-3.797
1515	Mean					0.0122	Mean of log Data					-4.452
1516	Median					0.0108	SD of log Data					0.317
1517	SD					0.00394						
1518	Coefficient of Variation					0.322						
1519	Skewness					0.867						
1520												
1521	**Relevant UCL Statistics**											
1522	**Normal Distribution Test**						**Lognormal Distribution Test**					
1523	Shapiro Wilk Test Statistic					0.932	Shapiro Wilk Test Statistic					0.973
1524	Shapiro Wilk Critical Value					0.901	Shapiro Wilk Critical Value					0.901
1525	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
1526												
1527	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1528	95% Student's-t UCL					0.0138	95% H-UCL					0.0141
1529	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					0.0162
1530	95% Adjusted-CLT UCL (Chen-1995)					0.0139	97.5% Chebyshev (MVUE) UCL					0.0179
1531	95% Modified-t UCL (Johnson-1978)					0.0138	99% Chebyshev (MVUE) UCL					0.0212
1532												
1533	**Gamma Distribution Test**						**Data Distribution**					
1534	k star (bias corrected)					9.033	**Data appear Normal at 5% Significance Level**					
1535	Theta Star					0.00135						
1536	MLE of Mean					0.0122						
1537	MLE of Standard Deviation					0.00407						
1538	nu star					343.2						
1539	Approximate Chi Square Value (.05)					301.3	**Nonparametric Statistics**					
1540	Adjusted Level of Significance					0.0369	95% CLT UCL					0.0137
1541	Adjusted Chi Square Value					297.9	95% Jackknife UCL					0.0138
1542							95% Standard Bootstrap UCL					0.0137
1543	Anderson-Darling Test Statistic					0.381	95% Bootstrap-t UCL					0.014
1544	Anderson-Darling 5% Critical Value					0.741	95% Hall's Bootstrap UCL					0.0141
1545	Kolmogorov-Smirnov Test Statistic					0.181	95% Percentile Bootstrap UCL					0.0137
1546	Kolmogorov-Smirnov 5% Critical Value					0.199	95% BCA Bootstrap UCL					0.0139
1547	**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					0.0162
1548							97.5% Chebyshev(Mean, Sd) UCL					0.0179
1549	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL					0.0212
1550	95% Approximate Gamma UCL					0.0139						

1551					95% Adjusted Gamma UCL	0.0141						
1552												
1553					**Potential UCL to Use**						Use 95% Student's-t UCL	0.0138
1554												
1555	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1556	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1557	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1558												
1559												
1560	**Tungsten**											
1561												
1562	**General Statistics**											
1563					Number of Valid Observations	19					Number of Distinct Observations	18
1564												
1565	**Raw Statistics**						**Log-transformed Statistics**					
1566					Minimum	0.00263					Minimum of Log Data	-5.94
1567					Maximum	0.0224					Maximum of Log Data	-3.8
1568					Mean	0.0108					Mean of log Data	-4.748
1569					Median	0.00692					SD of log Data	0.7
1570					SD	0.00712						
1571					Coefficient of Variation	0.657						
1572					Skewness	0.49						
1573												
1574	**Relevant UCL Statistics**											
1575	**Normal Distribution Test**						**Lognormal Distribution Test**					
1576					Shapiro Wilk Test Statistic	0.831					Shapiro Wilk Test Statistic	0.882
1577					Shapiro Wilk Critical Value	0.901					Shapiro Wilk Critical Value	0.901
1578	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
1579												
1580	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1581					95% Student's-t UCL	0.0137					95% H-UCL	0.016
1582	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.019
1583					95% Adjusted-CLT UCL (Chen-1995)	0.0137					97.5% Chebyshev (MVUE) UCL	0.0225
1584					95% Modified-t UCL (Johnson-1978)	0.0137					99% Chebyshev (MVUE) UCL	0.0294
1585												
1586	**Gamma Distribution Test**						**Data Distribution**					
1587					k star (bias corrected)	2.049	**Data do not follow a Discernable Distribution (0.05)**					
1588					Theta Star	0.00529						
1589					MLE of Mean	0.0108						
1590					MLE of Standard Deviation	0.00757						
1591					nu star	77.86						
1592					Approximate Chi Square Value (.05)	58.53	**Nonparametric Statistics**					
1593					Adjusted Level of Significance	0.0369					95% CLT UCL	0.0135
1594					Adjusted Chi Square Value	57.07					95% Jackknife UCL	0.0137
1595											95% Standard Bootstrap UCL	0.0134
1596					Anderson-Darling Test Statistic	1.175					95% Bootstrap-t UCL	0.0143
1597					Anderson-Darling 5% Critical Value	0.75					95% Hall's Bootstrap UCL	0.0135
1598					Kolmogorov-Smirnov Test Statistic	0.214					95% Percentile Bootstrap UCL	0.0135
1599					Kolmogorov-Smirnov 5% Critical Value	0.201					95% BCA Bootstrap UCL	0.0137
1600	**Data not Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	0.018

1601											97.5% Chebyshev(Mean, Sd) UCL	0.021
1602	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	0.0271
1603					95% Approximate Gamma UCL	0.0144						
1604					95% Adjusted Gamma UCL	0.0148						
1605												
1606	**Potential UCL to Use**										Use 95% Chebyshev (Mean, Sd) UCL	0.018
1607												
1608	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1609	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1610	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1611												
1612												
1613	**Uranium**											
1614												
1615	**General Statistics**											
1616					Number of Valid Observations	19					Number of Distinct Observations	18
1617												
1618	**Raw Statistics**						**Log-transformed Statistics**					
1619					Minimum	0.00253					Minimum of Log Data	-5.981
1620					Maximum	0.0125					Maximum of Log Data	-4.384
1621					Mean	0.00434					Mean of log Data	-5.578
1622					Median	0.00268					SD of log Data	0.504
1623					SD	0.0027						
1624					Coefficient of Variation	0.622						
1625					Skewness	1.833						
1626												
1627	**Relevant UCL Statistics**											
1628	**Normal Distribution Test**						**Lognormal Distribution Test**					
1629					Shapiro Wilk Test Statistic	0.722					Shapiro Wilk Test Statistic	0.788
1630					Shapiro Wilk Critical Value	0.901					Shapiro Wilk Critical Value	0.901
1631	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
1632												
1633	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1634					95% Student's-t UCL	0.00541					95% H-UCL	0.00545
1635	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.00649
1636					95% Adjusted-CLT UCL (Chen-1995)	0.00563					97.5% Chebyshev (MVUE) UCL	0.00745
1637					95% Modified-t UCL (Johnson-1978)	0.00546					99% Chebyshev (MVUE) UCL	0.00934
1638												
1639	**Gamma Distribution Test**						**Data Distribution**					
1640					k star (bias corrected)	3.232	**Data do not follow a Discernable Distribution (0.05)**					
1641					Theta Star	0.00134						
1642					MLE of Mean	0.00434						
1643					MLE of Standard Deviation	0.00241						
1644					nu star	122.8						
1645					Approximate Chi Square Value (.05)	98.23	**Nonparametric Statistics**					
1646					Adjusted Level of Significance	0.0369					95% CLT UCL	0.00536
1647					Adjusted Chi Square Value	96.31					95% Jackknife UCL	0.00541
1648											95% Standard Bootstrap UCL	0.00533
1649					Anderson-Darling Test Statistic	1.842					95% Bootstrap-t UCL	0.00593
1650					Anderson-Darling 5% Critical Value	0.746					95% Hall's Bootstrap UCL	0.00581

1651					Kolmogorov-Smirnov Test Statistic	0.282					95% Percentile Bootstrap UCL	0.00534
1652					Kolmogorov-Smirnov 5% Critical Value	0.199					95% BCA Bootstrap UCL	0.00556
1653					**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.00704
1654											97.5% Chebyshev(Mean, Sd) UCL	0.0082
1655					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.0105
1656					95% Approximate Gamma UCL	0.00542						
1657					95% Adjusted Gamma UCL	0.00553						
1658												
1659					**Potential UCL to Use**						Use 95% Chebyshev (Mean, Sd) UCL	0.00704
1660												
1661	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1662	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1663	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1664												
1665												
1666	**Vanadium**											
1667												
1668					**General Statistics**							
1669					Number of Valid Observations	19					Number of Distinct Observations	19
1670												
1671					**Raw Statistics**						**Log-transformed Statistics**	
1672					Minimum	0.0253					Minimum of Log Data	-3.678
1673					Maximum	0.0929					Maximum of Log Data	-2.376
1674					Mean	0.0385					Mean of log Data	-3.349
1675					Median	0.0268					SD of log Data	0.411
1676					SD	0.0194						
1677					Coefficient of Variation	0.503						
1678					Skewness	1.776						
1679												
1680					**Relevant UCL Statistics**							
1681					**Normal Distribution Test**						**Lognormal Distribution Test**	
1682					Shapiro Wilk Test Statistic	0.73					Shapiro Wilk Test Statistic	0.797
1683					Shapiro Wilk Critical Value	0.901					Shapiro Wilk Critical Value	0.901
1684					**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**	
1685												
1686					**Assuming Normal Distribution**						**Assuming Lognormal Distribution**	
1687					95% Student's-t UCL	0.0462					95% H-UCL	0.0461
1688					**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL	0.0541
1689					95% Adjusted-CLT UCL (Chen-1995)	0.0477					97.5% Chebyshev (MVUE) UCL	0.061
1690					95% Modified-t UCL (Johnson-1978)	0.0465					99% Chebyshev (MVUE) UCL	0.0746
1691												
1692					**Gamma Distribution Test**						**Data Distribution**	
1693					k star (bias corrected)	4.782					**Data do not follow a Discernable Distribution (0.05)**	
1694					Theta Star	0.00805						
1695					MLE of Mean	0.0385						
1696					MLE of Standard Deviation	0.0176						
1697					nu star	181.7						
1698					Approximate Chi Square Value (.05)	151.5					**Nonparametric Statistics**	
1699					Adjusted Level of Significance	0.0369					95% CLT UCL	0.0458
1700					Adjusted Chi Square Value	149.1					95% Jackknife UCL	0.0462

		95% Standard Bootstrap UCL	0.0455
Anderson-Darling Test Statistic	1.697	95% Bootstrap-t UCL	0.0502
Anderson-Darling 5% Critical Value	0.742	95% Hall's Bootstrap UCL	0.0514
Kolmogorov-Smirnov Test Statistic	0.274	95% Percentile Bootstrap UCL	0.0457
Kolmogorov-Smirnov 5% Critical Value	0.199	95% BCA Bootstrap UCL	0.0483
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.0578
		97.5% Chebyshev(Mean, Sd) UCL	0.0662
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.0827
95% Approximate Gamma UCL	0.0461		
95% Adjusted Gamma UCL	0.0469		
Potential UCL to Use		Use 95% Student's-t UCL	0.0462
		or 95% Modified-t UCL	0.0465

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Zinc

General Statistics

Number of Valid Observations	19	Number of Distinct Observations	19

Raw Statistics		**Log-transformed Statistics**	
Minimum	16.65	Minimum of Log Data	2.812
Maximum	31.32	Maximum of Log Data	3.444
Mean	24.51	Mean of log Data	3.186
Median	24.77	SD of log Data	0.166
SD	3.915		
Coefficient of Variation	0.16		
Skewness	-0.15		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.969	Shapiro Wilk Test Statistic	0.958
Shapiro Wilk Critical Value	0.901	Shapiro Wilk Critical Value	0.901
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	26.07	95% H-UCL	26.28
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	28.6
95% Adjusted-CLT UCL (Chen-1995)	25.95	97.5% Chebyshev (MVUE) UCL	30.36
95% Modified-t UCL (Johnson-1978)	26.06	99% Chebyshev (MVUE) UCL	33.83
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	33.43	**Data appear Normal at 5% Significance Level**	
Theta Star	0.733		
MLE of Mean	24.51		
MLE of Standard Deviation	4.239		

	A	B	C	D	E	F	G	H	I	J	K	L
1751					nu star	1270						
1752					Approximate Chi Square Value (.05)	1189	**Nonparametric Statistics**					
1753					Adjusted Level of Significance	0.0369					95% CLT UCL	25.99
1754					Adjusted Chi Square Value	1182					95% Jackknife UCL	26.07
1755											95% Standard Bootstrap UCL	25.98
1756					Anderson-Darling Test Statistic	0.329					95% Bootstrap-t UCL	25.92
1757					Anderson-Darling 5% Critical Value	0.74					95% Hall's Bootstrap UCL	26
1758					Kolmogorov-Smirnov Test Statistic	0.16					95% Percentile Bootstrap UCL	25.96
1759					Kolmogorov-Smirnov 5% Critical Value	0.198					95% BCA Bootstrap UCL	25.95
1760					**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	28.42
1761											97.5% Chebyshev(Mean, Sd) UCL	30.12
1762					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	33.45
1763					95% Approximate Gamma UCL	26.19						
1764					95% Adjusted Gamma UCL	26.35						
1765												
1766					**Potential UCL to Use**						Use 95% Student's-t UCL	26.07
1767												
1768	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1769	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1770	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1771												

ProUCL Outputs: Fish Carcasses - Sisson Brook

General UCL Statistics for Full Data Sets

User Selected Options	
From File	C:\Users\jmcphail\Desktop\UCL for server\fish_carcass_sisson.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Aluminum

General Statistics

Number of Valid Observations	20	Number of Distinct Observations	19

Raw Statistics		**Log-transformed Statistics**	
Minimum	0.24	Minimum of Log Data	-1.427
Maximum	1.38	Maximum of Log Data	0.322
Mean	0.687	Mean of log Data	-0.526
Median	0.61	SD of log Data	0.573
SD	0.38		
Coefficient of Variation	0.553		
Skewness	0.637		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.891	Shapiro Wilk Test Statistic	0.933
Shapiro Wilk Critical Value	0.905	Shapiro Wilk Critical Value	0.905
Data not Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	0.834	95% H-UCL	0.917
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1.093
95% Adjusted-CLT UCL (Chen-1995)	0.84	97.5% Chebyshev (MVUE) UCL	1.268
95% Modified-t UCL (Johnson-1978)	0.836	99% Chebyshev (MVUE) UCL	1.611
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	2.978	**Data appear Gamma Distributed at 5% Significance Level**	
Theta Star	0.231		
MLE of Mean	0.687		
MLE of Standard Deviation	0.398		
nu star	119.1		
Approximate Chi Square Value (.05)	94.94	**Nonparametric Statistics**	
Adjusted Level of Significance	0.038	95% CLT UCL	0.827
Adjusted Chi Square Value	93.23	95% Jackknife UCL	0.834
		95% Standard Bootstrap UCL	0.823
Anderson-Darling Test Statistic	0.543	95% Bootstrap-t UCL	0.858
Anderson-Darling 5% Critical Value	0.747	95% Hall's Bootstrap UCL	0.831
Kolmogorov-Smirnov Test Statistic	0.172	95% Percentile Bootstrap UCL	0.826
Kolmogorov-Smirnov 5% Critical Value	0.195	95% BCA Bootstrap UCL	0.849

51	Data appear Gamma Distributed at 5% Significance Level										95% Chebyshev(Mean, Sd) UCL	1.058
52											97.5% Chebyshev(Mean, Sd) UCL	1.218
53	Assuming Gamma Distribution										99% Chebyshev(Mean, Sd) UCL	1.532
54					95% Approximate Gamma UCL	0.862						
55					95% Adjusted Gamma UCL	0.878						
56												
57	Potential UCL to Use										Use 95% Approximate Gamma UCL	0.862
58												
59	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
60	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
61	and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.											
62												
63												
64	Antimony											
65												
66	General Statistics											
67	Number of Valid Observations					20					Number of Distinct Observations	5
68												
69	Raw Statistics										Log-transformed Statistics	
70	Minimum					0.0025					Minimum of Log Data	-5.991
71	Maximum					0.019					Maximum of Log Data	-3.963
72	Mean					0.00403					Mean of log Data	-5.716
73	Median					0.0025					SD of log Data	0.546
74	SD					0.00382						
75	Coefficient of Variation					0.948						
76	Skewness					3.522						
77												
78												
79	Relevant UCL Statistics											
80	Normal Distribution Test										Lognormal Distribution Test	
81	Shapiro Wilk Test Statistic					0.462					Shapiro Wilk Test Statistic	0.58
82	Shapiro Wilk Critical Value					0.905					Shapiro Wilk Critical Value	0.905
83	Data not Normal at 5% Significance Level										Data not Lognormal at 5% Significance Level	
84												
85	Assuming Normal Distribution										Assuming Lognormal Distribution	
86	95% Student's-t UCL					0.0055					95% H-UCL	0.00495
87	95% UCLs (Adjusted for Skewness)										95% Chebyshev (MVUE) UCL	0.0059
88	95% Adjusted-CLT UCL (Chen-1995)					0.00615					97.5% Chebyshev (MVUE) UCL	0.00681
89	95% Modified-t UCL (Johnson-1978)					0.00561					99% Chebyshev (MVUE) UCL	0.0086
90												
91	Gamma Distribution Test										Data Distribution	
92	k star (bias corrected)					2.278					Data do not follow a Discernable Distribution (0.05)	
93	Theta Star					0.00177						
94	MLE of Mean					0.00403						
95	MLE of Standard Deviation					0.00267						
96	nu star					91.11						
97	Approximate Chi Square Value (.05)					70.1					Nonparametric Statistics	
98	Adjusted Level of Significance					0.038					95% CLT UCL	0.00543
99	Adjusted Chi Square Value					68.65					95% Jackknife UCL	0.0055
100											95% Standard Bootstrap UCL	0.00541

101					Anderson-Darling Test Statistic	3.933					95% Bootstrap-t UCL	0.00819
102					Anderson-Darling 5% Critical Value	0.749					95% Hall's Bootstrap UCL	0.00995
103					Kolmogorov-Smirnov Test Statistic	0.443					95% Percentile Bootstrap UCL	0.0055
104					Kolmogorov-Smirnov 5% Critical Value	0.195					95% BCA Bootstrap UCL	0.0062
105					**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.00774
106											97.5% Chebyshev(Mean, Sd) UCL	0.00935
107					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.0125
108					95% Approximate Gamma UCL	0.00523						
109					95% Adjusted Gamma UCL	0.00534						
110												
111					**Potential UCL to Use**						Use 95% Chebyshev (Mean, Sd) UCL	0.00774
112												
113	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
114	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
115	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
116												
117												
118	**Arsenic**											
119												
120					**General Statistics**							
121					Number of Valid Observations	20					Number of Distinct Observations	14
122												
123					**Raw Statistics**						**Log-transformed Statistics**	
124					Minimum	0.025					Minimum of Log Data	-3.689
125					Maximum	0.235					Maximum of Log Data	-1.448
126					Mean	0.127					Mean of log Data	-2.263
127					Median	0.115					SD of log Data	0.699
128					SD	0.071						
129					Coefficient of Variation	0.561						
130					Skewness	0.187						
131												
132					**Relevant UCL Statistics**							
133					**Normal Distribution Test**						**Lognormal Distribution Test**	
134					Shapiro Wilk Test Statistic	0.924					Shapiro Wilk Test Statistic	0.91
135					Shapiro Wilk Critical Value	0.905					Shapiro Wilk Critical Value	0.905
136					**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**	
137												
138					**Assuming Normal Distribution**						**Assuming Lognormal Distribution**	
139					95% Student's-t UCL	0.154					95% H-UCL	0.19
140					**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL	0.226
141					95% Adjusted-CLT UCL (Chen-1995)	0.153					97.5% Chebyshev (MVUE) UCL	0.267
142					95% Modified-t UCL (Johnson-1978)	0.154					99% Chebyshev (MVUE) UCL	0.348
143												
144					**Gamma Distribution Test**						**Data Distribution**	
145					k star (bias corrected)	2.339					**Data appear Normal at 5% Significance Level**	
146					Theta Star	0.0541						
147					MLE of Mean	0.127						
148					MLE of Standard Deviation	0.0827						
149					nu star	93.55						
150					Approximate Chi Square Value (.05)	72.24					**Nonparametric Statistics**	

151					Adjusted Level of Significance	0.038					95% CLT UCL	0.153
152					Adjusted Chi Square Value	70.76					95% Jackknife UCL	0.154
153											95% Standard Bootstrap UCL	0.152
154					Anderson-Darling Test Statistic	0.438					95% Bootstrap-t UCL	0.156
155					Anderson-Darling 5% Critical Value	0.749					95% Hall's Bootstrap UCL	0.153
156					Kolmogorov-Smirnov Test Statistic	0.127					95% Percentile Bootstrap UCL	0.152
157					Kolmogorov-Smirnov 5% Critical Value	0.195					95% BCA Bootstrap UCL	0.152
158					**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.196
159											97.5% Chebyshev(Mean, Sd) UCL	0.226
160					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.285
161					95% Approximate Gamma UCL	0.164						
162					95% Adjusted Gamma UCL	0.167						
163												
164					**Potential UCL to Use**						Use 95% Student's-t UCL	0.154
165												
166	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
167	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
168	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
169												
170												
171	**Barium**											
172												
173	**General Statistics**											
174					Number of Valid Observations	20					Number of Distinct Observations	14
175												
176					**Raw Statistics**						**Log-transformed Statistics**	
177					Minimum	0.19					Minimum of Log Data	-1.661
178					Maximum	0.55					Maximum of Log Data	-0.598
179					Mean	0.299					Mean of log Data	-1.251
180					Median	0.29					SD of log Data	0.293
181					SD	0.0967						
182					Coefficient of Variation	0.324						
183					Skewness	1.373						
184												
185	**Relevant UCL Statistics**											
186					**Normal Distribution Test**						**Lognormal Distribution Test**	
187					Shapiro Wilk Test Statistic	0.851					Shapiro Wilk Test Statistic	0.924
188					Shapiro Wilk Critical Value	0.905					Shapiro Wilk Critical Value	0.905
189					**Data not Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**	
190												
191					**Assuming Normal Distribution**						**Assuming Lognormal Distribution**	
192					95% Student's-t UCL	0.336					95% H-UCL	0.338
193					**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL	0.385
194					95% Adjusted-CLT UCL (Chen-1995)	0.342					97.5% Chebyshev (MVUE) UCL	0.422
195					95% Modified-t UCL (Johnson-1978)	0.338					99% Chebyshev (MVUE) UCL	0.496
196												
197					**Gamma Distribution Test**						**Data Distribution**	
198					k star (bias corrected)	9.995					**Data appear Gamma Distributed at 5% Significance Level**	
199					Theta Star	0.0299						
200					MLE of Mean	0.299						

201					MLE of Standard Deviation	0.0946						
202					nu star	399.8						
203					Approximate Chi Square Value (.05)	354.5			**Nonparametric Statistics**			
204					Adjusted Level of Significance	0.038					95% CLT UCL	0.335
205					Adjusted Chi Square Value	351.1					95% Jackknife UCL	0.336
206											95% Standard Bootstrap UCL	0.333
207					Anderson-Darling Test Statistic	0.708					95% Bootstrap-t UCL	0.35
208					Anderson-Darling 5% Critical Value	0.742					95% Hall's Bootstrap UCL	0.366
209					Kolmogorov-Smirnov Test Statistic	0.162					95% Percentile Bootstrap UCL	0.336
210					Kolmogorov-Smirnov 5% Critical Value	0.194					95% BCA Bootstrap UCL	0.341
211					**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.393
212											97.5% Chebyshev(Mean, Sd) UCL	0.434
213					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.514
214					95% Approximate Gamma UCL	0.337						
215					95% Adjusted Gamma UCL	0.34						
216												
217					**Potential UCL to Use**						Use 95% Approximate Gamma UCL	0.337
218												
219	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
220	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
221	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
222												
223												
224	**Beryllium**											
225												
226	**General Statistics**											
227					Number of Valid Observations	20			Number of Distinct Observations	1		
228												
229												
230	**Warning: There is only one distinct observation value in this data set - resulting in '0' variance!**											
231	**ProUCL (or any other software) should not be used on such a data set!**											
232	**The data set for variable Beryllium was not processed!**											
233												
234	**If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.**											
235	**The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).**											
236												
237												
238												
239	**Bismuth**											
240												
241	**General Statistics**											
242					Number of Valid Observations	20			Number of Distinct Observations	2		
243												
244	**Raw Statistics**								**Log-transformed Statistics**			
245					Minimum	0.025			Minimum of Log Data	-3.689		
246					Maximum	0.2			Maximum of Log Data	-1.609		
247					Mean	0.0338			Mean of log Data	-3.585		
248					Median	0.025			SD of log Data	0.465		
249					SD	0.0391						
250					Coefficient of Variation	1.159						

Skewness	4.472	

Warning: There are only 2 Distinct Values in this data

There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.236	Shapiro Wilk Test Statistic	0.236
Shapiro Wilk Critical Value	0.905	Shapiro Wilk Critical Value	0.905
Data not Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	0.0489	95% H-UCL	0.0382
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.0451
95% Adjusted-CLT UCL (Chen-1995)	0.0575	97.5% Chebyshev (MVUE) UCL	0.0513
95% Modified-t UCL (Johnson-1978)	0.0503	99% Chebyshev (MVUE) UCL	0.0635
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	2.332	**Data do not follow a Discernable Distribution (0.05)**	
Theta Star	0.0145		
MLE of Mean	0.0338		
MLE of Standard Deviation	0.0221		
nu star	93.28		
Approximate Chi Square Value (.05)	72.01	**Nonparametric Statistics**	
Adjusted Level of Significance	0.038	95% CLT UCL	0.0481
Adjusted Chi Square Value	70.53	95% Jackknife UCL	N/A
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	7.349	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.749	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.553	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.195	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.0719
		97.5% Chebyshev(Mean, Sd) UCL	0.0884
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.121
95% Approximate Gamma UCL	0.0437		
95% Adjusted Gamma UCL	0.0446		
Potential UCL to Use		Use 95% Student's-t UCL	0.0489
		or 95% Modified-t UCL	0.0503

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

301												
302	**Boron**											
303												
304	**General Statistics**											
305					Number of Valid Observations	20			Number of Distinct Observations	1		
306												
307												
308	**Warning: There is only one distinct observation value in this data set - resulting in '0' variance!**											
309	**ProUCL (or any other software) should not be used on such a data set!**											
310	**The data set for variable Boron was not processed!**											
311												
312	**If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.**											
313	**The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).**											
314												
315												
316												
317	**Cadmium**											
318												
319	**General Statistics**											
320					Number of Valid Observations	20			Number of Distinct Observations	20		
321												
322	**Raw Statistics**								**Log-transformed Statistics**			
323					Minimum	0.0045			Minimum of Log Data	-5.404		
324					Maximum	0.0291			Maximum of Log Data	-3.537		
325					Mean	0.0153			Mean of log Data	-4.333		
326					Median	0.013			SD of log Data	0.588		
327					SD	0.00806						
328					Coefficient of Variation	0.527						
329					Skewness	0.225						
330												
331	**Relevant UCL Statistics**											
332	**Normal Distribution Test**								**Lognormal Distribution Test**			
333					Shapiro Wilk Test Statistic	0.889			Shapiro Wilk Test Statistic	0.91		
334					Shapiro Wilk Critical Value	0.905			Shapiro Wilk Critical Value	0.905		
335	**Data not Normal at 5% Significance Level**								**Data appear Lognormal at 5% Significance Level**			
336												
337	**Assuming Normal Distribution**								**Assuming Lognormal Distribution**			
338					95% Student's-t UCL	0.0184			95% H-UCL	0.0207		
339	**95% UCLs (Adjusted for Skewness)**								95% Chebyshev (MVUE) UCL	0.0247		
340					95% Adjusted-CLT UCL (Chen-1995)	0.0183			97.5% Chebyshev (MVUE) UCL	0.0288		
341					95% Modified-t UCL (Johnson-1978)	0.0184			99% Chebyshev (MVUE) UCL	0.0367		
342												
343	**Gamma Distribution Test**								**Data Distribution**			
344					k star (bias corrected)	2.958			**Data Follow Appr. Gamma Distribution at 5% Significance Level**			
345					Theta Star	0.00517						
346					MLE of Mean	0.0153						
347					MLE of Standard Deviation	0.00889						
348					nu star	118.3						
349					Approximate Chi Square Value (.05)	94.21			**Nonparametric Statistics**			
350					Adjusted Level of Significance	0.038			95% CLT UCL	0.0182		

351					Adjusted Chi Square Value	92.51					95% Jackknife UCL	0.0184
352											95% Standard Bootstrap UCL	0.0182
353					Anderson-Darling Test Statistic	0.825					95% Bootstrap-t UCL	0.0184
354					Anderson-Darling 5% Critical Value	0.747					95% Hall's Bootstrap UCL	0.0181
355					Kolmogorov-Smirnov Test Statistic	0.174					95% Percentile Bootstrap UCL	0.0182
356					Kolmogorov-Smirnov 5% Critical Value	0.195					95% BCA Bootstrap UCL	0.0182
357					**Data follow Appr. Gamma Distribution at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.0231
358											97.5% Chebyshev(Mean, Sd) UCL	0.0265
359					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.0332
360					95% Approximate Gamma UCL	0.0192						
361					95% Adjusted Gamma UCL	0.0195						
362												
363					**Potential UCL to Use**						Use 95% Approximate Gamma UCL	0.0192
364												
365	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
366	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
367	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
368												
369												
370	**Calcium**											
371												
372	**General Statistics**											
373					Number of Valid Observations	20					Number of Distinct Observations	19
374												
375					**Raw Statistics**						**Log-transformed Statistics**	
376					Minimum	2880					Minimum of Log Data	7.966
377					Maximum	5390					Maximum of Log Data	8.592
378					Mean	4240					Mean of log Data	8.335
379					Median	4185					SD of log Data	0.192
380					SD	786.5						
381					Coefficient of Variation	0.185						
382					Skewness	-0.118						
383												
384	**Relevant UCL Statistics**											
385					**Normal Distribution Test**						**Lognormal Distribution Test**	
386					Shapiro Wilk Test Statistic	0.935					Shapiro Wilk Test Statistic	0.933
387					Shapiro Wilk Critical Value	0.905					Shapiro Wilk Critical Value	0.905
388					**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**	
389												
390					**Assuming Normal Distribution**						**Assuming Lognormal Distribution**	
391					95% Student's-t UCL	4544					95% H-UCL	4592
392					**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL	5039
393					95% Adjusted-CLT UCL (Chen-1995)	4524					97.5% Chebyshev (MVUE) UCL	5384
394					95% Modified-t UCL (Johnson-1978)	4543					99% Chebyshev (MVUE) UCL	6062
395												
396					**Gamma Distribution Test**						**Data Distribution**	
397					k star (bias corrected)	25.08					**Data appear Normal at 5% Significance Level**	
398					Theta Star	169						
399					MLE of Mean	4240						
400					MLE of Standard Deviation	846.6						

401					nu star	1003						
402					Approximate Chi Square Value (.05)	930.8	**Nonparametric Statistics**					
403					Adjusted Level of Significance	0.038					95% CLT UCL	4529
404					Adjusted Chi Square Value	925.2					95% Jackknife UCL	4544
405											95% Standard Bootstrap UCL	4522
406					Anderson-Darling Test Statistic	0.507					95% Bootstrap-t UCL	4552
407					Anderson-Darling 5% Critical Value	0.74					95% Hall's Bootstrap UCL	4505
408					Kolmogorov-Smirnov Test Statistic	0.166					95% Percentile Bootstrap UCL	4518
409					Kolmogorov-Smirnov 5% Critical Value	0.193					95% BCA Bootstrap UCL	4516
410					**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	5007
411											97.5% Chebyshev(Mean, Sd) UCL	5338
412					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	5990
413					95% Approximate Gamma UCL	4570						
414					95% Adjusted Gamma UCL	4598						
415												
416					**Potential UCL to Use**						Use 95% Student's-t UCL	4544
417												
418	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
419	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
420	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
421												
422												
423	**Chromium**											
424												
425	**General Statistics**											
426					Number of Valid Observations	20					Number of Distinct Observations	2
427												
428	**Raw Statistics**						**Log-transformed Statistics**					
429					Minimum	0.025					Minimum of Log Data	-3.689
430					Maximum	0.05					Maximum of Log Data	-2.996
431					Mean	0.0263					Mean of log Data	-3.654
432					Median	0.025					SD of log Data	0.155
433					SD	0.00559						
434					Coefficient of Variation	0.213						
435					Skewness	4.472						
436												
437												
438	**Warning: There are only 2 Distinct Values in this data**											
439	**There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.**											
440	**Those methods will return a 'N/A' value on your output display!**											
441												
442	**It is necessary to have 4 or more Distinct Values to compute bootstrap methods.**											
443	**However, results obtained using 4 to 9 distinct values may not be reliable.**											
444	**It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.**											
445												
446	**Relevant UCL Statistics**											
447	**Normal Distribution Test**						**Lognormal Distribution Test**					
448					Shapiro Wilk Test Statistic	0.236					Shapiro Wilk Test Statistic	0.236
449					Shapiro Wilk Critical Value	0.905					Shapiro Wilk Critical Value	0.905
450	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					

451												
452	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
453					95% Student's-t UCL	0.0284					95% H-UCL	0.0279
454	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.0301
455					95% Adjusted-CLT UCL (Chen-1995)	0.0296					97.5% Chebyshev (MVUE) UCL	0.0319
456					95% Modified-t UCL (Johnson-1978)	0.0286					99% Chebyshev (MVUE) UCL	0.0352
457												
458	**Gamma Distribution Test**						**Data Distribution**					
459					k star (bias corrected)	30.25	**Data do not follow a Discernable Distribution (0.05)**					
460					Theta Star	0.0008679						
461					MLE of Mean	0.0263						
462					MLE of Standard Deviation	0.00477						
463					nu star	1210						
464					Approximate Chi Square Value (.05)	1130	**Nonparametric Statistics**					
465					Adjusted Level of Significance	0.038					95% CLT UCL	0.0283
466					Adjusted Chi Square Value	1124					95% Jackknife UCL	N/A
467											95% Standard Bootstrap UCL	N/A
468					Anderson-Darling Test Statistic	7.235					95% Bootstrap-t UCL	N/A
469					Anderson-Darling 5% Critical Value	0.74					95% Hall's Bootstrap UCL	N/A
470					Kolmogorov-Smirnov Test Statistic	0.542					95% Percentile Bootstrap UCL	N/A
471					Kolmogorov-Smirnov 5% Critical Value	0.193					95% BCA Bootstrap UCL	N/A
472	**Data not Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	0.0317
473											97.5% Chebyshev(Mean, Sd) UCL	0.0341
474	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	0.0387
475					95% Approximate Gamma UCL	0.0281						
476					95% Adjusted Gamma UCL	0.0283						
477												
478	**Potential UCL to Use**										Use 95% Student's-t UCL	0.0284
479											or 95% Modified-t UCL	0.0286
480												
481	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
482	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
483	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
484												
485												
486	**Cobalt**											
487												
488	**General Statistics**											
489					Number of Valid Observations	20					Number of Distinct Observations	18
490												
491	**Raw Statistics**						**Log-transformed Statistics**					
492					Minimum	0.007					Minimum of Log Data	-4.962
493					Maximum	0.157					Maximum of Log Data	-1.852
494					Mean	0.0439					Mean of log Data	-3.443
495					Median	0.0325					SD of log Data	0.844
496					SD	0.0363						
497					Coefficient of Variation	0.827						
498					Skewness	1.662						
499												
500	**Relevant UCL Statistics**											

	A	B	C	D	E	F	G	H	I	J	K	L
501	**Normal Distribution Test**						**Lognormal Distribution Test**					
502					Shapiro Wilk Test Statistic	0.838					Shapiro Wilk Test Statistic	0.966
503					Shapiro Wilk Critical Value	0.905					Shapiro Wilk Critical Value	0.905
504	**Data not Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
505												
506	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
507					95% Student's-t UCL	0.0579					95% H-UCL	0.0728
508	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.0846
509					95% Adjusted-CLT UCL (Chen-1995)	0.0605					97.5% Chebyshev (MVUE) UCL	0.102
510					95% Modified-t UCL (Johnson-1978)	0.0584					99% Chebyshev (MVUE) UCL	0.136
511												
512	**Gamma Distribution Test**						**Data Distribution**					
513					k star (bias corrected)	1.499	**Data appear Gamma Distributed at 5% Significance Level**					
514					Theta Star	0.0293						
515					MLE of Mean	0.0439						
516					MLE of Standard Deviation	0.0359						
517					nu star	59.95						
518					Approximate Chi Square Value (.05)	43.15	**Nonparametric Statistics**					
519					Adjusted Level of Significance	0.038					95% CLT UCL	0.0573
520					Adjusted Chi Square Value	42.02					95% Jackknife UCL	0.0579
521											95% Standard Bootstrap UCL	0.0569
522					Anderson-Darling Test Statistic	0.367					95% Bootstrap-t UCL	0.0617
523					Anderson-Darling 5% Critical Value	0.755					95% Hall's Bootstrap UCL	0.0672
524					Kolmogorov-Smirnov Test Statistic	0.159					95% Percentile Bootstrap UCL	0.058
525					Kolmogorov-Smirnov 5% Critical Value	0.197					95% BCA Bootstrap UCL	0.0608
526	**Data appear Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	0.0793
527											97.5% Chebyshev(Mean, Sd) UCL	0.0946
528	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	0.125
529					95% Approximate Gamma UCL	0.061						
530					95% Adjusted Gamma UCL	0.0626						
531												
532	**Potential UCL to Use**										Use 95% Approximate Gamma UCL	0.061
533												
534	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
535	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
536	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
537												
538												
539	**Copper**											
540												
541	**General Statistics**											
542					Number of Valid Observations	20					Number of Distinct Observations	14
543												
544	**Raw Statistics**						**Log-transformed Statistics**					
545					Minimum	0.31					Minimum of Log Data	-1.171
546					Maximum	0.55					Maximum of Log Data	-0.598
547					Mean	0.405					Mean of log Data	-0.921
548					Median	0.388					SD of log Data	0.188
549					SD	0.0771						
550					Coefficient of Variation	0.191						

	Skewness	0.415
	Relevant UCL Statistics	
	Normal Distribution Test	**Lognormal Distribution Test**
	Shapiro Wilk Test Statistic 0.914	Shapiro Wilk Test Statistic 0.922
	Shapiro Wilk Critical Value 0.905	Shapiro Wilk Critical Value 0.905
	Data appear Normal at 5% Significance Level	**Data appear Lognormal at 5% Significance Level**
	Assuming Normal Distribution	**Assuming Lognormal Distribution**
	95% Student's-t UCL 0.435	95% H-UCL 0.437
	95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL 0.479
	95% Adjusted-CLT UCL (Chen-1995) 0.435	97.5% Chebyshev (MVUE) UCL 0.511
	95% Modified-t UCL (Johnson-1978) 0.435	99% Chebyshev (MVUE) UCL 0.575
	Gamma Distribution Test	**Data Distribution**
	k star (bias corrected) 25.29	**Data appear Normal at 5% Significance Level**
	Theta Star 0.016	
	MLE of Mean 0.405	
	MLE of Standard Deviation 0.0805	
	nu star 1011	
	Approximate Chi Square Value (.05) 938.7	**Nonparametric Statistics**
	Adjusted Level of Significance 0.038	95% CLT UCL 0.433
	Adjusted Chi Square Value 933.1	95% Jackknife UCL 0.435
		95% Standard Bootstrap UCL 0.432
	Anderson-Darling Test Statistic 0.64	95% Bootstrap-t UCL 0.435
	Anderson-Darling 5% Critical Value 0.74	95% Hall's Bootstrap UCL 0.434
	Kolmogorov-Smirnov Test Statistic 0.164	95% Percentile Bootstrap UCL 0.431
	Kolmogorov-Smirnov 5% Critical Value 0.193	95% BCA Bootstrap UCL 0.432
	Data appear Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL 0.48
		97.5% Chebyshev(Mean, Sd) UCL 0.512
	Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL 0.576
	95% Approximate Gamma UCL 0.436	
	95% Adjusted Gamma UCL 0.439	
	Potential UCL to Use	Use 95% Student's-t UCL 0.435
	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.	
	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)	
	and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.	
	Iron	
	General Statistics	
	Number of Valid Observations 20	Number of Distinct Observations 6
	Raw Statistics	**Log-transformed Statistics**
	Minimum 3	Minimum of Log Data 1.099
	Maximum 7	Maximum of Log Data 1.946
	Mean 4.925	Mean of log Data 1.573

601					Median	5					SD of log Data	0.218
602					SD	1.004						
603					Coefficient of Variation	0.204						
604					Skewness	-0.163						
605												
606												
607					**Relevant UCL Statistics**							
608					**Normal Distribution Test**					**Lognormal Distribution Test**		
609					Shapiro Wilk Test Statistic	0.918				Shapiro Wilk Test Statistic		0.887
610					Shapiro Wilk Critical Value	0.905				Shapiro Wilk Critical Value		0.905
611					**Data appear Normal at 5% Significance Level**					**Data not Lognormal at 5% Significance Level**		
612												
613					**Assuming Normal Distribution**					**Assuming Lognormal Distribution**		
614					95% Student's-t UCL	5.313				95% H-UCL		5.4
615					**95% UCLs (Adjusted for Skewness)**					95% Chebyshev (MVUE) UCL		5.985
616					95% Adjusted-CLT UCL (Chen-1995)	5.285				97.5% Chebyshev (MVUE) UCL		6.442
617					95% Modified-t UCL (Johnson-1978)	5.312				99% Chebyshev (MVUE) UCL		7.338
618												
619					**Gamma Distribution Test**					**Data Distribution**		
620					k star (bias corrected)	20.01				**Data appear Normal at 5% Significance Level**		
621					Theta Star	0.246						
622					MLE of Mean	4.925						
623					MLE of Standard Deviation	1.101						
624					nu star	800.6						
625					Approximate Chi Square Value (.05)	735.9				**Nonparametric Statistics**		
626					Adjusted Level of Significance	0.038				95% CLT UCL		5.294
627					Adjusted Chi Square Value	731				95% Jackknife UCL		5.313
628										95% Standard Bootstrap UCL		5.28
629					Anderson-Darling Test Statistic	0.989				95% Bootstrap-t UCL		5.3
630					Anderson-Darling 5% Critical Value	0.741				95% Hall's Bootstrap UCL		5.325
631					Kolmogorov-Smirnov Test Statistic	0.257				95% Percentile Bootstrap UCL		5.275
632					Kolmogorov-Smirnov 5% Critical Value	0.193				95% BCA Bootstrap UCL		5.275
633					**Data not Gamma Distributed at 5% Significance Level**					95% Chebyshev(Mean, Sd) UCL		5.903
634										97.5% Chebyshev(Mean, Sd) UCL		6.326
635					**Assuming Gamma Distribution**					99% Chebyshev(Mean, Sd) UCL		7.158
636					95% Approximate Gamma UCL	5.358						
637					95% Adjusted Gamma UCL	5.394						
638												
639					**Potential UCL to Use**					Use 95% Student's-t UCL		5.313
640												
641					**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**							
642					**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**							
643					**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**							
644												
645												
646	**Lead**											
647												
648					**General Statistics**							
649					Number of Valid Observations	20				Number of Distinct Observations		15
650												

	A	B	C	D	E	F	G	H	I	J	K	L
651	**Raw Statistics**						**Log-transformed Statistics**					
652					Minimum	0.00475					Minimum of Log Data	-5.35
653					Maximum	0.032					Maximum of Log Data	-3.442
654					Mean	0.0135					Mean of log Data	-4.411
655					Median	0.0115					SD of log Data	0.463
656					SD	0.00659						
657					Coefficient of Variation	0.49						
658					Skewness	1.337						
659												
660	**Relevant UCL Statistics**											
661	**Normal Distribution Test**						**Lognormal Distribution Test**					
662					Shapiro Wilk Test Statistic	0.893					Shapiro Wilk Test Statistic	0.984
663					Shapiro Wilk Critical Value	0.905					Shapiro Wilk Critical Value	0.905
664	**Data not Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
665												
666	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
667					95% Student's-t UCL	0.016					95% H-UCL	0.0167
668	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.0197
669					95% Adjusted-CLT UCL (Chen-1995)	0.0164					97.5% Chebyshev (MVUE) UCL	0.0224
670					95% Modified-t UCL (Johnson-1978)	0.0161					99% Chebyshev (MVUE) UCL	0.0277
671												
672	**Gamma Distribution Test**						**Data Distribution**					
673					k star (bias corrected)	4.295	**Data appear Gamma Distributed at 5% Significance Level**					
674					Theta Star	0.00313						
675					MLE of Mean	0.0135						
676					MLE of Standard Deviation	0.0065						
677					nu star	171.8						
678					Approximate Chi Square Value (.05)	142.5	**Nonparametric Statistics**					
679					Adjusted Level of Significance	0.038					95% CLT UCL	0.0159
680					Adjusted Chi Square Value	140.4					95% Jackknife UCL	0.016
681											95% Standard Bootstrap UCL	0.0158
682					Anderson-Darling Test Statistic	0.319					95% Bootstrap-t UCL	0.0169
683					Anderson-Darling 5% Critical Value	0.745					95% Hall's Bootstrap UCL	0.0172
684					Kolmogorov-Smirnov Test Statistic	0.121					95% Percentile Bootstrap UCL	0.0158
685					Kolmogorov-Smirnov 5% Critical Value	0.194					95% BCA Bootstrap UCL	0.0164
686	**Data appear Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	0.0199
687											97.5% Chebyshev(Mean, Sd) UCL	0.0227
688	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	0.0281
689					95% Approximate Gamma UCL	0.0162						
690					95% Adjusted Gamma UCL	0.0165						
691												
692	**Potential UCL to Use**										Use 95% Approximate Gamma UCL	0.0162
693												
694	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
695	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
696	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
697												
698												
699	**Lithium**											
700												

701	**General Statistics**											
702	Number of Valid Observations				20		Number of Distinct Observations					4
703												
704	**Raw Statistics**						**Log-transformed Statistics**					
705	Minimum				0.0025		Minimum of Log Data					-5.991
706	Maximum				0.007		Maximum of Log Data					-4.962
707	Mean				0.0042		Mean of log Data					-5.566
708	Median				0.00375		SD of log Data					0.445
709	SD				0.00182							
710	Coefficient of Variation				0.433							
711	Skewness				0.248							
712												
713												
714	**Warning: There are only 4 Distinct Values in this data**											
715	**There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.**											
716	**Those methods will return a 'N/A' value on your output display!**											
717												
718	**It is necessary to have 4 or more Distinct Values to compute bootstrap methods.**											
719	**However, results obtained using 4 to 9 distinct values may not be reliable.**											
720	**It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.**											
721												
722	**Relevant UCL Statistics**											
723	**Normal Distribution Test**						**Lognormal Distribution Test**					
724	Shapiro Wilk Test Statistic				0.767		Shapiro Wilk Test Statistic					0.737
725	Shapiro Wilk Critical Value				0.905		Shapiro Wilk Critical Value					0.905
726	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
727												
728	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
729	95% Student's-t UCL				0.0049		95% H-UCL					0.00517
730	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					0.00608
731	95% Adjusted-CLT UCL (Chen-1995)				0.00489		97.5% Chebyshev (MVUE) UCL					0.00689
732	95% Modified-t UCL (Johnson-1978)				0.00491		99% Chebyshev (MVUE) UCL					0.00849
733												
734	**Gamma Distribution Test**						**Data Distribution**					
735	k star (bias corrected)				4.741		**Data do not follow a Discernable Distribution (0.05)**					
736	Theta Star				0.000886							
737	MLE of Mean				0.0042							
738	MLE of Standard Deviation				0.00193							
739	nu star				189.6							
740	Approximate Chi Square Value (.05)				158.8		**Nonparametric Statistics**					
741	Adjusted Level of Significance				0.038		95% CLT UCL					0.00487
742	Adjusted Chi Square Value				156.5		95% Jackknife UCL					0.0049
743							95% Standard Bootstrap UCL					0.00485
744	Anderson-Darling Test Statistic				2.403		95% Bootstrap-t UCL					0.00494
745	Anderson-Darling 5% Critical Value				0.745		95% Hall's Bootstrap UCL					0.00487
746	Kolmogorov-Smirnov Test Statistic				0.336		95% Percentile Bootstrap UCL					0.00488
747	Kolmogorov-Smirnov 5% Critical Value				0.194		95% BCA Bootstrap UCL					0.00483
748	**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					0.00597
749							97.5% Chebyshev(Mean, Sd) UCL					0.00674
750	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL					0.00824

751				95% Approximate Gamma UCL	0.00502							
752				95% Adjusted Gamma UCL	0.00509							
753												
754				**Potential UCL to Use**						Use 95% Student's-t UCL	0.0049	
755										or 95% Modified-t UCL	0.00491	
756												
757	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
758	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
759	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
760												
761												
762	**Magnesium**											
763												
764	**General Statistics**											
765				Number of Valid Observations	20					Number of Distinct Observations	17	
766												
767	**Raw Statistics**						**Log-transformed Statistics**					
768				Minimum	280					Minimum of Log Data	5.635	
769				Maximum	366					Maximum of Log Data	5.903	
770				Mean	324.8					Mean of log Data	5.781	
771				Median	324					SD of log Data	0.0724	
772				SD	23.3							
773				Coefficient of Variation	0.0717							
774				Skewness	-0.149							
775												
776	**Relevant UCL Statistics**											
777	**Normal Distribution Test**						**Lognormal Distribution Test**					
778				Shapiro Wilk Test Statistic	0.964					Shapiro Wilk Test Statistic	0.961	
779				Shapiro Wilk Critical Value	0.905					Shapiro Wilk Critical Value	0.905	
780	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
781												
782	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
783				95% Student's-t UCL	333.8					95% H-UCL	N/A	
784	**95% UCLs (Adjusted for Skewness)**									95% Chebyshev (MVUE) UCL	347.7	
785				95% Adjusted-CLT UCL (Chen-1995)	333.2					97.5% Chebyshev (MVUE) UCL	357.7	
786				95% Modified-t UCL (Johnson-1978)	333.8					99% Chebyshev (MVUE) UCL	377.1	
787												
788	**Gamma Distribution Test**						**Data Distribution**					
789				k star (bias corrected)	172.1		**Data appear Normal at 5% Significance Level**					
790				Theta Star	1.887							
791				MLE of Mean	324.8							
792				MLE of Standard Deviation	24.76							
793				nu star	6885							
794				Approximate Chi Square Value (.05)	6693		**Nonparametric Statistics**					
795				Adjusted Level of Significance	0.038					95% CLT UCL	333.4	
796				Adjusted Chi Square Value	6678					95% Jackknife UCL	333.8	
797										95% Standard Bootstrap UCL	333.1	
798				Anderson-Darling Test Statistic	0.405					95% Bootstrap-t UCL	333.8	
799				Anderson-Darling 5% Critical Value	0.74					95% Hall's Bootstrap UCL	332.9	
800				Kolmogorov-Smirnov Test Statistic	0.174					95% Percentile Bootstrap UCL	333.3	

801					Kolmogorov-Smirnov 5% Critical Value	0.193					95% BCA Bootstrap UCL	332.7
802					**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	347.5
803											97.5% Chebyshev(Mean, Sd) UCL	357.3
804					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	376.6
805					95% Approximate Gamma UCL	334.1						
806					95% Adjusted Gamma UCL	334.9						
807												
808					**Potential UCL to Use**						Use 95% Student's-t UCL	333.8
809												
810	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
811	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
812	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
813												
814												
815	**Manganese**											
816												
817					**General Statistics**							
818					Number of Valid Observations	20					Number of Distinct Observations	19
819												
820					**Raw Statistics**						**Log-transformed Statistics**	
821					Minimum	1.74					Minimum of Log Data	0.554
822					Maximum	5.18					Maximum of Log Data	1.645
823					Mean	3.003					Mean of log Data	1.058
824					Median	2.86					SD of log Data	0.297
825					SD	0.904						
826					Coefficient of Variation	0.301						
827					Skewness	0.675						
828												
829					**Relevant UCL Statistics**							
830					**Normal Distribution Test**						**Lognormal Distribution Test**	
831					Shapiro Wilk Test Statistic	0.947					Shapiro Wilk Test Statistic	0.974
832					Shapiro Wilk Critical Value	0.905					Shapiro Wilk Critical Value	0.905
833					**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**	
834												
835					**Assuming Normal Distribution**						**Assuming Lognormal Distribution**	
836					95% Student's-t UCL	3.353					95% H-UCL	3.414
837					**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL	3.884
838					95% Adjusted-CLT UCL (Chen-1995)	3.368					97.5% Chebyshev (MVUE) UCL	4.265
839					95% Modified-t UCL (Johnson-1978)	3.358					99% Chebyshev (MVUE) UCL	5.014
840												
841					**Gamma Distribution Test**						**Data Distribution**	
842					k star (bias corrected)	10.3					**Data appear Normal at 5% Significance Level**	
843					Theta Star	0.292						
844					MLE of Mean	3.003						
845					MLE of Standard Deviation	0.936						
846					nu star	411.9						
847					Approximate Chi Square Value (.05)	365.9					**Nonparametric Statistics**	
848					Adjusted Level of Significance	0.038					95% CLT UCL	3.336
849					Adjusted Chi Square Value	362.5					95% Jackknife UCL	3.353
850											95% Standard Bootstrap UCL	3.327

851					Anderson-Darling Test Statistic	0.253					95% Bootstrap-t UCL	3.383
852					Anderson-Darling 5% Critical Value	0.742					95% Hall's Bootstrap UCL	3.375
853					Kolmogorov-Smirnov Test Statistic	0.117					95% Percentile Bootstrap UCL	3.341
854					Kolmogorov-Smirnov 5% Critical Value	0.194					95% BCA Bootstrap UCL	3.372
855					**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	3.884
856											97.5% Chebyshev(Mean, Sd) UCL	4.265
857					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	5.014
858					95% Approximate Gamma UCL	3.381						
859					95% Adjusted Gamma UCL	3.413						
860												
861					**Potential UCL to Use**						Use 95% Student's-t UCL	3.353
862												
863	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
864	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
865	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
866												
867												
868	**Mercury**											
869												
870					**General Statistics**							
871					Number of Valid Observations	20					Number of Distinct Observations	11
872												
873					**Raw Statistics**						**Log-transformed Statistics**	
874					Minimum	0.09					Minimum of Log Data	-2.408
875					Maximum	0.19					Maximum of Log Data	-1.661
876					Mean	0.13					Mean of log Data	-2.067
877					Median	0.123					SD of log Data	0.235
878					SD	0.0316						
879					Coefficient of Variation	0.243						
880					Skewness	0.661						
881												
882					**Relevant UCL Statistics**							
883					**Normal Distribution Test**						**Lognormal Distribution Test**	
884					Shapiro Wilk Test Statistic	0.916					Shapiro Wilk Test Statistic	0.943
885					Shapiro Wilk Critical Value	0.905					Shapiro Wilk Critical Value	0.905
886					**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**	
887												
888					**Assuming Normal Distribution**						**Assuming Lognormal Distribution**	
889					95% Student's-t UCL	0.142					95% H-UCL	0.143
890					**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL	0.16
891					95% Adjusted-CLT UCL (Chen-1995)	0.143					97.5% Chebyshev (MVUE) UCL	0.173
892					95% Modified-t UCL (Johnson-1978)	0.142					99% Chebyshev (MVUE) UCL	0.199
893												
894					**Gamma Distribution Test**						**Data Distribution**	
895					k star (bias corrected)	16.02					**Data appear Normal at 5% Significance Level**	
896					Theta Star	0.00812						
897					MLE of Mean	0.13						
898					MLE of Standard Deviation	0.0325						
899					nu star	640.6						
900					Approximate Chi Square Value (.05)	582.9					**Nonparametric Statistics**	

901	Adjusted Level of Significance	0.038								95% CLT UCL	0.142	
902	Adjusted Chi Square Value	578.6								95% Jackknife UCL	0.142	
903										95% Standard Bootstrap UCL	0.142	
904	Anderson-Darling Test Statistic	0.442								95% Bootstrap-t UCL	0.143	
905	Anderson-Darling 5% Critical Value	0.741								95% Hall's Bootstrap UCL	0.142	
906	Kolmogorov-Smirnov Test Statistic	0.135								95% Percentile Bootstrap UCL	0.142	
907	Kolmogorov-Smirnov 5% Critical Value	0.194								95% BCA Bootstrap UCL	0.143	
908	**Data appear Gamma Distributed at 5% Significance Level**									95% Chebyshev(Mean, Sd) UCL	0.161	
909										97.5% Chebyshev(Mean, Sd) UCL	0.174	
910	**Assuming Gamma Distribution**									99% Chebyshev(Mean, Sd) UCL	0.2	
911	95% Approximate Gamma UCL	0.143										
912	95% Adjusted Gamma UCL	0.144										
913												
914	**Potential UCL to Use**									Use 95% Student's-t UCL	0.142	
915												
916	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
917	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
918	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
919												
920												
921	**Molybdenum**											
922												
923	**General Statistics**											
924	Number of Valid Observations	20								Number of Distinct Observations	12	
925												
926	**Raw Statistics**									**Log-transformed Statistics**		
927	Minimum	0.006								Minimum of Log Data	-5.116	
928	Maximum	0.026								Maximum of Log Data	-3.65	
929	Mean	0.0118								Mean of log Data	-4.538	
930	Median	0.01								SD of log Data	0.435	
931	SD	0.00559										
932	Coefficient of Variation	0.476										
933	Skewness	1.183										
934												
935	**Relevant UCL Statistics**											
936	**Normal Distribution Test**									**Lognormal Distribution Test**		
937	Shapiro Wilk Test Statistic	0.859								Shapiro Wilk Test Statistic	0.931	
938	Shapiro Wilk Critical Value	0.905								Shapiro Wilk Critical Value	0.905	
939	**Data not Normal at 5% Significance Level**									**Data appear Lognormal at 5% Significance Level**		
940												
941	**Assuming Normal Distribution**									**Assuming Lognormal Distribution**		
942	95% Student's-t UCL	0.0139								95% H-UCL	0.0143	
943	**95% UCLs (Adjusted for Skewness)**									95% Chebyshev (MVUE) UCL	0.0168	
944	95% Adjusted-CLT UCL (Chen-1995)	0.0142								97.5% Chebyshev (MVUE) UCL	0.019	
945	95% Modified-t UCL (Johnson-1978)	0.014								99% Chebyshev (MVUE) UCL	0.0233	
946												
947	**Gamma Distribution Test**									**Data Distribution**		
948	k star (bias corrected)	4.665								**Data appear Gamma Distributed at 5% Significance Level**		
949	Theta Star	0.00252										
950	MLE of Mean	0.0118										

951	MLE of Standard Deviation	0.00544										
952	nu star	186.6										
953	Approximate Chi Square Value (.05)	156					**Nonparametric Statistics**					
954	Adjusted Level of Significance	0.038									95% CLT UCL	0.0138
955	Adjusted Chi Square Value	153.8									95% Jackknife UCL	0.0139
956											95% Standard Bootstrap UCL	0.0137
957	Anderson-Darling Test Statistic	0.687									95% Bootstrap-t UCL	0.0144
958	Anderson-Darling 5% Critical Value	0.745									95% Hall's Bootstrap UCL	0.0142
959	Kolmogorov-Smirnov Test Statistic	0.188									95% Percentile Bootstrap UCL	0.0139
960	Kolmogorov-Smirnov 5% Critical Value	0.194									95% BCA Bootstrap UCL	0.0142
961	**Data appear Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	0.0172
962											97.5% Chebyshev(Mean, Sd) UCL	0.0196
963	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	0.0242
964	95% Approximate Gamma UCL	0.0141										
965	95% Adjusted Gamma UCL	0.0143										
966												
967	**Potential UCL to Use**										Use 95% Approximate Gamma UCL	0.0141
968												
969	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
970	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
971	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
972												
973												
974	**Nickel**											
975												
976	**General Statistics**											
977	Number of Valid Observations	20					Number of Distinct Observations	2				
978												
979	**Raw Statistics**						**Log-transformed Statistics**					
980	Minimum	0.025					Minimum of Log Data	-3.689				
981	Maximum	0.06					Maximum of Log Data	-2.813				
982	Mean	0.0268					Mean of log Data	-3.645				
983	Median	0.025					SD of log Data	0.196				
984	SD	0.00783										
985	Coefficient of Variation	0.293										
986	Skewness	4.472										
987												
988												
989	**Warning: There are only 2 Distinct Values in this data**											
990	**There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.**											
991	**Those methods will return a 'N/A' value on your output display!**											
992												
993	**It is necessary to have 4 or more Distinct Values to compute bootstrap methods.**											
994	**However, results obtained using 4 to 9 distinct values may not be reliable.**											
995	**It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.**											
996												
997	**Relevant UCL Statistics**											
998	**Normal Distribution Test**						**Lognormal Distribution Test**					
999	Shapiro Wilk Test Statistic	0.236					Shapiro Wilk Test Statistic	0.236				
1000	Shapiro Wilk Critical Value	0.905					Shapiro Wilk Critical Value	0.905				

1001	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
1002												
1003	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1004	95% Student's-t UCL					0.0298	95% H-UCL					0.0288
1005	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					0.0317
1006	95% Adjusted-CLT UCL (Chen-1995)					0.0315	97.5% Chebyshev (MVUE) UCL					0.0339
1007	95% Modified-t UCL (Johnson-1978)					0.0301	99% Chebyshev (MVUE) UCL					0.0383
1008												
1009	**Gamma Distribution Test**						**Data Distribution**					
1010	k star (bias corrected)					17.97	**Data do not follow a Discernable Distribution (0.05)**					
1011	Theta Star					0.00149						
1012	MLE of Mean					0.0268						
1013	MLE of Standard Deviation					0.00631						
1014	nu star					718.7						
1015	Approximate Chi Square Value (.05)					657.5	**Nonparametric Statistics**					
1016	Adjusted Level of Significance					0.038	95% CLT UCL					0.0296
1017	Adjusted Chi Square Value					652.9	95% Jackknife UCL					N/A
1018							95% Standard Bootstrap UCL					N/A
1019	Anderson-Darling Test Statistic					7.242	95% Bootstrap-t UCL					N/A
1020	Anderson-Darling 5% Critical Value					0.741	95% Hall's Bootstrap UCL					N/A
1021	Kolmogorov-Smirnov Test Statistic					0.543	95% Percentile Bootstrap UCL					N/A
1022	Kolmogorov-Smirnov 5% Critical Value					0.193	95% BCA Bootstrap UCL					N/A
1023	**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					0.0344
1024							97.5% Chebyshev(Mean, Sd) UCL					0.0377
1025	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL					0.0442
1026	95% Approximate Gamma UCL					0.0292						
1027	95% Adjusted Gamma UCL					0.0294						
1028												
1029	**Potential UCL to Use**						Use 95% Student's-t UCL					0.0298
1030							or 95% Modified-t UCL					0.0301
1031												
1032	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1033	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1034	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1035												
1036												
1037	**Potassium**											
1038												
1039	**General Statistics**											
1040	Number of Valid Observations					20	Number of Distinct Observations					16
1041												
1042	**Raw Statistics**						**Log-transformed Statistics**					
1043	Minimum					3710	Minimum of Log Data					8.219
1044	Maximum					4050	Maximum of Log Data					8.306
1045	Mean					3905	Mean of log Data					8.27
1046	Median					3900	SD of log Data					0.0266
1047	SD					103.7						
1048	Coefficient of Variation					0.0266						
1049	Skewness					-0.245						
1050												

1051	**Relevant UCL Statistics**											
1052	**Normal Distribution Test**						**Lognormal Distribution Test**					
1053	Shapiro Wilk Test Statistic				0.945		Shapiro Wilk Test Statistic					0.945
1054	Shapiro Wilk Critical Value				0.905		Shapiro Wilk Critical Value					0.905
1055	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
1056												
1057	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1058	95% Student's-t UCL				3945		95% H-UCL					N/A
1059	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					4007
1060	95% Adjusted-CLT UCL (Chen-1995)				3942		97.5% Chebyshev (MVUE) UCL					4051
1061	95% Modified-t UCL (Johnson-1978)				3945		99% Chebyshev (MVUE) UCL					4137
1062												
1063	**Gamma Distribution Test**						**Data Distribution**					
1064	k star (bias corrected)				1263		**Data appear Normal at 5% Significance Level**					
1065	Theta Star				3.092							
1066	MLE of Mean				3905							
1067	MLE of Standard Deviation				109.9							
1068	nu star				50520							
1069	Approximate Chi Square Value (.05)				49999		**Nonparametric Statistics**					
1070	Adjusted Level of Significance				0.038		95% CLT UCL					3943
1071	Adjusted Chi Square Value				49958		95% Jackknife UCL					3945
1072							95% Standard Bootstrap UCL					3941
1073	Anderson-Darling Test Statistic				0.394		95% Bootstrap-t UCL					3943
1074	Anderson-Darling 5% Critical Value				0.74		95% Hall's Bootstrap UCL					3942
1075	Kolmogorov-Smirnov Test Statistic				0.163		95% Percentile Bootstrap UCL					3942
1076	Kolmogorov-Smirnov 5% Critical Value				0.193		95% BCA Bootstrap UCL					3938
1077	**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					4006
1078							97.5% Chebyshev(Mean, Sd) UCL					4050
1079	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL					4136
1080	95% Approximate Gamma UCL				3946							
1081	95% Adjusted Gamma UCL				3949							
1082												
1083	**Potential UCL to Use**						Use 95% Student's-t UCL					3945
1084												
1085	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1086	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1087	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1088												
1089												
1090	**Rubidium**											
1091												
1092	**General Statistics**											
1093	Number of Valid Observations				20		Number of Distinct Observations					18
1094												
1095	**Raw Statistics**						**Log-transformed Statistics**					
1096	Minimum				9.13		Minimum of Log Data					2.212
1097	Maximum				17.3		Maximum of Log Data					2.851
1098	Mean				13.51		Mean of log Data					2.589
1099	Median				13.43		SD of log Data					0.174
1100	SD				2.258							

1101					Coefficient of Variation	0.167						
1102					Skewness	-0.202						
1103												
1104	**Relevant UCL Statistics**											
1105	**Normal Distribution Test**						**Lognormal Distribution Test**					
1106					Shapiro Wilk Test Statistic	0.975					Shapiro Wilk Test Statistic	0.96
1107					Shapiro Wilk Critical Value	0.905					Shapiro Wilk Critical Value	0.905
1108	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
1109												
1110	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1111					95% Student's-t UCL	14.38					95% H-UCL	14.51
1112	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	15.81
1113					95% Adjusted-CLT UCL (Chen-1995)	14.31					97.5% Chebyshev (MVUE) UCL	16.81
1114					95% Modified-t UCL (Johnson-1978)	14.37					99% Chebyshev (MVUE) UCL	18.77
1115												
1116	**Gamma Distribution Test**						**Data Distribution**					
1117					k star (bias corrected)	30.57	**Data appear Normal at 5% Significance Level**					
1118					Theta Star	0.442						
1119					MLE of Mean	13.51						
1120					MLE of Standard Deviation	2.443						
1121					nu star	1223						
1122					Approximate Chi Square Value (.05)	1142	**Nonparametric Statistics**					
1123					Adjusted Level of Significance	0.038					95% CLT UCL	14.34
1124					Adjusted Chi Square Value	1136					95% Jackknife UCL	14.38
1125											95% Standard Bootstrap UCL	14.33
1126					Anderson-Darling Test Statistic	0.239					95% Bootstrap-t UCL	14.33
1127					Anderson-Darling 5% Critical Value	0.74					95% Hall's Bootstrap UCL	14.28
1128					Kolmogorov-Smirnov Test Statistic	0.106					95% Percentile Bootstrap UCL	14.3
1129					Kolmogorov-Smirnov 5% Critical Value	0.193					95% BCA Bootstrap UCL	14.29
1130	**Data appear Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	15.71
1131											97.5% Chebyshev(Mean, Sd) UCL	16.66
1132	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	18.53
1133					95% Approximate Gamma UCL	14.45						
1134					95% Adjusted Gamma UCL	14.53						
1135												
1136	**Potential UCL to Use**										Use 95% Student's-t UCL	14.38
1137												
1138	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1139	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1140	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1141												
1142												
1143	**Selenium**											
1144												
1145	**General Statistics**											
1146					Number of Valid Observations	20					Number of Distinct Observations	14
1147												
1148	**Raw Statistics**						**Log-transformed Statistics**					
1149					Minimum	0.17					Minimum of Log Data	-1.772
1150					Maximum	0.4					Maximum of Log Data	-0.916

1151					Mean	0.31					Mean of log Data	-1.194
1152					Median	0.32					SD of log Data	0.23
1153					SD	0.0631						
1154					Coefficient of Variation	0.203						
1155					Skewness	-0.85						
1156												
1157					**Relevant UCL Statistics**							
1158					**Normal Distribution Test**						**Lognormal Distribution Test**	
1159					Shapiro Wilk Test Statistic	0.92					Shapiro Wilk Test Statistic	0.871
1160					Shapiro Wilk Critical Value	0.905					Shapiro Wilk Critical Value	0.905
1161					**Data appear Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**	
1162												
1163					**Assuming Normal Distribution**						**Assuming Lognormal Distribution**	
1164					95% Student's-t UCL	0.334					95% H-UCL	0.342
1165					**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL	0.381
1166					95% Adjusted-CLT UCL (Chen-1995)	0.33					97.5% Chebyshev (MVUE) UCL	0.411
1167					95% Modified-t UCL (Johnson-1978)	0.334					99% Chebyshev (MVUE) UCL	0.471
1168												
1169					**Gamma Distribution Test**						**Data Distribution**	
1170					k star (bias corrected)	18.55					**Data appear Normal at 5% Significance Level**	
1171					Theta Star	0.0167						
1172					MLE of Mean	0.31						
1173					MLE of Standard Deviation	0.072						
1174					nu star	742.1						
1175					Approximate Chi Square Value (.05)	679.9					**Nonparametric Statistics**	
1176					Adjusted Level of Significance	0.038					95% CLT UCL	0.333
1177					Adjusted Chi Square Value	675.2					95% Jackknife UCL	0.334
1178											95% Standard Bootstrap UCL	0.333
1179					Anderson-Darling Test Statistic	0.942					95% Bootstrap-t UCL	0.331
1180					Anderson-Darling 5% Critical Value	0.741					95% Hall's Bootstrap UCL	0.33
1181					Kolmogorov-Smirnov Test Statistic	0.228					95% Percentile Bootstrap UCL	0.332
1182					Kolmogorov-Smirnov 5% Critical Value	0.193					95% BCA Bootstrap UCL	0.331
1183					**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.371
1184											97.5% Chebyshev(Mean, Sd) UCL	0.398
1185					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.45
1186					95% Approximate Gamma UCL	0.338						
1187					95% Adjusted Gamma UCL	0.341						
1188												
1189					**Potential UCL to Use**						Use 95% Student's-t UCL	0.334
1190												
1191					**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**							
1192					**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**							
1193					**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**							
1194												
1195												
1196	**Silver**											
1197												
1198					**General Statistics**							
1199					Number of Valid Observations	20					Number of Distinct Observations	1
1200												

	A	B	C	D	E	F	G	H	I	J	K	L
1201												
1202	**Warning: There is only one distinct observation value in this data set - resulting in '0' variance!**											
1203	**ProUCL (or any other software) should not be used on such a data set!**											
1204	**The data set for variable Silver was not processed!**											
1205												
1206	**If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.**											
1207	**The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).**											
1208												
1209												
1210												
1211	**Sodium**											
1212												
1213	**General Statistics**											
1214	Number of Valid Observations					20	Number of Distinct Observations					17
1215												
1216	**Raw Statistics**						**Log-transformed Statistics**					
1217	Minimum					550	Minimum of Log Data					6.31
1218	Maximum					846	Maximum of Log Data					6.741
1219	Mean					644.5	Mean of log Data					6.464
1220	Median					644	SD of log Data					0.0915
1221	SD					62.03						
1222	Coefficient of Variation					0.0963						
1223	Skewness					1.598						
1224												
1225	**Relevant UCL Statistics**											
1226	**Normal Distribution Test**						**Lognormal Distribution Test**					
1227	Shapiro Wilk Test Statistic					0.85	Shapiro Wilk Test Statistic					0.893
1228	Shapiro Wilk Critical Value					0.905	Shapiro Wilk Critical Value					0.905
1229	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
1230												
1231	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1232	95% Student's-t UCL					668.5	95% H-UCL					N/A
1233	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					701.9
1234	95% Adjusted-CLT UCL (Chen-1995)					672.6	97.5% Chebyshev (MVUE) UCL					726.8
1235	95% Modified-t UCL (Johnson-1978)					669.3	99% Chebyshev (MVUE) UCL					775.8
1236												
1237	**Gamma Distribution Test**						**Data Distribution**					
1238	k star (bias corrected)					103.8	**Data appear Gamma Distributed at 5% Significance Level**					
1239	Theta Star					6.211						
1240	MLE of Mean					644.5						
1241	MLE of Standard Deviation					63.27						
1242	nu star					4150						
1243	Approximate Chi Square Value (.05)					4002	**Nonparametric Statistics**					
1244	Adjusted Level of Significance					0.038	95% CLT UCL					667.3
1245	Adjusted Chi Square Value					3990	95% Jackknife UCL					668.5
1246							95% Standard Bootstrap UCL					666.4
1247	Anderson-Darling Test Statistic					0.686	95% Bootstrap-t UCL					675.4
1248	Anderson-Darling 5% Critical Value					0.74	95% Hall's Bootstrap UCL					693.9
1249	Kolmogorov-Smirnov Test Statistic					0.176	95% Percentile Bootstrap UCL					667.3
1250	Kolmogorov-Smirnov 5% Critical Value					0.193	95% BCA Bootstrap UCL					672.9

1251	Data appear Gamma Distributed at 5% Significance Level										95% Chebyshev(Mean, Sd) UCL	704.9
1252											97.5% Chebyshev(Mean, Sd) UCL	731.1
1253	Assuming Gamma Distribution										99% Chebyshev(Mean, Sd) UCL	782.5
1254					95% Approximate Gamma UCL	668.4						
1255					95% Adjusted Gamma UCL	670.4						
1256												
1257	Potential UCL to Use										Use 95% Approximate Gamma UCL	668.4
1258												
1259	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1260	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1261	and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.											
1262												
1263												
1264	Strontium											
1265												
1266	General Statistics											
1267					Number of Valid Observations	20					Number of Distinct Observations	20
1268												
1269	Raw Statistics						Log-transformed Statistics					
1270					Minimum	5.65					Minimum of Log Data	1.732
1271					Maximum	15.5					Maximum of Log Data	2.741
1272					Mean	9.731					Mean of log Data	2.241
1273					Median	10.01					SD of log Data	0.274
1274					SD	2.585						
1275					Coefficient of Variation	0.266						
1276					Skewness	0.254						
1277												
1278	Relevant UCL Statistics											
1279	Normal Distribution Test						Lognormal Distribution Test					
1280					Shapiro Wilk Test Statistic	0.958					Shapiro Wilk Test Statistic	0.955
1281					Shapiro Wilk Critical Value	0.905					Shapiro Wilk Critical Value	0.905
1282	Data appear Normal at 5% Significance Level						Data appear Lognormal at 5% Significance Level					
1283												
1284	Assuming Normal Distribution						Assuming Lognormal Distribution					
1285					95% Student's-t UCL	10.73					95% H-UCL	10.95
1286	95% UCLs (Adjusted for Skewness)										95% Chebyshev (MVUE) UCL	12.36
1287					95% Adjusted-CLT UCL (Chen-1995)	10.72					97.5% Chebyshev (MVUE) UCL	13.5
1288					95% Modified-t UCL (Johnson-1978)	10.74					99% Chebyshev (MVUE) UCL	15.73
1289												
1290	Gamma Distribution Test						Data Distribution					
1291					k star (bias corrected)	12.43	Data appear Normal at 5% Significance Level					
1292					Theta Star	0.783						
1293					MLE of Mean	9.731						
1294					MLE of Standard Deviation	2.761						
1295					nu star	497						
1296					Approximate Chi Square Value (.05)	446.3	Nonparametric Statistics					
1297					Adjusted Level of Significance	0.038					95% CLT UCL	10.68
1298					Adjusted Chi Square Value	442.5					95% Jackknife UCL	10.73
1299											95% Standard Bootstrap UCL	10.64
1300					Anderson-Darling Test Statistic	0.402					95% Bootstrap-t UCL	10.77

1301					Anderson-Darling 5% Critical Value	0.741					95% Hall's Bootstrap UCL	10.76
1302					Kolmogorov-Smirnov Test Statistic	0.12					95% Percentile Bootstrap UCL	10.68
1303					Kolmogorov-Smirnov 5% Critical Value	0.194					95% BCA Bootstrap UCL	10.72
1304					**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	12.25
1305											97.5% Chebyshev(Mean, Sd) UCL	13.34
1306					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	15.48
1307					95% Approximate Gamma UCL	10.84						
1308					95% Adjusted Gamma UCL	10.93						
1309												
1310					**Potential UCL to Use**						Use 95% Student's-t UCL	10.73
1311												
1312	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1313	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1314	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1315												
1316												
1317	**Tellurium**											
1318												
1319	**General Statistics**											
1320					Number of Valid Observations	20					Number of Distinct Observations	1
1321												
1322												
1323	**Warning: There is only one distinct observation value in this data set - resulting in '0' variance!**											
1324	**ProUCL (or any other software) should not be used on such a data set!**											
1325	**The data set for variable Tellurium was not processed!**											
1326												
1327	**If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.**											
1328	**The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).**											
1329												
1330												
1331												
1332	**Thallium**											
1333												
1334	**General Statistics**											
1335					Number of Valid Observations	20					Number of Distinct Observations	13
1336												
1337					**Raw Statistics**						**Log-transformed Statistics**	
1338					Minimum	0.008					Minimum of Log Data	-4.828
1339					Maximum	0.048					Maximum of Log Data	-3.037
1340					Mean	0.0168					Mean of log Data	-4.208
1341					Median	0.014					SD of log Data	0.49
1342					SD	0.00956						
1343					Coefficient of Variation	0.568						
1344					Skewness	1.923						
1345												
1346	**Relevant UCL Statistics**											
1347					**Normal Distribution Test**						**Lognormal Distribution Test**	
1348					Shapiro Wilk Test Statistic	0.807					Shapiro Wilk Test Statistic	0.932
1349					Shapiro Wilk Critical Value	0.905					Shapiro Wilk Critical Value	0.905
1350					**Data not Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**	

1351												
1352	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1353					95% Student's-t UCL	0.0205					95% H-UCL	0.021
1354	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.0249
1355					95% Adjusted-CLT UCL (Chen-1995)	0.0213					97.5% Chebyshev (MVUE) UCL	0.0285
1356					95% Modified-t UCL (Johnson-1978)	0.0207					99% Chebyshev (MVUE) UCL	0.0355
1357												
1358	**Gamma Distribution Test**						**Data Distribution**					
1359					k star (bias corrected)	3.63	**Data appear Gamma Distributed at 5% Significance Level**					
1360					Theta Star	0.00463						
1361					MLE of Mean	0.0168						
1362					MLE of Standard Deviation	0.00883						
1363					nu star	145.2						
1364					Approximate Chi Square Value (.05)	118.4	**Nonparametric Statistics**					
1365					Adjusted Level of Significance	0.038					95% CLT UCL	0.0203
1366					Adjusted Chi Square Value	116.5					95% Jackknife UCL	0.0205
1367											95% Standard Bootstrap UCL	0.0203
1368					Anderson-Darling Test Statistic	0.55					95% Bootstrap-t UCL	0.0222
1369					Anderson-Darling 5% Critical Value	0.745					95% Hall's Bootstrap UCL	0.0251
1370					Kolmogorov-Smirnov Test Statistic	0.14					95% Percentile Bootstrap UCL	0.0204
1371					Kolmogorov-Smirnov 5% Critical Value	0.195					95% BCA Bootstrap UCL	0.0217
1372	**Data appear Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	0.0261
1373											97.5% Chebyshev(Mean, Sd) UCL	0.0302
1374	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	0.0381
1375					95% Approximate Gamma UCL	0.0206						
1376					95% Adjusted Gamma UCL	0.021						
1377												
1378	**Potential UCL to Use**										Use 95% Approximate Gamma UCL	0.0206
1379												
1380	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1381	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1382	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1383												
1384												
1385	**Tin**											
1386												
1387	**General Statistics**											
1388					Number of Valid Observations	20					Number of Distinct Observations	12
1389												
1390	**Raw Statistics**						**Log-transformed Statistics**					
1391					Minimum	0.0025					Minimum of Log Data	-5.991
1392					Maximum	0.457					Maximum of Log Data	-0.783
1393					Mean	0.0305					Mean of log Data	-4.928
1394					Median	0.0055					SD of log Data	1.255
1395					SD	0.101						
1396					Coefficient of Variation	3.296						
1397					Skewness	4.434						
1398												
1399	**Relevant UCL Statistics**											
1400	**Normal Distribution Test**						**Lognormal Distribution Test**					

1401					Shapiro Wilk Test Statistic	0.288					Shapiro Wilk Test Statistic	0.786
1402					Shapiro Wilk Critical Value	0.905					Shapiro Wilk Critical Value	0.905
1403					**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**	
1404												
1405					**Assuming Normal Distribution**						**Assuming Lognormal Distribution**	
1406					95% Student's-t UCL	0.0694					95% H-UCL	0.038
1407					**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL	0.0361
1408					95% Adjusted-CLT UCL (Chen-1995)	0.0914					97.5% Chebyshev (MVUE) UCL	0.0453
1409					95% Modified-t UCL (Johnson-1978)	0.0732					99% Chebyshev (MVUE) UCL	0.0633
1410												
1411					**Gamma Distribution Test**						**Data Distribution**	
1412					k star (bias corrected)	0.415					**Data do not follow a Discernable Distribution (0.05)**	
1413					Theta Star	0.0736						
1414					MLE of Mean	0.0305						
1415					MLE of Standard Deviation	0.0474						
1416					nu star	16.6						
1417					Approximate Chi Square Value (.05)	8.387					**Nonparametric Statistics**	
1418					Adjusted Level of Significance	0.038					95% CLT UCL	0.0676
1419					Adjusted Chi Square Value	7.927					95% Jackknife UCL	0.0694
1420											95% Standard Bootstrap UCL	0.0679
1421					Anderson-Darling Test Statistic	3.358					95% Bootstrap-t UCL	0.544
1422					Anderson-Darling 5% Critical Value	0.813					95% Hall's Bootstrap UCL	0.264
1423					Kolmogorov-Smirnov Test Statistic	0.326					95% Percentile Bootstrap UCL	0.075
1424					Kolmogorov-Smirnov 5% Critical Value	0.206					95% BCA Bootstrap UCL	0.102
1425					**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.129
1426											97.5% Chebyshev(Mean, Sd) UCL	0.171
1427					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.254
1428					95% Approximate Gamma UCL	0.0604						
1429					95% Adjusted Gamma UCL	0.0639						
1430												
1431					**Potential UCL to Use**						Use 95% Chebyshev (Mean, Sd) UCL	0.129
1432												
1433	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1434	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1435	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1436												
1437												
1438	**Tungsten**											
1439												
1440	**General Statistics**											
1441	Number of Valid Observations					20	Number of Distinct Observations					18
1442												
1443	**Raw Statistics**						**Log-transformed Statistics**					
1444	Minimum					0.024	Minimum of Log Data					-3.73
1445	Maximum					0.124	Maximum of Log Data					-2.087
1446	Mean					0.0516	Mean of log Data					-3.048
1447	Median					0.047	SD of log Data					0.412
1448	SD					0.0233						
1449	Coefficient of Variation					0.452						
1450	Skewness					1.589						

1451												
1452	**Relevant UCL Statistics**											
1453	**Normal Distribution Test**						**Lognormal Distribution Test**					
1454					Shapiro Wilk Test Statistic	0.87					Shapiro Wilk Test Statistic	0.973
1455					Shapiro Wilk Critical Value	0.905					Shapiro Wilk Critical Value	0.905
1456	**Data not Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
1457												
1458	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1459					95% Student's-t UCL	0.0606					95% H-UCL	0.0621
1460	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.0726
1461					95% Adjusted-CLT UCL (Chen-1995)	0.0622					97.5% Chebyshev (MVUE) UCL	0.0818
1462					95% Modified-t UCL (Johnson-1978)	0.061					99% Chebyshev (MVUE) UCL	0.0998
1463												
1464	**Gamma Distribution Test**						**Data Distribution**					
1465					k star (bias corrected)	5.239	**Data appear Gamma Distributed at 5% Significance Level**					
1466					Theta Star	0.00985						
1467					MLE of Mean	0.0516						
1468					MLE of Standard Deviation	0.0226						
1469					nu star	209.6						
1470					Approximate Chi Square Value (.05)	177.1	**Nonparametric Statistics**					
1471					Adjusted Level of Significance	0.038					95% CLT UCL	0.0602
1472					Adjusted Chi Square Value	174.7					95% Jackknife UCL	0.0606
1473											95% Standard Bootstrap UCL	0.0598
1474					Anderson-Darling Test Statistic	0.288					95% Bootstrap-t UCL	0.0638
1475					Anderson-Darling 5% Critical Value	0.744					95% Hall's Bootstrap UCL	0.0667
1476					Kolmogorov-Smirnov Test Statistic	0.117					95% Percentile Bootstrap UCL	0.0603
1477					Kolmogorov-Smirnov 5% Critical Value	0.194					95% BCA Bootstrap UCL	0.0619
1478	**Data appear Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	0.0744
1479											97.5% Chebyshev(Mean, Sd) UCL	0.0842
1480	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	0.104
1481					95% Approximate Gamma UCL	0.0611						
1482					95% Adjusted Gamma UCL	0.0619						
1483												
1484	**Potential UCL to Use**										Use 95% Approximate Gamma UCL	0.0611
1485												
1486	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1487	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1488	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1489												
1490												
1491	**Uranium**											
1492												
1493	**General Statistics**											
1494					Number of Valid Observations	20					Number of Distinct Observations	1
1495												
1496												
1497	**Warning: There is only one distinct observation value in this data set - resulting in '0' variance!**											
1498	**ProUCL (or any other software) should not be used on such a data set!**											
1499	**The data set for variable Uranium was not processed!**											
1500												

1501	If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.											
1502	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
1503												
1504												
1505												
1506	Vanadium											
1507												
1508	General Statistics											
1509						Number of Valid Observations	20			Number of Distinct Observations	1	
1510												
1511												
1512	Warning: There is only one distinct observation value in this data set - resulting in '0' variance!											
1513	ProUCL (or any other software) should not be used on such a data set!											
1514	The data set for variable Vanadium was not processed!											
1515												
1516	If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.											
1517	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
1518												
1519												
1520												
1521	Zinc											
1522												
1523	General Statistics											
1524						Number of Valid Observations	20			Number of Distinct Observations	16	
1525												
1526	Raw Statistics							Log-transformed Statistics				
1527						Minimum	10.3			Minimum of Log Data	2.332	
1528						Maximum	14.9			Maximum of Log Data	2.701	
1529						Mean	12.72			Mean of log Data	2.537	
1530						Median	12.9			SD of log Data	0.111	
1531						SD	1.378					
1532						Coefficient of Variation	0.108					
1533						Skewness	-0.249					
1534												
1535	Relevant UCL Statistics											
1536	Normal Distribution Test							Lognormal Distribution Test				
1537						Shapiro Wilk Test Statistic	0.958			Shapiro Wilk Test Statistic	0.948	
1538						Shapiro Wilk Critical Value	0.905			Shapiro Wilk Critical Value	0.905	
1539	Data appear Normal at 5% Significance Level							Data appear Lognormal at 5% Significance Level				
1540												
1541	Assuming Normal Distribution							Assuming Lognormal Distribution				
1542						95% Student's-t UCL	13.25			95% H-UCL	13.29	
1543	95% UCLs (Adjusted for Skewness)									95% Chebyshev (MVUE) UCL	14.09	
1544						95% Adjusted-CLT UCL (Chen-1995)	13.2			97.5% Chebyshev (MVUE) UCL	14.69	
1545						95% Modified-t UCL (Johnson-1978)	13.24			99% Chebyshev (MVUE) UCL	15.86	
1546												
1547	Gamma Distribution Test							Data Distribution				
1548						k star (bias corrected)	74.23	Data appear Normal at 5% Significance Level				
1549						Theta Star	0.171					
1550						MLE of Mean	12.72					

1551	MLE of Standard Deviation					1.476						
1552	nu star					2969						
1553	Approximate Chi Square Value (.05)					2844	**Nonparametric Statistics**					
1554	Adjusted Level of Significance					0.038					95% CLT UCL	13.22
1555	Adjusted Chi Square Value					2834					95% Jackknife UCL	13.25
1556											95% Standard Bootstrap UCL	13.21
1557	Anderson-Darling Test Statistic					0.337					95% Bootstrap-t UCL	13.23
1558	Anderson-Darling 5% Critical Value					0.74					95% Hall's Bootstrap UCL	13.2
1559	Kolmogorov-Smirnov Test Statistic					0.114					95% Percentile Bootstrap UCL	13.2
1560	Kolmogorov-Smirnov 5% Critical Value					0.193					95% BCA Bootstrap UCL	13.2
1561	**Data appear Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	14.06
1562											97.5% Chebyshev(Mean, Sd) UCL	14.64
1563	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	15.78
1564	95% Approximate Gamma UCL					13.28						
1565	95% Adjusted Gamma UCL					13.32						
1566												
1567	**Potential UCL to Use**										Use 95% Student's-t UCL	13.25
1568												
1569	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1570	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1571	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1572												

ProUCL Outputs: Whole Fish - Sisson Brook

General UCL Statistics for Full Data Sets

User Selected Options	
From File	U:\121810356\1_environmental\4_field_data\3_hhera\6_reporting\fish_whole_sisson.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Aluminum

General Statistics

Number of Valid Observations	18	Number of Distinct Observations	18

Raw Statistics		**Log-transformed Statistics**	
Minimum	0.476	Minimum of Log Data	-0.743
Maximum	44.27	Maximum of Log Data	3.79
Mean	5.384	Mean of log Data	0.865
Median	1.805	SD of log Data	1.127
SD	10.5		
Coefficient of Variation	1.951		
Skewness	3.438		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.469	Shapiro Wilk Test Statistic	0.912
Shapiro Wilk Critical Value	0.897	Shapiro Wilk Critical Value	0.897
Data not Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	9.691	95% H-UCL	9.704
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	9.805
95% Adjusted-CLT UCL (Chen-1995)	11.6	97.5% Chebyshev (MVUE) UCL	12.21
95% Modified-t UCL (Johnson-1978)	10.02	99% Chebyshev (MVUE) UCL	16.93
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	0.648	**Data appear Lognormal at 5% Significance Level**	
Theta Star	8.305		
MLE of Mean	5.384		
MLE of Standard Deviation	6.687		
nu star	23.34		
Approximate Chi Square Value (.05)	13.35	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0357	95% CLT UCL	9.456
Adjusted Chi Square Value	12.62	95% Jackknife UCL	9.691
		95% Standard Bootstrap UCL	9.286
Anderson-Darling Test Statistic	1.678	95% Bootstrap-t UCL	31.86
Anderson-Darling 5% Critical Value	0.779	95% Hall's Bootstrap UCL	29.44
Kolmogorov-Smirnov Test Statistic	0.273	95% Percentile Bootstrap UCL	9.868
Kolmogorov-Smirnov 5% Critical Value	0.212	95% BCA Bootstrap UCL	12.56

51	**Data not Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	16.18
52											97.5% Chebyshev(Mean, Sd) UCL	20.84
53	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	30.02
54	95% Approximate Gamma UCL	9.415										
55	95% Adjusted Gamma UCL	9.953										
56												
57	**Potential UCL to Use**										Use 95% Chebyshev (Mean, Sd) UCL	16.18
58												
59	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
60	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
61	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
62												
63												
64	**Antimony**											
65												
66	**General Statistics**											
67	Number of Valid Observations	18									Number of Distinct Observations	18
68												
69	**Raw Statistics**										**Log-transformed Statistics**	
70	Minimum	0.00255									Minimum of Log Data	-5.973
71	Maximum	0.015									Maximum of Log Data	-4.202
72	Mean	0.00505									Mean of log Data	-5.436
73	Median	0.00403									SD of log Data	0.519
74	SD	0.00333										
75	Coefficient of Variation	0.66										
76	Skewness	2.076										
77												
78	**Relevant UCL Statistics**											
79	**Normal Distribution Test**										**Lognormal Distribution Test**	
80	Shapiro Wilk Test Statistic	0.737									Shapiro Wilk Test Statistic	0.889
81	Shapiro Wilk Critical Value	0.897									Shapiro Wilk Critical Value	0.897
82	**Data not Normal at 5% Significance Level**										**Data not Lognormal at 5% Significance Level**	
83												
84	**Assuming Normal Distribution**										**Assuming Lognormal Distribution**	
85	95% Student's-t UCL	0.00641									95% H-UCL	0.00644
86	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.00768
87	95% Adjusted-CLT UCL (Chen-1995)	0.00675									97.5% Chebyshev (MVUE) UCL	0.00886
88	95% Modified-t UCL (Johnson-1978)	0.00648									99% Chebyshev (MVUE) UCL	0.0112
89												
90	**Gamma Distribution Test**										**Data Distribution**	
91	k star (bias corrected)	3.011									**Data Follow Appr. Gamma Distribution at 5% Significance Level**	
92	Theta Star	0.00168										
93	MLE of Mean	0.00505										
94	MLE of Standard Deviation	0.00291										
95	nu star	108.4										
96	Approximate Chi Square Value (.05)	85.37									**Nonparametric Statistics**	
97	Adjusted Level of Significance	0.0357									95% CLT UCL	0.00634
98	Adjusted Chi Square Value	83.41									95% Jackknife UCL	0.00641
99											95% Standard Bootstrap UCL	0.00629
100	Anderson-Darling Test Statistic	0.926									95% Bootstrap-t UCL	0.00777

101				Anderson-Darling 5% Critical Value	0.744					95% Hall's Bootstrap UCL	0.0127	
102				Kolmogorov-Smirnov Test Statistic	0.2					95% Percentile Bootstrap UCL	0.00639	
103				Kolmogorov-Smirnov 5% Critical Value	0.205					95% BCA Bootstrap UCL	0.00676	
104				**Data follow Appr. Gamma Distribution at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.00847	
105										97.5% Chebyshev(Mean, Sd) UCL	0.00995	
106				**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.0129	
107				95% Approximate Gamma UCL	0.00641							
108				95% Adjusted Gamma UCL	0.00656							
109												
110				**Potential UCL to Use**						Use 95% Approximate Gamma UCL	0.00641	
111												
112	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
113	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
114	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
115												
116												
117	**Arsenic**											
118												
119				**General Statistics**								
120				Number of Valid Observations	18					Number of Distinct Observations	18	
121												
122				**Raw Statistics**						**Log-transformed Statistics**		
123				Minimum	0.0258					Minimum of Log Data	-3.659	
124				Maximum	0.393					Maximum of Log Data	-0.934	
125				Mean	0.15					Mean of log Data	-2.145	
126				Median	0.116					SD of log Data	0.764	
127				SD	0.102							
128				Coefficient of Variation	0.683							
129				Skewness	0.887							
130												
131				**Relevant UCL Statistics**								
132				**Normal Distribution Test**						**Lognormal Distribution Test**		
133				Shapiro Wilk Test Statistic	0.921					Shapiro Wilk Test Statistic	0.971	
134				Shapiro Wilk Critical Value	0.897					Shapiro Wilk Critical Value	0.897	
135				**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**		
136												
137				**Assuming Normal Distribution**						**Assuming Lognormal Distribution**		
138				95% Student's-t UCL	0.192					95% H-UCL	0.241	
139				**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL	0.283	
140				95% Adjusted-CLT UCL (Chen-1995)	0.195					97.5% Chebyshev (MVUE) UCL	0.339	
141				95% Modified-t UCL (Johnson-1978)	0.193					99% Chebyshev (MVUE) UCL	0.449	
142												
143				**Gamma Distribution Test**						**Data Distribution**		
144				k star (bias corrected)	1.851					**Data appear Normal at 5% Significance Level**		
145				Theta Star	0.0809							
146				MLE of Mean	0.15							
147				MLE of Standard Deviation	0.11							
148				nu star	66.64							
149				Approximate Chi Square Value (.05)	48.86					**Nonparametric Statistics**		
150				Adjusted Level of Significance	0.0357					95% CLT UCL	0.19	

151					Adjusted Chi Square Value	47.4					95% Jackknife UCL	0.192
152											95% Standard Bootstrap UCL	0.189
153					Anderson-Darling Test Statistic	0.183					95% Bootstrap-t UCL	0.199
154					Anderson-Darling 5% Critical Value	0.751					95% Hall's Bootstrap UCL	0.198
155					Kolmogorov-Smirnov Test Statistic	0.102					95% Percentile Bootstrap UCL	0.191
156					Kolmogorov-Smirnov 5% Critical Value	0.206					95% BCA Bootstrap UCL	0.193
157					**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.255
158											97.5% Chebyshev(Mean, Sd) UCL	0.301
159					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.39
160					95% Approximate Gamma UCL	0.204						
161					95% Adjusted Gamma UCL	0.211						
162												
163					**Potential UCL to Use**						Use 95% Student's-t UCL	0.192
164												
165	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
166	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
167	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
168												
169												
170	**Barium**											
171												
172	**General Statistics**											
173					Number of Valid Observations	18					Number of Distinct Observations	18
174												
175	**Raw Statistics**						**Log-transformed Statistics**					
176					Minimum	0.338					Minimum of Log Data	-1.086
177					Maximum	0.678					Maximum of Log Data	-0.389
178					Mean	0.465					Mean of log Data	-0.788
179					Median	0.43					SD of log Data	0.211
180					SD	0.103						
181					Coefficient of Variation	0.222						
182					Skewness	0.864						
183												
184	**Relevant UCL Statistics**											
185	**Normal Distribution Test**						**Lognormal Distribution Test**					
186					Shapiro Wilk Test Statistic	0.898					Shapiro Wilk Test Statistic	0.932
187					Shapiro Wilk Critical Value	0.897					Shapiro Wilk Critical Value	0.897
188	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
189												
190	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
191					95% Student's-t UCL	0.507					95% H-UCL	0.51
192	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.566
193					95% Adjusted-CLT UCL (Chen-1995)	0.51					97.5% Chebyshev (MVUE) UCL	0.609
194					95% Modified-t UCL (Johnson-1978)	0.508					99% Chebyshev (MVUE) UCL	0.696
195												
196	**Gamma Distribution Test**						**Data Distribution**					
197					k star (bias corrected)	19.41	**Data appear Normal at 5% Significance Level**					
198					Theta Star	0.0239						
199					MLE of Mean	0.465						
200					MLE of Standard Deviation	0.105						

201					nu star	698.8						
202					Approximate Chi Square Value (.05)	638.5				**Nonparametric Statistics**		
203					Adjusted Level of Significance	0.0357					95% CLT UCL	0.505
204					Adjusted Chi Square Value	633					95% Jackknife UCL	0.507
205											95% Standard Bootstrap UCL	0.504
206					Anderson-Darling Test Statistic	0.575					95% Bootstrap-t UCL	0.519
207					Anderson-Darling 5% Critical Value	0.739					95% Hall's Bootstrap UCL	0.507
208					Kolmogorov-Smirnov Test Statistic	0.178					95% Percentile Bootstrap UCL	0.505
209					Kolmogorov-Smirnov 5% Critical Value	0.203					95% BCA Bootstrap UCL	0.508
210					**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.571
211											97.5% Chebyshev(Mean, Sd) UCL	0.616
212					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.706
213					95% Approximate Gamma UCL	0.509						
214					95% Adjusted Gamma UCL	0.513						
215												
216					**Potential UCL to Use**						Use 95% Student's-t UCL	0.507
217												
218	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
219	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
220	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
221												
222												
223	**Beryllium**											
224												
225	**General Statistics**											
226					Number of Valid Observations	18				Number of Distinct Observations		17
227												
228	**Raw Statistics**						**Log-transformed Statistics**					
229					Minimum	0.00251				Minimum of Log Data		-5.987
230					Maximum	0.0042				Maximum of Log Data		-5.473
231					Mean	0.00266				Mean of log Data		-5.938
232					Median	0.00256				SD of log Data		0.117
233					SD	0.0003867						
234					Coefficient of Variation	0.146						
235					Skewness	4.175						
236												
237	**Relevant UCL Statistics**											
238	**Normal Distribution Test**						**Lognormal Distribution Test**					
239					Shapiro Wilk Test Statistic	0.33				Shapiro Wilk Test Statistic		0.352
240					Shapiro Wilk Critical Value	0.897				Shapiro Wilk Critical Value		0.897
241	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
242												
243	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
244					95% Student's-t UCL	0.00281					95% H-UCL	0.00279
245	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.00297
246					95% Adjusted-CLT UCL (Chen-1995)	0.0029					97.5% Chebyshev (MVUE) UCL	0.00311
247					95% Modified-t UCL (Johnson-1978)	0.00283					99% Chebyshev (MVUE) UCL	0.00338
248												
249	**Gamma Distribution Test**						**Data Distribution**					
250					k star (bias corrected)	55.82	**Data do not follow a Discernable Distribution (0.05)**					

251					Theta Star	4.758E-05						
252					MLE of Mean	0.00266						
253					MLE of Standard Deviation	0.0003555						
254					nu star	2010						
255					Approximate Chi Square Value (.05)	1906			**Nonparametric Statistics**			
256					Adjusted Level of Significance	0.0357					95% CLT UCL	0.00281
257					Adjusted Chi Square Value	1897					95% Jackknife UCL	0.00281
258											95% Standard Bootstrap UCL	0.0028
259					Anderson-Darling Test Statistic	5.071					95% Bootstrap-t UCL	0.0042
260					Anderson-Darling 5% Critical Value	0.738					95% Hall's Bootstrap UCL	0.00361
261					Kolmogorov-Smirnov Test Statistic	0.439					95% Percentile Bootstrap UCL	0.00283
262					Kolmogorov-Smirnov 5% Critical Value	0.203					95% BCA Bootstrap UCL	0.00293
263				**Data not Gamma Distributed at 5% Significance Level**							95% Chebyshev(Mean, Sd) UCL	0.00305
264											97.5% Chebyshev(Mean, Sd) UCL	0.00323
265				**Assuming Gamma Distribution**							99% Chebyshev(Mean, Sd) UCL	0.00356
266					95% Approximate Gamma UCL	0.0028						
267					95% Adjusted Gamma UCL	0.00281						
268												
269				**Potential UCL to Use**							Use 95% Student's-t UCL	0.00281
270											or 95% Modified-t UCL	0.00283
271												
272	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
273	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
274	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
275												
276												
277	**Bismuth**											
278												
279	**General Statistics**											
280					Number of Valid Observations	18			Number of Distinct Observations			17
281												
282	**Raw Statistics**								**Log-transformed Statistics**			
283					Minimum	0.0251			Minimum of Log Data			-3.684
284					Maximum	0.139			Maximum of Log Data			-1.974
285					Mean	0.0406			Mean of log Data			-3.416
286					Median	0.0256			SD of log Data			0.577
287					SD	0.0356						
288					Coefficient of Variation	0.875						
289					Skewness	2.194						
290												
291	**Relevant UCL Statistics**											
292	**Normal Distribution Test**								**Lognormal Distribution Test**			
293					Shapiro Wilk Test Statistic	0.491			Shapiro Wilk Test Statistic			0.498
294					Shapiro Wilk Critical Value	0.897			Shapiro Wilk Critical Value			0.897
295	**Data not Normal at 5% Significance Level**								**Data not Lognormal at 5% Significance Level**			
296												
297	**Assuming Normal Distribution**								**Assuming Lognormal Distribution**			
298					95% Student's-t UCL	0.0552					95% H-UCL	0.052
299	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.0622
300					95% Adjusted-CLT UCL (Chen-1995)	0.059					97.5% Chebyshev (MVUE) UCL	0.0724

301	95% Modified-t UCL (Johnson-1978)					0.0559	99% Chebyshev (MVUE) UCL					0.0926
302												
303	**Gamma Distribution Test**						**Data Distribution**					
304	k star (bias corrected)					2.128	**Data do not follow a Discernable Distribution (0.05)**					
305	Theta Star					0.0191						
306	MLE of Mean					0.0406						
307	MLE of Standard Deviation					0.0279						
308	nu star					76.6						
309	Approximate Chi Square Value (.05)					57.44	**Nonparametric Statistics**					
310	Adjusted Level of Significance					0.0357	95% CLT UCL					0.0544
311	Adjusted Chi Square Value					55.85	95% Jackknife UCL					0.0552
312							95% Standard Bootstrap UCL					0.0544
313	Anderson-Darling Test Statistic					4.731	95% Bootstrap-t UCL					0.0681
314	Anderson-Darling 5% Critical Value					0.749	95% Hall's Bootstrap UCL					0.0528
315	Kolmogorov-Smirnov Test Statistic					0.487	95% Percentile Bootstrap UCL					0.0555
316	Kolmogorov-Smirnov 5% Critical Value					0.206	95% BCA Bootstrap UCL					0.0581
317	**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					0.0772
318							97.5% Chebyshev(Mean, Sd) UCL					0.093
319	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL					0.124
320	95% Approximate Gamma UCL					0.0542						
321	95% Adjusted Gamma UCL					0.0557						
322												
323	**Potential UCL to Use**						Use 95% Chebyshev (Mean, Sd) UCL					0.0772
324												
325	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
326	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
327	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
328												
329												
330	**Boron**											
331												
332	**General Statistics**											
333	Number of Valid Observations					18	Number of Distinct Observations					16
334												
335	**Raw Statistics**						**Log-transformed Statistics**					
336	Minimum					0.0251	Minimum of Log Data					-3.684
337	Maximum					0.0269	Maximum of Log Data					-3.617
338	Mean					0.0256	Mean of log Data					-3.663
339	Median					0.0256	SD of log Data					0.0147
340	SD					0.0003821						
341	Coefficient of Variation					0.0149						
342	Skewness					1.84						
343												
344	**Relevant UCL Statistics**											
345	**Normal Distribution Test**						**Lognormal Distribution Test**					
346	Shapiro Wilk Test Statistic					0.817	Shapiro Wilk Test Statistic					0.824
347	Shapiro Wilk Critical Value					0.897	Shapiro Wilk Critical Value					0.897
348	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
349												
350	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					

351					95% Student's-t UCL	0.0258					95% H-UCL	N/A
352				**95% UCLs (Adjusted for Skewness)**							95% Chebyshev (MVUE) UCL	0.026
353					95% Adjusted-CLT UCL (Chen-1995)	0.0258					97.5% Chebyshev (MVUE) UCL	0.0262
354					95% Modified-t UCL (Johnson-1978)	0.0258					99% Chebyshev (MVUE) UCL	0.0265
355												
356				**Gamma Distribution Test**							**Data Distribution**	
357					k star (bias corrected)	4039					**Data do not follow a Discernable Distribution (0.05)**	
358					Theta Star	6.35E-06						
359					MLE of Mean	0.0256						
360					MLE of Standard Deviation	0.0004036						
361					nu star	145414						
362					Approximate Chi Square Value (.05)	144528					**Nonparametric Statistics**	
363					Adjusted Level of Significance	0.0357					95% CLT UCL	0.0258
364					Adjusted Chi Square Value	144444					95% Jackknife UCL	0.0258
365											95% Standard Bootstrap UCL	0.0258
366					Anderson-Darling Test Statistic	1.52					95% Bootstrap-t UCL	0.0259
367					Anderson-Darling 5% Critical Value	0.737					95% Hall's Bootstrap UCL	0.0266
368					Kolmogorov-Smirnov Test Statistic	0.33					95% Percentile Bootstrap UCL	0.0258
369					Kolmogorov-Smirnov 5% Critical Value	0.203					95% BCA Bootstrap UCL	0.0258
370				**Data not Gamma Distributed at 5% Significance Level**							95% Chebyshev(Mean, Sd) UCL	0.026
371											97.5% Chebyshev(Mean, Sd) UCL	0.0262
372				**Assuming Gamma Distribution**							99% Chebyshev(Mean, Sd) UCL	0.0265
373					95% Approximate Gamma UCL	0.0258						
374					95% Adjusted Gamma UCL	0.0258						
375												
376				**Potential UCL to Use**							Use 95% Student's-t UCL	0.0258
377											or 95% Modified-t UCL	0.0258
378												
379	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
380	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
381	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
382												
383												
384	**Cadmium**											
385												
386	**General Statistics**											
387	Number of Valid Observations					18	Number of Distinct Observations					18
388												
389	**Raw Statistics**						**Log-transformed Statistics**					
390	Minimum					0.0239	Minimum of Log Data					-3.733
391	Maximum					0.175	Maximum of Log Data					-1.746
392	Mean					0.084	Mean of log Data					-2.685
393	Median					0.0743	SD of log Data					0.687
394	SD					0.0517						
395	Coefficient of Variation					0.616						
396	Skewness					0.333						
397												
398	**Relevant UCL Statistics**											
399	**Normal Distribution Test**						**Lognormal Distribution Test**					
400	Shapiro Wilk Test Statistic					0.874	Shapiro Wilk Test Statistic					0.883

401					Shapiro Wilk Critical Value	0.897					Shapiro Wilk Critical Value	0.897
402	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
403												
404	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
405					95% Student's-t UCL	0.105					95% H-UCL	0.125
406	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.149
407					95% Adjusted-CLT UCL (Chen-1995)	0.105					97.5% Chebyshev (MVUE) UCL	0.176
408					95% Modified-t UCL (Johnson-1978)	0.105					99% Chebyshev (MVUE) UCL	0.23
409												
410	**Gamma Distribution Test**						**Data Distribution**					
411					k star (bias corrected)	2.168	**Data do not follow a Discernable Distribution (0.05)**					
412					Theta Star	0.0387						
413					MLE of Mean	0.084						
414					MLE of Standard Deviation	0.057						
415					nu star	78.05						
416					Approximate Chi Square Value (.05)	58.69	**Nonparametric Statistics**					
417					Adjusted Level of Significance	0.0357					95% CLT UCL	0.104
418					Adjusted Chi Square Value	57.08					95% Jackknife UCL	0.105
419											95% Standard Bootstrap UCL	0.103
420					Anderson-Darling Test Statistic	0.948					95% Bootstrap-t UCL	0.106
421					Anderson-Darling 5% Critical Value	0.749					95% Hall's Bootstrap UCL	0.104
422					Kolmogorov-Smirnov Test Statistic	0.222					95% Percentile Bootstrap UCL	0.103
423					Kolmogorov-Smirnov 5% Critical Value	0.206					95% BCA Bootstrap UCL	0.105
424	**Data not Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	0.137
425											97.5% Chebyshev(Mean, Sd) UCL	0.16
426	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	0.205
427					95% Approximate Gamma UCL	0.112						
428					95% Adjusted Gamma UCL	0.115						
429												
430	**Potential UCL to Use**										Use 95% Chebyshev (Mean, Sd) UCL	0.137
431												
432	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
433	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
434	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
435												
436												
437	**Calcium**											
438												
439	**General Statistics**											
440					Number of Valid Observations	18					Number of Distinct Observations	18
441												
442	**Raw Statistics**						**Log-transformed Statistics**					
443					Minimum	4995					Minimum of Log Data	8.516
444					Maximum	7762					Maximum of Log Data	8.957
445					Mean	6624					Mean of log Data	8.792
446					Median	6688					SD of log Data	0.117
447					SD	733.3						
448					Coefficient of Variation	0.111						
449					Skewness	-0.769						
450												

451	**Relevant UCL Statistics**											
452	**Normal Distribution Test**						**Lognormal Distribution Test**					
453	Shapiro Wilk Test Statistic					0.948	Shapiro Wilk Test Statistic					0.919
454	Shapiro Wilk Critical Value					0.897	Shapiro Wilk Critical Value					0.897
455	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
456												
457	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
458	95% Student's-t UCL					6925	95% H-UCL					6963
459	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					7421
460	95% Adjusted-CLT UCL (Chen-1995)					6875	97.5% Chebyshev (MVUE) UCL					7765
461	95% Modified-t UCL (Johnson-1978)					6919	99% Chebyshev (MVUE) UCL					8441
462												
463	**Gamma Distribution Test**						**Data Distribution**					
464	k star (bias corrected)					67.43	**Data appear Normal at 5% Significance Level**					
465	Theta Star					98.24						
466	MLE of Mean					6624						
467	MLE of Standard Deviation					806.7						
468	nu star					2427						
469	Approximate Chi Square Value (.05)					2314	**Nonparametric Statistics**					
470	Adjusted Level of Significance					0.0357	95% CLT UCL					6908
471	Adjusted Chi Square Value					2303	95% Jackknife UCL					6925
472							95% Standard Bootstrap UCL					6901
473	Anderson-Darling Test Statistic					0.464	95% Bootstrap-t UCL					6890
474	Anderson-Darling 5% Critical Value					0.738	95% Hall's Bootstrap UCL					6879
475	Kolmogorov-Smirnov Test Statistic					0.142	95% Percentile Bootstrap UCL					6894
476	Kolmogorov-Smirnov 5% Critical Value					0.203	95% BCA Bootstrap UCL					6868
477	**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					7377
478							97.5% Chebyshev(Mean, Sd) UCL					7703
479	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL					8344
480	95% Approximate Gamma UCL					6949						
481	95% Adjusted Gamma UCL					6981						
482												
483	**Potential UCL to Use**						Use 95% Student's-t UCL					6925
484												
485	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
486	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
487	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
488												
489												
490	**Chromium**											
491												
492	**General Statistics**											
493	Number of Valid Observations					18	Number of Distinct Observations					18
494												
495	**Raw Statistics**						**Log-transformed Statistics**					
496	Minimum					0.0255	Minimum of Log Data					-3.67
497	Maximum					0.151	Maximum of Log Data					-1.888
498	Mean					0.0396	Mean of log Data					-3.363
499	Median					0.0264	SD of log Data					0.458
500	SD					0.0296						

501					Coefficient of Variation	0.747						
502					Skewness	3.519						
503												
504	**Relevant UCL Statistics**											
505	**Normal Distribution Test**						**Lognormal Distribution Test**					
506					Shapiro Wilk Test Statistic	0.512					Shapiro Wilk Test Statistic	0.71
507					Shapiro Wilk Critical Value	0.897					Shapiro Wilk Critical Value	0.897
508	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
509												
510	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
511					95% Student's-t UCL	0.0517					95% H-UCL	0.0479
512	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.0567
513					95% Adjusted-CLT UCL (Chen-1995)	0.0573					97.5% Chebyshev (MVUE) UCL	0.0647
514					95% Modified-t UCL (Johnson-1978)	0.0527					99% Chebyshev (MVUE) UCL	0.0805
515												
516	**Gamma Distribution Test**						**Data Distribution**					
517					k star (bias corrected)	3.279	**Data do not follow a Discernable Distribution (0.05)**					
518					Theta Star	0.0121						
519					MLE of Mean	0.0396						
520					MLE of Standard Deviation	0.0219						
521					nu star	118						
522					Approximate Chi Square Value (.05)	93.95	**Nonparametric Statistics**					
523					Adjusted Level of Significance	0.0357					95% CLT UCL	0.0511
524					Adjusted Chi Square Value	91.89					95% Jackknife UCL	0.0517
525											95% Standard Bootstrap UCL	0.0505
526					Anderson-Darling Test Statistic	2.139					95% Bootstrap-t UCL	0.0715
527					Anderson-Darling 5% Critical Value	0.743					95% Hall's Bootstrap UCL	0.093
528					Kolmogorov-Smirnov Test Statistic	0.263					95% Percentile Bootstrap UCL	0.0517
529					Kolmogorov-Smirnov 5% Critical Value	0.205					95% BCA Bootstrap UCL	0.0599
530	**Data not Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	0.07
531											97.5% Chebyshev(Mean, Sd) UCL	0.0831
532	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	0.109
533					95% Approximate Gamma UCL	0.0498						
534					95% Adjusted Gamma UCL	0.0509						
535												
536	**Potential UCL to Use**										Use 95% Student's-t UCL	0.0517
537											or 95% Modified-t UCL	0.0527
538												
539	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
540	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
541	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
542												
543												
544	**Cobalt**											
545												
546	**General Statistics**											
547					Number of Valid Observations	18					Number of Distinct Observations	18
548												
549	**Raw Statistics**						**Log-transformed Statistics**					
550					Minimum	0.0118					Minimum of Log Data	-4.437

551					Maximum	0.162					Maximum of Log Data	-1.821
552					Mean	0.0697					Mean of log Data	-2.94
553					Median	0.0528					SD of log Data	0.812
554					SD	0.048						
555					Coefficient of Variation	0.689						
556					Skewness	0.472						
557												
558	**Relevant UCL Statistics**											
559	**Normal Distribution Test**						**Lognormal Distribution Test**					
560					Shapiro Wilk Test Statistic	0.901					Shapiro Wilk Test Statistic	0.932
561					Shapiro Wilk Critical Value	0.897					Shapiro Wilk Critical Value	0.897
562	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
563												
564	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
565					95% Student's-t UCL	0.0893					95% H-UCL	0.118
566	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.137
567					95% Adjusted-CLT UCL (Chen-1995)	0.0896					97.5% Chebyshev (MVUE) UCL	0.165
568					95% Modified-t UCL (Johnson-1978)	0.0895					99% Chebyshev (MVUE) UCL	0.22
569												
570	**Gamma Distribution Test**						**Data Distribution**					
571					k star (bias corrected)	1.675	**Data appear Normal at 5% Significance Level**					
572					Theta Star	0.0416						
573					MLE of Mean	0.0697						
574					MLE of Standard Deviation	0.0538						
575					nu star	60.32						
576					Approximate Chi Square Value (.05)	43.46	**Nonparametric Statistics**					
577					Adjusted Level of Significance	0.0357					95% CLT UCL	0.0882
578					Adjusted Chi Square Value	42.09					95% Jackknife UCL	0.0893
579											95% Standard Bootstrap UCL	0.0878
580					Anderson-Darling Test Statistic	0.526					95% Bootstrap-t UCL	0.0905
581					Anderson-Darling 5% Critical Value	0.753					95% Hall's Bootstrap UCL	0.0889
582					Kolmogorov-Smirnov Test Statistic	0.18					95% Percentile Bootstrap UCL	0.0872
583					Kolmogorov-Smirnov 5% Critical Value	0.206					95% BCA Bootstrap UCL	0.0894
584	**Data appear Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	0.119
585											97.5% Chebyshev(Mean, Sd) UCL	0.14
586	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	0.182
587					95% Approximate Gamma UCL	0.0967						
588					95% Adjusted Gamma UCL	0.0998						
589												
590	**Potential UCL to Use**										Use 95% Student's-t UCL	0.0893
591												
592	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
593	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
594	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
595												
596												
597	**Copper**											
598												
599	**General Statistics**											
600					Number of Valid Observations	18					Number of Distinct Observations	18

Raw Statistics		**Log-transformed Statistics**
Minimum	0.579	Minimum of Log Data -0.547
Maximum	1.408	Maximum of Log Data 0.342
Mean	0.837	Mean of log Data -0.205
Median	0.784	SD of log Data 0.234
SD	0.218	
Coefficient of Variation	0.26	
Skewness	1.466	

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**
Shapiro Wilk Test Statistic	0.859	Shapiro Wilk Test Statistic 0.929
Shapiro Wilk Critical Value	0.897	Shapiro Wilk Critical Value 0.897
Data not Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**
Assuming Normal Distribution		**Assuming Lognormal Distribution**
95% Student's-t UCL	0.926	95% H-UCL 0.928
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL 1.039
95% Adjusted-CLT UCL (Chen-1995)	0.941	97.5% Chebyshev (MVUE) UCL 1.126
95% Modified-t UCL (Johnson-1978)	0.929	99% Chebyshev (MVUE) UCL 1.299
Gamma Distribution Test		**Data Distribution**
k star (bias corrected)	15.22	**Data appear Gamma Distributed at 5% Significance Level**
Theta Star	0.055	
MLE of Mean	0.837	
MLE of Standard Deviation	0.215	
nu star	548.1	
Approximate Chi Square Value (.05)	494.8	**Nonparametric Statistics**
Adjusted Level of Significance	0.0357	95% CLT UCL 0.922
Adjusted Chi Square Value	489.9	95% Jackknife UCL 0.926
		95% Standard Bootstrap UCL 0.919
Anderson-Darling Test Statistic	0.642	95% Bootstrap-t UCL 0.964
Anderson-Darling 5% Critical Value	0.739	95% Hall's Bootstrap UCL 0.999
Kolmogorov-Smirnov Test Statistic	0.17	95% Percentile Bootstrap UCL 0.923
Kolmogorov-Smirnov 5% Critical Value	0.203	95% BCA Bootstrap UCL 0.938
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 1.061
		97.5% Chebyshev(Mean, Sd) UCL 1.158
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 1.348
95% Approximate Gamma UCL	0.927	
95% Adjusted Gamma UCL	0.937	
Potential UCL to Use		Use 95% Approximate Gamma UCL 0.927

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Iron

651												
652	**General Statistics**											
653	Number of Valid Observations				18		Number of Distinct Observations					18
654												
655	**Raw Statistics**						**Log-transformed Statistics**					
656	Minimum				10.65		Minimum of Log Data					2.366
657	Maximum				47.14		Maximum of Log Data					3.853
658	Mean				16.41		Mean of log Data					2.693
659	Median				12.69		SD of log Data					0.413
660	SD				10.05							
661	Coefficient of Variation				0.612							
662	Skewness				2.634							
663												
664	**Relevant UCL Statistics**											
665	**Normal Distribution Test**						**Lognormal Distribution Test**					
666	Shapiro Wilk Test Statistic				0.543		Shapiro Wilk Test Statistic					0.669
667	Shapiro Wilk Critical Value				0.897		Shapiro Wilk Critical Value					0.897
668	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
669												
670	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
671	95% Student's-t UCL				20.53		95% H-UCL					19.53
672	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					22.95
673	95% Adjusted-CLT UCL (Chen-1995)				21.87		97.5% Chebyshev (MVUE) UCL					25.96
674	95% Modified-t UCL (Johnson-1978)				20.77		99% Chebyshev (MVUE) UCL					31.86
675												
676	**Gamma Distribution Test**						**Data Distribution**					
677	k star (bias corrected)				4.139		**Data do not follow a Discernable Distribution (0.05)**					
678	Theta Star				3.964							
679	MLE of Mean				16.41							
680	MLE of Standard Deviation				8.065							
681	nu star				149							
682	Approximate Chi Square Value (.05)				121.8		**Nonparametric Statistics**					
683	Adjusted Level of Significance				0.0357		95% CLT UCL					20.3
684	Adjusted Chi Square Value				119.4		95% Jackknife UCL					20.53
685							95% Standard Bootstrap UCL					20.39
686	Anderson-Darling Test Statistic				2.851		95% Bootstrap-t UCL					35.5
687	Anderson-Darling 5% Critical Value				0.743		95% Hall's Bootstrap UCL					41.51
688	Kolmogorov-Smirnov Test Statistic				0.309		95% Percentile Bootstrap UCL					20.66
689	Kolmogorov-Smirnov 5% Critical Value				0.204		95% BCA Bootstrap UCL					21.75
690	**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					26.73
691							97.5% Chebyshev(Mean, Sd) UCL					31.2
692	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL					39.97
693	95% Approximate Gamma UCL				20.07							
694	95% Adjusted Gamma UCL				20.47							
695												
696	**Potential UCL to Use**						Use 95% Student's-t UCL					20.53
697							or 95% Modified-t UCL					20.77
698												
699	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
700	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Lead

General Statistics

Number of Valid Observations	18	Number of Distinct Observations	18

Raw Statistics		**Log-transformed Statistics**	
Minimum	0.00806	Minimum of Log Data	-4.821
Maximum	0.0451	Maximum of Log Data	-3.099
Mean	0.0193	Mean of log Data	-4.012
Median	0.0181	SD of log Data	0.364
SD	0.00803		
Coefficient of Variation	0.415		
Skewness	2.056		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.813	Shapiro Wilk Test Statistic	0.947
Shapiro Wilk Critical Value	0.897	Shapiro Wilk Critical Value	0.897
Data not Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	0.0226	95% H-UCL	0.0229
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.0266
95% Adjusted-CLT UCL (Chen-1995)	0.0234	97.5% Chebyshev (MVUE) UCL	0.0298
95% Modified-t UCL (Johnson-1978)	0.0228	99% Chebyshev (MVUE) UCL	0.036
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	6.468	**Data appear Gamma Distributed at 5% Significance Level**	
Theta Star	0.00299		
MLE of Mean	0.0193		
MLE of Standard Deviation	0.00761		
nu star	232.9		
Approximate Chi Square Value (.05)	198.5	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0357	95% CLT UCL	0.0225
Adjusted Chi Square Value	195.5	95% Jackknife UCL	0.0226
		95% Standard Bootstrap UCL	0.0223
Anderson-Darling Test Statistic	0.558	95% Bootstrap-t UCL	0.0243
Anderson-Darling 5% Critical Value	0.741	95% Hall's Bootstrap UCL	0.0388
Kolmogorov-Smirnov Test Statistic	0.148	95% Percentile Bootstrap UCL	0.0227
Kolmogorov-Smirnov 5% Critical Value	0.204	95% BCA Bootstrap UCL	0.0236
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.0276
		97.5% Chebyshev(Mean, Sd) UCL	0.0312
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.0382
95% Approximate Gamma UCL	0.0227		
95% Adjusted Gamma UCL	0.023		
Potential UCL to Use		Use 95% Approximate Gamma UCL	0.0227

	A	B	C	D	E	F	G	H	I	J	K	L
751												
752	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
753	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
754	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
755												
756												
757	**Lithium**											
758												
759	**General Statistics**											
760	Number of Valid Observations					18	Number of Distinct Observations					18
761												
762	**Raw Statistics**						**Log-transformed Statistics**					
763	Minimum					0.00405	Minimum of Log Data					-5.508
764	Maximum					0.0556	Maximum of Log Data					-2.889
765	Mean					0.0108	Mean of log Data					-4.761
766	Median					0.00814	SD of log Data					0.572
767	SD					0.0116						
768	Coefficient of Variation					1.078						
769	Skewness					3.814						
770												
771	**Relevant UCL Statistics**											
772	**Normal Distribution Test**						**Lognormal Distribution Test**					
773	Shapiro Wilk Test Statistic					0.459	Shapiro Wilk Test Statistic					0.788
774	Shapiro Wilk Critical Value					0.897	Shapiro Wilk Critical Value					0.897
775	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
776												
777	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
778	95% Student's-t UCL					0.0155	95% H-UCL					0.0135
779	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					0.0161
780	95% Adjusted-CLT UCL (Chen-1995)					0.0179	97.5% Chebyshev (MVUE) UCL					0.0187
781	95% Modified-t UCL (Johnson-1978)					0.0159	99% Chebyshev (MVUE) UCL					0.0239
782												
783	**Gamma Distribution Test**						**Data Distribution**					
784	k star (bias corrected)					1.99	**Data do not follow a Discernable Distribution (0.05)**					
785	Theta Star					0.0054						
786	MLE of Mean					0.0108						
787	MLE of Standard Deviation					0.00762						
788	nu star					71.63						
789	Approximate Chi Square Value (.05)					53.14	**Nonparametric Statistics**					
790	Adjusted Level of Significance					0.0357	95% CLT UCL					0.0152
791	Adjusted Chi Square Value					51.61	95% Jackknife UCL					0.0155
792							95% Standard Bootstrap UCL					0.0151
793	Anderson-Darling Test Statistic					2.105	95% Bootstrap-t UCL					0.0324
794	Anderson-Darling 5% Critical Value					0.75	95% Hall's Bootstrap UCL					0.0378
795	Kolmogorov-Smirnov Test Statistic					0.352	95% Percentile Bootstrap UCL					0.0158
796	Kolmogorov-Smirnov 5% Critical Value					0.206	95% BCA Bootstrap UCL					0.0189
797	**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					0.0227
798							97.5% Chebyshev(Mean, Sd) UCL					0.0278
799	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL					0.0379
800	95% Approximate Gamma UCL					0.0145						

95% Adjusted Gamma UCL	0.0149	
Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL 0.0227

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Magnesium

General Statistics

Number of Valid Observations	18	Number of Distinct Observations	18

Raw Statistics		**Log-transformed Statistics**	
Minimum	286.8	Minimum of Log Data	5.659
Maximum	349.4	Maximum of Log Data	5.856
Mean	321.7	Mean of log Data	5.772
Median	327.2	SD of log Data	0.0532
SD	16.88		
Coefficient of Variation	0.0525		
Skewness	-0.508		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.949	Shapiro Wilk Test Statistic	0.942
Shapiro Wilk Critical Value	0.897	Shapiro Wilk Critical Value	0.897
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	328.6	95% H-UCL	N/A
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	339.3
95% Adjusted-CLT UCL (Chen-1995)	327.7	97.5% Chebyshev (MVUE) UCL	346.9
95% Modified-t UCL (Johnson-1978)	328.5	99% Chebyshev (MVUE) UCL	361.9
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	314.6	**Data appear Normal at 5% Significance Level**	
Theta Star	1.022		
MLE of Mean	321.7		
MLE of Standard Deviation	18.14		
nu star	11326		
Approximate Chi Square Value (.05)	11079	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0357	95% CLT UCL	328.2
Adjusted Chi Square Value	11056	95% Jackknife UCL	328.6
		95% Standard Bootstrap UCL	328.3
Anderson-Darling Test Statistic	0.52	95% Bootstrap-t UCL	328.2
Anderson-Darling 5% Critical Value	0.737	95% Hall's Bootstrap UCL	327.3
Kolmogorov-Smirnov Test Statistic	0.183	95% Percentile Bootstrap UCL	328
Kolmogorov-Smirnov 5% Critical Value	0.203	95% BCA Bootstrap UCL	327.2
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	339

851											97.5% Chebyshev(Mean, Sd) UCL	346.5
852	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	361.3
853					95% Approximate Gamma UCL	328.8						
854					95% Adjusted Gamma UCL	329.5						
855												
856	**Potential UCL to Use**										Use 95% Student's-t UCL	328.6
857												
858	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
859	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
860	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
861												
862												
863	**Manganese**											
864												
865	**General Statistics**											
866					Number of Valid Observations	18					Number of Distinct Observations	18
867												
868	**Raw Statistics**						**Log-transformed Statistics**					
869					Minimum	3.437					Minimum of Log Data	1.235
870					Maximum	8.522					Maximum of Log Data	2.143
871					Mean	5.79					Mean of log Data	1.717
872					Median	5.601					SD of log Data	0.29
873					SD	1.671						
874					Coefficient of Variation	0.289						
875					Skewness	0.401						
876												
877	**Relevant UCL Statistics**											
878	**Normal Distribution Test**						**Lognormal Distribution Test**					
879					Shapiro Wilk Test Statistic	0.933					Shapiro Wilk Test Statistic	0.955
880					Shapiro Wilk Critical Value	0.897					Shapiro Wilk Critical Value	0.897
881	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
882												
883	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
884					95% Student's-t UCL	6.475					95% H-UCL	6.612
885	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	7.54
886					95% Adjusted-CLT UCL (Chen-1995)	6.478					97.5% Chebyshev (MVUE) UCL	8.297
887					95% Modified-t UCL (Johnson-1978)	6.481					99% Chebyshev (MVUE) UCL	9.784
888												
889	**Gamma Distribution Test**						**Data Distribution**					
890					k star (bias corrected)	10.72	**Data appear Normal at 5% Significance Level**					
891					Theta Star	0.54						
892					MLE of Mean	5.79						
893					MLE of Standard Deviation	1.769						
894					nu star	385.9						
895					Approximate Chi Square Value (.05)	341.4	**Nonparametric Statistics**					
896					Adjusted Level of Significance	0.0357					95% CLT UCL	6.438
897					Adjusted Chi Square Value	337.3					95% Jackknife UCL	6.475
898											95% Standard Bootstrap UCL	6.41
899					Anderson-Darling Test Statistic	0.273					95% Bootstrap-t UCL	6.53
900					Anderson-Darling 5% Critical Value	0.739					95% Hall's Bootstrap UCL	6.482

901					Kolmogorov-Smirnov Test Statistic	0.104					95% Percentile Bootstrap UCL	6.4
902					Kolmogorov-Smirnov 5% Critical Value	0.203					95% BCA Bootstrap UCL	6.446
903					**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	7.507
904											97.5% Chebyshev(Mean, Sd) UCL	8.249
905					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	9.708
906					95% Approximate Gamma UCL	6.545						
907					95% Adjusted Gamma UCL	6.623						
908												
909					**Potential UCL to Use**						Use 95% Student's-t UCL	6.475
910												
911	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
912	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
913	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
914												
915												
916	**Mercury**											
917												
918					**General Statistics**							
919					Number of Valid Observations	18					Number of Distinct Observations	18
920												
921					**Raw Statistics**						**Log-transformed Statistics**	
922					Minimum	0.0811					Minimum of Log Data	-2.512
923					Maximum	0.17					Maximum of Log Data	-1.774
924					Mean	0.113					Mean of log Data	-2.205
925					Median	0.106					SD of log Data	0.242
926					SD	0.0289						
927					Coefficient of Variation	0.255						
928					Skewness	0.831						
929												
930					**Relevant UCL Statistics**							
931					**Normal Distribution Test**						**Lognormal Distribution Test**	
932					Shapiro Wilk Test Statistic	0.884					Shapiro Wilk Test Statistic	0.919
933					Shapiro Wilk Critical Value	0.897					Shapiro Wilk Critical Value	0.897
934					**Data not Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**	
935												
936					**Assuming Normal Distribution**						**Assuming Lognormal Distribution**	
937					95% Student's-t UCL	0.125					95% H-UCL	0.126
938					**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL	0.142
939					95% Adjusted-CLT UCL (Chen-1995)	0.126					97.5% Chebyshev (MVUE) UCL	0.154
940					95% Modified-t UCL (Johnson-1978)	0.126					99% Chebyshev (MVUE) UCL	0.178
941												
942					**Gamma Distribution Test**						**Data Distribution**	
943					k star (bias corrected)	14.74					**Data appear Gamma Distributed at 5% Significance Level**	
944					Theta Star	0.0077						
945					MLE of Mean	0.113						
946					MLE of Standard Deviation	0.0296						
947					nu star	530.7						
948					Approximate Chi Square Value (.05)	478.3					**Nonparametric Statistics**	
949					Adjusted Level of Significance	0.0357					95% CLT UCL	0.125
950					Adjusted Chi Square Value	473.5					95% Jackknife UCL	0.125

951											95% Standard Bootstrap UCL	0.124
952					Anderson-Darling Test Statistic	0.598					95% Bootstrap-t UCL	0.128
953					Anderson-Darling 5% Critical Value	0.739					95% Hall's Bootstrap UCL	0.125
954					Kolmogorov-Smirnov Test Statistic	0.139					95% Percentile Bootstrap UCL	0.125
955					Kolmogorov-Smirnov 5% Critical Value	0.203					95% BCA Bootstrap UCL	0.126
956					**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.143
957											97.5% Chebyshev(Mean, Sd) UCL	0.156
958					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.181
959					95% Approximate Gamma UCL	0.126						
960					95% Adjusted Gamma UCL	0.127						
961												
962					**Potential UCL to Use**						Use 95% Approximate Gamma UCL	0.126
963												
964	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
965	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
966	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
967												
968												
969	**Molybdenum**											
970												
971	**General Statistics**											
972					Number of Valid Observations	18					Number of Distinct Observations	18
973												
974	**Raw Statistics**						**Log-transformed Statistics**					
975					Minimum	0.0184					Minimum of Log Data	-3.997
976					Maximum	0.0971					Maximum of Log Data	-2.333
977					Mean	0.0395					Mean of log Data	-3.349
978					Median	0.0299					SD of log Data	0.479
979					SD	0.0215						
980					Coefficient of Variation	0.544						
981					Skewness	1.419						
982												
983	**Relevant UCL Statistics**											
984	**Normal Distribution Test**						**Lognormal Distribution Test**					
985					Shapiro Wilk Test Statistic	0.829					Shapiro Wilk Test Statistic	0.915
986					Shapiro Wilk Critical Value	0.897					Shapiro Wilk Critical Value	0.897
987	**Data not Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
988												
989	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
990					95% Student's-t UCL	0.0483					95% H-UCL	0.0497
991	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.059
992					95% Adjusted-CLT UCL (Chen-1995)	0.0496					97.5% Chebyshev (MVUE) UCL	0.0675
993					95% Modified-t UCL (Johnson-1978)	0.0486					99% Chebyshev (MVUE) UCL	0.0844
994												
995	**Gamma Distribution Test**						**Data Distribution**					
996					k star (bias corrected)	3.729	**Data appear Lognormal at 5% Significance Level**					
997					Theta Star	0.0106						
998					MLE of Mean	0.0395						
999					MLE of Standard Deviation	0.0204						
1000					nu star	134.2						

1001					Approximate Chi Square Value (.05)	108.5		**Nonparametric Statistics**				
1002					Adjusted Level of Significance	0.0357					95% CLT UCL	0.0478
1003					Adjusted Chi Square Value	106.3					95% Jackknife UCL	0.0483
1004											95% Standard Bootstrap UCL	0.0478
1005					Anderson-Darling Test Statistic	0.823					95% Bootstrap-t UCL	0.0517
1006					Anderson-Darling 5% Critical Value	0.743					95% Hall's Bootstrap UCL	0.0506
1007					Kolmogorov-Smirnov Test Statistic	0.217					95% Percentile Bootstrap UCL	0.0479
1008					Kolmogorov-Smirnov 5% Critical Value	0.204					95% BCA Bootstrap UCL	0.05
1009					**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.0616
1010											97.5% Chebyshev(Mean, Sd) UCL	0.0711
1011					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.0899
1012					95% Approximate Gamma UCL	0.0488						
1013					95% Adjusted Gamma UCL	0.0499						
1014												
1015					**Potential UCL to Use**						Use 95% Student's-t UCL	0.0483
1016											or 95% Modified-t UCL	0.0486
1017											or 95% H-UCL	0.0497
1018												
1019	**ProUCL computes and outputs H-statistic based UCLs for historical reasons only.**											
1020	**H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.**											
1021	**It is therefore recommended to avoid the use of H-statistic based 95% UCLs.**											
1022	**Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.**											
1023												
1024	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1025	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1026	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1027												
1028												
1029	**Nickel**											
1030												
1031	**General Statistics**											
1032					Number of Valid Observations	18					Number of Distinct Observations	18
1033												
1034					**Raw Statistics**			**Log-transformed Statistics**				
1035					Minimum	0.0251					Minimum of Log Data	-3.684
1036					Maximum	0.0566					Maximum of Log Data	-2.872
1037					Mean	0.0329					Mean of log Data	-3.453
1038					Median	0.0264					SD of log Data	0.272
1039					SD	0.00991						
1040					Coefficient of Variation	0.302						
1041					Skewness	1.259						
1042												
1043	**Relevant UCL Statistics**											
1044					**Normal Distribution Test**			**Lognormal Distribution Test**				
1045					Shapiro Wilk Test Statistic	0.781					Shapiro Wilk Test Statistic	0.805
1046					Shapiro Wilk Critical Value	0.897					Shapiro Wilk Critical Value	0.897
1047					**Data not Normal at 5% Significance Level**			**Data not Lognormal at 5% Significance Level**				
1048												
1049					**Assuming Normal Distribution**			**Assuming Lognormal Distribution**				
1050					95% Student's-t UCL	0.0369					95% H-UCL	0.0371

1051	**95% UCLs (Adjusted for Skewness)**									95% Chebyshev (MVUE) UCL	0.042	
1052	95% Adjusted-CLT UCL (Chen-1995)	0.0374								97.5% Chebyshev (MVUE) UCL	0.046	
1053	95% Modified-t UCL (Johnson-1978)	0.037								99% Chebyshev (MVUE) UCL	0.0539	
1054												
1055	**Gamma Distribution Test**									**Data Distribution**		
1056	k star (bias corrected)	11.34								**Data do not follow a Discernable Distribution (0.05)**		
1057	Theta Star	0.0029										
1058	MLE of Mean	0.0329										
1059	MLE of Standard Deviation	0.00975										
1060	nu star	408.4										
1061	Approximate Chi Square Value (.05)	362.6								**Nonparametric Statistics**		
1062	Adjusted Level of Significance	0.0357								95% CLT UCL	0.0367	
1063	Adjusted Chi Square Value	358.4								95% Jackknife UCL	0.0369	
1064										95% Standard Bootstrap UCL	0.0366	
1065	Anderson-Darling Test Statistic	1.551								95% Bootstrap-t UCL	0.0382	
1066	Anderson-Darling 5% Critical Value	0.739								95% Hall's Bootstrap UCL	0.0373	
1067	Kolmogorov-Smirnov Test Statistic	0.29								95% Percentile Bootstrap UCL	0.0368	
1068	Kolmogorov-Smirnov 5% Critical Value	0.203								95% BCA Bootstrap UCL	0.0372	
1069	**Data not Gamma Distributed at 5% Significance Level**									95% Chebyshev(Mean, Sd) UCL	0.043	
1070										97.5% Chebyshev(Mean, Sd) UCL	0.0474	
1071	**Assuming Gamma Distribution**									99% Chebyshev(Mean, Sd) UCL	0.0561	
1072	95% Approximate Gamma UCL	0.037										
1073	95% Adjusted Gamma UCL	0.0374										
1074												
1075	**Potential UCL to Use**									Use 95% Student's-t UCL	0.0369	
1076										or 95% Modified-t UCL	0.037	
1077												
1078	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1079	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1080	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1081												
1082												
1083	**Potassium**											
1084												
1085	**General Statistics**											
1086	Number of Valid Observations	18								Number of Distinct Observations	18	
1087												
1088	**Raw Statistics**									**Log-transformed Statistics**		
1089	Minimum	3117								Minimum of Log Data	8.045	
1090	Maximum	3590								Maximum of Log Data	8.186	
1091	Mean	3397								Mean of log Data	8.13	
1092	Median	3383								SD of log Data	0.0326	
1093	SD	109.8										
1094	Coefficient of Variation	0.0323										
1095	Skewness	-0.552										
1096												
1097	**Relevant UCL Statistics**											
1098	**Normal Distribution Test**									**Lognormal Distribution Test**		
1099	Shapiro Wilk Test Statistic	0.956								Shapiro Wilk Test Statistic	0.949	
1100	Shapiro Wilk Critical Value	0.897								Shapiro Wilk Critical Value	0.897	

1101	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
1102												
1103	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1104	95% Student's-t UCL					3442	95% H-UCL					N/A
1105	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					3511
1106	95% Adjusted-CLT UCL (Chen-1995)					3436	97.5% Chebyshev (MVUE) UCL					3560
1107	95% Modified-t UCL (Johnson-1978)					3442	99% Chebyshev (MVUE) UCL					3657
1108												
1109	**Gamma Distribution Test**						**Data Distribution**					
1110	k star (bias corrected)					834.3	**Data appear Normal at 5% Significance Level**					
1111	Theta Star					4.072						
1112	MLE of Mean					3397						
1113	MLE of Standard Deviation					117.6						
1114	nu star					30035						
1115	Approximate Chi Square Value (.05)					29633	**Nonparametric Statistics**					
1116	Adjusted Level of Significance					0.0357	95% CLT UCL					3440
1117	Adjusted Chi Square Value					29595	95% Jackknife UCL					3442
1118							95% Standard Bootstrap UCL					3439
1119	Anderson-Darling Test Statistic					0.322	95% Bootstrap-t UCL					3438
1120	Anderson-Darling 5% Critical Value					0.737	95% Hall's Bootstrap UCL					3440
1121	Kolmogorov-Smirnov Test Statistic					0.109	95% Percentile Bootstrap UCL					3439
1122	Kolmogorov-Smirnov 5% Critical Value					0.203	95% BCA Bootstrap UCL					3438
1123	**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					3510
1124							97.5% Chebyshev(Mean, Sd) UCL					3559
1125	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL					3655
1126	95% Approximate Gamma UCL					3443						
1127	95% Adjusted Gamma UCL					3448						
1128												
1129	**Potential UCL to Use**						Use 95% Student's-t UCL					3442
1130												
1131	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1132	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1133	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1134												
1135												
1136	**Rubidium**											
1137												
1138	**General Statistics**											
1139	Number of Valid Observations					18	Number of Distinct Observations					18
1140												
1141	**Raw Statistics**						**Log-transformed Statistics**					
1142	Minimum					8.265	Minimum of Log Data					2.112
1143	Maximum					14.67	Maximum of Log Data					2.686
1144	Mean					11.95	Mean of log Data					2.468
1145	Median					12.02	SD of log Data					0.171
1146	SD					1.942						
1147	Coefficient of Variation					0.162						
1148	Skewness					-0.392						
1149												
1150	**Relevant UCL Statistics**											

1151	**Normal Distribution Test**						**Lognormal Distribution Test**					
1152	Shapiro Wilk Test Statistic				0.946		Shapiro Wilk Test Statistic					0.931
1153	Shapiro Wilk Critical Value				0.897		Shapiro Wilk Critical Value					0.897
1154	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
1155												
1156	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1157	95% Student's-t UCL				12.75		95% H-UCL					12.88
1158	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					14.07
1159	95% Adjusted-CLT UCL (Chen-1995)				12.66		97.5% Chebyshev (MVUE) UCL					14.98
1160	95% Modified-t UCL (Johnson-1978)				12.74		99% Chebyshev (MVUE) UCL					16.77
1161												
1162	**Gamma Distribution Test**						**Data Distribution**					
1163	k star (bias corrected)				31.51		**Data appear Normal at 5% Significance Level**					
1164	Theta Star				0.379							
1165	MLE of Mean				11.95							
1166	MLE of Standard Deviation				2.129							
1167	nu star				1134							
1168	Approximate Chi Square Value (.05)				1057		**Nonparametric Statistics**					
1169	Adjusted Level of Significance				0.0357		95% CLT UCL					12.71
1170	Adjusted Chi Square Value				1050		95% Jackknife UCL					12.75
1171							95% Standard Bootstrap UCL					12.69
1172	Anderson-Darling Test Statistic				0.438		95% Bootstrap-t UCL					12.75
1173	Anderson-Darling 5% Critical Value				0.739		95% Hall's Bootstrap UCL					12.63
1174	Kolmogorov-Smirnov Test Statistic				0.199		95% Percentile Bootstrap UCL					12.68
1175	Kolmogorov-Smirnov 5% Critical Value				0.203		95% BCA Bootstrap UCL					12.64
1176	**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					13.95
1177							97.5% Chebyshev(Mean, Sd) UCL					14.81
1178	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL					16.51
1179	95% Approximate Gamma UCL				12.83							
1180	95% Adjusted Gamma UCL				12.91							
1181												
1182	**Potential UCL to Use**						Use 95% Student's-t UCL					12.75
1183												
1184	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1185	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1186	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1187												
1188												
1189	**Selenium**											
1190												
1191	**General Statistics**											
1192	Number of Valid Observations				18		Number of Distinct Observations					18
1193												
1194	**Raw Statistics**						**Log-transformed Statistics**					
1195	Minimum				0.188		Minimum of Log Data					-1.669
1196	Maximum				0.437		Maximum of Log Data					-0.828
1197	Mean				0.35		Mean of log Data					-1.075
1198	Median				0.376		SD of log Data					0.247
1199	SD				0.0752							
1200	Coefficient of Variation				0.215							

Skewness	-1.02	
Relevant UCL Statistics		
Normal Distribution Test		**Lognormal Distribution Test**
Shapiro Wilk Test Statistic	0.853	Shapiro Wilk Test Statistic 0.813
Shapiro Wilk Critical Value	0.897	Shapiro Wilk Critical Value 0.897
Data not Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**
Assuming Normal Distribution		**Assuming Lognormal Distribution**
95% Student's-t UCL	0.381	95% H-UCL 0.393
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL 0.442
95% Adjusted-CLT UCL (Chen-1995)	0.375	97.5% Chebyshev (MVUE) UCL 0.481
95% Modified-t UCL (Johnson-1978)	0.381	99% Chebyshev (MVUE) UCL 0.557
Gamma Distribution Test		**Data Distribution**
k star (bias corrected)	16.05	**Data do not follow a Discernable Distribution (0.05)**
Theta Star	0.0218	
MLE of Mean	0.35	
MLE of Standard Deviation	0.0875	
nu star	577.7	
Approximate Chi Square Value (.05)	522.9	**Nonparametric Statistics**
Adjusted Level of Significance	0.0357	95% CLT UCL 0.38
Adjusted Chi Square Value	517.9	95% Jackknife UCL 0.381
		95% Standard Bootstrap UCL 0.378
Anderson-Darling Test Statistic	1.407	95% Bootstrap-t UCL 0.377
Anderson-Darling 5% Critical Value	0.739	95% Hall's Bootstrap UCL 0.374
Kolmogorov-Smirnov Test Statistic	0.272	95% Percentile Bootstrap UCL 0.378
Kolmogorov-Smirnov 5% Critical Value	0.203	95% BCA Bootstrap UCL 0.375
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 0.428
		97.5% Chebyshev(Mean, Sd) UCL 0.461
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 0.527
95% Approximate Gamma UCL	0.387	
95% Adjusted Gamma UCL	0.391	
Potential UCL to Use		Use 95% Student's-t UCL 0.381
		or 95% Modified-t UCL 0.381
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.		
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)		
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.		
Silver		
General Statistics		
Number of Valid Observations	18	Number of Distinct Observations 18
Raw Statistics		**Log-transformed Statistics**
Minimum	0.00555	Minimum of Log Data -5.195
Maximum	0.0159	Maximum of Log Data -4.145

1251					Mean	0.0108					Mean of log Data	-4.574
1252					Median	0.0116					SD of log Data	0.322
1253					SD	0.00312						
1254					Coefficient of Variation	0.289						
1255					Skewness	-0.213						
1256												
1257					**Relevant UCL Statistics**							
1258				**Normal Distribution Test**						**Lognormal Distribution Test**		
1259					Shapiro Wilk Test Statistic	0.943					Shapiro Wilk Test Statistic	0.903
1260					Shapiro Wilk Critical Value	0.897					Shapiro Wilk Critical Value	0.897
1261				**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**		
1262												
1263				**Assuming Normal Distribution**						**Assuming Lognormal Distribution**		
1264					95% Student's-t UCL	0.0121					95% H-UCL	0.0126
1265				**95% UCLs (Adjusted for Skewness)**							95% Chebyshev (MVUE) UCL	0.0145
1266					95% Adjusted-CLT UCL (Chen-1995)	0.012					97.5% Chebyshev (MVUE) UCL	0.016
1267					95% Modified-t UCL (Johnson-1978)	0.0121					99% Chebyshev (MVUE) UCL	0.0191
1268												
1269				**Gamma Distribution Test**						**Data Distribution**		
1270					k star (bias corrected)	9.379				**Data appear Normal at 5% Significance Level**		
1271					Theta Star	0.00115						
1272					MLE of Mean	0.0108						
1273					MLE of Standard Deviation	0.00352						
1274					nu star	337.6						
1275					Approximate Chi Square Value (.05)	296.1				**Nonparametric Statistics**		
1276					Adjusted Level of Significance	0.0357					95% CLT UCL	0.012
1277					Adjusted Chi Square Value	292.3					95% Jackknife UCL	0.0121
1278											95% Standard Bootstrap UCL	0.012
1279					Anderson-Darling Test Statistic	0.618					95% Bootstrap-t UCL	0.012
1280					Anderson-Darling 5% Critical Value	0.739					95% Hall's Bootstrap UCL	0.012
1281					Kolmogorov-Smirnov Test Statistic	0.181					95% Percentile Bootstrap UCL	0.012
1282					Kolmogorov-Smirnov 5% Critical Value	0.203					95% BCA Bootstrap UCL	0.0119
1283				**Data appear Gamma Distributed at 5% Significance Level**							95% Chebyshev(Mean, Sd) UCL	0.014
1284											97.5% Chebyshev(Mean, Sd) UCL	0.0154
1285				**Assuming Gamma Distribution**							99% Chebyshev(Mean, Sd) UCL	0.0181
1286					95% Approximate Gamma UCL	0.0123						
1287					95% Adjusted Gamma UCL	0.0125						
1288												
1289				**Potential UCL to Use**							Use 95% Student's-t UCL	0.0121
1290												
1291	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1292	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1293	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1294												
1295												
1296	**Sodium**											
1297												
1298					**General Statistics**							
1299					Number of Valid Observations	18					Number of Distinct Observations	18
1300												

	A	B	C	D	E	F	G	H	I	J	K	L
1301	**Raw Statistics**						**Log-transformed Statistics**					
1302					Minimum	904.7					Minimum of Log Data	6.808
1303					Maximum	1186					Maximum of Log Data	7.078
1304					Mean	984.6					Mean of log Data	6.89
1305					Median	969.6					SD of log Data	0.0716
1306					SD	73.49						
1307					Coefficient of Variation	0.0746						
1308					Skewness	1.433						
1309												
1310	**Relevant UCL Statistics**											
1311	**Normal Distribution Test**						**Lognormal Distribution Test**					
1312					Shapiro Wilk Test Statistic	0.871					Shapiro Wilk Test Statistic	0.893
1313					Shapiro Wilk Critical Value	0.897					Shapiro Wilk Critical Value	0.897
1314	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
1315												
1316	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1317					95% Student's-t UCL	1015					95% H-UCL	N/A
1318	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	1057
1319					95% Adjusted-CLT UCL (Chen-1995)	1019					97.5% Chebyshev (MVUE) UCL	1088
1320					95% Modified-t UCL (Johnson-1978)	1016					99% Chebyshev (MVUE) UCL	1150
1321												
1322	**Gamma Distribution Test**						**Data Distribution**					
1323					k star (bias corrected)	167.5	**Data appear Gamma Distributed at 5% Significance Level**					
1324					Theta Star	5.877						
1325					MLE of Mean	984.6						
1326					MLE of Standard Deviation	76.07						
1327					nu star	6032						
1328					Approximate Chi Square Value (.05)	5852	**Nonparametric Statistics**					
1329					Adjusted Level of Significance	0.0357					95% CLT UCL	1013
1330					Adjusted Chi Square Value	5835					95% Jackknife UCL	1015
1331											95% Standard Bootstrap UCL	1012
1332					Anderson-Darling Test Statistic	0.705					95% Bootstrap-t UCL	1024
1333					Anderson-Darling 5% Critical Value	0.737					95% Hall's Bootstrap UCL	1029
1334					Kolmogorov-Smirnov Test Statistic	0.2					95% Percentile Bootstrap UCL	1015
1335					Kolmogorov-Smirnov 5% Critical Value	0.203					95% BCA Bootstrap UCL	1020
1336	**Data appear Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	1060
1337											97.5% Chebyshev(Mean, Sd) UCL	1093
1338	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	1157
1339					95% Approximate Gamma UCL	1015						
1340					95% Adjusted Gamma UCL	1018						
1341												
1342	**Potential UCL to Use**										Use 95% Approximate Gamma UCL	1015
1343												
1344	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1345	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1346	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1347												
1348												
1349	**Strontium**											
1350												

	A	B	C	D	E	F	G	H	I	J	K	L
1351	**General Statistics**											
1352	Number of Valid Observations					18	Number of Distinct Observations					18
1353												
1354	**Raw Statistics**						**Log-transformed Statistics**					
1355	Minimum					9.587	Minimum of Log Data					2.26
1356	Maximum					20.78	Maximum of Log Data					3.034
1357	Mean					15.29	Mean of log Data					2.711
1358	Median					15.38	SD of log Data					0.191
1359	SD					2.765						
1360	Coefficient of Variation					0.181						
1361	Skewness					-0.218						
1362												
1363	**Relevant UCL Statistics**											
1364	**Normal Distribution Test**						**Lognormal Distribution Test**					
1365	Shapiro Wilk Test Statistic					0.983	Shapiro Wilk Test Statistic					0.957
1366	Shapiro Wilk Critical Value					0.897	Shapiro Wilk Critical Value					0.897
1367	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
1368												
1369	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1370	95% Student's-t UCL					16.43	95% H-UCL					16.64
1371	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					18.33
1372	95% Adjusted-CLT UCL (Chen-1995)					16.33	97.5% Chebyshev (MVUE) UCL					19.64
1373	95% Modified-t UCL (Johnson-1978)					16.42	99% Chebyshev (MVUE) UCL					22.21
1374												
1375	**Gamma Distribution Test**						**Data Distribution**					
1376	k star (bias corrected)					25.33	**Data appear Normal at 5% Significance Level**					
1377	Theta Star					0.604						
1378	MLE of Mean					15.29						
1379	MLE of Standard Deviation					3.039						
1380	nu star					911.9						
1381	Approximate Chi Square Value (.05)					842.8	**Nonparametric Statistics**					
1382	Adjusted Level of Significance					0.0357	95% CLT UCL					16.37
1383	Adjusted Chi Square Value					836.4	95% Jackknife UCL					16.43
1384							95% Standard Bootstrap UCL					16.35
1385	Anderson-Darling Test Statistic					0.302	95% Bootstrap-t UCL					16.33
1386	Anderson-Darling 5% Critical Value					0.739	95% Hall's Bootstrap UCL					16.41
1387	Kolmogorov-Smirnov Test Statistic					0.12	95% Percentile Bootstrap UCL					16.32
1388	Kolmogorov-Smirnov 5% Critical Value					0.203	95% BCA Bootstrap UCL					16.41
1389	**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					18.13
1390							97.5% Chebyshev(Mean, Sd) UCL					19.36
1391	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL					21.78
1392	95% Approximate Gamma UCL					16.55						
1393	95% Adjusted Gamma UCL					16.67						
1394												
1395	**Potential UCL to Use**						Use 95% Student's-t UCL					16.43
1396												
1397	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1398	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1399	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1400												

Tellurium

General Statistics

Number of Valid Observations	18	Number of Distinct Observations	16

Raw Statistics		**Log-transformed Statistics**	
Minimum	0.00251	Minimum of Log Data	-5.987
Maximum	0.00269	Maximum of Log Data	-5.92
Mean	0.00256	Mean of log Data	-5.966
Median	0.00256	SD of log Data	0.0147
SD	3.821E-05		
Coefficient of Variation	0.0149		
Skewness	1.84		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.817	Shapiro Wilk Test Statistic	0.824
Shapiro Wilk Critical Value	0.897	Shapiro Wilk Critical Value	0.897
Data not Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	0.00258	95% H-UCL	N/A
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.0026
95% Adjusted-CLT UCL (Chen-1995)	0.00258	97.5% Chebyshev (MVUE) UCL	0.00262
95% Modified-t UCL (Johnson-1978)	0.00258	99% Chebyshev (MVUE) UCL	0.00265

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	4039	**Data do not follow a Discernable Distribution (0.05)**	
Theta Star	6.35E-07		
MLE of Mean	0.00256		
MLE of Standard Deviation	4.036E-05		
nu star	145414		
Approximate Chi Square Value (.05)	144528	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0357	95% CLT UCL	0.00258
Adjusted Chi Square Value	144444	95% Jackknife UCL	0.00258
		95% Standard Bootstrap UCL	0.00258
Anderson-Darling Test Statistic	1.52	95% Bootstrap-t UCL	0.00259
Anderson-Darling 5% Critical Value	0.737	95% Hall's Bootstrap UCL	0.00266
Kolmogorov-Smirnov Test Statistic	0.33	95% Percentile Bootstrap UCL	0.00258
Kolmogorov-Smirnov 5% Critical Value	0.203	95% BCA Bootstrap UCL	0.00258
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.0026
		97.5% Chebyshev(Mean, Sd) UCL	0.00262
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.00265
95% Approximate Gamma UCL	0.00258		
95% Adjusted Gamma UCL	0.00258		
Potential UCL to Use		Use 95% Student's-t UCL	0.00258
		or 95% Modified-t UCL	0.00258

	A	B	C	D	E	F	G	H	I	J	K	L
1451	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1452	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1453	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1454												
1455												
1456	**Thallium**											
1457												
1458	**General Statistics**											
1459	Number of Valid Observations					18	Number of Distinct Observations					18
1460												
1461	**Raw Statistics**						**Log-transformed Statistics**					
1462	Minimum					0.00933	Minimum of Log Data					-4.675
1463	Maximum					0.0308	Maximum of Log Data					-3.479
1464	Mean					0.0185	Mean of log Data					-4.068
1465	Median					0.0165	SD of log Data					0.408
1466	SD					0.00733						
1467	Coefficient of Variation					0.396						
1468	Skewness					0.37						
1469												
1470	**Relevant UCL Statistics**											
1471	**Normal Distribution Test**						**Lognormal Distribution Test**					
1472	Shapiro Wilk Test Statistic					0.916	Shapiro Wilk Test Statistic					0.93
1473	Shapiro Wilk Critical Value					0.897	Shapiro Wilk Critical Value					0.897
1474	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
1475												
1476	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1477	95% Student's-t UCL					0.0215	95% H-UCL					0.0225
1478	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					0.0265
1479	95% Adjusted-CLT UCL (Chen-1995)					0.0215	97.5% Chebyshev (MVUE) UCL					0.0299
1480	95% Modified-t UCL (Johnson-1978)					0.0215	99% Chebyshev (MVUE) UCL					0.0366
1481												
1482	**Gamma Distribution Test**						**Data Distribution**					
1483	k star (bias corrected)					5.59	**Data appear Normal at 5% Significance Level**					
1484	Theta Star					0.00331						
1485	MLE of Mean					0.0185						
1486	MLE of Standard Deviation					0.00782						
1487	nu star					201.2						
1488	Approximate Chi Square Value (.05)					169.4	**Nonparametric Statistics**					
1489	Adjusted Level of Significance					0.0357	95% CLT UCL					0.0213
1490	Adjusted Chi Square Value					166.6	95% Jackknife UCL					0.0215
1491							95% Standard Bootstrap UCL					0.0212
1492	Anderson-Darling Test Statistic					0.453	95% Bootstrap-t UCL					0.0217
1493	Anderson-Darling 5% Critical Value					0.742	95% Hall's Bootstrap UCL					0.0214
1494	Kolmogorov-Smirnov Test Statistic					0.137	95% Percentile Bootstrap UCL					0.0213
1495	Kolmogorov-Smirnov 5% Critical Value					0.204	95% BCA Bootstrap UCL					0.0214
1496	**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					0.026
1497							97.5% Chebyshev(Mean, Sd) UCL					0.0293
1498	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL					0.0357
1499	95% Approximate Gamma UCL					0.022						
1500	95% Adjusted Gamma UCL					0.0223						

1501												
1502	**Potential UCL to Use**										Use 95% Student's-t UCL	0.0215
1503												
1504	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1505	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1506	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1507												
1508												
1509	**Tin**											
1510												
1511	**General Statistics**											
1512	Number of Valid Observations					18					Number of Distinct Observations	18
1513												
1514	**Raw Statistics**										**Log-transformed Statistics**	
1515	Minimum					0.00626					Minimum of Log Data	-5.074
1516	Maximum					0.296					Maximum of Log Data	-1.216
1517	Mean					0.0316					Mean of log Data	-4.144
1518	Median					0.0131					SD of log Data	0.919
1519	SD					0.0671						
1520	Coefficient of Variation					2.125						
1521	Skewness					4.047						
1522												
1523	**Relevant UCL Statistics**											
1524	**Normal Distribution Test**										**Lognormal Distribution Test**	
1525	Shapiro Wilk Test Statistic					0.376					Shapiro Wilk Test Statistic	0.789
1526	Shapiro Wilk Critical Value					0.897					Shapiro Wilk Critical Value	0.897
1527	**Data not Normal at 5% Significance Level**										**Data not Lognormal at 5% Significance Level**	
1528												
1529	**Assuming Normal Distribution**										**Assuming Lognormal Distribution**	
1530	95% Student's-t UCL					0.0591					95% H-UCL	0.0425
1531	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.0477
1532	95% Adjusted-CLT UCL (Chen-1995)					0.0737					97.5% Chebyshev (MVUE) UCL	0.0582
1533	95% Modified-t UCL (Johnson-1978)					0.0616					99% Chebyshev (MVUE) UCL	0.0789
1534												
1535	**Gamma Distribution Test**										**Data Distribution**	
1536	k star (bias corrected)					0.75					**Data do not follow a Discernable Distribution (0.05)**	
1537	Theta Star					0.0421						
1538	MLE of Mean					0.0316						
1539	MLE of Standard Deviation					0.0365						
1540	nu star					26.99						
1541	Approximate Chi Square Value (.05)					16.14					**Nonparametric Statistics**	
1542	Adjusted Level of Significance					0.0357					95% CLT UCL	0.0576
1543	Adjusted Chi Square Value					15.34					95% Jackknife UCL	0.0591
1544											95% Standard Bootstrap UCL	0.0559
1545	Anderson-Darling Test Statistic					2.574					95% Bootstrap-t UCL	0.208
1546	Anderson-Darling 5% Critical Value					0.773					95% Hall's Bootstrap UCL	0.149
1547	Kolmogorov-Smirnov Test Statistic					0.354					95% Percentile Bootstrap UCL	0.0614
1548	Kolmogorov-Smirnov 5% Critical Value					0.211					95% BCA Bootstrap UCL	0.0788
1549	**Data not Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	0.1
1550											97.5% Chebyshev(Mean, Sd) UCL	0.13

1551	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	0.189
1552					95% Approximate Gamma UCL	0.0528						
1553					95% Adjusted Gamma UCL	0.0555						
1554												
1555	**Potential UCL to Use**										Use 95% Chebyshev (Mean, Sd) UCL	0.1
1556												
1557	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1558	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1559	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1560												
1561												
1562	**Tungsten**											
1563												
1564	**General Statistics**											
1565					Number of Valid Observations	18					Number of Distinct Observations	18
1566												
1567	**Raw Statistics**						**Log-transformed Statistics**					
1568					Minimum	0.0388					Minimum of Log Data	-3.25
1569					Maximum	0.214					Maximum of Log Data	-1.541
1570					Mean	0.099					Mean of log Data	-2.392
1571					Median	0.092					SD of log Data	0.409
1572					SD	0.043						
1573					Coefficient of Variation	0.434						
1574					Skewness	1.378						
1575												
1576	**Relevant UCL Statistics**											
1577	**Normal Distribution Test**						**Lognormal Distribution Test**					
1578					Shapiro Wilk Test Statistic	0.887					Shapiro Wilk Test Statistic	0.979
1579					Shapiro Wilk Critical Value	0.897					Shapiro Wilk Critical Value	0.897
1580	**Data not Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
1581												
1582	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1583					95% Student's-t UCL	0.117					95% H-UCL	0.12
1584	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.141
1585					95% Adjusted-CLT UCL (Chen-1995)	0.119					97.5% Chebyshev (MVUE) UCL	0.16
1586					95% Modified-t UCL (Johnson-1978)	0.117					99% Chebyshev (MVUE) UCL	0.196
1587												
1588	**Gamma Distribution Test**						**Data Distribution**					
1589					k star (bias corrected)	5.371	**Data appear Gamma Distributed at 5% Significance Level**					
1590					Theta Star	0.0184						
1591					MLE of Mean	0.099						
1592					MLE of Standard Deviation	0.0427						
1593					nu star	193.4						
1594					Approximate Chi Square Value (.05)	162.2	**Nonparametric Statistics**					
1595					Adjusted Level of Significance	0.0357					95% CLT UCL	0.116
1596					Adjusted Chi Square Value	159.5					95% Jackknife UCL	0.117
1597											95% Standard Bootstrap UCL	0.115
1598					Anderson-Darling Test Statistic	0.32					95% Bootstrap-t UCL	0.124
1599					Anderson-Darling 5% Critical Value	0.742					95% Hall's Bootstrap UCL	0.14
1600					Kolmogorov-Smirnov Test Statistic	0.148					95% Percentile Bootstrap UCL	0.116

1601					Kolmogorov-Smirnov 5% Critical Value	0.204					95% BCA Bootstrap UCL	0.119
1602					**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.143
1603											97.5% Chebyshev(Mean, Sd) UCL	0.162
1604					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.2
1605					95% Approximate Gamma UCL	0.118						
1606					95% Adjusted Gamma UCL	0.12						
1607												
1608					**Potential UCL to Use**						Use 95% Approximate Gamma UCL	0.118
1609												
1610	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1611	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1612	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1613												
1614												
1615	**Uranium**											
1616												
1617					**General Statistics**							
1618					Number of Valid Observations	18					Number of Distinct Observations	17
1619												
1620					**Raw Statistics**						**Log-transformed Statistics**	
1621					Minimum	0.00251					Minimum of Log Data	-5.987
1622					Maximum	0.00493					Maximum of Log Data	-5.313
1623					Mean	0.00272					Mean of log Data	-5.922
1624					Median	0.00256					SD of log Data	0.156
1625					SD	0.0005593						
1626					Coefficient of Variation	0.206						
1627					Skewness	4.066						
1628												
1629					**Relevant UCL Statistics**							
1630					**Normal Distribution Test**						**Lognormal Distribution Test**	
1631					Shapiro Wilk Test Statistic	0.355					Shapiro Wilk Test Statistic	0.391
1632					Shapiro Wilk Critical Value	0.897					Shapiro Wilk Critical Value	0.897
1633					**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**	
1634												
1635					**Assuming Normal Distribution**						**Assuming Lognormal Distribution**	
1636					95% Student's-t UCL	0.00295					95% H-UCL	0.0029
1637					**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL	0.00315
1638					95% Adjusted-CLT UCL (Chen-1995)	0.00307					97.5% Chebyshev (MVUE) UCL	0.00333
1639					95% Modified-t UCL (Johnson-1978)	0.00297					99% Chebyshev (MVUE) UCL	0.0037
1640												
1641					**Gamma Distribution Test**						**Data Distribution**	
1642					k star (bias corrected)	30.37					**Data do not follow a Discernable Distribution (0.05)**	
1643					Theta Star	8.947E-05						
1644					MLE of Mean	0.00272						
1645					MLE of Standard Deviation	0.0004931						
1646					nu star	1093						
1647					Approximate Chi Square Value (.05)	1018					**Nonparametric Statistics**	
1648					Adjusted Level of Significance	0.0357					95% CLT UCL	0.00293
1649					Adjusted Chi Square Value	1011					95% Jackknife UCL	0.00295
1650											95% Standard Bootstrap UCL	0.00293

1651					Anderson-Darling Test Statistic	4.722					95% Bootstrap-t UCL	0.0051
1652					Anderson-Darling 5% Critical Value	0.739					95% Hall's Bootstrap UCL	0.00404
1653					Kolmogorov-Smirnov Test Statistic	0.414					95% Percentile Bootstrap UCL	0.00297
1654					Kolmogorov-Smirnov 5% Critical Value	0.203					95% BCA Bootstrap UCL	0.00314
1655					**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.00329
1656											97.5% Chebyshev(Mean, Sd) UCL	0.00354
1657					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.00403
1658					95% Approximate Gamma UCL	0.00292						
1659					95% Adjusted Gamma UCL	0.00294						
1660												
1661					**Potential UCL to Use**						Use 95% Student's-t UCL	0.00295
1662											or 95% Modified-t UCL	0.00297
1663												
1664	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1665	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1666	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1667												
1668												
1669	**Vanadium**											
1670												
1671	**General Statistics**											
1672	Number of Valid Observations					18	Number of Distinct Observations					17
1673												
1674	**Raw Statistics**						**Log-transformed Statistics**					
1675	Minimum					0.0251	Minimum of Log Data					-3.684
1676	Maximum					0.093	Maximum of Log Data					-2.375
1677	Mean					0.0309	Mean of log Data					-3.545
1678	Median					0.0256	SD of log Data					0.323
1679	SD					0.0162						
1680	Coefficient of Variation					0.523						
1681	Skewness					3.759						
1682												
1683	**Relevant UCL Statistics**											
1684	**Normal Distribution Test**						**Lognormal Distribution Test**					
1685	Shapiro Wilk Test Statistic					0.394	Shapiro Wilk Test Statistic					0.467
1686	Shapiro Wilk Critical Value					0.897	Shapiro Wilk Critical Value					0.897
1687	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
1688												
1689	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1690	95% Student's-t UCL					0.0375	95% H-UCL					0.0352
1691	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					0.0405
1692	95% Adjusted-CLT UCL (Chen-1995)					0.0408	97.5% Chebyshev (MVUE) UCL					0.045
1693	95% Modified-t UCL (Johnson-1978)					0.0381	99% Chebyshev (MVUE) UCL					0.0537
1694												
1695	**Gamma Distribution Test**						**Data Distribution**					
1696	k star (bias corrected)					6.304	**Data do not follow a Discernable Distribution (0.05)**					
1697	Theta Star					0.0049						
1698	MLE of Mean					0.0309						
1699	MLE of Standard Deviation					0.0123						
1700	nu star					227						

1701	Approximate Chi Square Value (.05)					193.1	**Nonparametric Statistics**					
1702	Adjusted Level of Significance					0.0357	95% CLT UCL					0.0372
1703	Adjusted Chi Square Value					190.1	95% Jackknife UCL					0.0375
1704							95% Standard Bootstrap UCL					0.0371
1705	Anderson-Darling Test Statistic					4.36	95% Bootstrap-t UCL					0.0677
1706	Anderson-Darling 5% Critical Value					0.741	95% Hall's Bootstrap UCL					0.0692
1707	Kolmogorov-Smirnov Test Statistic					0.433	95% Percentile Bootstrap UCL					0.0383
1708	Kolmogorov-Smirnov 5% Critical Value					0.204	95% BCA Bootstrap UCL					0.0422
1709	**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					0.0475
1710							97.5% Chebyshev(Mean, Sd) UCL					0.0547
1711	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL					0.0688
1712	95% Approximate Gamma UCL					0.0363						
1713	95% Adjusted Gamma UCL					0.0369						
1714												
1715	**Potential UCL to Use**						Use 95% Student's-t UCL					0.0375
1716							or 95% Modified-t UCL					0.0381
1717												
1718	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1719	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1720	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1721												
1722												
1723	**Zinc**											
1724												
1725	**General Statistics**											
1726	Number of Valid Observations					18	Number of Distinct Observations					18
1727												
1728	**Raw Statistics**						**Log-transformed Statistics**					
1729	Minimum					19.17	Minimum of Log Data					2.953
1730	Maximum					26.54	Maximum of Log Data					3.279
1731	Mean					23.33	Mean of log Data					3.146
1732	Median					23.36	SD of log Data					0.0966
1733	SD					2.193						
1734	Coefficient of Variation					0.094						
1735	Skewness					-0.453						
1736												
1737	**Relevant UCL Statistics**											
1738	**Normal Distribution Test**						**Lognormal Distribution Test**					
1739	Shapiro Wilk Test Statistic					0.953	Shapiro Wilk Test Statistic					0.94
1740	Shapiro Wilk Critical Value					0.897	Shapiro Wilk Critical Value					0.897
1741	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
1742												
1743	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1744	95% Student's-t UCL					24.23	95% H-UCL					N/A
1745	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					25.65
1746	95% Adjusted-CLT UCL (Chen-1995)					24.12	97.5% Chebyshev (MVUE) UCL					26.66
1747	95% Modified-t UCL (Johnson-1978)					24.22	99% Chebyshev (MVUE) UCL					28.63
1748												
1749	**Gamma Distribution Test**						**Data Distribution**					
1750	k star (bias corrected)					96.59	**Data appear Normal at 5% Significance Level**					

1751					Theta Star	0.242						
1752					MLE of Mean	23.33						
1753					MLE of Standard Deviation	2.374						
1754					nu star	3477						
1755					Approximate Chi Square Value (.05)	3341			**Nonparametric Statistics**			
1756					Adjusted Level of Significance	0.0357					95% CLT UCL	24.18
1757					Adjusted Chi Square Value	3328					95% Jackknife UCL	24.23
1758											95% Standard Bootstrap UCL	24.16
1759					Anderson-Darling Test Statistic	0.323					95% Bootstrap-t UCL	24.18
1760					Anderson-Darling 5% Critical Value	0.737					95% Hall's Bootstrap UCL	24.16
1761					Kolmogorov-Smirnov Test Statistic	0.118					95% Percentile Bootstrap UCL	24.18
1762					Kolmogorov-Smirnov 5% Critical Value	0.203					95% BCA Bootstrap UCL	24.12
1763					**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	25.59
1764											97.5% Chebyshev(Mean, Sd) UCL	26.56
1765					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	28.48
1766					95% Approximate Gamma UCL	24.28						
1767					95% Adjusted Gamma UCL	24.38						
1768												
1769					**Potential UCL to Use**						Use 95% Student's-t UCL	24.23
1770												
1771	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1772	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1773	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1774												

ProUCL Outputs: Fish Carcasses - McBean Brook

General UCL Statistics for Full Data Sets

User Selected Options	
From File	C:\Users\jmcphail\Desktop\UCL for server\fish_carcass_mcbean.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Aluminum

General Statistics

Number of Valid Observations	10	Number of Distinct Observations	10

Raw Statistics		**Log-transformed Statistics**	
Minimum	0.21	Minimum of Log Data	-1.561
Maximum	0.79	Maximum of Log Data	-0.236
Mean	0.505	Mean of log Data	-0.752
Median	0.513	SD of log Data	0.408
SD	0.179		
Coefficient of Variation	0.356		
Skewness	-0.122		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.976	Shapiro Wilk Test Statistic	0.932
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	0.609	95% H-UCL	0.682
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.797
95% Adjusted-CLT UCL (Chen-1995)	0.596	97.5% Chebyshev (MVUE) UCL	0.922
95% Modified-t UCL (Johnson-1978)	0.608	99% Chebyshev (MVUE) UCL	1.168
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	5.362	**Data appear Normal at 5% Significance Level**	
Theta Star	0.0941		
MLE of Mean	0.505		
MLE of Standard Deviation	0.218		
nu star	107.2		
Approximate Chi Square Value (.05)	84.33	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0267	95% CLT UCL	0.598
Adjusted Chi Square Value	80.81	95% Jackknife UCL	0.609
		95% Standard Bootstrap UCL	0.59
Anderson-Darling Test Statistic	0.284	95% Bootstrap-t UCL	0.606
Anderson-Darling 5% Critical Value	0.727	95% Hall's Bootstrap UCL	0.6
Kolmogorov-Smirnov Test Statistic	0.195	95% Percentile Bootstrap UCL	0.593
Kolmogorov-Smirnov 5% Critical Value	0.267	95% BCA Bootstrap UCL	0.595

51	Data appear Gamma Distributed at 5% Significance Level										95% Chebyshev(Mean, Sd) UCL	0.752
52											97.5% Chebyshev(Mean, Sd) UCL	0.859
53	Assuming Gamma Distribution										99% Chebyshev(Mean, Sd) UCL	1.069
54					95% Approximate Gamma UCL	0.641						
55					95% Adjusted Gamma UCL	0.669						
56												
57	Potential UCL to Use										Use 95% Student's-t UCL	0.609
58												
59	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
60	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
61	and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.											
62												
63												
64	Antimony											
65												
66	General Statistics											
67	Number of Valid Observations					10					Number of Distinct Observations	3
68												
69	Raw Statistics										Log-transformed Statistics	
70	Minimum					0.0025					Minimum of Log Data	-5.991
71	Maximum					0.017					Maximum of Log Data	-4.075
72	Mean					0.0043					Mean of log Data	-5.712
73	Median					0.0025					SD of log Data	0.638
74	SD					0.0046						
75	Coefficient of Variation					1.069						
76	Skewness					2.871						
77												
78												
79	Warning: There are only 3 Distinct Values in this data											
80	There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.											
81	Those methods will return a 'N/A' value on your output display!											
82												
83	It is necessary to have 4 or more Distinct Values to compute bootstrap methods.											
84	However, results obtained using 4 to 9 distinct values may not be reliable.											
85	It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.											
86												
87	Relevant UCL Statistics											
88	Normal Distribution Test										Lognormal Distribution Test	
89	Shapiro Wilk Test Statistic					0.472					Shapiro Wilk Test Statistic	0.526
90	Shapiro Wilk Critical Value					0.842					Shapiro Wilk Critical Value	0.842
91	Data not Normal at 5% Significance Level										Data not Lognormal at 5% Significance Level	
92												
93	Assuming Normal Distribution										Assuming Lognormal Distribution	
94	95% Student's-t UCL					0.00696					95% H-UCL	0.00679
95	95% UCLs (Adjusted for Skewness)										95% Chebyshev (MVUE) UCL	0.00753
96	95% Adjusted-CLT UCL (Chen-1995)					0.0081					97.5% Chebyshev (MVUE) UCL	0.00908
97	95% Modified-t UCL (Johnson-1978)					0.00718					99% Chebyshev (MVUE) UCL	0.0121
98												
99	Gamma Distribution Test										Data Distribution	
100	k star (bias corrected)					1.503					Data do not follow a Discernable Distribution (0.05)	

101					Theta Star	0.00286						
102					MLE of Mean	0.0043						
103					MLE of Standard Deviation	0.00351						
104					nu star	30.06						
105					Approximate Chi Square Value (.05)	18.54	**Nonparametric Statistics**					
106					Adjusted Level of Significance	0.0267					95% CLT UCL	0.00669
107					Adjusted Chi Square Value	16.98					95% Jackknife UCL	0.00696
108											95% Standard Bootstrap UCL	N/A
109					Anderson-Darling Test Statistic	2.471					95% Bootstrap-t UCL	N/A
110					Anderson-Darling 5% Critical Value	0.735					95% Hall's Bootstrap UCL	N/A
111					Kolmogorov-Smirnov Test Statistic	0.48					95% Percentile Bootstrap UCL	N/A
112					Kolmogorov-Smirnov 5% Critical Value	0.27					95% BCA Bootstrap UCL	N/A
113					**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.0106
114											97.5% Chebyshev(Mean, Sd) UCL	0.0134
115					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.0188
116					95% Approximate Gamma UCL	0.00697						
117					95% Adjusted Gamma UCL	0.00761						
118												
119					**Potential UCL to Use**						Use 95% Chebyshev (Mean, Sd) UCL	0.0106
120												
121	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
122	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
123	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
124												
125												
126	**Arsenic**											
127												
128	**General Statistics**											
129					Number of Valid Observations	10	Number of Distinct Observations	5				
130												
131	**Raw Statistics**						**Log-transformed Statistics**					
132					Minimum	0.025	Minimum of Log Data	-3.689				
133					Maximum	0.09	Maximum of Log Data	-2.408				
134					Mean	0.0555	Mean of log Data	-3.001				
135					Median	0.055	SD of log Data	0.516				
136					SD	0.0251						
137					Coefficient of Variation	0.452						
138					Skewness	0.0251						
139												
140												
141	**Relevant UCL Statistics**											
142	**Normal Distribution Test**						**Lognormal Distribution Test**					
143					Shapiro Wilk Test Statistic	0.893	Shapiro Wilk Test Statistic	0.85				
144					Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842				
145	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
146												
147	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
148					95% Student's-t UCL	0.0701					95% H-UCL	0.0835
149	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.0966
150					95% Adjusted-CLT UCL (Chen-1995)	0.0686					97.5% Chebyshev (MVUE) UCL	0.114

151				95% Modified-t UCL (Johnson-1978)	0.0701					99% Chebyshev (MVUE) UCL	0.149	
152												
153				**Gamma Distribution Test**						**Data Distribution**		
154				k star (bias corrected)	3.383					**Data appear Normal at 5% Significance Level**		
155				Theta Star	0.0164							
156				MLE of Mean	0.0555							
157				MLE of Standard Deviation	0.0302							
158				nu star	67.67							
159				Approximate Chi Square Value (.05)	49.74					**Nonparametric Statistics**		
160				Adjusted Level of Significance	0.0267					95% CLT UCL	0.0686	
161				Adjusted Chi Square Value	47.07					95% Jackknife UCL	0.0701	
162										95% Standard Bootstrap UCL	0.0683	
163				Anderson-Darling Test Statistic	0.577					95% Bootstrap-t UCL	0.0701	
164				Anderson-Darling 5% Critical Value	0.729					95% Hall's Bootstrap UCL	0.0677	
165				Kolmogorov-Smirnov Test Statistic	0.215					95% Percentile Bootstrap UCL	0.0675	
166				Kolmogorov-Smirnov 5% Critical Value	0.268					95% BCA Bootstrap UCL	0.0685	
167				**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.0901	
168										97.5% Chebyshev(Mean, Sd) UCL	0.105	
169				**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.134	
170				95% Approximate Gamma UCL	0.0755							
171				95% Adjusted Gamma UCL	0.0798							
172												
173				**Potential UCL to Use**						Use 95% Student's-t UCL	0.0701	
174												
175	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
176	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
177	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
178												
179												
180	**Barium**											
181												
182						**General Statistics**							
183				Number of Valid Observations	10					Number of Distinct Observations	8	
184												
185				**Raw Statistics**						**Log-transformed Statistics**		
186				Minimum	0.12					Minimum of Log Data	-2.12	
187				Maximum	0.41					Maximum of Log Data	-0.892	
188				Mean	0.248					Mean of log Data	-1.454	
189				Median	0.225					SD of log Data	0.37	
190				SD	0.088							
191				Coefficient of Variation	0.355							
192				Skewness	0.418							
193												
194												
195						**Relevant UCL Statistics**							
196				**Normal Distribution Test**						**Lognormal Distribution Test**		
197				Shapiro Wilk Test Statistic	0.963					Shapiro Wilk Test Statistic	0.973	
198				Shapiro Wilk Critical Value	0.842					Shapiro Wilk Critical Value	0.842	
199				**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**		
200												

201	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
202					95% Student's-t UCL	0.299					95% H-UCL	0.322
203	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.376
204					95% Adjusted-CLT UCL (Chen-1995)	0.298					97.5% Chebyshev (MVUE) UCL	0.432
205					95% Modified-t UCL (Johnson-1978)	0.3					99% Chebyshev (MVUE) UCL	0.54
206												
207	**Gamma Distribution Test**						**Data Distribution**					
208					k star (bias corrected)	6.082	**Data appear Normal at 5% Significance Level**					
209					Theta Star	0.0408						
210					MLE of Mean	0.248						
211					MLE of Standard Deviation	0.101						
212					nu star	121.6						
213					Approximate Chi Square Value (.05)	97.16	**Nonparametric Statistics**					
214					Adjusted Level of Significance	0.0267					95% CLT UCL	0.294
215					Adjusted Chi Square Value	93.37					95% Jackknife UCL	0.299
216											95% Standard Bootstrap UCL	0.291
217					Anderson-Darling Test Statistic	0.214					95% Bootstrap-t UCL	0.302
218					Anderson-Darling 5% Critical Value	0.726					95% Hall's Bootstrap UCL	0.3
219					Kolmogorov-Smirnov Test Statistic	0.154					95% Percentile Bootstrap UCL	0.293
220					Kolmogorov-Smirnov 5% Critical Value	0.267					95% BCA Bootstrap UCL	0.297
221	**Data appear Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	0.369
222											97.5% Chebyshev(Mean, Sd) UCL	0.422
223	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	0.525
224					95% Approximate Gamma UCL	0.31						
225					95% Adjusted Gamma UCL	0.323						
226												
227	**Potential UCL to Use**										Use 95% Student's-t UCL	0.299
228												
229	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
230	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
231	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
232												
233												
234	**Beryllium**											
235												
236	**General Statistics**											
237					Number of Valid Observations	10					Number of Distinct Observations	1
238												
239												
240	**Warning: There is only one distinct observation value in this data set - resulting in '0' variance!**											
241	**ProUCL (or any other software) should not be used on such a data set!**											
242	**The data set for variable Beryllium was not processed!**											
243												
244	**If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.**											
245	**The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).**											
246												
247												
248												
249	**Bismuth**											
250												

251	**General Statistics**											
252	Number of Valid Observations				10		Number of Distinct Observations					2
253												
254	**Raw Statistics**						**Log-transformed Statistics**					
255	Minimum				0.025		Minimum of Log Data					-3.689
256	Maximum				0.2		Maximum of Log Data					-1.609
257	Mean				0.0425		Mean of log Data					-3.481
258	Median				0.025		SD of log Data					0.658
259	SD				0.0553							
260	Coefficient of Variation				1.302							
261	Skewness				3.162							
262												
263												
264	**Warning: There are only 2 Distinct Values in this data**											
265	**There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.**											
266	**Those methods will return a 'N/A' value on your output display!**											
267												
268	**It is necessary to have 4 or more Distinct Values to compute bootstrap methods.**											
269	**However, results obtained using 4 to 9 distinct values may not be reliable.**											
270	**It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.**											
271												
272	**Relevant UCL Statistics**											
273	**Normal Distribution Test**						**Lognormal Distribution Test**					
274	Shapiro Wilk Test Statistic				0.366		Shapiro Wilk Test Statistic					0.366
275	Shapiro Wilk Critical Value				0.842		Shapiro Wilk Critical Value					0.842
276	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
277												
278	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
279	95% Student's-t UCL				0.0746		95% H-UCL					0.0655
280	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					0.072
281	95% Adjusted-CLT UCL (Chen-1995)				0.09		97.5% Chebyshev (MVUE) UCL					0.087
282	95% Modified-t UCL (Johnson-1978)				0.0775		99% Chebyshev (MVUE) UCL					0.117
283												
284	**Gamma Distribution Test**						**Data Distribution**					
285	k star (bias corrected)				1.255		**Data do not follow a Discernable Distribution (0.05)**					
286	Theta Star				0.0339							
287	MLE of Mean				0.0425							
288	MLE of Standard Deviation				0.0379							
289	nu star				25.09							
290	Approximate Chi Square Value (.05)				14.68		**Nonparametric Statistics**					
291	Adjusted Level of Significance				0.0267		95% CLT UCL					0.0713
292	Adjusted Chi Square Value				13.32		95% Jackknife UCL					N/A
293							95% Standard Bootstrap UCL					N/A
294	Anderson-Darling Test Statistic				3.357		95% Bootstrap-t UCL					N/A
295	Anderson-Darling 5% Critical Value				0.738		95% Hall's Bootstrap UCL					N/A
296	Kolmogorov-Smirnov Test Statistic				0.543		95% Percentile Bootstrap UCL					N/A
297	Kolmogorov-Smirnov 5% Critical Value				0.271		95% BCA Bootstrap UCL					N/A
298	**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					0.119
299							97.5% Chebyshev(Mean, Sd) UCL					0.152
300	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL					0.217

301					95% Approximate Gamma UCL	0.0726						
302					95% Adjusted Gamma UCL	0.0801						
303												
304					**Potential UCL to Use**						Use 95% Chebyshev (Mean, Sd) UCL	0.119
305												
306	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
307	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
308	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
309												
310												
311	**Boron**											
312												
313	**General Statistics**											
314					Number of Valid Observations	10					Number of Distinct Observations	1
315												
316												
317	**Warning: There is only one distinct observation value in this data set - resulting in '0' variance!**											
318	**ProUCL (or any other software) should not be used on such a data set!**											
319	**The data set for variable Boron was not processed!**											
320												
321	**If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.**											
322	**The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).**											
323												
324												
325												
326	**Cadmium**											
327												
328	**General Statistics**											
329					Number of Valid Observations	10					Number of Distinct Observations	9
330												
331					**Raw Statistics**						**Log-transformed Statistics**	
332					Minimum	0.0034					Minimum of Log Data	-5.684
333					Maximum	0.0214					Maximum of Log Data	-3.844
334					Mean	0.0118					Mean of log Data	-4.574
335					Median	0.0131					SD of log Data	0.592
336					SD	0.00587						
337					Coefficient of Variation	0.496						
338					Skewness	0.118						
339												
340												
341	**Relevant UCL Statistics**											
342					**Normal Distribution Test**						**Lognormal Distribution Test**	
343					Shapiro Wilk Test Statistic	0.96					Shapiro Wilk Test Statistic	0.931
344					Shapiro Wilk Critical Value	0.842					Shapiro Wilk Critical Value	0.842
345					**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**	
346												
347					**Assuming Normal Distribution**						**Assuming Lognormal Distribution**	
348					95% Student's-t UCL	0.0152					95% H-UCL	0.0196
349					**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL	0.0221
350					95% Adjusted-CLT UCL (Chen-1995)	0.015					97.5% Chebyshev (MVUE) UCL	0.0265

351	95% Modified-t UCL (Johnson-1978)	0.0153					99% Chebyshev (MVUE) UCL	0.035				
352												
353	**Gamma Distribution Test**						**Data Distribution**					
354	k star (bias corrected)	2.716					**Data appear Normal at 5% Significance Level**					
355	Theta Star	0.00436										
356	MLE of Mean	0.0118										
357	MLE of Standard Deviation	0.00719										
358	nu star	54.31										
359	Approximate Chi Square Value (.05)	38.38					**Nonparametric Statistics**					
360	Adjusted Level of Significance	0.0267					95% CLT UCL	0.0149				
361	Adjusted Chi Square Value	36.06					95% Jackknife UCL	0.0152				
362							95% Standard Bootstrap UCL	0.0147				
363	Anderson-Darling Test Statistic	0.307					95% Bootstrap-t UCL	0.0153				
364	Anderson-Darling 5% Critical Value	0.73					95% Hall's Bootstrap UCL	0.015				
365	Kolmogorov-Smirnov Test Statistic	0.215					95% Percentile Bootstrap UCL	0.0147				
366	Kolmogorov-Smirnov 5% Critical Value	0.268					95% BCA Bootstrap UCL	0.0148				
367	**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.0199				
368							97.5% Chebyshev(Mean, Sd) UCL	0.0234				
369	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.0303				
370	95% Approximate Gamma UCL	0.0168										
371	95% Adjusted Gamma UCL	0.0178										
372												
373	**Potential UCL to Use**						Use 95% Student's-t UCL	0.0152				
374												
375	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
376	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
377	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
378												
379												
380	**Calcium**											
381												
382	**General Statistics**											
383	Number of Valid Observations	10					Number of Distinct Observations	10				
384												
385	**Raw Statistics**						**Log-transformed Statistics**					
386	Minimum	1920					Minimum of Log Data	7.56				
387	Maximum	5980					Maximum of Log Data	8.696				
388	Mean	3789					Mean of log Data	8.187				
389	Median	3813					SD of log Data	0.347				
390	SD	1264										
391	Coefficient of Variation	0.334										
392	Skewness	0.4										
393												
394	**Relevant UCL Statistics**											
395	**Normal Distribution Test**						**Lognormal Distribution Test**					
396	Shapiro Wilk Test Statistic	0.964					Shapiro Wilk Test Statistic	0.973				
397	Shapiro Wilk Critical Value	0.842					Shapiro Wilk Critical Value	0.842				
398	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
399												
400	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					

401					95% Student's-t UCL	4521					95% H-UCL	4828
402				**95% UCLs (Adjusted for Skewness)**							95% Chebyshev (MVUE) UCL	5627
403					95% Adjusted-CLT UCL (Chen-1995)	4500					97.5% Chebyshev (MVUE) UCL	6420
404					95% Modified-t UCL (Johnson-1978)	4530					99% Chebyshev (MVUE) UCL	7977
405												
406				**Gamma Distribution Test**							**Data Distribution**	
407					k star (bias corrected)	6.87					**Data appear Normal at 5% Significance Level**	
408					Theta Star	551.5						
409					MLE of Mean	3789						
410					MLE of Standard Deviation	1445						
411					nu star	137.4						
412					Approximate Chi Square Value (.05)	111.3					**Nonparametric Statistics**	
413					Adjusted Level of Significance	0.0267					95% CLT UCL	4446
414					Adjusted Chi Square Value	107.2					95% Jackknife UCL	4521
415											95% Standard Bootstrap UCL	4412
416					Anderson-Darling Test Statistic	0.184					95% Bootstrap-t UCL	4648
417					Anderson-Darling 5% Critical Value	0.725					95% Hall's Bootstrap UCL	4769
418					Kolmogorov-Smirnov Test Statistic	0.135					95% Percentile Bootstrap UCL	4412
419					Kolmogorov-Smirnov 5% Critical Value	0.267					95% BCA Bootstrap UCL	4460
420				**Data appear Gamma Distributed at 5% Significance Level**							95% Chebyshev(Mean, Sd) UCL	5531
421											97.5% Chebyshev(Mean, Sd) UCL	6286
422				**Assuming Gamma Distribution**							99% Chebyshev(Mean, Sd) UCL	7767
423					95% Approximate Gamma UCL	4676						
424					95% Adjusted Gamma UCL	4854						
425												
426				**Potential UCL to Use**							Use 95% Student's-t UCL	4521
427												
428	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
429	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
430	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
431												
432												
433	**Chromium**											
434												
435	**General Statistics**											
436					Number of Valid Observations	10					Number of Distinct Observations	1
437												
438												
439	**Warning: There is only one distinct observation value in this data set - resulting in '0' variance!**											
440	**ProUCL (or any other software) should not be used on such a data set!**											
441	**The data set for variable Chromium was not processed!**											
442												
443	**If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.**											
444	**The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).**											
445												
446												
447												
448	**Cobalt**											
449												
450	**General Statistics**											

Number of Valid Observations	10	Number of Distinct Observations	9

Raw Statistics		Log-transformed Statistics	
Minimum	0.014	Minimum of Log Data	-4.269
Maximum	0.05	Maximum of Log Data	-2.996
Mean	0.0311	Mean of log Data	-3.542
Median	0.0305	SD of log Data	0.412
SD	0.0118		
Coefficient of Variation	0.378		
Skewness	0.0868		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.955	Shapiro Wilk Test Statistic	0.949
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	0.0379	95% H-UCL	0.0421
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.0492
95% Adjusted-CLT UCL (Chen-1995)	0.0373	97.5% Chebyshev (MVUE) UCL	0.057
95% Modified-t UCL (Johnson-1978)	0.0379	99% Chebyshev (MVUE) UCL	0.0722

Gamma Distribution Test		Data Distribution	
k star (bias corrected)	5.063	**Data appear Normal at 5% Significance Level**	
Theta Star	0.00614		
MLE of Mean	0.0311		
MLE of Standard Deviation	0.0138		
nu star	101.3		
Approximate Chi Square Value (.05)	79.05	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0267	95% CLT UCL	0.0372
Adjusted Chi Square Value	75.64	95% Jackknife UCL	0.0379
		95% Standard Bootstrap UCL	0.037
Anderson-Darling Test Statistic	0.276	95% Bootstrap-t UCL	0.0385
Anderson-Darling 5% Critical Value	0.728	95% Hall's Bootstrap UCL	0.037
Kolmogorov-Smirnov Test Statistic	0.195	95% Percentile Bootstrap UCL	0.0372
Kolmogorov-Smirnov 5% Critical Value	0.267	95% BCA Bootstrap UCL	0.037
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.0473
		97.5% Chebyshev(Mean, Sd) UCL	0.0543
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.0681
95% Approximate Gamma UCL	0.0398		
95% Adjusted Gamma UCL	0.0416		
Potential UCL to Use		Use 95% Student's-t UCL	0.0379

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Copper

General Statistics

Number of Valid Observations	10	Number of Distinct Observations	7

Raw Statistics		Log-transformed Statistics	
Minimum	0.27	Minimum of Log Data	-1.309
Maximum	0.46	Maximum of Log Data	-0.777
Mean	0.34	Mean of log Data	-1.09
Median	0.33	SD of log Data	0.155
SD	0.055		
Coefficient of Variation	0.162		
Skewness	1.023		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.921	Shapiro Wilk Test Statistic	0.951
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	0.372	95% H-UCL	0.374
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.413
95% Adjusted-CLT UCL (Chen-1995)	0.375	97.5% Chebyshev (MVUE) UCL	0.444
95% Modified-t UCL (Johnson-1978)	0.373	99% Chebyshev (MVUE) UCL	0.506

Gamma Distribution Test		Data Distribution	
k star (bias corrected)	31.67	**Data appear Normal at 5% Significance Level**	
Theta Star	0.0107		
MLE of Mean	0.34		
MLE of Standard Deviation	0.0604		
nu star	633.4		
Approximate Chi Square Value (.05)	576	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0267	95% CLT UCL	0.369
Adjusted Chi Square Value	566.5	95% Jackknife UCL	0.372
		95% Standard Bootstrap UCL	0.367
Anderson-Darling Test Statistic	0.313	95% Bootstrap-t UCL	0.38
Anderson-Darling 5% Critical Value	0.724	95% Hall's Bootstrap UCL	0.391
Kolmogorov-Smirnov Test Statistic	0.16	95% Percentile Bootstrap UCL	0.369
Kolmogorov-Smirnov 5% Critical Value	0.266	95% BCA Bootstrap UCL	0.372
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.416
		97.5% Chebyshev(Mean, Sd) UCL	0.449
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.513
95% Approximate Gamma UCL	0.374		
95% Adjusted Gamma UCL	0.38		

Potential UCL to Use			
		Use 95% Student's-t UCL	0.372

	A	B	C	D	E	F	G	H	I	J	K	L
551	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
552	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
553	and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.											
554												
555												
556	Iron											
557												
558	General Statistics											
559	Number of Valid Observations					10	Number of Distinct Observations					4
560												
561	Raw Statistics						Log-transformed Statistics					
562	Minimum					3	Minimum of Log Data					1.099
563	Maximum					5	Maximum of Log Data					1.609
564	Mean					4.15	Mean of log Data					1.407
565	Median					4	SD of log Data					0.19
566	SD					0.747						
567	Coefficient of Variation					0.18						
568	Skewness					-0.39						
569												
570												
571	Warning: There are only 4 Distinct Values in this data											
572	There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.											
573	Those methods will return a 'N/A' value on your output display!											
574												
575	It is necessary to have 4 or more Distinct Values to compute bootstrap methods.											
576	However, results obtained using 4 to 9 distinct values may not be reliable.											
577	It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.											
578												
579	Relevant UCL Statistics											
580	Normal Distribution Test						Lognormal Distribution Test					
581	Shapiro Wilk Test Statistic					0.862	Shapiro Wilk Test Statistic					0.845
582	Shapiro Wilk Critical Value					0.842	Shapiro Wilk Critical Value					0.842
583	Data appear Normal at 5% Significance Level						Data appear Lognormal at 5% Significance Level					
584												
585	Assuming Normal Distribution						Assuming Lognormal Distribution					
586	95% Student's-t UCL					4.583	95% H-UCL					4.683
587	95% UCLs (Adjusted for Skewness)						95% Chebyshev (MVUE) UCL					5.242
588	95% Adjusted-CLT UCL (Chen-1995)					4.508	97.5% Chebyshev (MVUE) UCL					5.713
589	95% Modified-t UCL (Johnson-1978)					4.578	99% Chebyshev (MVUE) UCL					6.64
590												
591	Gamma Distribution Test						Data Distribution					
592	k star (bias corrected)					22.58	Data appear Normal at 5% Significance Level					
593	Theta Star					0.184						
594	MLE of Mean					4.15						
595	MLE of Standard Deviation					0.873						
596	nu star					451.5						
597	Approximate Chi Square Value (.05)					403.3	Nonparametric Statistics					
598	Adjusted Level of Significance					0.0267	95% CLT UCL					4.539
599	Adjusted Chi Square Value					395.3	95% Jackknife UCL					4.583
600							95% Standard Bootstrap UCL					4.518

601					Anderson-Darling Test Statistic	0.671					95% Bootstrap-t UCL	4.567
602					Anderson-Darling 5% Critical Value	0.724					95% Hall's Bootstrap UCL	4.514
603					Kolmogorov-Smirnov Test Statistic	0.241					95% Percentile Bootstrap UCL	4.5
604					Kolmogorov-Smirnov 5% Critical Value	0.266					95% BCA Bootstrap UCL	4.5
605					**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	5.18
606											97.5% Chebyshev(Mean, Sd) UCL	5.626
607					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	6.501
608					95% Approximate Gamma UCL	4.647						
609					95% Adjusted Gamma UCL	4.74						
610												
611					**Potential UCL to Use**						Use 95% Student's-t UCL	4.583
612												
613	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
614	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
615	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
616												
617												
618	**Lead**											
619												
620					**General Statistics**							
621					Number of Valid Observations	10					Number of Distinct Observations	10
622												
623					**Raw Statistics**						**Log-transformed Statistics**	
624					Minimum	0.01					Minimum of Log Data	-4.605
625					Maximum	0.046					Maximum of Log Data	-3.079
626					Mean	0.0214					Mean of log Data	-3.961
627					Median	0.02					SD of log Data	0.501
628					SD	0.0111						
629					Coefficient of Variation	0.522						
630					Skewness	1.167						
631												
632					**Relevant UCL Statistics**							
633					**Normal Distribution Test**						**Lognormal Distribution Test**	
634					Shapiro Wilk Test Statistic	0.882					Shapiro Wilk Test Statistic	0.938
635					Shapiro Wilk Critical Value	0.842					Shapiro Wilk Critical Value	0.842
636					**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**	
637												
638					**Assuming Normal Distribution**						**Assuming Lognormal Distribution**	
639					95% Student's-t UCL	0.0278					95% H-UCL	0.0313
640					**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL	0.0363
641					95% Adjusted-CLT UCL (Chen-1995)	0.0285					97.5% Chebyshev (MVUE) UCL	0.0427
642					95% Modified-t UCL (Johnson-1978)	0.028					99% Chebyshev (MVUE) UCL	0.0554
643												
644					**Gamma Distribution Test**						**Data Distribution**	
645					k star (bias corrected)	3.232					**Data appear Normal at 5% Significance Level**	
646					Theta Star	0.00661						
647					MLE of Mean	0.0214						
648					MLE of Standard Deviation	0.0119						
649					nu star	64.64						
650					Approximate Chi Square Value (.05)	47.14					**Nonparametric Statistics**	

651					Adjusted Level of Significance	0.0267					95% CLT UCL	0.0271
652					Adjusted Chi Square Value	44.55					95% Jackknife UCL	0.0278
653											95% Standard Bootstrap UCL	0.0269
654					Anderson-Darling Test Statistic	0.348					95% Bootstrap-t UCL	0.03
655					Anderson-Darling 5% Critical Value	0.729					95% Hall's Bootstrap UCL	0.0306
656					Kolmogorov-Smirnov Test Statistic	0.191					95% Percentile Bootstrap UCL	0.0269
657					Kolmogorov-Smirnov 5% Critical Value	0.268					95% BCA Bootstrap UCL	0.0281
658					**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.0367
659											97.5% Chebyshev(Mean, Sd) UCL	0.0434
660					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.0564
661					95% Approximate Gamma UCL	0.0293						
662					95% Adjusted Gamma UCL	0.031						
663												
664					**Potential UCL to Use**						Use 95% Student's-t UCL	0.0278
665												
666	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
667	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
668	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
669												
670												
671	**Lithium**											
672												
673	**General Statistics**											
674					Number of Valid Observations	10					Number of Distinct Observations	3
675												
676	**Raw Statistics**						**Log-transformed Statistics**					
677					Minimum	0.0025					Minimum of Log Data	-5.991
678					Maximum	0.007					Maximum of Log Data	-4.962
679					Mean	0.0047					Mean of log Data	-5.451
680					Median	0.006					SD of log Data	0.468
681					SD	0.00192						
682					Coefficient of Variation	0.408						
683					Skewness	-0.383						
684												
685												
686	**Warning: There are only 3 Distinct Values in this data**											
687	**There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.**											
688	**Those methods will return a 'N/A' value on your output display!**											
689												
690	**It is necessary to have 4 or more Distinct Values to compute bootstrap methods.**											
691	**However, results obtained using 4 to 9 distinct values may not be reliable.**											
692	**It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.**											
693												
694	**Relevant UCL Statistics**											
695	**Normal Distribution Test**						**Lognormal Distribution Test**					
696					Shapiro Wilk Test Statistic	0.729					Shapiro Wilk Test Statistic	0.7
697					Shapiro Wilk Critical Value	0.842					Shapiro Wilk Critical Value	0.842
698	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
699												
700	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					

701					95% Student's-t UCL	0.00581					95% H-UCL	0.00672
702				**95% UCLs (Adjusted for Skewness)**							95% Chebyshev (MVUE) UCL	0.00783
703					95% Adjusted-CLT UCL (Chen-1995)	0.00562					97.5% Chebyshev (MVUE) UCL	0.00917
704					95% Modified-t UCL (Johnson-1978)	0.0058					99% Chebyshev (MVUE) UCL	0.0118
705												
706				**Gamma Distribution Test**							**Data Distribution**	
707					k star (bias corrected)	4.044					**Data do not follow a Discernable Distribution (0.05)**	
708					Theta Star	0.00116						
709					MLE of Mean	0.0047						
710					MLE of Standard Deviation	0.00234						
711					nu star	80.88						
712					Approximate Chi Square Value (.05)	61.15					**Nonparametric Statistics**	
713					Adjusted Level of Significance	0.0267					95% CLT UCL	0.0057
714					Adjusted Chi Square Value	58.18					95% Jackknife UCL	0.00581
715											95% Standard Bootstrap UCL	N/A
716					Anderson-Darling Test Statistic	1.577					95% Bootstrap-t UCL	N/A
717					Anderson-Darling 5% Critical Value	0.729					95% Hall's Bootstrap UCL	N/A
718					Kolmogorov-Smirnov Test Statistic	0.372					95% Percentile Bootstrap UCL	N/A
719					Kolmogorov-Smirnov 5% Critical Value	0.267					95% BCA Bootstrap UCL	N/A
720				**Data not Gamma Distributed at 5% Significance Level**							95% Chebyshev(Mean, Sd) UCL	0.00734
721											97.5% Chebyshev(Mean, Sd) UCL	0.00849
722				**Assuming Gamma Distribution**							99% Chebyshev(Mean, Sd) UCL	0.0107
723					95% Approximate Gamma UCL	0.00622						
724					95% Adjusted Gamma UCL	0.00653						
725												
726				**Potential UCL to Use**							Use 95% Student's-t UCL	0.00581
727											or 95% Modified-t UCL	0.0058
728												
729	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
730	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
731	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
732												
733												
734	**Magnesium**											
735												
736	**General Statistics**											
737	Number of Valid Observations					10	Number of Distinct Observations					10
738												
739	**Raw Statistics**						**Log-transformed Statistics**					
740	Minimum					268	Minimum of Log Data					5.591
741	Maximum					355	Maximum of Log Data					5.872
742	Mean					316	Mean of log Data					5.751
743	Median					317.8	SD of log Data					0.1
744	SD					31.31						
745	Coefficient of Variation					0.0991						
746	Skewness					-0.104						
747												
748	**Relevant UCL Statistics**											
749	**Normal Distribution Test**						**Lognormal Distribution Test**					
750	Shapiro Wilk Test Statistic					0.922	Shapiro Wilk Test Statistic					0.923

751	Shapiro Wilk Critical Value	0.842					Shapiro Wilk Critical Value	0.842				
752	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
753												
754	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
755	95% Student's-t UCL	334.1					95% H-UCL	335.7				
756	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL	359.6				
757	95% Adjusted-CLT UCL (Chen-1995)	331.9					97.5% Chebyshev (MVUE) UCL	378.4				
758	95% Modified-t UCL (Johnson-1978)	334					99% Chebyshev (MVUE) UCL	415.5				
759												
760	**Gamma Distribution Test**						**Data Distribution**					
761	k star (bias corrected)	78.39					**Data appear Normal at 5% Significance Level**					
762	Theta Star	4.031										
763	MLE of Mean	316										
764	MLE of Standard Deviation	35.69										
765	nu star	1568										
766	Approximate Chi Square Value (.05)	1477					**Nonparametric Statistics**					
767	Adjusted Level of Significance	0.0267					95% CLT UCL	332.2				
768	Adjusted Chi Square Value	1461					95% Jackknife UCL	334.1				
769							95% Standard Bootstrap UCL	331.3				
770	Anderson-Darling Test Statistic	0.39					95% Bootstrap-t UCL	334.5				
771	Anderson-Darling 5% Critical Value	0.724					95% Hall's Bootstrap UCL	330.8				
772	Kolmogorov-Smirnov Test Statistic	0.201					95% Percentile Bootstrap UCL	331.7				
773	Kolmogorov-Smirnov 5% Critical Value	0.266					95% BCA Bootstrap UCL	331.5				
774	**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	359.1				
775							97.5% Chebyshev(Mean, Sd) UCL	377.8				
776	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	414.5				
777	95% Approximate Gamma UCL	335.4										
778	95% Adjusted Gamma UCL	338.9										
779												
780	**Potential UCL to Use**						Use 95% Student's-t UCL	334.1				
781												
782	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
783	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
784	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
785												
786												
787	**Manganese**											
788												
789	**General Statistics**											
790	Number of Valid Observations	10					Number of Distinct Observations	10				
791												
792	**Raw Statistics**						**Log-transformed Statistics**					
793	Minimum	1.83					Minimum of Log Data	0.604				
794	Maximum	5.07					Maximum of Log Data	1.623				
795	Mean	3.143					Mean of log Data	1.068				
796	Median	2.57					SD of log Data	0.413				
797	SD	1.303										
798	Coefficient of Variation	0.415										
799	Skewness	0.451										
800												

801	**Relevant UCL Statistics**											
802	**Normal Distribution Test**						**Lognormal Distribution Test**					
803	Shapiro Wilk Test Statistic				0.838		Shapiro Wilk Test Statistic					0.857
804	Shapiro Wilk Critical Value				0.842		Shapiro Wilk Critical Value					0.842
805	**Data not Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
806												
807	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
808	95% Student's-t UCL				3.898		95% H-UCL					4.232
809	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					4.949
810	95% Adjusted-CLT UCL (Chen-1995)				3.884		97.5% Chebyshev (MVUE) UCL					5.732
811	95% Modified-t UCL (Johnson-1978)				3.908		99% Chebyshev (MVUE) UCL					7.269
812												
813	**Gamma Distribution Test**						**Data Distribution**					
814	k star (bias corrected)				4.714		**Data appear Gamma Distributed at 5% Significance Level**					
815	Theta Star				0.667							
816	MLE of Mean				3.143							
817	MLE of Standard Deviation				1.448							
818	nu star				94.27							
819	Approximate Chi Square Value (.05)				72.88		**Nonparametric Statistics**					
820	Adjusted Level of Significance				0.0267		95% CLT UCL					3.821
821	Adjusted Chi Square Value				69.62		95% Jackknife UCL					3.898
822							95% Standard Bootstrap UCL					3.805
823	Anderson-Darling Test Statistic				0.713		95% Bootstrap-t UCL					3.958
824	Anderson-Darling 5% Critical Value				0.728		95% Hall's Bootstrap UCL					3.689
825	Kolmogorov-Smirnov Test Statistic				0.222		95% Percentile Bootstrap UCL					3.809
826	Kolmogorov-Smirnov 5% Critical Value				0.267		95% BCA Bootstrap UCL					3.813
827	**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					4.939
828							97.5% Chebyshev(Mean, Sd) UCL					5.717
829	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL					7.244
830	95% Approximate Gamma UCL				4.066							
831	95% Adjusted Gamma UCL				4.256							
832												
833	**Potential UCL to Use**						Use 95% Approximate Gamma UCL					4.066
834												
835	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
836	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
837	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
838												
839												
840	**Mercury**											
841												
842	**General Statistics**											
843	Number of Valid Observations				10		Number of Distinct Observations					9
844												
845	**Raw Statistics**						**Log-transformed Statistics**					
846	Minimum				0.06		Minimum of Log Data					-2.813
847	Maximum				0.16		Maximum of Log Data					-1.833
848	Mean				0.105		Mean of log Data					-2.295
849	Median				0.105		SD of log Data					0.307
850	SD				0.031							

851					Coefficient of Variation	0.295						
852					Skewness	0.224						
853												
854												
855					**Relevant UCL Statistics**							
856					**Normal Distribution Test**					**Lognormal Distribution Test**		
857					Shapiro Wilk Test Statistic	0.977				Shapiro Wilk Test Statistic	0.974	
858					Shapiro Wilk Critical Value	0.842				Shapiro Wilk Critical Value	0.842	
859					**Data appear Normal at 5% Significance Level**					**Data appear Lognormal at 5% Significance Level**		
860												
861					**Assuming Normal Distribution**					**Assuming Lognormal Distribution**		
862					95% Student's-t UCL	0.123				95% H-UCL	0.129	
863					**95% UCLs (Adjusted for Skewness)**					95% Chebyshev (MVUE) UCL	0.15	
864					95% Adjusted-CLT UCL (Chen-1995)	0.122				97.5% Chebyshev (MVUE) UCL	0.169	
865					95% Modified-t UCL (Johnson-1978)	0.123				99% Chebyshev (MVUE) UCL	0.207	
866												
867					**Gamma Distribution Test**					**Data Distribution**		
868					k star (bias corrected)	8.686				**Data appear Normal at 5% Significance Level**		
869					Theta Star	0.0121						
870					MLE of Mean	0.105						
871					MLE of Standard Deviation	0.0356						
872					nu star	173.7						
873					Approximate Chi Square Value (.05)	144.2				**Nonparametric Statistics**		
874					Adjusted Level of Significance	0.0267				95% CLT UCL	0.121	
875					Adjusted Chi Square Value	139.6				95% Jackknife UCL	0.123	
876										95% Standard Bootstrap UCL	0.12	
877					Anderson-Darling Test Statistic	0.172				95% Bootstrap-t UCL	0.125	
878					Anderson-Darling 5% Critical Value	0.725				95% Hall's Bootstrap UCL	0.122	
879					Kolmogorov-Smirnov Test Statistic	0.117				95% Percentile Bootstrap UCL	0.121	
880					Kolmogorov-Smirnov 5% Critical Value	0.267				95% BCA Bootstrap UCL	0.119	
881					**Data appear Gamma Distributed at 5% Significance Level**					95% Chebyshev(Mean, Sd) UCL	0.148	
882										97.5% Chebyshev(Mean, Sd) UCL	0.166	
883					**Assuming Gamma Distribution**					99% Chebyshev(Mean, Sd) UCL	0.203	
884					95% Approximate Gamma UCL	0.126						
885					95% Adjusted Gamma UCL	0.131						
886												
887					**Potential UCL to Use**					Use 95% Student's-t UCL	0.123	
888												
889					**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**							
890					**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**							
891					**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**							
892												
893												
894	**Molybdenum**											
895												
896					**General Statistics**							
897					Number of Valid Observations	10				Number of Distinct Observations	5	
898												
899					**Raw Statistics**					**Log-transformed Statistics**		
900					Minimum	0.0025				Minimum of Log Data	-5.991	

901					Maximum	0.02					Maximum of Log Data	-3.912
902					Mean	0.00705					Mean of log Data	-5.316
903					Median	0.00375					SD of log Data	0.843
904					SD	0.00703						
905					Coefficient of Variation	0.997						
906					Skewness	1.547						
907												
908												
909					**Relevant UCL Statistics**							
910	**Normal Distribution Test**						**Lognormal Distribution Test**					
911					Shapiro Wilk Test Statistic	0.673					Shapiro Wilk Test Statistic	0.78
912					Shapiro Wilk Critical Value	0.842					Shapiro Wilk Critical Value	0.842
913	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
914												
915	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
916					95% Student's-t UCL	0.0111					95% H-UCL	0.0153
917	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.0148
918					95% Adjusted-CLT UCL (Chen-1995)	0.0119					97.5% Chebyshev (MVUE) UCL	0.0183
919					95% Modified-t UCL (Johnson-1978)	0.0113					99% Chebyshev (MVUE) UCL	0.0252
920												
921	**Gamma Distribution Test**						**Data Distribution**					
922					k star (bias corrected)	1.138	**Data do not follow a Discernable Distribution (0.05)**					
923					Theta Star	0.0062						
924					MLE of Mean	0.00705						
925					MLE of Standard Deviation	0.00661						
926					nu star	22.76						
927					Approximate Chi Square Value (.05)	12.91	**Nonparametric Statistics**					
928					Adjusted Level of Significance	0.0267					95% CLT UCL	0.0107
929					Adjusted Chi Square Value	11.64					95% Jackknife UCL	0.0111
930											95% Standard Bootstrap UCL	0.0106
931					Anderson-Darling Test Statistic	1.121					95% Bootstrap-t UCL	0.0205
932					Anderson-Darling 5% Critical Value	0.739					95% Hall's Bootstrap UCL	0.0324
933					Kolmogorov-Smirnov Test Statistic	0.29					95% Percentile Bootstrap UCL	0.0106
934					Kolmogorov-Smirnov 5% Critical Value	0.271					95% BCA Bootstrap UCL	0.0117
935	**Data not Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	0.0167
936											97.5% Chebyshev(Mean, Sd) UCL	0.0209
937	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	0.0292
938					95% Approximate Gamma UCL	0.0124						
939					95% Adjusted Gamma UCL	0.0138						
940												
941	**Potential UCL to Use**										Use 95% Chebyshev (Mean, Sd) UCL	0.0167
942												
943	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
944	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
945	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
946												
947												
948	**Nickel**											
949												
950	**General Statistics**											

951	Number of Valid Observations					10	Number of Distinct Observations					1
952												
953												
954	**Warning: There is only one distinct observation value in this data set - resulting in '0' variance!**											
955	**ProUCL (or any other software) should not be used on such a data set!**											
956	**The data set for variable Nickel was not processed!**											
957												
958	**If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.**											
959	**The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).**											
960												
961												
962												
963	**Potassium**											
964												
965	**General Statistics**											
966	Number of Valid Observations					10	Number of Distinct Observations					8
967												
968	**Raw Statistics**						**Log-transformed Statistics**					
969	Minimum					3800	Minimum of Log Data					8.243
970	Maximum					4200	Maximum of Log Data					8.343
971	Mean					3970	Mean of log Data					8.286
972	Median					3963	SD of log Data					0.0271
973	SD					108.6						
974	Coefficient of Variation					0.0274						
975	Skewness					0.793						
976												
977												
978	**Relevant UCL Statistics**											
979	**Normal Distribution Test**						**Lognormal Distribution Test**					
980	Shapiro Wilk Test Statistic					0.94	Shapiro Wilk Test Statistic					0.946
981	Shapiro Wilk Critical Value					0.842	Shapiro Wilk Critical Value					0.842
982	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
983												
984	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
985	95% Student's-t UCL					4032	95% H-UCL					N/A
986	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					4118
987	95% Adjusted-CLT UCL (Chen-1995)					4035	97.5% Chebyshev (MVUE) UCL					4182
988	95% Modified-t UCL (Johnson-1978)					4034	99% Chebyshev (MVUE) UCL					4309
989												
990	**Gamma Distribution Test**						**Data Distribution**					
991	k star (bias corrected)					1051	**Data appear Normal at 5% Significance Level**					
992	Theta Star					3.779						
993	MLE of Mean					3970						
994	MLE of Standard Deviation					122.5						
995	nu star					21010						
996	Approximate Chi Square Value (.05)					20674	**Nonparametric Statistics**					
997	Adjusted Level of Significance					0.0267	95% CLT UCL					4026
998	Adjusted Chi Square Value					20616	95% Jackknife UCL					4032
999							95% Standard Bootstrap UCL					4023
1000	Anderson-Darling Test Statistic					0.365	95% Bootstrap-t UCL					4048

1001					Anderson-Darling 5% Critical Value	0.724					95% Hall's Bootstrap UCL	4119
1002					Kolmogorov-Smirnov Test Statistic	0.2					95% Percentile Bootstrap UCL	4027
1003					Kolmogorov-Smirnov 5% Critical Value	0.266					95% BCA Bootstrap UCL	4028
1004					**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	4119
1005											97.5% Chebyshev(Mean, Sd) UCL	4184
1006					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	4311
1007					95% Approximate Gamma UCL	4034						
1008					95% Adjusted Gamma UCL	4045						
1009												
1010					**Potential UCL to Use**						Use 95% Student's-t UCL	4032
1011												
1012	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1013	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1014	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1015												
1016												
1017	**Rubidium**											
1018												
1019	**General Statistics**											
1020					Number of Valid Observations	10					Number of Distinct Observations	10
1021												
1022					**Raw Statistics**						**Log-transformed Statistics**	
1023					Minimum	7.14					Minimum of Log Data	1.966
1024					Maximum	13.1					Maximum of Log Data	2.573
1025					Mean	9.666					Mean of log Data	2.257
1026					Median	9.5					SD of log Data	0.158
1027					SD	1.562						
1028					Coefficient of Variation	0.162						
1029					Skewness	0.891						
1030												
1031	**Relevant UCL Statistics**											
1032					**Normal Distribution Test**						**Lognormal Distribution Test**	
1033					Shapiro Wilk Test Statistic	0.927					Shapiro Wilk Test Statistic	0.952
1034					Shapiro Wilk Critical Value	0.842					Shapiro Wilk Critical Value	0.842
1035					**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**	
1036												
1037					**Assuming Normal Distribution**						**Assuming Lognormal Distribution**	
1038					95% Student's-t UCL	10.57					95% H-UCL	10.66
1039					**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL	11.77
1040					95% Adjusted-CLT UCL (Chen-1995)	10.63					97.5% Chebyshev (MVUE) UCL	12.68
1041					95% Modified-t UCL (Johnson-1978)	10.59					99% Chebyshev (MVUE) UCL	14.47
1042												
1043					**Gamma Distribution Test**						**Data Distribution**	
1044					k star (bias corrected)	31.12					**Data appear Normal at 5% Significance Level**	
1045					Theta Star	0.311						
1046					MLE of Mean	9.666						
1047					MLE of Standard Deviation	1.733						
1048					nu star	622.4						
1049					Approximate Chi Square Value (.05)	565.6					**Nonparametric Statistics**	
1050					Adjusted Level of Significance	0.0267					95% CLT UCL	10.48

1051					Adjusted Chi Square Value	556.1					95% Jackknife UCL	10.57
1052											95% Standard Bootstrap UCL	10.44
1053					Anderson-Darling Test Statistic	0.344					95% Bootstrap-t UCL	10.81
1054					Anderson-Darling 5% Critical Value	0.724					95% Hall's Bootstrap UCL	11.49
1055					Kolmogorov-Smirnov Test Statistic	0.177					95% Percentile Bootstrap UCL	10.49
1056					Kolmogorov-Smirnov 5% Critical Value	0.266					95% BCA Bootstrap UCL	10.63
1057					**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	11.82
1058											97.5% Chebyshev(Mean, Sd) UCL	12.75
1059					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	14.58
1060					95% Approximate Gamma UCL	10.64						
1061					95% Adjusted Gamma UCL	10.82						
1062												
1063					**Potential UCL to Use**						Use 95% Student's-t UCL	10.57
1064												
1065	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1066	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1067	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1068												
1069												
1070	**Selenium**											
1071												
1072	**General Statistics**											
1073					Number of Valid Observations	10					Number of Distinct Observations	9
1074												
1075	**Raw Statistics**						**Log-transformed Statistics**					
1076					Minimum	0.175					Minimum of Log Data	-1.743
1077					Maximum	0.31					Maximum of Log Data	-1.171
1078					Mean	0.242					Mean of log Data	-1.438
1079					Median	0.245					SD of log Data	0.196
1080					SD	0.0459						
1081					Coefficient of Variation	0.19						
1082					Skewness	-0.0919						
1083												
1084												
1085	**Relevant UCL Statistics**											
1086	**Normal Distribution Test**						**Lognormal Distribution Test**					
1087					Shapiro Wilk Test Statistic	0.956					Shapiro Wilk Test Statistic	0.944
1088					Shapiro Wilk Critical Value	0.842					Shapiro Wilk Critical Value	0.842
1089	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
1090												
1091	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1092					95% Student's-t UCL	0.268					95% H-UCL	0.274
1093	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.307
1094					95% Adjusted-CLT UCL (Chen-1995)	0.265					97.5% Chebyshev (MVUE) UCL	0.335
1095					95% Modified-t UCL (Johnson-1978)	0.268					99% Chebyshev (MVUE) UCL	0.391
1096												
1097	**Gamma Distribution Test**						**Data Distribution**					
1098					k star (bias corrected)	20.83	**Data appear Normal at 5% Significance Level**					
1099					Theta Star	0.0116						
1100					MLE of Mean	0.242						

1101					MLE of Standard Deviation	0.0529						
1102					nu star	416.6						
1103					Approximate Chi Square Value (.05)	370.2				**Nonparametric Statistics**		
1104					Adjusted Level of Significance	0.0267				95% CLT UCL	0.265	
1105					Adjusted Chi Square Value	362.6				95% Jackknife UCL	0.268	
1106										95% Standard Bootstrap UCL	0.264	
1107					Anderson-Darling Test Statistic	0.263				95% Bootstrap-t UCL	0.267	
1108					Anderson-Darling 5% Critical Value	0.724				95% Hall's Bootstrap UCL	0.264	
1109					Kolmogorov-Smirnov Test Statistic	0.18				95% Percentile Bootstrap UCL	0.264	
1110					Kolmogorov-Smirnov 5% Critical Value	0.266				95% BCA Bootstrap UCL	0.264	
1111					**Data appear Gamma Distributed at 5% Significance Level**					95% Chebyshev(Mean, Sd) UCL	0.305	
1112										97.5% Chebyshev(Mean, Sd) UCL	0.332	
1113					**Assuming Gamma Distribution**					99% Chebyshev(Mean, Sd) UCL	0.386	
1114					95% Approximate Gamma UCL	0.272						
1115					95% Adjusted Gamma UCL	0.277						
1116												
1117					**Potential UCL to Use**					Use 95% Student's-t UCL	0.268	
1118												
1119	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1120	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1121	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1122												
1123												
1124	**Silver**											
1125												
1126	**General Statistics**											
1127	Number of Valid Observations					10	Number of Distinct Observations				1	
1128												
1129												
1130	**Warning: There is only one distinct observation value in this data set - resulting in '0' variance!**											
1131	**ProUCL (or any other software) should not be used on such a data set!**											
1132	**The data set for variable Silver was not processed!**											
1133												
1134	**If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.**											
1135	**The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).**											
1136												
1137												
1138												
1139	**Sodium**											
1140												
1141	**General Statistics**											
1142	Number of Valid Observations					10	Number of Distinct Observations				10	
1143												
1144	**Raw Statistics**						**Log-transformed Statistics**					
1145	Minimum					535	Minimum of Log Data				6.282	
1146	Maximum					728	Maximum of Log Data				6.59	
1147	Mean					612.3	Mean of log Data				6.412	
1148	Median					602	SD of log Data				0.108	
1149	SD					67.33						
1150	Coefficient of Variation					0.11						

	Skewness	0.485
Relevant UCL Statistics		
Normal Distribution Test		**Lognormal Distribution Test**
Shapiro Wilk Test Statistic	0.927	Shapiro Wilk Test Statistic 0.932
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value 0.842
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**
Assuming Normal Distribution		**Assuming Lognormal Distribution**
95% Student's-t UCL	651.3	95% H-UCL 654
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL 703.8
95% Adjusted-CLT UCL (Chen-1995)	650.8	97.5% Chebyshev (MVUE) UCL 743.5
95% Modified-t UCL (Johnson-1978)	651.9	99% Chebyshev (MVUE) UCL 821.3
Gamma Distribution Test		**Data Distribution**
k star (bias corrected)	65.76	**Data appear Normal at 5% Significance Level**
Theta Star	9.311	
MLE of Mean	612.3	
MLE of Standard Deviation	75.51	
nu star	1315	
Approximate Chi Square Value (.05)	1232	**Nonparametric Statistics**
Adjusted Level of Significance	0.0267	95% CLT UCL 647.3
Adjusted Chi Square Value	1218	95% Jackknife UCL 651.3
		95% Standard Bootstrap UCL 644.9
Anderson-Darling Test Statistic	0.332	95% Bootstrap-t UCL 657.5
Anderson-Darling 5% Critical Value	0.724	95% Hall's Bootstrap UCL 647.9
Kolmogorov-Smirnov Test Statistic	0.183	95% Percentile Bootstrap UCL 645.1
Kolmogorov-Smirnov 5% Critical Value	0.266	95% BCA Bootstrap UCL 651
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 705.1
		97.5% Chebyshev(Mean, Sd) UCL 745.3
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 824.1
95% Approximate Gamma UCL	653.7	
95% Adjusted Gamma UCL	661.2	
Potential UCL to Use		Use 95% Student's-t UCL 651.3

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Strontium

General Statistics		
Number of Valid Observations	10	Number of Distinct Observations 10
Raw Statistics		**Log-transformed Statistics**
Minimum	3.14	Minimum of Log Data 1.144
Maximum	14.1	Maximum of Log Data 2.646
Mean	6.897	Mean of log Data 1.818

1201					Median	5.535					SD of log Data	0.493
1202					SD	3.588						
1203					Coefficient of Variation	0.52						
1204					Skewness	1.038						
1205												
1206					**Relevant UCL Statistics**							
1207					**Normal Distribution Test**						**Lognormal Distribution Test**	
1208					Shapiro Wilk Test Statistic	0.877					Shapiro Wilk Test Statistic	0.948
1209					Shapiro Wilk Critical Value	0.842					Shapiro Wilk Critical Value	0.842
1210					**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**	
1211												
1212					**Assuming Normal Distribution**						**Assuming Lognormal Distribution**	
1213					95% Student's-t UCL	8.977					95% H-UCL	10.01
1214					**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL	11.62
1215					95% Adjusted-CLT UCL (Chen-1995)	9.162					97.5% Chebyshev (MVUE) UCL	13.68
1216					95% Modified-t UCL (Johnson-1978)	9.039					99% Chebyshev (MVUE) UCL	17.72
1217												
1218					**Gamma Distribution Test**						**Data Distribution**	
1219					k star (bias corrected)	3.282					**Data appear Normal at 5% Significance Level**	
1220					Theta Star	2.101						
1221					MLE of Mean	6.897						
1222					MLE of Standard Deviation	3.807						
1223					nu star	65.64						
1224					Approximate Chi Square Value (.05)	48					**Nonparametric Statistics**	
1225					Adjusted Level of Significance	0.0267					95% CLT UCL	8.763
1226					Adjusted Chi Square Value	45.39					95% Jackknife UCL	8.977
1227											95% Standard Bootstrap UCL	8.656
1228					Anderson-Darling Test Statistic	0.383					95% Bootstrap-t UCL	9.842
1229					Anderson-Darling 5% Critical Value	0.729					95% Hall's Bootstrap UCL	8.969
1230					Kolmogorov-Smirnov Test Statistic	0.194					95% Percentile Bootstrap UCL	8.704
1231					Kolmogorov-Smirnov 5% Critical Value	0.268					95% BCA Bootstrap UCL	8.968
1232					**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	11.84
1233											97.5% Chebyshev(Mean, Sd) UCL	13.98
1234					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	18.19
1235					95% Approximate Gamma UCL	9.432						
1236					95% Adjusted Gamma UCL	9.975						
1237												
1238					**Potential UCL to Use**						Use 95% Student's-t UCL	8.977
1239												
1240					**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**							
1241					**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**							
1242					**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**							
1243												
1244												
1245	**Tellurium**											
1246												
1247					**General Statistics**							
1248					Number of Valid Observations	10					Number of Distinct Observations	1
1249												
1250												

1251	**Warning: There is only one distinct observation value in this data set - resulting in '0' variance!**											
1252	**ProUCL (or any other software) should not be used on such a data set!**											
1253	**The data set for variable Tellurium was not processed!**											
1254												
1255	**If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.**											
1256	**The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).**											
1257												
1258												
1259												
1260	**Thallium**											
1261												
1262	**General Statistics**											
1263	Number of Valid Observations	10			Number of Distinct Observations	8						
1264												
1265	**Raw Statistics**				**Log-transformed Statistics**							
1266	Minimum	0.005			Minimum of Log Data	-5.298						
1267	Maximum	0.013			Maximum of Log Data	-4.343						
1268	Mean	0.00885			Mean of log Data	-4.766						
1269	Median	0.008			SD of log Data	0.297						
1270	SD	0.00256										
1271	Coefficient of Variation	0.289										
1272	Skewness	0.297										
1273												
1274												
1275	**Relevant UCL Statistics**											
1276	**Normal Distribution Test**				**Lognormal Distribution Test**							
1277	Shapiro Wilk Test Statistic	0.954			Shapiro Wilk Test Statistic	0.962						
1278	Shapiro Wilk Critical Value	0.842			Shapiro Wilk Critical Value	0.842						
1279	**Data appear Normal at 5% Significance Level**				**Data appear Lognormal at 5% Significance Level**							
1280												
1281	**Assuming Normal Distribution**				**Assuming Lognormal Distribution**							
1282	95% Student's-t UCL	0.0103			95% H-UCL	0.0108						
1283	**95% UCLs (Adjusted for Skewness)**				95% Chebyshev (MVUE) UCL	0.0125						
1284	95% Adjusted-CLT UCL (Chen-1995)	0.0103			97.5% Chebyshev (MVUE) UCL	0.0141						
1285	95% Modified-t UCL (Johnson-1978)	0.0103			99% Chebyshev (MVUE) UCL	0.0172						
1286												
1287	**Gamma Distribution Test**				**Data Distribution**							
1288	k star (bias corrected)	9.194			**Data appear Normal at 5% Significance Level**							
1289	Theta Star	0.0009626										
1290	MLE of Mean	0.00885										
1291	MLE of Standard Deviation	0.00292										
1292	nu star	183.9										
1293	Approximate Chi Square Value (.05)	153.5			**Nonparametric Statistics**							
1294	Adjusted Level of Significance	0.0267			95% CLT UCL	0.0102						
1295	Adjusted Chi Square Value	148.7			95% Jackknife UCL	0.0103						
1296					95% Standard Bootstrap UCL	0.0101						
1297	Anderson-Darling Test Statistic	0.265			95% Bootstrap-t UCL	0.0105						
1298	Anderson-Darling 5% Critical Value	0.725			95% Hall's Bootstrap UCL	0.0103						
1299	Kolmogorov-Smirnov Test Statistic	0.205			95% Percentile Bootstrap UCL	0.0101						
1300	Kolmogorov-Smirnov 5% Critical Value	0.266			95% BCA Bootstrap UCL	0.0102						

1301	**Data appear Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	0.0124
1302											97.5% Chebyshev(Mean, Sd) UCL	0.0139
1303	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	0.0169
1304					95% Approximate Gamma UCL	0.0106						
1305					95% Adjusted Gamma UCL	0.0109						
1306												
1307	**Potential UCL to Use**										Use 95% Student's-t UCL	0.0103
1308												
1309	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1310	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1311	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1312												
1313												
1314	**Tin**											
1315												
1316	**General Statistics**											
1317					Number of Valid Observations	10					Number of Distinct Observations	7
1318												
1319	**Raw Statistics**						**Log-transformed Statistics**					
1320					Minimum	0.0025					Minimum of Log Data	-5.991
1321					Maximum	0.019					Maximum of Log Data	-3.963
1322					Mean	0.00728					Mean of log Data	-5.232
1323					Median	0.00488					SD of log Data	0.808
1324					SD	0.00633						
1325					Coefficient of Variation	0.87						
1326					Skewness	1.296						
1327												
1328												
1329	**Relevant UCL Statistics**											
1330	**Normal Distribution Test**						**Lognormal Distribution Test**					
1331					Shapiro Wilk Test Statistic	0.764					Shapiro Wilk Test Statistic	0.848
1332					Shapiro Wilk Critical Value	0.842					Shapiro Wilk Critical Value	0.842
1333	**Data not Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
1334												
1335	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1336					95% Student's-t UCL	0.0109					95% H-UCL	0.0154
1337	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.0153
1338					95% Adjusted-CLT UCL (Chen-1995)	0.0114					97.5% Chebyshev (MVUE) UCL	0.0189
1339					95% Modified-t UCL (Johnson-1978)	0.0111					99% Chebyshev (MVUE) UCL	0.0259
1340												
1341	**Gamma Distribution Test**						**Data Distribution**					
1342					k star (bias corrected)	1.304	**Data appear Gamma Distributed at 5% Significance Level**					
1343					Theta Star	0.00558						
1344					MLE of Mean	0.00728						
1345					MLE of Standard Deviation	0.00637						
1346					nu star	26.08						
1347					Approximate Chi Square Value (.05)	15.44	**Nonparametric Statistics**					
1348					Adjusted Level of Significance	0.0267					95% CLT UCL	0.0106
1349					Adjusted Chi Square Value	14.04					95% Jackknife UCL	0.0109
1350											95% Standard Bootstrap UCL	0.0105

1351					Anderson-Darling Test Statistic	0.721					95% Bootstrap-t UCL	0.0146
1352					Anderson-Darling 5% Critical Value	0.737					95% Hall's Bootstrap UCL	0.0165
1353					Kolmogorov-Smirnov Test Statistic	0.226					95% Percentile Bootstrap UCL	0.0105
1354					Kolmogorov-Smirnov 5% Critical Value	0.27					95% BCA Bootstrap UCL	0.0111
1355					**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.016
1356											97.5% Chebyshev(Mean, Sd) UCL	0.0198
1357					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.0272
1358					95% Approximate Gamma UCL	0.0123						
1359					95% Adjusted Gamma UCL	0.0135						
1360												
1361					**Potential UCL to Use**						Use 95% Approximate Gamma UCL	0.0123
1362												
1363	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1364	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1365	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1366												
1367												
1368	**Tungsten**											
1369												
1370	**General Statistics**											
1371					Number of Valid Observations	10					Number of Distinct Observations	4
1372												
1373					**Raw Statistics**						**Log-transformed Statistics**	
1374					Minimum	0.0025					Minimum of Log Data	-5.991
1375					Maximum	0.052					Maximum of Log Data	-2.957
1376					Mean	0.0109					Mean of log Data	-5.342
1377					Median	0.0025					SD of log Data	1.175
1378					SD	0.0173						
1379					Coefficient of Variation	1.595						
1380					Skewness	2.046						
1381												
1382												
1383	**Warning: There are only 4 Distinct Values in this data**											
1384	**There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.**											
1385	**Those methods will return a 'N/A' value on your output display!**											
1386												
1387	**It is necessary to have 4 or more Distinct Values to compute bootstrap methods.**											
1388	**However, results obtained using 4 to 9 distinct values may not be reliable.**											
1389	**It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.**											
1390												
1391	**Relevant UCL Statistics**											
1392					**Normal Distribution Test**						**Lognormal Distribution Test**	
1393					Shapiro Wilk Test Statistic	0.57					Shapiro Wilk Test Statistic	0.621
1394					Shapiro Wilk Critical Value	0.842					Shapiro Wilk Critical Value	0.842
1395					**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**	
1396												
1397					**Assuming Normal Distribution**						**Assuming Lognormal Distribution**	
1398					95% Student's-t UCL	0.0209					95% H-UCL	0.0372
1399					**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL	0.0234
1400					95% Adjusted-CLT UCL (Chen-1995)	0.0236					97.5% Chebyshev (MVUE) UCL	0.0298

1401	95% Modified-t UCL (Johnson-1978)	0.0215					99% Chebyshev (MVUE) UCL	0.0423				
1402												
1403	**Gamma Distribution Test**						**Data Distribution**					
1404	k star (bias corrected)	0.58					**Data do not follow a Discernable Distribution (0.05)**					
1405	Theta Star	0.0187										
1406	MLE of Mean	0.0109										
1407	MLE of Standard Deviation	0.0142										
1408	nu star	11.6										
1409	Approximate Chi Square Value (.05)	4.965					**Nonparametric Statistics**					
1410	Adjusted Level of Significance	0.0267					95% CLT UCL	0.0199				
1411	Adjusted Chi Square Value	4.236					95% Jackknife UCL	0.0209				
1412							95% Standard Bootstrap UCL	0.0194				
1413	Anderson-Darling Test Statistic	2.058					95% Bootstrap-t UCL	0.101				
1414	Anderson-Darling 5% Critical Value	0.758					95% Hall's Bootstrap UCL	0.0916				
1415	Kolmogorov-Smirnov Test Statistic	0.424					95% Percentile Bootstrap UCL	0.0204				
1416	Kolmogorov-Smirnov 5% Critical Value	0.276					95% BCA Bootstrap UCL	0.0219				
1417	**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.0347				
1418							97.5% Chebyshev(Mean, Sd) UCL	0.045				
1419	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.0653				
1420	95% Approximate Gamma UCL	0.0254										
1421	95% Adjusted Gamma UCL	0.0297										
1422												
1423	**Potential UCL to Use**						Use 95% Chebyshev (Mean, Sd) UCL	0.0347				
1424												
1425	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1426	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1427	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1428												
1429												
1430	**Uranium**											
1431												
1432	**General Statistics**											
1433	Number of Valid Observations	10					Number of Distinct Observations	1				
1434												
1435												
1436	**Warning: There is only one distinct observation value in this data set - resulting in '0' variance!**											
1437	**ProUCL (or any other software) should not be used on such a data set!**											
1438	**The data set for variable Uranium was not processed!**											
1439												
1440	**If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.**											
1441	**The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).**											
1442												
1443												
1444												
1445	**Vanadium**											
1446												
1447	**General Statistics**											
1448	Number of Valid Observations	10					Number of Distinct Observations	1				
1449												
1450												

1451	**Warning: There is only one distinct observation value in this data set - resulting in '0' variance!**											
1452	**ProUCL (or any other software) should not be used on such a data set!**											
1453	**The data set for variable Vanadium was not processed!**											
1454												
1455	**If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.**											
1456	**The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).**											
1457												
1458												
1459												
1460	**Zinc**											
1461												
1462	**General Statistics**											
1463	Number of Valid Observations	10				Number of Distinct Observations	10					
1464												
1465	**Raw Statistics**					**Log-transformed Statistics**						
1466	Minimum	10.1				Minimum of Log Data	2.313					
1467	Maximum	18.1				Maximum of Log Data	2.896					
1468	Mean	14.08				Mean of log Data	2.629					
1469	Median	14				SD of log Data	0.185					
1470	SD	2.602										
1471	Coefficient of Variation	0.185										
1472	Skewness	0.309										
1473												
1474	**Relevant UCL Statistics**											
1475	**Normal Distribution Test**					**Lognormal Distribution Test**						
1476	Shapiro Wilk Test Statistic	0.953				Shapiro Wilk Test Statistic	0.965					
1477	Shapiro Wilk Critical Value	0.842				Shapiro Wilk Critical Value	0.842					
1478	**Data appear Normal at 5% Significance Level**					**Data appear Lognormal at 5% Significance Level**						
1479												
1480	**Assuming Normal Distribution**					**Assuming Lognormal Distribution**						
1481	95% Student's-t UCL	15.58				95% H-UCL	15.83					
1482	**95% UCLs (Adjusted for Skewness)**					95% Chebyshev (MVUE) UCL	17.68					
1483	95% Adjusted-CLT UCL (Chen-1995)	15.51				97.5% Chebyshev (MVUE) UCL	19.24					
1484	95% Modified-t UCL (Johnson-1978)	15.6				99% Chebyshev (MVUE) UCL	22.31					
1485												
1486	**Gamma Distribution Test**					**Data Distribution**						
1487	k star (bias corrected)	22.91				**Data appear Normal at 5% Significance Level**						
1488	Theta Star	0.614										
1489	MLE of Mean	14.08										
1490	MLE of Standard Deviation	2.941										
1491	nu star	458.2										
1492	Approximate Chi Square Value (.05)	409.6				**Nonparametric Statistics**						
1493	Adjusted Level of Significance	0.0267				95% CLT UCL	15.43					
1494	Adjusted Chi Square Value	401.6				95% Jackknife UCL	15.58					
1495						95% Standard Bootstrap UCL	15.35					
1496	Anderson-Darling Test Statistic	0.219				95% Bootstrap-t UCL	15.78					
1497	Anderson-Darling 5% Critical Value	0.724				95% Hall's Bootstrap UCL	15.89					
1498	Kolmogorov-Smirnov Test Statistic	0.132				95% Percentile Bootstrap UCL	15.37					
1499	Kolmogorov-Smirnov 5% Critical Value	0.266				95% BCA Bootstrap UCL	15.47					
1500	**Data appear Gamma Distributed at 5% Significance Level**					95% Chebyshev(Mean, Sd) UCL	17.66					

	A	B	C	D	E	F	G	H	I	J	K	L
1501											97.5% Chebyshev(Mean, Sd) UCL	19.21
1502			**Assuming Gamma Distribution**								99% Chebyshev(Mean, Sd) UCL	22.26
1503					95% Approximate Gamma UCL	15.75						
1504					95% Adjusted Gamma UCL	16.06						
1505												
1506			**Potential UCL to Use**								Use 95% Student's-t UCL	15.58
1507												
1508	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1509	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1510	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1511												

ProUCL Outputs: Whole fish - McBean Brook

General UCL Statistics for Full Data Sets

User Selected Options	
From File	U:\121810356\1_environmental\4_field_data\3_hhera\6_reporting\fish_whole_mcbean.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Aluminum

General Statistics

Number of Valid Observations	10	Number of Distinct Observations	10

Raw Statistics		Log-transformed Statistics	
Minimum	1.05	Minimum of Log Data	0.0488
Maximum	55.94	Maximum of Log Data	4.024
Mean	9.104	Mean of log Data	1.282
Median	2.561	SD of log Data	1.23
SD	17.08		
Coefficient of Variation	1.877		
Skewness	2.799		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.527	Shapiro Wilk Test Statistic	0.832
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data not Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	19.01	95% H-UCL	33.55
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	19.15
95% Adjusted-CLT UCL (Chen-1995)	23.1	97.5% Chebyshev (MVUE) UCL	24.47
95% Modified-t UCL (Johnson-1978)	19.81	99% Chebyshev (MVUE) UCL	34.92
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	0.527	**Data do not follow a Discernable Distribution (0.05)**	
Theta Star	17.27		
MLE of Mean	9.104		
MLE of Standard Deviation	12.54		
nu star	10.54		
Approximate Chi Square Value (.05)	4.284	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0267	95% CLT UCL	17.99
Adjusted Chi Square Value	3.617	95% Jackknife UCL	19.01
		95% Standard Bootstrap UCL	17.78
Anderson-Darling Test Statistic	1.335	95% Bootstrap-t UCL	136.8
Anderson-Darling 5% Critical Value	0.764	95% Hall's Bootstrap UCL	67.97
Kolmogorov-Smirnov Test Statistic	0.353	95% Percentile Bootstrap UCL	18.3
Kolmogorov-Smirnov 5% Critical Value	0.278	95% BCA Bootstrap UCL	23.81

51	**Data not Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	32.65
52											97.5% Chebyshev(Mean, Sd) UCL	42.84
53	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	62.86
54					95% Approximate Gamma UCL	22.41						
55					95% Adjusted Gamma UCL	26.54						
56												
57	**Potential UCL to Use**										Use 95% Chebyshev (Mean, Sd) UCL	32.65
58												
59	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
60	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
61	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
62												
63												
64	**Antimony**											
65												
66	**General Statistics**											
67	Number of Valid Observations					10	Number of Distinct Observations					10
68												
69	**Raw Statistics**						**Log-transformed Statistics**					
70	Minimum					0.00255	Minimum of Log Data					-5.974
71	Maximum					0.0129	Maximum of Log Data					-4.347
72	Mean					0.00416	Mean of log Data					-5.644
73	Median					0.0026	SD of log Data					0.525
74	SD					0.00322						
75	Coefficient of Variation					0.775						
76	Skewness					2.717						
77												
78	**Relevant UCL Statistics**											
79	**Normal Distribution Test**						**Lognormal Distribution Test**					
80	Shapiro Wilk Test Statistic					0.576	Shapiro Wilk Test Statistic					0.705
81	Shapiro Wilk Critical Value					0.842	Shapiro Wilk Critical Value					0.842
82	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
83												
84	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
85	95% Student's-t UCL					0.00602	95% H-UCL					0.00603
86	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					0.00695
87	95% Adjusted-CLT UCL (Chen-1995)					0.00677	97.5% Chebyshev (MVUE) UCL					0.00823
88	95% Modified-t UCL (Johnson-1978)					0.00617	99% Chebyshev (MVUE) UCL					0.0107
89												
90	**Gamma Distribution Test**						**Data Distribution**					
91	k star (bias corrected)					2.358	**Data do not follow a Discernable Distribution (0.05)**					
92	Theta Star					0.00176						
93	MLE of Mean					0.00416						
94	MLE of Standard Deviation					0.00271						
95	nu star					47.15						
96	Approximate Chi Square Value (.05)					32.39	**Nonparametric Statistics**					
97	Adjusted Level of Significance					0.0267	95% CLT UCL					0.00583
98	Adjusted Chi Square Value					30.28	95% Jackknife UCL					0.00602
99							95% Standard Bootstrap UCL					0.00568
100	Anderson-Darling Test Statistic					1.441	95% Bootstrap-t UCL					0.0105

101					Anderson-Darling 5% Critical Value	0.731					95% Hall's Bootstrap UCL	0.0116
102					Kolmogorov-Smirnov Test Statistic	0.323					95% Percentile Bootstrap UCL	0.00604
103					Kolmogorov-Smirnov 5% Critical Value	0.268					95% BCA Bootstrap UCL	0.00708
104					**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.0086
105											97.5% Chebyshev(Mean, Sd) UCL	0.0105
106					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.0143
107					95% Approximate Gamma UCL	0.00605						
108					95% Adjusted Gamma UCL	0.00647						
109												
110					**Potential UCL to Use**						Use 95% Chebyshev (Mean, Sd) UCL	0.0086
111												
112	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
113	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
114	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
115												
116												
117	**Arsenic**											
118												
119					**General Statistics**							
120					Number of Valid Observations	10					Number of Distinct Observations	10
121												
122					**Raw Statistics**						**Log-transformed Statistics**	
123					Minimum	0.0342					Minimum of Log Data	-3.375
124					Maximum	0.094					Maximum of Log Data	-2.364
125					Mean	0.0657					Mean of log Data	-2.777
126					Median	0.0647					SD of log Data	0.358
127					SD	0.0214						
128					Coefficient of Variation	0.326						
129					Skewness	-0.122						
130												
131					**Relevant UCL Statistics**							
132					**Normal Distribution Test**						**Lognormal Distribution Test**	
133					Shapiro Wilk Test Statistic	0.929					Shapiro Wilk Test Statistic	0.911
134					Shapiro Wilk Critical Value	0.842					Shapiro Wilk Critical Value	0.842
135					**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**	
136												
137					**Assuming Normal Distribution**						**Assuming Lognormal Distribution**	
138					95% Student's-t UCL	0.0781					95% H-UCL	0.0846
139					**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL	0.0987
140					95% Adjusted-CLT UCL (Chen-1995)	0.0766					97.5% Chebyshev (MVUE) UCL	0.113
141					95% Modified-t UCL (Johnson-1978)	0.0781					99% Chebyshev (MVUE) UCL	0.141
142												
143					**Gamma Distribution Test**						**Data Distribution**	
144					k star (bias corrected)	6.669					**Data appear Normal at 5% Significance Level**	
145					Theta Star	0.00985						
146					MLE of Mean	0.0657						
147					MLE of Standard Deviation	0.0254						
148					nu star	133.4						
149					Approximate Chi Square Value (.05)	107.7					**Nonparametric Statistics**	
150					Adjusted Level of Significance	0.0267					95% CLT UCL	0.0768

151					Adjusted Chi Square Value	103.7					95% Jackknife UCL	0.0781
152											95% Standard Bootstrap UCL	0.0762
153					Anderson-Darling Test Statistic	0.362					95% Bootstrap-t UCL	0.078
154					Anderson-Darling 5% Critical Value	0.726					95% Hall's Bootstrap UCL	0.0759
155					Kolmogorov-Smirnov Test Statistic	0.175					95% Percentile Bootstrap UCL	0.0763
156					Kolmogorov-Smirnov 5% Critical Value	0.267					95% BCA Bootstrap UCL	0.0765
157					**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.0952
158											97.5% Chebyshev(Mean, Sd) UCL	0.108
159					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.133
160					95% Approximate Gamma UCL	0.0814						
161					95% Adjusted Gamma UCL	0.0845						
162												
163					**Potential UCL to Use**						Use 95% Student's-t UCL	0.0781
164												
165	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
166	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
167	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
168												
169												
170	**Barium**											
171												
172	**General Statistics**											
173					Number of Valid Observations	10					Number of Distinct Observations	10
174												
175	**Raw Statistics**						**Log-transformed Statistics**					
176					Minimum	0.28					Minimum of Log Data	-1.272
177					Maximum	0.582					Maximum of Log Data	-0.541
178					Mean	0.419					Mean of log Data	-0.901
179					Median	0.406					SD of log Data	0.269
180					SD	0.112						
181					Coefficient of Variation	0.268						
182					Skewness	0.309						
183												
184	**Relevant UCL Statistics**											
185	**Normal Distribution Test**						**Lognormal Distribution Test**					
186					Shapiro Wilk Test Statistic	0.918					Shapiro Wilk Test Statistic	0.929
187					Shapiro Wilk Critical Value	0.842					Shapiro Wilk Critical Value	0.842
188	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
189												
190	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
191					95% Student's-t UCL	0.485					95% H-UCL	0.501
192	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.576
193					95% Adjusted-CLT UCL (Chen-1995)	0.482					97.5% Chebyshev (MVUE) UCL	0.644
194					95% Modified-t UCL (Johnson-1978)	0.485					99% Chebyshev (MVUE) UCL	0.777
195												
196	**Gamma Distribution Test**						**Data Distribution**					
197					k star (bias corrected)	10.94	**Data appear Normal at 5% Significance Level**					
198					Theta Star	0.0383						
199					MLE of Mean	0.419						
200					MLE of Standard Deviation	0.127						

201					nu star	218.9						
202					Approximate Chi Square Value (.05)	185.6				**Nonparametric Statistics**		
203					Adjusted Level of Significance	0.0267					95% CLT UCL	0.478
204					Adjusted Chi Square Value	180.3					95% Jackknife UCL	0.485
205											95% Standard Bootstrap UCL	0.476
206					Anderson-Darling Test Statistic	0.33					95% Bootstrap-t UCL	0.489
207					Anderson-Darling 5% Critical Value	0.725					95% Hall's Bootstrap UCL	0.476
208					Kolmogorov-Smirnov Test Statistic	0.155					95% Percentile Bootstrap UCL	0.479
209					Kolmogorov-Smirnov 5% Critical Value	0.266					95% BCA Bootstrap UCL	0.477
210					**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.574
211											97.5% Chebyshev(Mean, Sd) UCL	0.641
212					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.773
213					95% Approximate Gamma UCL	0.495						
214					95% Adjusted Gamma UCL	0.509						
215												
216					**Potential UCL to Use**						Use 95% Student's-t UCL	0.485
217												
218	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
219	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
220	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
221												
222												
223	**Beryllium**											
224												
225	**General Statistics**											
226					Number of Valid Observations	10				Number of Distinct Observations		10
227												
228	**Raw Statistics**						**Log-transformed Statistics**					
229					Minimum	0.00255				Minimum of Log Data		-5.974
230					Maximum	0.00367				Maximum of Log Data		-5.608
231					Mean	0.0027				Mean of log Data		-5.919
232					Median	0.0026				SD of log Data		0.111
233					SD	0.0003419						
234					Coefficient of Variation	0.126						
235					Skewness	3.069						
236												
237	**Relevant UCL Statistics**											
238	**Normal Distribution Test**						**Lognormal Distribution Test**					
239					Shapiro Wilk Test Statistic	0.481				Shapiro Wilk Test Statistic		0.503
240					Shapiro Wilk Critical Value	0.842				Shapiro Wilk Critical Value		0.842
241	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
242												
243	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
244					95% Student's-t UCL	0.0029					95% H-UCL	0.00289
245	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.00311
246					95% Adjusted-CLT UCL (Chen-1995)	0.00299					97.5% Chebyshev (MVUE) UCL	0.00329
247					95% Modified-t UCL (Johnson-1978)	0.00292					99% Chebyshev (MVUE) UCL	0.00364
248												
249	**Gamma Distribution Test**						**Data Distribution**					
250					k star (bias corrected)	58.27	**Data do not follow a Discernable Distribution (0.05)**					

251					Theta Star	4.64E-05						
252					MLE of Mean	0.0027						
253					MLE of Standard Deviation	0.0003542						
254					nu star	1165						
255					Approximate Chi Square Value (.05)	1087			**Nonparametric Statistics**			
256					Adjusted Level of Significance	0.0267					95% CLT UCL	0.00288
257					Adjusted Chi Square Value	1074					95% Jackknife UCL	0.0029
258											95% Standard Bootstrap UCL	0.00287
259					Anderson-Darling Test Statistic	2.311					95% Bootstrap-t UCL	0.00375
260					Anderson-Darling 5% Critical Value	0.724					95% Hall's Bootstrap UCL	0.0037
261					Kolmogorov-Smirnov Test Statistic	0.446					95% Percentile Bootstrap UCL	0.00292
262					Kolmogorov-Smirnov 5% Critical Value	0.266					95% BCA Bootstrap UCL	0.00303
263					**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.00318
264											97.5% Chebyshev(Mean, Sd) UCL	0.00338
265					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.00378
266					95% Approximate Gamma UCL	0.0029						
267					95% Adjusted Gamma UCL	0.00293						
268												
269					**Potential UCL to Use**						Use 95% Student's-t UCL	0.0029
270											or 95% Modified-t UCL	0.00292
271												
272	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
273	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
274	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
275												
276												
277	**Bismuth**											
278												
279	**General Statistics**											
280	Number of Valid Observations					10			Number of Distinct Observations			9
281												
282	**Raw Statistics**								**Log-transformed Statistics**			
283	Minimum					0.0255			Minimum of Log Data			-3.671
284	Maximum					0.151			Maximum of Log Data			-1.892
285	Mean					0.0423			Mean of log Data			-3.388
286	Median					0.0258			SD of log Data			0.603
287	SD					0.0401						
288	Coefficient of Variation					0.949						
289	Skewness					2.691						
290												
291												
292	**Relevant UCL Statistics**											
293	**Normal Distribution Test**								**Lognormal Distribution Test**			
294	Shapiro Wilk Test Statistic					0.504			Shapiro Wilk Test Statistic			0.553
295	Shapiro Wilk Critical Value					0.842			Shapiro Wilk Critical Value			0.842
296	**Data not Normal at 5% Significance Level**								**Data not Lognormal at 5% Significance Level**			
297												
298	**Assuming Normal Distribution**								**Assuming Lognormal Distribution**			
299	95% Student's-t UCL					0.0655			95% H-UCL			0.0652
300	**95% UCLs (Adjusted for Skewness)**								95% Chebyshev (MVUE) UCL			0.0735

301	95% Adjusted-CLT UCL (Chen-1995)					0.0747	97.5% Chebyshev (MVUE) UCL					0.0881
302	95% Modified-t UCL (Johnson-1978)					0.0673	99% Chebyshev (MVUE) UCL					0.117
303												
304	**Gamma Distribution Test**						**Data Distribution**					
305	k star (bias corrected)					1.734	**Data do not follow a Discernable Distribution (0.05)**					
306	Theta Star					0.0244						
307	MLE of Mean					0.0423						
308	MLE of Standard Deviation					0.0321						
309	nu star					34.67						
310	Approximate Chi Square Value (.05)					22.2	**Nonparametric Statistics**					
311	Adjusted Level of Significance					0.0267	95% CLT UCL					0.0632
312	Adjusted Chi Square Value					20.48	95% Jackknife UCL					0.0655
313							95% Standard Bootstrap UCL					0.0616
314	Anderson-Darling Test Statistic					2.34	95% Bootstrap-t UCL					1.948
315	Anderson-Darling 5% Critical Value					0.734	95% Hall's Bootstrap UCL					1.28
316	Kolmogorov-Smirnov Test Statistic					0.47	95% Percentile Bootstrap UCL					0.0671
317	Kolmogorov-Smirnov 5% Critical Value					0.269	95% BCA Bootstrap UCL					0.0797
318	**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					0.0976
319							97.5% Chebyshev(Mean, Sd) UCL					0.122
320	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL					0.169
321	95% Approximate Gamma UCL					0.066						
322	95% Adjusted Gamma UCL					0.0716						
323												
324	**Potential UCL to Use**						Use 95% Chebyshev (Mean, Sd) UCL					0.0976
325												
326	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
327	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
328	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
329												
330												
331	**Boron**											
332												
333	**General Statistics**											
334	Number of Valid Observations					10	Number of Distinct Observations					10
335												
336	**Raw Statistics**						**Log-transformed Statistics**					
337	Minimum					0.0255	Minimum of Log Data					-3.671
338	Maximum					0.0367	Maximum of Log Data					-3.305
339	Mean					0.027	Mean of log Data					-3.617
340	Median					0.026	SD of log Data					0.111
341	SD					0.00342						
342	Coefficient of Variation					0.126						
343	Skewness					3.069						
344												
345	**Relevant UCL Statistics**											
346	**Normal Distribution Test**						**Lognormal Distribution Test**					
347	Shapiro Wilk Test Statistic					0.481	Shapiro Wilk Test Statistic					0.503
348	Shapiro Wilk Critical Value					0.842	Shapiro Wilk Critical Value					0.842
349	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
350												

351	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
352	95% Student's-t UCL	0.029					95% H-UCL	0.0289				
353	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL	0.0311				
354	95% Adjusted-CLT UCL (Chen-1995)	0.0299					97.5% Chebyshev (MVUE) UCL	0.0329				
355	95% Modified-t UCL (Johnson-1978)	0.0292					99% Chebyshev (MVUE) UCL	0.0364				
356												
357	**Gamma Distribution Test**						**Data Distribution**					
358	k star (bias corrected)	58.27					**Data do not follow a Discernable Distribution (0.05)**					
359	Theta Star	0.000464										
360	MLE of Mean	0.027										
361	MLE of Standard Deviation	0.00354										
362	nu star	1165										
363	Approximate Chi Square Value (.05)	1087					**Nonparametric Statistics**					
364	Adjusted Level of Significance	0.0267					95% CLT UCL	0.0288				
365	Adjusted Chi Square Value	1074					95% Jackknife UCL	0.029				
366							95% Standard Bootstrap UCL	0.0287				
367	Anderson-Darling Test Statistic	2.311					95% Bootstrap-t UCL	0.0375				
368	Anderson-Darling 5% Critical Value	0.724					95% Hall's Bootstrap UCL	0.0369				
369	Kolmogorov-Smirnov Test Statistic	0.446					95% Percentile Bootstrap UCL	0.0291				
370	Kolmogorov-Smirnov 5% Critical Value	0.266					95% BCA Bootstrap UCL	0.0303				
371	**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.0318				
372							97.5% Chebyshev(Mean, Sd) UCL	0.0338				
373	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.0378				
374	95% Approximate Gamma UCL	0.029										
375	95% Adjusted Gamma UCL	0.0293										
376												
377	**Potential UCL to Use**						Use 95% Student's-t UCL	0.029				
378							or 95% Modified-t UCL	0.0292				
379												
380	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
381	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
382	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
383												
384												
385	**Cadmium**											
386												
387	**General Statistics**											
388	Number of Valid Observations	10					Number of Distinct Observations	10				
389												
390	**Raw Statistics**						**Log-transformed Statistics**					
391	Minimum	0.0252					Minimum of Log Data	-3.681				
392	Maximum	0.103					Maximum of Log Data	-2.272				
393	Mean	0.0633					Mean of log Data	-2.833				
394	Median	0.0607					SD of log Data	0.422				
395	SD	0.0242										
396	Coefficient of Variation	0.382										
397	Skewness	0.2										
398												
399	**Relevant UCL Statistics**											
400	**Normal Distribution Test**						**Lognormal Distribution Test**					

401					Shapiro Wilk Test Statistic	0.977					Shapiro Wilk Test Statistic	0.96
402					Shapiro Wilk Critical Value	0.842					Shapiro Wilk Critical Value	0.842
403	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
404												
405	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
406					95% Student's-t UCL	0.0774					95% H-UCL	0.0866
407	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.101
408					95% Adjusted-CLT UCL (Chen-1995)	0.0765					97.5% Chebyshev (MVUE) UCL	0.118
409					95% Modified-t UCL (Johnson-1978)	0.0775					99% Chebyshev (MVUE) UCL	0.149
410												
411	**Gamma Distribution Test**						**Data Distribution**					
412					k star (bias corrected)	4.913	**Data appear Normal at 5% Significance Level**					
413					Theta Star	0.0129						
414					MLE of Mean	0.0633						
415					MLE of Standard Deviation	0.0286						
416					nu star	98.25						
417					Approximate Chi Square Value (.05)	76.39	**Nonparametric Statistics**					
418					Adjusted Level of Significance	0.0267					95% CLT UCL	0.0759
419					Adjusted Chi Square Value	73.04					95% Jackknife UCL	0.0774
420											95% Standard Bootstrap UCL	0.0752
421					Anderson-Darling Test Statistic	0.169					95% Bootstrap-t UCL	0.079
422					Anderson-Darling 5% Critical Value	0.728					95% Hall's Bootstrap UCL	0.0773
423					Kolmogorov-Smirnov Test Statistic	0.12					95% Percentile Bootstrap UCL	0.0754
424					Kolmogorov-Smirnov 5% Critical Value	0.267					95% BCA Bootstrap UCL	0.0758
425	**Data appear Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	0.0967
426											97.5% Chebyshev(Mean, Sd) UCL	0.111
427	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	0.14
428					95% Approximate Gamma UCL	0.0815						
429					95% Adjusted Gamma UCL	0.0852						
430												
431	**Potential UCL to Use**										Use 95% Student's-t UCL	0.0774
432												
433	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
434	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
435	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
436												
437												
438	**Calcium**											
439												
440	**General Statistics**											
441					Number of Valid Observations	10					Number of Distinct Observations	10
442												
443	**Raw Statistics**						**Log-transformed Statistics**					
444					Minimum	5160					Minimum of Log Data	8.549
445					Maximum	8188					Maximum of Log Data	9.01
446					Mean	6507					Mean of log Data	8.771
447					Median	6608					SD of log Data	0.147
448					SD	959.1						
449					Coefficient of Variation	0.147						
450					Skewness	0.37						

451												
452	**Relevant UCL Statistics**											
453	**Normal Distribution Test**						**Lognormal Distribution Test**					
454					Shapiro Wilk Test Statistic	0.936					Shapiro Wilk Test Statistic	0.943
455					Shapiro Wilk Critical Value	0.842					Shapiro Wilk Critical Value	0.842
456	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
457												
458	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
459					95% Student's-t UCL	7062					95% H-UCL	7125
460	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	7824
461					95% Adjusted-CLT UCL (Chen-1995)	7043					97.5% Chebyshev (MVUE) UCL	8394
462					95% Modified-t UCL (Johnson-1978)	7068					99% Chebyshev (MVUE) UCL	9515
463												
464	**Gamma Distribution Test**						**Data Distribution**					
465					k star (bias corrected)	36.26	**Data appear Normal at 5% Significance Level**					
466					Theta Star	179.4						
467					MLE of Mean	6507						
468					MLE of Standard Deviation	1080						
469					nu star	725.2						
470					Approximate Chi Square Value (.05)	663.7	**Nonparametric Statistics**					
471					Adjusted Level of Significance	0.0267					95% CLT UCL	7005
472					Adjusted Chi Square Value	653.5					95% Jackknife UCL	7062
473											95% Standard Bootstrap UCL	6972
474					Anderson-Darling Test Statistic	0.362					95% Bootstrap-t UCL	7150
475					Anderson-Darling 5% Critical Value	0.724					95% Hall's Bootstrap UCL	7235
476					Kolmogorov-Smirnov Test Statistic	0.182					95% Percentile Bootstrap UCL	6954
477					Kolmogorov-Smirnov 5% Critical Value	0.266					95% BCA Bootstrap UCL	6998
478	**Data appear Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	7829
479											97.5% Chebyshev(Mean, Sd) UCL	8401
480	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	9524
481					95% Approximate Gamma UCL	7109						
482					95% Adjusted Gamma UCL	7221						
483												
484	**Potential UCL to Use**										Use 95% Student's-t UCL	7062
485												
486	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
487	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
488	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
489												
490												
491	**Chromium**											
492												
493	**General Statistics**											
494					Number of Valid Observations	10					Number of Distinct Observations	10
495												
496	**Raw Statistics**						**Log-transformed Statistics**					
497					Minimum	0.0256					Minimum of Log Data	-3.667
498					Maximum	0.354					Maximum of Log Data	-1.04
499					Mean	0.098					Mean of log Data	-2.722
500					Median	0.0442					SD of log Data	0.853

501					SD	0.11						
502					Coefficient of Variation	1.119						
503					Skewness	1.924						
504												
505	**Relevant UCL Statistics**											
506	**Normal Distribution Test**						**Lognormal Distribution Test**					
507					Shapiro Wilk Test Statistic	0.659					Shapiro Wilk Test Statistic	0.817
508					Shapiro Wilk Critical Value	0.842					Shapiro Wilk Critical Value	0.842
509	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
510												
511	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
512					95% Student's-t UCL	0.162					95% H-UCL	0.21
513	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.201
514					95% Adjusted-CLT UCL (Chen-1995)	0.178					97.5% Chebyshev (MVUE) UCL	0.249
515					95% Modified-t UCL (Johnson-1978)	0.165					99% Chebyshev (MVUE) UCL	0.343
516												
517	**Gamma Distribution Test**						**Data Distribution**					
518					k star (bias corrected)	1.044	**Data do not follow a Discernable Distribution (0.05)**					
519					Theta Star	0.0938						
520					MLE of Mean	0.098						
521					MLE of Standard Deviation	0.0959						
522					nu star	20.89						
523					Approximate Chi Square Value (.05)	11.51	**Nonparametric Statistics**					
524					Adjusted Level of Significance	0.0267					95% CLT UCL	0.155
525					Adjusted Chi Square Value	10.32					95% Jackknife UCL	0.162
526											95% Standard Bootstrap UCL	0.151
527					Anderson-Darling Test Statistic	1.235					95% Bootstrap-t UCL	0.407
528					Anderson-Darling 5% Critical Value	0.741					95% Hall's Bootstrap UCL	0.443
529					Kolmogorov-Smirnov Test Statistic	0.335					95% Percentile Bootstrap UCL	0.158
530					Kolmogorov-Smirnov 5% Critical Value	0.272					95% BCA Bootstrap UCL	0.176
531	**Data not Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	0.249
532											97.5% Chebyshev(Mean, Sd) UCL	0.315
533	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	0.443
534					95% Approximate Gamma UCL	0.178						
535					95% Adjusted Gamma UCL	0.198						
536												
537	**Potential UCL to Use**										Use 95% Chebyshev (Mean, Sd) UCL	0.249
538												
539	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
540	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
541	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
542												
543												
544	**Cobalt**											
545												
546	**General Statistics**											
547					Number of Valid Observations	10					Number of Distinct Observations	10
548												
549	**Raw Statistics**						**Log-transformed Statistics**					
550					Minimum	0.0289					Minimum of Log Data	-3.544

551					Maximum	0.0972					Maximum of Log Data	-2.331
552					Mean	0.0572					Mean of log Data	-2.944
553					Median	0.0505					SD of log Data	0.432
554					SD	0.0243						
555					Coefficient of Variation	0.425						
556					Skewness	0.454						
557												
558	**Relevant UCL Statistics**											
559	**Normal Distribution Test**						**Lognormal Distribution Test**					
560					Shapiro Wilk Test Statistic	0.917					Shapiro Wilk Test Statistic	0.935
561					Shapiro Wilk Critical Value	0.842					Shapiro Wilk Critical Value	0.842
562	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
563												
564	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
565					95% Student's-t UCL	0.0713					95% H-UCL	0.0786
566	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.0918
567					95% Adjusted-CLT UCL (Chen-1995)	0.071					97.5% Chebyshev (MVUE) UCL	0.107
568					95% Modified-t UCL (Johnson-1978)	0.0715					99% Chebyshev (MVUE) UCL	0.136
569												
570	**Gamma Distribution Test**						**Data Distribution**					
571					k star (bias corrected)	4.397	**Data appear Normal at 5% Significance Level**					
572					Theta Star	0.013						
573					MLE of Mean	0.0572						
574					MLE of Standard Deviation	0.0273						
575					nu star	87.93						
576					Approximate Chi Square Value (.05)	67.31	**Nonparametric Statistics**					
577					Adjusted Level of Significance	0.0267					95% CLT UCL	0.0698
578					Adjusted Chi Square Value	64.19					95% Jackknife UCL	0.0713
579											95% Standard Bootstrap UCL	0.069
580					Anderson-Darling Test Statistic	0.356					95% Bootstrap-t UCL	0.0728
581					Anderson-Darling 5% Critical Value	0.728					95% Hall's Bootstrap UCL	0.0694
582					Kolmogorov-Smirnov Test Statistic	0.214					95% Percentile Bootstrap UCL	0.0695
583					Kolmogorov-Smirnov 5% Critical Value	0.267					95% BCA Bootstrap UCL	0.0698
584	**Data appear Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	0.0907
585											97.5% Chebyshev(Mean, Sd) UCL	0.105
586	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	0.134
587					95% Approximate Gamma UCL	0.0747						
588					95% Adjusted Gamma UCL	0.0784						
589												
590	**Potential UCL to Use**										Use 95% Student's-t UCL	0.0713
591												
592	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
593	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
594	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
595												
596												
597	**Copper**											
598												
599	**General Statistics**											
600					Number of Valid Observations	10					Number of Distinct Observations	10

601												
602	**Raw Statistics**						**Log-transformed Statistics**					
603					Minimum	0.489					Minimum of Log Data	-0.715
604					Maximum	0.915					Maximum of Log Data	-0.0887
605					Mean	0.695					Mean of log Data	-0.379
606					Median	0.707					SD of log Data	0.186
607					SD	0.126						
608					Coefficient of Variation	0.181						
609					Skewness	0.0423						
610												
611	**Relevant UCL Statistics**											
612	**Normal Distribution Test**						**Lognormal Distribution Test**					
613					Shapiro Wilk Test Statistic	0.983					Shapiro Wilk Test Statistic	0.975
614					Shapiro Wilk Critical Value	0.842					Shapiro Wilk Critical Value	0.842
615	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
616												
617	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
618					95% Student's-t UCL	0.768					95% H-UCL	0.782
619	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.874
620					95% Adjusted-CLT UCL (Chen-1995)	0.761					97.5% Chebyshev (MVUE) UCL	0.951
621					95% Modified-t UCL (Johnson-1978)	0.768					99% Chebyshev (MVUE) UCL	1.103
622												
623	**Gamma Distribution Test**						**Data Distribution**					
624					k star (bias corrected)	23.21	**Data appear Normal at 5% Significance Level**					
625					Theta Star	0.0299						
626					MLE of Mean	0.695						
627					MLE of Standard Deviation	0.144						
628					nu star	464.3						
629					Approximate Chi Square Value (.05)	415.3	**Nonparametric Statistics**					
630					Adjusted Level of Significance	0.0267					95% CLT UCL	0.761
631					Adjusted Chi Square Value	407.3					95% Jackknife UCL	0.768
632											95% Standard Bootstrap UCL	0.758
633					Anderson-Darling Test Statistic	0.198					95% Bootstrap-t UCL	0.767
634					Anderson-Darling 5% Critical Value	0.724					95% Hall's Bootstrap UCL	0.769
635					Kolmogorov-Smirnov Test Statistic	0.136					95% Percentile Bootstrap UCL	0.754
636					Kolmogorov-Smirnov 5% Critical Value	0.266					95% BCA Bootstrap UCL	0.759
637	**Data appear Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	0.869
638											97.5% Chebyshev(Mean, Sd) UCL	0.944
639	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	1.091
640					95% Approximate Gamma UCL	0.777						
641					95% Adjusted Gamma UCL	0.792						
642												
643	**Potential UCL to Use**										Use 95% Student's-t UCL	0.768
644												
645	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
646	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
647	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
648												
649												
650	**Iron**											

	General Statistics	
Number of Valid Observations	10	Number of Distinct Observations	9
Raw Statistics		**Log-transformed Statistics**	
Minimum	11.19	Minimum of Log Data	2.415
Maximum	52.58	Maximum of Log Data	3.962
Mean	17.97	Mean of log Data	2.753
Median	12.8	SD of log Data	0.484
SD	12.73		
Coefficient of Variation	0.708		
Skewness	2.708		
	Relevant UCL Statistics		
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.584	Shapiro Wilk Test Statistic	0.718
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data not Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	25.34	95% H-UCL	25.13
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	29.21
95% Adjusted-CLT UCL (Chen-1995)	28.27	97.5% Chebyshev (MVUE) UCL	34.32
95% Modified-t UCL (Johnson-1978)	25.92	99% Chebyshev (MVUE) UCL	44.35
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	2.756	**Data do not follow a Discernable Distribution (0.05)**	
Theta Star	6.519		
MLE of Mean	17.97		
MLE of Standard Deviation	10.82		
nu star	55.12		
Approximate Chi Square Value (.05)	39.06	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0267	95% CLT UCL	24.59
Adjusted Chi Square Value	36.72	95% Jackknife UCL	25.34
		95% Standard Bootstrap UCL	24.09
Anderson-Darling Test Statistic	1.418	95% Bootstrap-t UCL	48.55
Anderson-Darling 5% Critical Value	0.73	95% Hall's Bootstrap UCL	47.47
Kolmogorov-Smirnov Test Statistic	0.338	95% Percentile Bootstrap UCL	25.33
Kolmogorov-Smirnov 5% Critical Value	0.268	95% BCA Bootstrap UCL	29.05
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	35.51
		97.5% Chebyshev(Mean, Sd) UCL	43.1
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	58.01
95% Approximate Gamma UCL	25.35		
95% Adjusted Gamma UCL	26.97		
Potential UCL to Use		Use 95% Student's-t UCL	25.34
		or 95% Modified-t UCL	25.92

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

701	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
702	and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.											
703												
704												
705	**Lead**											
706												
707	**General Statistics**											
708	Number of Valid Observations					10	Number of Distinct Observations					10
709												
710	**Raw Statistics**						**Log-transformed Statistics**					
711	Minimum					0.0259	Minimum of Log Data					-3.652
712	Maximum					0.0649	Maximum of Log Data					-2.735
713	Mean					0.0384	Mean of log Data					-3.298
714	Median					0.0376	SD of log Data					0.284
715	SD					0.0116						
716	Coefficient of Variation					0.303						
717	Skewness					1.266						
718												
719	**Relevant UCL Statistics**											
720	**Normal Distribution Test**						**Lognormal Distribution Test**					
721	Shapiro Wilk Test Statistic					0.888	Shapiro Wilk Test Statistic					0.941
722	Shapiro Wilk Critical Value					0.842	Shapiro Wilk Critical Value					0.842
723	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
724												
725	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
726	95% Student's-t UCL					0.0451	95% H-UCL					0.0463
727	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					0.0534
728	95% Adjusted-CLT UCL (Chen-1995)					0.046	97.5% Chebyshev (MVUE) UCL					0.0599
729	95% Modified-t UCL (Johnson-1978)					0.0454	99% Chebyshev (MVUE) UCL					0.0727
730												
731	**Gamma Distribution Test**						**Data Distribution**					
732	k star (bias corrected)					9.498	**Data appear Normal at 5% Significance Level**					
733	Theta Star					0.00404						
734	MLE of Mean					0.0384						
735	MLE of Standard Deviation					0.0125						
736	nu star					190						
737	Approximate Chi Square Value (.05)					159.1	**Nonparametric Statistics**					
738	Adjusted Level of Significance					0.0267	95% CLT UCL					0.0444
739	Adjusted Chi Square Value					154.2	95% Jackknife UCL					0.0451
740							95% Standard Bootstrap UCL					0.0441
741	Anderson-Darling Test Statistic					0.307	95% Bootstrap-t UCL					0.0476
742	Anderson-Darling 5% Critical Value					0.725	95% Hall's Bootstrap UCL					0.0567
743	Kolmogorov-Smirnov Test Statistic					0.153	95% Percentile Bootstrap UCL					0.0444
744	Kolmogorov-Smirnov 5% Critical Value					0.266	95% BCA Bootstrap UCL					0.0454
745	**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					0.0544
746							97.5% Chebyshev(Mean, Sd) UCL					0.0614
747	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL					0.075
748	95% Approximate Gamma UCL					0.0458						
749	95% Adjusted Gamma UCL					0.0473						
750												

751	**Potential UCL to Use**										Use 95% Student's-t UCL	0.0451
752												
753	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
754	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
755	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
756												
757												
758	**Lithium**											
759												
760	**General Statistics**											
761	Number of Valid Observations	10					Number of Distinct Observations	10				
762												
763	**Raw Statistics**						**Log-transformed Statistics**					
764	Minimum	0.00595					Minimum of Log Data	-5.125				
765	Maximum	0.0798					Maximum of Log Data	-2.528				
766	Mean	0.018					Mean of log Data	-4.38				
767	Median	0.0104					SD of log Data	0.761				
768	SD	0.0224										
769	Coefficient of Variation	1.243										
770	Skewness	2.853										
771												
772	**Relevant UCL Statistics**											
773	**Normal Distribution Test**						**Lognormal Distribution Test**					
774	Shapiro Wilk Test Statistic	0.548					Shapiro Wilk Test Statistic	0.798				
775	Shapiro Wilk Critical Value	0.842					Shapiro Wilk Critical Value	0.842				
776	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
777												
778	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
779	95% Student's-t UCL	0.031					95% H-UCL	0.0327				
780	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL	0.0337				
781	95% Adjusted-CLT UCL (Chen-1995)	0.0365					97.5% Chebyshev (MVUE) UCL	0.0413				
782	95% Modified-t UCL (Johnson-1978)	0.0321					99% Chebyshev (MVUE) UCL	0.0562				
783												
784	**Gamma Distribution Test**						**Data Distribution**					
785	k star (bias corrected)	1.133					**Data do not follow a Discernable Distribution (0.05)**					
786	Theta Star	0.0159										
787	MLE of Mean	0.018										
788	MLE of Standard Deviation	0.0169										
789	nu star	22.66										
790	Approximate Chi Square Value (.05)	12.83					**Nonparametric Statistics**					
791	Adjusted Level of Significance	0.0267					95% CLT UCL	0.0297				
792	Adjusted Chi Square Value	11.57					95% Jackknife UCL	0.031				
793							95% Standard Bootstrap UCL	0.0291				
794	Anderson-Darling Test Statistic	1.308					95% Bootstrap-t UCL	0.108				
795	Anderson-Darling 5% Critical Value	0.739					95% Hall's Bootstrap UCL	0.0961				
796	Kolmogorov-Smirnov Test Statistic	0.35					95% Percentile Bootstrap UCL	0.0307				
797	Kolmogorov-Smirnov 5% Critical Value	0.271					95% BCA Bootstrap UCL	0.0388				
798	**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.0489				
799							97.5% Chebyshev(Mean, Sd) UCL	0.0622				
800	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.0885				

801				95% Approximate Gamma UCL	0.0318							
802				95% Adjusted Gamma UCL	0.0353							
803												
804				**Potential UCL to Use**						Use 95% Chebyshev (Mean, Sd) UCL	0.0489	
805												
806	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
807	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
808	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
809												
810												
811	**Magnesium**											
812												
813	**General Statistics**											
814				Number of Valid Observations	10					Number of Distinct Observations	10	
815												
816	**Raw Statistics**							**Log-transformed Statistics**				
817				Minimum	295.4					Minimum of Log Data	5.688	
818				Maximum	352.8					Maximum of Log Data	5.866	
819				Mean	322.6					Mean of log Data	5.775	
820				Median	322.8					SD of log Data	0.0606	
821				SD	19.54							
822				Coefficient of Variation	0.0606							
823				Skewness	0.0781							
824												
825	**Relevant UCL Statistics**											
826	**Normal Distribution Test**							**Lognormal Distribution Test**				
827				Shapiro Wilk Test Statistic	0.953					Shapiro Wilk Test Statistic	0.952	
828				Shapiro Wilk Critical Value	0.842					Shapiro Wilk Critical Value	0.842	
829	**Data appear Normal at 5% Significance Level**							**Data appear Lognormal at 5% Significance Level**				
830												
831	**Assuming Normal Distribution**							**Assuming Lognormal Distribution**				
832				95% Student's-t UCL	333.9					95% H-UCL	N/A	
833	**95% UCLs (Adjusted for Skewness)**									95% Chebyshev (MVUE) UCL	349.5	
834				95% Adjusted-CLT UCL (Chen-1995)	332.9					97.5% Chebyshev (MVUE) UCL	361.2	
835				95% Modified-t UCL (Johnson-1978)	333.9					99% Chebyshev (MVUE) UCL	384.1	
836												
837	**Gamma Distribution Test**							**Data Distribution**				
838				k star (bias corrected)	212			**Data appear Normal at 5% Significance Level**				
839				Theta Star	1.522							
840				MLE of Mean	322.6							
841				MLE of Standard Deviation	22.16							
842				nu star	4239							
843				Approximate Chi Square Value (.05)	4089			**Nonparametric Statistics**				
844				Adjusted Level of Significance	0.0267					95% CLT UCL	332.7	
845				Adjusted Chi Square Value	4063					95% Jackknife UCL	333.9	
846										95% Standard Bootstrap UCL	332.1	
847				Anderson-Darling Test Statistic	0.258					95% Bootstrap-t UCL	334.1	
848				Anderson-Darling 5% Critical Value	0.724					95% Hall's Bootstrap UCL	332.7	
849				Kolmogorov-Smirnov Test Statistic	0.162					95% Percentile Bootstrap UCL	332.1	
850				Kolmogorov-Smirnov 5% Critical Value	0.266					95% BCA Bootstrap UCL	332.2	

851	**Data appear Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	349.5
852											97.5% Chebyshev(Mean, Sd) UCL	361.2
853	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	384.1
854	95% Approximate Gamma UCL	334.4										
855	95% Adjusted Gamma UCL	336.5										
856												
857	**Potential UCL to Use**										Use 95% Student's-t UCL	333.9
858												
859	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
860	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
861	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
862												
863												
864	**Manganese**											
865												
866	**General Statistics**											
867	Number of Valid Observations	10									Number of Distinct Observations	10
868												
869	**Raw Statistics**										**Log-transformed Statistics**	
870	Minimum	4.191									Minimum of Log Data	1.433
871	Maximum	23.41									Maximum of Log Data	3.153
872	Mean	8.514									Mean of log Data	2.004
873	Median	6.62									SD of log Data	0.511
874	SD	5.676										
875	Coefficient of Variation	0.667										
876	Skewness	2.36										
877												
878	**Relevant UCL Statistics**											
879	**Normal Distribution Test**										**Lognormal Distribution Test**	
880	Shapiro Wilk Test Statistic	0.715									Shapiro Wilk Test Statistic	0.902
881	Shapiro Wilk Critical Value	0.842									Shapiro Wilk Critical Value	0.842
882	**Data not Normal at 5% Significance Level**										**Data appear Lognormal at 5% Significance Level**	
883												
884	**Assuming Normal Distribution**										**Assuming Lognormal Distribution**	
885	95% Student's-t UCL	11.8									95% H-UCL	12.37
886	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	14.31
887	95% Adjusted-CLT UCL (Chen-1995)	12.9									97.5% Chebyshev (MVUE) UCL	16.9
888	95% Modified-t UCL (Johnson-1978)	12.03									99% Chebyshev (MVUE) UCL	21.98
889												
890	**Gamma Distribution Test**										**Data Distribution**	
891	k star (bias corrected)	2.713									**Data appear Gamma Distributed at 5% Significance Level**	
892	Theta Star	3.138										
893	MLE of Mean	8.514										
894	MLE of Standard Deviation	5.169										
895	nu star	54.26										
896	Approximate Chi Square Value (.05)	38.34									**Nonparametric Statistics**	
897	Adjusted Level of Significance	0.0267									95% CLT UCL	11.47
898	Adjusted Chi Square Value	36.02									95% Jackknife UCL	11.8
899											95% Standard Bootstrap UCL	11.34
900	Anderson-Darling Test Statistic	0.603									95% Bootstrap-t UCL	16.09

901					Anderson-Darling 5% Critical Value	0.73					95% Hall's Bootstrap UCL	22.68
902					Kolmogorov-Smirnov Test Statistic	0.209					95% Percentile Bootstrap UCL	11.57
903					Kolmogorov-Smirnov 5% Critical Value	0.268					95% BCA Bootstrap UCL	13.18
904					**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	16.34
905											97.5% Chebyshev(Mean, Sd) UCL	19.72
906					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	26.37
907					95% Approximate Gamma UCL	12.05						
908					95% Adjusted Gamma UCL	12.82						
909												
910					**Potential UCL to Use**						Use 95% Approximate Gamma UCL	12.05
911												
912	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
913	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
914	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
915												
916												
917	**Mercury**											
918												
919	**General Statistics**											
920					Number of Valid Observations	10					Number of Distinct Observations	10
921												
922					**Raw Statistics**						**Log-transformed Statistics**	
923					Minimum	0.0542					Minimum of Log Data	-2.915
924					Maximum	0.143					Maximum of Log Data	-1.944
925					Mean	0.0934					Mean of log Data	-2.412
926					Median	0.0912					SD of log Data	0.307
927					SD	0.028						
928					Coefficient of Variation	0.3						
929					Skewness	0.34						
930												
931	**Relevant UCL Statistics**											
932					**Normal Distribution Test**						**Lognormal Distribution Test**	
933					Shapiro Wilk Test Statistic	0.974					Shapiro Wilk Test Statistic	0.98
934					Shapiro Wilk Critical Value	0.842					Shapiro Wilk Critical Value	0.842
935					**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**	
936												
937					**Assuming Normal Distribution**						**Assuming Lognormal Distribution**	
938					95% Student's-t UCL	0.11					95% H-UCL	0.115
939					**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL	0.133
940					95% Adjusted-CLT UCL (Chen-1995)	0.109					97.5% Chebyshev (MVUE) UCL	0.15
941					95% Modified-t UCL (Johnson-1978)	0.11					99% Chebyshev (MVUE) UCL	0.184
942												
943					**Gamma Distribution Test**						**Data Distribution**	
944					k star (bias corrected)	8.623					**Data appear Normal at 5% Significance Level**	
945					Theta Star	0.0108						
946					MLE of Mean	0.0934						
947					MLE of Standard Deviation	0.0318						
948					nu star	172.5						
949					Approximate Chi Square Value (.05)	143.1					**Nonparametric Statistics**	
950					Adjusted Level of Significance	0.0267					95% CLT UCL	0.108

951					Adjusted Chi Square Value	138.4					95% Jackknife UCL	0.11
952											95% Standard Bootstrap UCL	0.107
953					Anderson-Darling Test Statistic	0.164					95% Bootstrap-t UCL	0.111
954					Anderson-Darling 5% Critical Value	0.725					95% Hall's Bootstrap UCL	0.109
955					Kolmogorov-Smirnov Test Statistic	0.128					95% Percentile Bootstrap UCL	0.108
956					Kolmogorov-Smirnov 5% Critical Value	0.267					95% BCA Bootstrap UCL	0.109
957					**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.132
958											97.5% Chebyshev(Mean, Sd) UCL	0.149
959					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.181
960					95% Approximate Gamma UCL	0.113						
961					95% Adjusted Gamma UCL	0.116						
962												
963					**Potential UCL to Use**						Use 95% Student's-t UCL	0.11
964												
965	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
966	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
967	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
968												
969												
970	**Molybdenum**											
971												
972	**General Statistics**											
973					Number of Valid Observations	10					Number of Distinct Observations	10
974												
975					**Raw Statistics**						**Log-transformed Statistics**	
976					Minimum	0.0118					Minimum of Log Data	-4.436
977					Maximum	0.108					Maximum of Log Data	-2.227
978					Mean	0.029					Mean of log Data	-3.787
979					Median	0.0198					SD of log Data	0.643
980					SD	0.0286						
981					Coefficient of Variation	0.987						
982					Skewness	2.82						
983												
984	**Relevant UCL Statistics**											
985					**Normal Distribution Test**						**Lognormal Distribution Test**	
986					Shapiro Wilk Test Statistic	0.59					Shapiro Wilk Test Statistic	0.841
987					Shapiro Wilk Critical Value	0.842					Shapiro Wilk Critical Value	0.842
988					**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**	
989												
990					**Assuming Normal Distribution**						**Assuming Lognormal Distribution**	
991					95% Student's-t UCL	0.0455					95% H-UCL	0.047
992					**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL	0.052
993					95% Adjusted-CLT UCL (Chen-1995)	0.0524					97.5% Chebyshev (MVUE) UCL	0.0627
994					95% Modified-t UCL (Johnson-1978)	0.0469					99% Chebyshev (MVUE) UCL	0.0838
995												
996					**Gamma Distribution Test**						**Data Distribution**	
997					k star (bias corrected)	1.603					**Data Follow Appr. Gamma Distribution at 5% Significance Level**	
998					Theta Star	0.0181						
999					MLE of Mean	0.029						
1000					MLE of Standard Deviation	0.0229						

1001					nu star	32.06						
1002					Approximate Chi Square Value (.05)	20.12				Nonparametric Statistics		
1003					Adjusted Level of Significance	0.0267					95% CLT UCL	0.0438
1004					Adjusted Chi Square Value	18.49					95% Jackknife UCL	0.0455
1005											95% Standard Bootstrap UCL	0.0428
1006					Anderson-Darling Test Statistic	0.978					95% Bootstrap-t UCL	0.0844
1007					Anderson-Darling 5% Critical Value	0.735					95% Hall's Bootstrap UCL	0.101
1008					Kolmogorov-Smirnov Test Statistic	0.229					95% Percentile Bootstrap UCL	0.0451
1009					Kolmogorov-Smirnov 5% Critical Value	0.27					95% BCA Bootstrap UCL	0.0549
1010					**Data follow Appr. Gamma Distribution at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.0684
1011											97.5% Chebyshev(Mean, Sd) UCL	0.0854
1012					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.119
1013					95% Approximate Gamma UCL	0.0461						
1014					95% Adjusted Gamma UCL	0.0502						
1015												
1016					**Potential UCL to Use**						Use 95% Approximate Gamma UCL	0.0461
1017												
1018	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1019	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1020	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1021												
1022												
1023	**Nickel**											
1024												
1025	**General Statistics**											
1026	Number of Valid Observations					10	Number of Distinct Observations					10
1027												
1028	**Raw Statistics**						**Log-transformed Statistics**					
1029	Minimum					0.0256	Minimum of Log Data					-3.667
1030	Maximum					0.0845	Maximum of Log Data					-2.471
1031	Mean					0.0349	Mean of log Data					-3.434
1032	Median					0.0266	SD of log Data					0.374
1033	SD					0.0182						
1034	Coefficient of Variation					0.52						
1035	Skewness					2.748						
1036												
1037	**Relevant UCL Statistics**											
1038	**Normal Distribution Test**						**Lognormal Distribution Test**					
1039	Shapiro Wilk Test Statistic					0.576	Shapiro Wilk Test Statistic					0.68
1040	Shapiro Wilk Critical Value					0.842	Shapiro Wilk Critical Value					0.842
1041	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
1042												
1043	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1044	95% Student's-t UCL					0.0454	95% H-UCL					0.0447
1045	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					0.0522
1046	95% Adjusted-CLT UCL (Chen-1995)					0.0496	97.5% Chebyshev (MVUE) UCL					0.0599
1047	95% Modified-t UCL (Johnson-1978)					0.0462	99% Chebyshev (MVUE) UCL					0.0751
1048												
1049	**Gamma Distribution Test**						**Data Distribution**					
1050	k star (bias corrected)					4.652	**Data do not follow a Discernable Distribution (0.05)**					

1051					Theta Star	0.0075						
1052					MLE of Mean	0.0349						
1053					MLE of Standard Deviation	0.0162						
1054					nu star	93.03						
1055					Approximate Chi Square Value (.05)	71.79			**Nonparametric Statistics**			
1056					Adjusted Level of Significance	0.0267					95% CLT UCL	0.0443
1057					Adjusted Chi Square Value	68.55					95% Jackknife UCL	0.0454
1058											95% Standard Bootstrap UCL	0.044
1059					Anderson-Darling Test Statistic	1.505					95% Bootstrap-t UCL	0.0742
1060					Anderson-Darling 5% Critical Value	0.728					95% Hall's Bootstrap UCL	0.0787
1061					Kolmogorov-Smirnov Test Statistic	0.302					95% Percentile Bootstrap UCL	0.0458
1062					Kolmogorov-Smirnov 5% Critical Value	0.267					95% BCA Bootstrap UCL	0.0523
1063					**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.0599
1064											97.5% Chebyshev(Mean, Sd) UCL	0.0707
1065					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.092
1066					95% Approximate Gamma UCL	0.0452						
1067					95% Adjusted Gamma UCL	0.0473						
1068												
1069					**Potential UCL to Use**						Use 95% Student's-t UCL	0.0454
1070											or 95% Modified-t UCL	0.0462
1071												
1072	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1073	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1074	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1075												
1076												
1077	**Potassium**											
1078												
1079	**General Statistics**											
1080	Number of Valid Observations					10			Number of Distinct Observations			10
1081												
1082	**Raw Statistics**								**Log-transformed Statistics**			
1083	Minimum					3383			Minimum of Log Data			8.127
1084	Maximum					3789			Maximum of Log Data			8.24
1085	Mean					3501			Mean of log Data			8.16
1086	Median					3473			SD of log Data			0.032
1087	SD					114.8						
1088	Coefficient of Variation					0.0328						
1089	Skewness					1.935						
1090												
1091	**Relevant UCL Statistics**											
1092	**Normal Distribution Test**								**Lognormal Distribution Test**			
1093	Shapiro Wilk Test Statistic					0.816			Shapiro Wilk Test Statistic			0.83
1094	Shapiro Wilk Critical Value					0.842			Shapiro Wilk Critical Value			0.842
1095	**Data not Normal at 5% Significance Level**								**Data not Lognormal at 5% Significance Level**			
1096												
1097	**Assuming Normal Distribution**								**Assuming Lognormal Distribution**			
1098	95% Student's-t UCL					3568			95% H-UCL			N/A
1099	**95% UCLs (Adjusted for Skewness)**								95% Chebyshev (MVUE) UCL			3655
1100	95% Adjusted-CLT UCL (Chen-1995)					3584			97.5% Chebyshev (MVUE) UCL			3722

1101	95% Modified-t UCL (Johnson-1978)					3571	99% Chebyshev (MVUE) UCL					3854
1102												
1103	**Gamma Distribution Test**						**Data Distribution**					
1104	k star (bias corrected)					747.3	**Data appear Gamma Distributed at 5% Significance Level**					
1105	Theta Star					4.685						
1106	MLE of Mean					3501						
1107	MLE of Standard Deviation					128.1						
1108	nu star					14947						
1109	Approximate Chi Square Value (.05)					14664	**Nonparametric Statistics**					
1110	Adjusted Level of Significance					0.0267	95% CLT UCL					3561
1111	Adjusted Chi Square Value					14615	95% Jackknife UCL					3568
1112							95% Standard Bootstrap UCL					3557
1113	Anderson-Darling Test Statistic					0.661	95% Bootstrap-t UCL					3615
1114	Anderson-Darling 5% Critical Value					0.724	95% Hall's Bootstrap UCL					3833
1115	Kolmogorov-Smirnov Test Statistic					0.211	95% Percentile Bootstrap UCL					3562
1116	Kolmogorov-Smirnov 5% Critical Value					0.266	95% BCA Bootstrap UCL					3583
1117	**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					3659
1118							97.5% Chebyshev(Mean, Sd) UCL					3728
1119	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL					3862
1120	95% Approximate Gamma UCL					3569						
1121	95% Adjusted Gamma UCL					3581						
1122												
1123	**Potential UCL to Use**						Use 95% Approximate Gamma UCL					3569
1124												
1125	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1126	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1127	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1128												
1129												
1130	**Rubidium**											
1131												
1132	**General Statistics**											
1133	Number of Valid Observations					10	Number of Distinct Observations					10
1134												
1135	**Raw Statistics**						**Log-transformed Statistics**					
1136	Minimum					6.377	Minimum of Log Data					1.853
1137	Maximum					12.3	Maximum of Log Data					2.51
1138	Mean					8.871	Mean of log Data					2.169
1139	Median					8.861	SD of log Data					0.174
1140	SD					1.576						
1141	Coefficient of Variation					0.178						
1142	Skewness					0.842						
1143												
1144	**Relevant UCL Statistics**											
1145	**Normal Distribution Test**						**Lognormal Distribution Test**					
1146	Shapiro Wilk Test Statistic					0.94	Shapiro Wilk Test Statistic					0.966
1147	Shapiro Wilk Critical Value					0.842	Shapiro Wilk Critical Value					0.842
1148	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
1149												
1150	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					

1151					95% Student's-t UCL	9.785					95% H-UCL	9.893
1152				**95% UCLs (Adjusted for Skewness)**							95% Chebyshev (MVUE) UCL	11
1153					95% Adjusted-CLT UCL (Chen-1995)	9.833					97.5% Chebyshev (MVUE) UCL	11.92
1154					95% Modified-t UCL (Johnson-1978)	9.807					99% Chebyshev (MVUE) UCL	13.73
1155												
1156				**Gamma Distribution Test**							**Data Distribution**	
1157					k star (bias corrected)	25.69					**Data appear Normal at 5% Significance Level**	
1158					Theta Star	0.345						
1159					MLE of Mean	8.871						
1160					MLE of Standard Deviation	1.75						
1161					nu star	513.7						
1162					Approximate Chi Square Value (.05)	462.2					**Nonparametric Statistics**	
1163					Adjusted Level of Significance	0.0267					95% CLT UCL	9.691
1164					Adjusted Chi Square Value	453.7					95% Jackknife UCL	9.785
1165											95% Standard Bootstrap UCL	9.641
1166					Anderson-Darling Test Statistic	0.271					95% Bootstrap-t UCL	9.958
1167					Anderson-Darling 5% Critical Value	0.724					95% Hall's Bootstrap UCL	10.49
1168					Kolmogorov-Smirnov Test Statistic	0.142					95% Percentile Bootstrap UCL	9.679
1169					Kolmogorov-Smirnov 5% Critical Value	0.266					95% BCA Bootstrap UCL	9.836
1170				**Data appear Gamma Distributed at 5% Significance Level**							95% Chebyshev(Mean, Sd) UCL	11.04
1171											97.5% Chebyshev(Mean, Sd) UCL	11.98
1172				**Assuming Gamma Distribution**							99% Chebyshev(Mean, Sd) UCL	13.83
1173					95% Approximate Gamma UCL	9.861						
1174					95% Adjusted Gamma UCL	10.05						
1175												
1176				**Potential UCL to Use**							Use 95% Student's-t UCL	9.785
1177												
1178	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1179	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1180	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1181												
1182												
1183	**Selenium**											
1184												
1185					**General Statistics**							
1186					Number of Valid Observations	10					Number of Distinct Observations	10
1187												
1188				**Raw Statistics**							**Log-transformed Statistics**	
1189					Minimum	0.213					Minimum of Log Data	-1.547
1190					Maximum	0.337					Maximum of Log Data	-1.089
1191					Mean	0.274					Mean of log Data	-1.305
1192					Median	0.274					SD of log Data	0.152
1193					SD	0.0405						
1194					Coefficient of Variation	0.148						
1195					Skewness	-0.152						
1196												
1197					**Relevant UCL Statistics**							
1198				**Normal Distribution Test**							**Lognormal Distribution Test**	
1199					Shapiro Wilk Test Statistic	0.961					Shapiro Wilk Test Statistic	0.949
1200					Shapiro Wilk Critical Value	0.842					Shapiro Wilk Critical Value	0.842

1201	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
1202												
1203	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1204	95% Student's-t UCL					0.298	95% H-UCL					0.301
1205	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					0.331
1206	95% Adjusted-CLT UCL (Chen-1995)					0.294	97.5% Chebyshev (MVUE) UCL					0.356
1207	95% Modified-t UCL (Johnson-1978)					0.297	99% Chebyshev (MVUE) UCL					0.405
1208												
1209	**Gamma Distribution Test**						**Data Distribution**					
1210	k star (bias corrected)					34.62	**Data appear Normal at 5% Significance Level**					
1211	Theta Star					0.00791						
1212	MLE of Mean					0.274						
1213	MLE of Standard Deviation					0.0466						
1214	nu star					692.5						
1215	Approximate Chi Square Value (.05)					632.4	**Nonparametric Statistics**					
1216	Adjusted Level of Significance					0.0267	95% CLT UCL					0.295
1217	Adjusted Chi Square Value					622.5	95% Jackknife UCL					0.298
1218							95% Standard Bootstrap UCL					0.294
1219	Anderson-Darling Test Statistic					0.255	95% Bootstrap-t UCL					0.297
1220	Anderson-Darling 5% Critical Value					0.724	95% Hall's Bootstrap UCL					0.295
1221	Kolmogorov-Smirnov Test Statistic					0.15	95% Percentile Bootstrap UCL					0.294
1222	Kolmogorov-Smirnov 5% Critical Value					0.266	95% BCA Bootstrap UCL					0.294
1223	**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					0.33
1224							97.5% Chebyshev(Mean, Sd) UCL					0.354
1225	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL					0.402
1226	95% Approximate Gamma UCL					0.3						
1227	95% Adjusted Gamma UCL					0.305						
1228												
1229	**Potential UCL to Use**						Use 95% Student's-t UCL					0.298
1230												
1231	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1232	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1233	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1234												
1235												
1236	**Silver**											
1237												
1238	**General Statistics**											
1239	Number of Valid Observations					10	Number of Distinct Observations					10
1240												
1241	**Raw Statistics**						**Log-transformed Statistics**					
1242	Minimum					0.00524	Minimum of Log Data					-5.251
1243	Maximum					0.0134	Maximum of Log Data					-4.313
1244	Mean					0.00972	Mean of log Data					-4.667
1245	Median					0.00997	SD of log Data					0.282
1246	SD					0.00249						
1247	Coefficient of Variation					0.256						
1248	Skewness					-0.328						
1249												
1250	**Relevant UCL Statistics**											

1251	**Normal Distribution Test**						**Lognormal Distribution Test**					
1252					Shapiro Wilk Test Statistic	0.982					Shapiro Wilk Test Statistic	0.943
1253					Shapiro Wilk Critical Value	0.842					Shapiro Wilk Critical Value	0.842
1254	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
1255												
1256	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1257					95% Student's-t UCL	0.0112					95% H-UCL	0.0118
1258	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.0135
1259					95% Adjusted-CLT UCL (Chen-1995)	0.0109					97.5% Chebyshev (MVUE) UCL	0.0152
1260					95% Modified-t UCL (Johnson-1978)	0.0111					99% Chebyshev (MVUE) UCL	0.0184
1261												
1262	**Gamma Distribution Test**						**Data Distribution**					
1263					k star (bias corrected)	10.68	**Data appear Normal at 5% Significance Level**					
1264					Theta Star	0.0009098						
1265					MLE of Mean	0.00972						
1266					MLE of Standard Deviation	0.00297						
1267					nu star	213.7						
1268					Approximate Chi Square Value (.05)	180.8	**Nonparametric Statistics**					
1269					Adjusted Level of Significance	0.0267					95% CLT UCL	0.011
1270					Adjusted Chi Square Value	175.6					95% Jackknife UCL	0.0112
1271											95% Standard Bootstrap UCL	0.011
1272					Anderson-Darling Test Statistic	0.221					95% Bootstrap-t UCL	0.0111
1273					Anderson-Darling 5% Critical Value	0.725					95% Hall's Bootstrap UCL	0.0109
1274					Kolmogorov-Smirnov Test Statistic	0.123					95% Percentile Bootstrap UCL	0.011
1275					Kolmogorov-Smirnov 5% Critical Value	0.266					95% BCA Bootstrap UCL	0.0109
1276	**Data appear Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	0.0132
1277											97.5% Chebyshev(Mean, Sd) UCL	0.0146
1278	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	0.0176
1279					95% Approximate Gamma UCL	0.0115						
1280					95% Adjusted Gamma UCL	0.0118						
1281												
1282	**Potential UCL to Use**										Use 95% Student's-t UCL	0.0112
1283												
1284	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1285	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1286	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1287												
1288												
1289	**Sodium**											
1290												
1291	**General Statistics**											
1292					Number of Valid Observations	10					Number of Distinct Observations	10
1293												
1294	**Raw Statistics**						**Log-transformed Statistics**					
1295					Minimum	802					Minimum of Log Data	6.687
1296					Maximum	1109					Maximum of Log Data	7.011
1297					Mean	944.4					Mean of log Data	6.847
1298					Median	944.7					SD of log Data	0.0888
1299					SD	84.04						
1300					Coefficient of Variation	0.089						

	Skewness	0.303
Relevant UCL Statistics		
Normal Distribution Test		**Lognormal Distribution Test**
Shapiro Wilk Test Statistic	0.974	Shapiro Wilk Test Statistic 0.979
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value 0.842
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**
Assuming Normal Distribution		**Assuming Lognormal Distribution**
95% Student's-t UCL	993.1	95% H-UCL N/A
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL 1060
95% Adjusted-CLT UCL (Chen-1995)	990.8	97.5% Chebyshev (MVUE) UCL 1110
95% Modified-t UCL (Johnson-1978)	993.5	99% Chebyshev (MVUE) UCL 1208
Gamma Distribution Test		**Data Distribution**
k star (bias corrected)	98.81	**Data appear Normal at 5% Significance Level**
Theta Star	9.558	
MLE of Mean	944.4	
MLE of Standard Deviation	95.01	
nu star	1976	
Approximate Chi Square Value (.05)	1874	**Nonparametric Statistics**
Adjusted Level of Significance	0.0267	95% CLT UCL 988.1
Adjusted Chi Square Value	1857	95% Jackknife UCL 993.1
		95% Standard Bootstrap UCL 986.8
Anderson-Darling Test Statistic	0.206	95% Bootstrap-t UCL 995.7
Anderson-Darling 5% Critical Value	0.724	95% Hall's Bootstrap UCL 1000
Kolmogorov-Smirnov Test Statistic	0.138	95% Percentile Bootstrap UCL 987.5
Kolmogorov-Smirnov 5% Critical Value	0.266	95% BCA Bootstrap UCL 987.5
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 1060
		97.5% Chebyshev(Mean, Sd) UCL 1110
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 1209
95% Approximate Gamma UCL	995.9	
95% Adjusted Gamma UCL	1005	
Potential UCL to Use		Use 95% Student's-t UCL 993.1
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.		
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)		
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.		
Strontium		
General Statistics		
Number of Valid Observations	10	Number of Distinct Observations 10
Raw Statistics		**Log-transformed Statistics**
Minimum	7.702	Minimum of Log Data 2.041
Maximum	17.95	Maximum of Log Data 2.888
Mean	11.18	Mean of log Data 2.381

1351					Median	10.11					SD of log Data	0.267
1352					SD	3.227						
1353					Coefficient of Variation	0.289						
1354					Skewness	1.189						
1355												
1356					**Relevant UCL Statistics**							
1357	**Normal Distribution Test**						**Lognormal Distribution Test**					
1358					Shapiro Wilk Test Statistic	0.89					Shapiro Wilk Test Statistic	0.943
1359					Shapiro Wilk Critical Value	0.842					Shapiro Wilk Critical Value	0.842
1360	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
1361												
1362	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1363					95% Student's-t UCL	13.05					95% H-UCL	13.32
1364	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	15.29
1365					95% Adjusted-CLT UCL (Chen-1995)	13.27					97.5% Chebyshev (MVUE) UCL	17.08
1366					95% Modified-t UCL (Johnson-1978)	13.12					99% Chebyshev (MVUE) UCL	20.59
1367												
1368	**Gamma Distribution Test**						**Data Distribution**					
1369					k star (bias corrected)	10.59	**Data appear Normal at 5% Significance Level**					
1370					Theta Star	1.057						
1371					MLE of Mean	11.18						
1372					MLE of Standard Deviation	3.437						
1373					nu star	211.7						
1374					Approximate Chi Square Value (.05)	179	**Nonparametric Statistics**					
1375					Adjusted Level of Significance	0.0267					95% CLT UCL	12.86
1376					Adjusted Chi Square Value	173.8					95% Jackknife UCL	13.05
1377											95% Standard Bootstrap UCL	12.72
1378					Anderson-Darling Test Statistic	0.371					95% Bootstrap-t UCL	14.12
1379					Anderson-Darling 5% Critical Value	0.725					95% Hall's Bootstrap UCL	14.17
1380					Kolmogorov-Smirnov Test Statistic	0.175					95% Percentile Bootstrap UCL	12.84
1381					Kolmogorov-Smirnov 5% Critical Value	0.266					95% BCA Bootstrap UCL	13.16
1382	**Data appear Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	15.63
1383											97.5% Chebyshev(Mean, Sd) UCL	17.56
1384	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	21.34
1385					95% Approximate Gamma UCL	13.22						
1386					95% Adjusted Gamma UCL	13.62						
1387												
1388	**Potential UCL to Use**										Use 95% Student's-t UCL	13.05
1389												
1390	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1391	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1392	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1393												
1394												
1395	**Tellurium**											
1396												
1397	**General Statistics**											
1398					Number of Valid Observations	10					Number of Distinct Observations	9
1399												
1400	**Raw Statistics**						**Log-transformed Statistics**					

1401					Minimum	0.00255				Minimum of Log Data	-5.974	
1402					Maximum	0.00266				Maximum of Log Data	-5.93	
1403					Mean	0.00259				Mean of log Data	-5.955	
1404					Median	0.00258				SD of log Data	0.0174	
1405					SD	4.529E-05						
1406					Coefficient of Variation	0.0175						
1407					Skewness	0.556						
1408												
1409												
1410					**Relevant UCL Statistics**							
1411	**Normal Distribution Test**						**Lognormal Distribution Test**					
1412					Shapiro Wilk Test Statistic	0.841				Shapiro Wilk Test Statistic	0.842	
1413					Shapiro Wilk Critical Value	0.842				Shapiro Wilk Critical Value	0.842	
1414	**Data not Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
1415												
1416	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1417					95% Student's-t UCL	0.00262				95% H-UCL	N/A	
1418	**95% UCLs (Adjusted for Skewness)**									95% Chebyshev (MVUE) UCL	0.00265	
1419					95% Adjusted-CLT UCL (Chen-1995)	0.00262				97.5% Chebyshev (MVUE) UCL	0.00268	
1420					95% Modified-t UCL (Johnson-1978)	0.00262				99% Chebyshev (MVUE) UCL	0.00273	
1421												
1422	**Gamma Distribution Test**						**Data Distribution**					
1423					k star (bias corrected)	2561	**Data Follow Appr. Gamma Distribution at 5% Significance Level**					
1424					Theta Star	1.012E-06						
1425					MLE of Mean	0.00259						
1426					MLE of Standard Deviation	5.123E-05						
1427					nu star	51214						
1428					Approximate Chi Square Value (.05)	50689	**Nonparametric Statistics**					
1429					Adjusted Level of Significance	0.0267				95% CLT UCL	0.00262	
1430					Adjusted Chi Square Value	50598				95% Jackknife UCL	0.00262	
1431										95% Standard Bootstrap UCL	0.00261	
1432					Anderson-Darling Test Statistic	0.813				95% Bootstrap-t UCL	0.00262	
1433					Anderson-Darling 5% Critical Value	0.724				95% Hall's Bootstrap UCL	0.00261	
1434					Kolmogorov-Smirnov Test Statistic	0.261				95% Percentile Bootstrap UCL	0.00262	
1435					Kolmogorov-Smirnov 5% Critical Value	0.266				95% BCA Bootstrap UCL	0.00262	
1436	**Data follow Appr. Gamma Distribution at 5% Significance Level**									95% Chebyshev(Mean, Sd) UCL	0.00265	
1437										97.5% Chebyshev(Mean, Sd) UCL	0.00268	
1438	**Assuming Gamma Distribution**									99% Chebyshev(Mean, Sd) UCL	0.00273	
1439					95% Approximate Gamma UCL	0.00262						
1440					95% Adjusted Gamma UCL	0.00262						
1441												
1442	**Potential UCL to Use**									Use 95% Approximate Gamma UCL	0.00262	
1443												
1444	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1445	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1446	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1447												
1448												
1449	**Thallium**											
1450												

1451	**General Statistics**											
1452	Number of Valid Observations				10		Number of Distinct Observations					10
1453												
1454	**Raw Statistics**						**Log-transformed Statistics**					
1455	Minimum				0.00638		Minimum of Log Data					-5.055
1456	Maximum				0.015		Maximum of Log Data					-4.199
1457	Mean				0.0107		Mean of log Data					-4.573
1458	Median				0.0103		SD of log Data					0.272
1459	SD				0.00281							
1460	Coefficient of Variation				0.264							
1461	Skewness				0.165							
1462												
1463	**Relevant UCL Statistics**											
1464	**Normal Distribution Test**						**Lognormal Distribution Test**					
1465	Shapiro Wilk Test Statistic				0.972		Shapiro Wilk Test Statistic					0.974
1466	Shapiro Wilk Critical Value				0.842		Shapiro Wilk Critical Value					0.842
1467	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
1468												
1469	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1470	95% Student's-t UCL				0.0123		95% H-UCL					0.0128
1471	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					0.0147
1472	95% Adjusted-CLT UCL (Chen-1995)				0.0122		97.5% Chebyshev (MVUE) UCL					0.0165
1473	95% Modified-t UCL (Johnson-1978)				0.0123		99% Chebyshev (MVUE) UCL					0.0199
1474												
1475	**Gamma Distribution Test**						**Data Distribution**					
1476	k star (bias corrected)				10.94		**Data appear Normal at 5% Significance Level**					
1477	Theta Star				0.000976							
1478	MLE of Mean				0.0107							
1479	MLE of Standard Deviation				0.00323							
1480	nu star				218.7							
1481	Approximate Chi Square Value (.05)				185.5		**Nonparametric Statistics**					
1482	Adjusted Level of Significance				0.0267		95% CLT UCL					0.0121
1483	Adjusted Chi Square Value				180.2		95% Jackknife UCL					0.0123
1484							95% Standard Bootstrap UCL					0.0121
1485	Anderson-Darling Test Statistic				0.155		95% Bootstrap-t UCL					0.0124
1486	Anderson-Darling 5% Critical Value				0.725		95% Hall's Bootstrap UCL					0.0123
1487	Kolmogorov-Smirnov Test Statistic				0.119		95% Percentile Bootstrap UCL					0.0121
1488	Kolmogorov-Smirnov 5% Critical Value				0.266		95% BCA Bootstrap UCL					0.012
1489	**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					0.0146
1490							97.5% Chebyshev(Mean, Sd) UCL					0.0162
1491	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL					0.0195
1492	95% Approximate Gamma UCL				0.0126							
1493	95% Adjusted Gamma UCL				0.013							
1494												
1495	**Potential UCL to Use**						Use 95% Student's-t UCL					0.0123
1496												
1497	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1498	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1499	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1500												

Tin

General Statistics			
Number of Valid Observations	10	Number of Distinct Observations	10

Raw Statistics		Log-transformed Statistics	
Minimum	0.00424	Minimum of Log Data	-5.463
Maximum	0.0169	Maximum of Log Data	-4.079
Mean	0.0093	Mean of log Data	-4.793
Median	0.00803	SD of log Data	0.509
SD	0.00464		
Coefficient of Variation	0.499		
Skewness	0.58		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.897	Shapiro Wilk Test Statistic	0.928
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	0.012	95% H-UCL	0.0138
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.016
95% Adjusted-CLT UCL (Chen-1995)	0.012	97.5% Chebyshev (MVUE) UCL	0.0188
95% Modified-t UCL (Johnson-1978)	0.012	99% Chebyshev (MVUE) UCL	0.0245

Gamma Distribution Test		Data Distribution	
k star (bias corrected)	3.228	**Data appear Normal at 5% Significance Level**	
Theta Star	0.00288		
MLE of Mean	0.0093		
MLE of Standard Deviation	0.00518		
nu star	64.56		
Approximate Chi Square Value (.05)	47.07	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0267	95% CLT UCL	0.0117
Adjusted Chi Square Value	44.49	95% Jackknife UCL	0.012
		95% Standard Bootstrap UCL	0.0116
Anderson-Darling Test Statistic	0.345	95% Bootstrap-t UCL	0.0121
Anderson-Darling 5% Critical Value	0.729	95% Hall's Bootstrap UCL	0.0116
Kolmogorov-Smirnov Test Statistic	0.171	95% Percentile Bootstrap UCL	0.0117
Kolmogorov-Smirnov 5% Critical Value	0.268	95% BCA Bootstrap UCL	0.0118
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.0157
		97.5% Chebyshev(Mean, Sd) UCL	0.0185
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.0239
95% Approximate Gamma UCL	0.0128		
95% Adjusted Gamma UCL	0.0135		
Potential UCL to Use		Use 95% Student's-t UCL	0.012

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

	A	B	C	D	E	F	G	H	I	J	K	L
1551	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1552	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1553												
1554												
1555	**Tungsten**											
1556												
1557	**General Statistics**											
1558	Number of Valid Observations					10	Number of Distinct Observations					10
1559												
1560	**Raw Statistics**						**Log-transformed Statistics**					
1561	Minimum					0.00576	Minimum of Log Data					-5.157
1562	Maximum					0.0659	Maximum of Log Data					-2.72
1563	Mean					0.0206	Mean of log Data					-4.211
1564	Median					0.0111	SD of log Data					0.79
1565	SD					0.0204						
1566	Coefficient of Variation					0.992						
1567	Skewness					1.772						
1568												
1569	**Relevant UCL Statistics**											
1570	**Normal Distribution Test**						**Lognormal Distribution Test**					
1571	Shapiro Wilk Test Statistic					0.698	Shapiro Wilk Test Statistic					0.875
1572	Shapiro Wilk Critical Value					0.842	Shapiro Wilk Critical Value					0.842
1573	**Data not Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
1574												
1575	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1576	95% Student's-t UCL					0.0325	95% H-UCL					0.0411
1577	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					0.0415
1578	95% Adjusted-CLT UCL (Chen-1995)					0.0351	97.5% Chebyshev (MVUE) UCL					0.051
1579	95% Modified-t UCL (Johnson-1978)					0.0331	99% Chebyshev (MVUE) UCL					0.0698
1580												
1581	**Gamma Distribution Test**						**Data Distribution**					
1582	k star (bias corrected)					1.234	**Data Follow Appr. Gamma Distribution at 5% Significance Level**					
1583	Theta Star					0.0167						
1584	MLE of Mean					0.0206						
1585	MLE of Standard Deviation					0.0185						
1586	nu star					24.68						
1587	Approximate Chi Square Value (.05)					14.37	**Nonparametric Statistics**					
1588	Adjusted Level of Significance					0.0267	95% CLT UCL					0.0312
1589	Adjusted Chi Square Value					13.02	95% Jackknife UCL					0.0325
1590							95% Standard Bootstrap UCL					0.0307
1591	Anderson-Darling Test Statistic					0.931	95% Bootstrap-t UCL					0.07
1592	Anderson-Darling 5% Critical Value					0.738	95% Hall's Bootstrap UCL					0.0893
1593	Kolmogorov-Smirnov Test Statistic					0.267	95% Percentile Bootstrap UCL					0.0311
1594	Kolmogorov-Smirnov 5% Critical Value					0.271	95% BCA Bootstrap UCL					0.0349
1595	**Data follow Appr. Gamma Distribution at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					0.0488
1596							97.5% Chebyshev(Mean, Sd) UCL					0.061
1597	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL					0.0849
1598	95% Approximate Gamma UCL					0.0354						
1599	95% Adjusted Gamma UCL					0.0391						
1600												

1601	**Potential UCL to Use**										Use 95% Approximate Gamma UCL	0.0354
1602												
1603	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1604	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1605	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1606												
1607												
1608	**Uranium**											
1609												
1610	**General Statistics**											
1611	Number of Valid Observations	10					Number of Distinct Observations	10				
1612												
1613	**Raw Statistics**						**Log-transformed Statistics**					
1614	Minimum	0.00256					Minimum of Log Data	-5.97				
1615	Maximum	0.00941					Maximum of Log Data	-4.666				
1616	Mean	0.00454					Mean of log Data	-5.52				
1617	Median	0.00321					SD of log Data	0.514				
1618	SD	0.00255										
1619	Coefficient of Variation	0.56										
1620	Skewness	1.061										
1621												
1622	**Relevant UCL Statistics**											
1623	**Normal Distribution Test**						**Lognormal Distribution Test**					
1624	Shapiro Wilk Test Statistic	0.8					Shapiro Wilk Test Statistic	0.823				
1625	Shapiro Wilk Critical Value	0.842					Shapiro Wilk Critical Value	0.842				
1626	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
1627												
1628	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1629	95% Student's-t UCL	0.00602					95% H-UCL	0.00671				
1630	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL	0.00776				
1631	95% Adjusted-CLT UCL (Chen-1995)	0.00616					97.5% Chebyshev (MVUE) UCL	0.00916				
1632	95% Modified-t UCL (Johnson-1978)	0.00607					99% Chebyshev (MVUE) UCL	0.0119				
1633												
1634	**Gamma Distribution Test**						**Data Distribution**					
1635	k star (bias corrected)	2.948					**Data do not follow a Discernable Distribution (0.05)**					
1636	Theta Star	0.00154										
1637	MLE of Mean	0.00454										
1638	MLE of Standard Deviation	0.00265										
1639	nu star	58.96										
1640	Approximate Chi Square Value (.05)	42.31					**Nonparametric Statistics**					
1641	Adjusted Level of Significance	0.0267					95% CLT UCL	0.00587				
1642	Adjusted Chi Square Value	39.87					95% Jackknife UCL	0.00602				
1643							95% Standard Bootstrap UCL	0.00579				
1644	Anderson-Darling Test Statistic	0.854					95% Bootstrap-t UCL	0.00656				
1645	Anderson-Darling 5% Critical Value	0.729					95% Hall's Bootstrap UCL	0.00609				
1646	Kolmogorov-Smirnov Test Statistic	0.296					95% Percentile Bootstrap UCL	0.00588				
1647	Kolmogorov-Smirnov 5% Critical Value	0.268					95% BCA Bootstrap UCL	0.00617				
1648	**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.00805				
1649							97.5% Chebyshev(Mean, Sd) UCL	0.00957				
1650	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.0126				

1651					95% Approximate Gamma UCL	0.00633						
1652					95% Adjusted Gamma UCL	0.00672						
1653												
1654	**Potential UCL to Use**										Use 95% Chebyshev (Mean, Sd) UCL	0.00805
1655												
1656	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1657	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1658	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1659												
1660												
1661	**Vanadium**											
1662												
1663	**General Statistics**											
1664	Number of Valid Observations					10	Number of Distinct Observations					10
1665												
1666	**Raw Statistics**						**Log-transformed Statistics**					
1667	Minimum					0.0255	Minimum of Log Data					-3.668
1668	Maximum					0.0973	Maximum of Log Data					-2.33
1669	Mean					0.0376	Mean of log Data					-3.4
1670	Median					0.0265	SD of log Data					0.464
1671	SD					0.0236						
1672	Coefficient of Variation					0.628						
1673	Skewness					2.251						
1674												
1675	**Relevant UCL Statistics**											
1676	**Normal Distribution Test**						**Lognormal Distribution Test**					
1677	Shapiro Wilk Test Statistic					0.601	Shapiro Wilk Test Statistic					0.655
1678	Shapiro Wilk Critical Value					0.842	Shapiro Wilk Critical Value					0.842
1679	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
1680												
1681	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1682	95% Student's-t UCL					0.0513	95% H-UCL					0.052
1683	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					0.0606
1684	95% Adjusted-CLT UCL (Chen-1995)					0.0555	97.5% Chebyshev (MVUE) UCL					0.0709
1685	95% Modified-t UCL (Johnson-1978)					0.0522	99% Chebyshev (MVUE) UCL					0.0912
1686												
1687	**Gamma Distribution Test**						**Data Distribution**					
1688	k star (bias corrected)					3.116	**Data do not follow a Discernable Distribution (0.05)**					
1689	Theta Star					0.0121						
1690	MLE of Mean					0.0376						
1691	MLE of Standard Deviation					0.0213						
1692	nu star					62.33						
1693	Approximate Chi Square Value (.05)					45.17	**Nonparametric Statistics**					
1694	Adjusted Level of Significance					0.0267	95% CLT UCL					0.0499
1695	Adjusted Chi Square Value					42.64	95% Jackknife UCL					0.0513
1696							95% Standard Bootstrap UCL					0.0497
1697	Anderson-Darling Test Statistic					1.768	95% Bootstrap-t UCL					0.116
1698	Anderson-Darling 5% Critical Value					0.729	95% Hall's Bootstrap UCL					0.136
1699	Kolmogorov-Smirnov Test Statistic					0.398	95% Percentile Bootstrap UCL					0.0507
1700	Kolmogorov-Smirnov 5% Critical Value					0.268	95% BCA Bootstrap UCL					0.0552

1701	**Data not Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	0.0701
1702											97.5% Chebyshev(Mean, Sd) UCL	0.0842
1703	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	0.112
1704	95% Approximate Gamma UCL	0.0519										
1705	95% Adjusted Gamma UCL	0.0549										
1706												
1707	**Potential UCL to Use**										Use 95% Student's-t UCL	0.0513
1708											or 95% Modified-t UCL	0.0522
1709												
1710	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1711	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1712	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1713												
1714												
1715	**Zinc**											
1716												
1717	**General Statistics**											
1718	Number of Valid Observations	10									Number of Distinct Observations	10
1719												
1720	**Raw Statistics**										**Log-transformed Statistics**	
1721	Minimum	19.04									Minimum of Log Data	2.947
1722	Maximum	27.77									Maximum of Log Data	3.324
1723	Mean	23.31									Mean of log Data	3.142
1724	Median	23.29									SD of log Data	0.12
1725	SD	2.801										
1726	Coefficient of Variation	0.12										
1727	Skewness	0.341										
1728												
1729	**Relevant UCL Statistics**											
1730	**Normal Distribution Test**										**Lognormal Distribution Test**	
1731	Shapiro Wilk Test Statistic	0.942									Shapiro Wilk Test Statistic	0.952
1732	Shapiro Wilk Critical Value	0.842									Shapiro Wilk Critical Value	0.842
1733	**Data appear Normal at 5% Significance Level**										**Data appear Lognormal at 5% Significance Level**	
1734												
1735	**Assuming Normal Distribution**										**Assuming Lognormal Distribution**	
1736	95% Student's-t UCL	24.93									95% H-UCL	25.08
1737	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	27.16
1738	95% Adjusted-CLT UCL (Chen-1995)	24.87									97.5% Chebyshev (MVUE) UCL	28.82
1739	95% Modified-t UCL (Johnson-1978)	24.95									99% Chebyshev (MVUE) UCL	32.09
1740												
1741	**Gamma Distribution Test**										**Data Distribution**	
1742	k star (bias corrected)	54.4									**Data appear Normal at 5% Significance Level**	
1743	Theta Star	0.428										
1744	MLE of Mean	23.31										
1745	MLE of Standard Deviation	3.16										
1746	nu star	1088										
1747	Approximate Chi Square Value (.05)	1012									**Nonparametric Statistics**	
1748	Adjusted Level of Significance	0.0267									95% CLT UCL	24.76
1749	Adjusted Chi Square Value	999.8									95% Jackknife UCL	24.93
1750											95% Standard Bootstrap UCL	24.68

1751				Anderson-Darling Test Statistic		0.287				95% Bootstrap-t UCL		25.22
1752				Anderson-Darling 5% Critical Value		0.724				95% Hall's Bootstrap UCL		25.59
1753				Kolmogorov-Smirnov Test Statistic		0.14				95% Percentile Bootstrap UCL		24.72
1754				Kolmogorov-Smirnov 5% Critical Value		0.266				95% BCA Bootstrap UCL		24.73
1755				**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL		27.17
1756										97.5% Chebyshev(Mean, Sd) UCL		28.84
1757				**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL		32.12
1758				95% Approximate Gamma UCL		25.05						
1759				95% Adjusted Gamma UCL		25.36						
1760												
1761				**Potential UCL to Use**						Use 95% Student's-t UCL		24.93
1762												
1763	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1764	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1765	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1766												

ProUCL Outputs: West Branch Napadogan River

General UCL Statistics for Full Data Sets

User Selected Options	
From File	C:\Users\jmcphail\Desktop\UCL for server\fish_carcass_wnappa.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Aluminum

General Statistics

Number of Valid Observations	29	Number of Distinct Observations	26

Raw Statistics		**Log-transformed Statistics**	
Minimum	0.27	Minimum of Log Data	-1.309
Maximum	13.2	Maximum of Log Data	2.58
Mean	1.176	Mean of log Data	-0.445
Median	0.53	SD of log Data	0.836
SD	2.453		
Coefficient of Variation	2.085		
Skewness	4.582		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.363	Shapiro Wilk Test Statistic	0.743
Shapiro Wilk Critical Value	0.926	Shapiro Wilk Critical Value	0.926
Data not Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	1.951	95% H-UCL	1.301
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1.566
95% Adjusted-CLT UCL (Chen-1995)	2.339	97.5% Chebyshev (MVUE) UCL	1.856
95% Modified-t UCL (Johnson-1978)	2.016	99% Chebyshev (MVUE) UCL	2.427
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	0.88	**Data do not follow a Discernable Distribution (0.05)**	
Theta Star	1.337		
MLE of Mean	1.176		
MLE of Standard Deviation	1.254		
nu star	51.03		
Approximate Chi Square Value (.05)	35.62	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0407	95% CLT UCL	1.925
Adjusted Chi Square Value	34.85	95% Jackknife UCL	1.951
		95% Standard Bootstrap UCL	1.888
Anderson-Darling Test Statistic	4.588	95% Bootstrap-t UCL	4.221
Anderson-Darling 5% Critical Value	0.776	95% Hall's Bootstrap UCL	4.204
Kolmogorov-Smirnov Test Statistic	0.349	95% Percentile Bootstrap UCL	2.021
Kolmogorov-Smirnov 5% Critical Value	0.168	95% BCA Bootstrap UCL	2.545

51	Data not Gamma Distributed at 5% Significance Level										95% Chebyshev(Mean, Sd) UCL	3.161
52											97.5% Chebyshev(Mean, Sd) UCL	4.02
53	Assuming Gamma Distribution										99% Chebyshev(Mean, Sd) UCL	5.708
54					95% Approximate Gamma UCL	1.685						
55					95% Adjusted Gamma UCL	1.722						
56												
57	Potential UCL to Use										Use 95% Chebyshev (Mean, Sd) UCL	3.161
58												
59	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
60	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
61	and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.											
62												
63												
64	Antimony											
65												
66	General Statistics											
67	Number of Valid Observations					29	Number of Distinct Observations					5
68												
69	Raw Statistics						Log-transformed Statistics					
70	Minimum					0.0025	Minimum of Log Data					-5.991
71	Maximum					0.0155	Maximum of Log Data					-4.167
72	Mean					0.00337	Mean of log Data					-5.832
73	Median					0.0025	SD of log Data					0.44
74	SD					0.00272						
75	Coefficient of Variation					0.806						
76	Skewness					3.766						
77												
78												
79	Relevant UCL Statistics											
80	Normal Distribution Test						Lognormal Distribution Test					
81	Shapiro Wilk Test Statistic					0.381	Shapiro Wilk Test Statistic					0.427
82	Shapiro Wilk Critical Value					0.926	Shapiro Wilk Critical Value					0.926
83	Data not Normal at 5% Significance Level						Data not Lognormal at 5% Significance Level					
84												
85	Assuming Normal Distribution						Assuming Lognormal Distribution					
86	95% Student's-t UCL					0.00423	95% H-UCL					0.00378
87	95% UCLs (Adjusted for Skewness)						95% Chebyshev (MVUE) UCL					0.0044
88	95% Adjusted-CLT UCL (Chen-1995)					0.00458	97.5% Chebyshev (MVUE) UCL					0.00491
89	95% Modified-t UCL (Johnson-1978)					0.00429	99% Chebyshev (MVUE) UCL					0.00592
90												
91	Gamma Distribution Test						Data Distribution					
92	k star (bias corrected)					3.38	Data do not follow a Discernable Distribution (0.05)					
93	Theta Star					0.0009971						
94	MLE of Mean					0.00337						
95	MLE of Standard Deviation					0.00183						
96	nu star					196.1						
97	Approximate Chi Square Value (.05)					164.7	Nonparametric Statistics					
98	Adjusted Level of Significance					0.0407	95% CLT UCL					0.0042
99	Adjusted Chi Square Value					163	95% Jackknife UCL					0.00423
100							95% Standard Bootstrap UCL					0.00419

101					Anderson-Darling Test Statistic	8.056					95% Bootstrap-t UCL	0.00577
102					Anderson-Darling 5% Critical Value	0.751					95% Hall's Bootstrap UCL	0.00691
103					Kolmogorov-Smirnov Test Statistic	0.508					95% Percentile Bootstrap UCL	0.00429
104					Kolmogorov-Smirnov 5% Critical Value	0.164					95% BCA Bootstrap UCL	0.00461
105					**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.00557
106											97.5% Chebyshev(Mean, Sd) UCL	0.00652
107					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.00839
108					95% Approximate Gamma UCL	0.00401						
109					95% Adjusted Gamma UCL	0.00406						
110												
111					**Potential UCL to Use**						Use 95% Student's-t UCL	0.00423
112											or 95% Modified-t UCL	0.00429
113												
114	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
115	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
116	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
117												
118												
119	**Arsenic**											
120												
121	**General Statistics**											
122	Number of Valid Observations					29	Number of Distinct Observations					18
123												
124	**Raw Statistics**						**Log-transformed Statistics**					
125	Minimum					0.025	Minimum of Log Data					-3.689
126	Maximum					1.77	Maximum of Log Data					0.571
127	Mean					0.449	Mean of log Data					-1.785
128	Median					0.125	SD of log Data					1.564
129	SD					0.545						
130	Coefficient of Variation					1.212						
131	Skewness					1.099						
132												
133	**Relevant UCL Statistics**											
134	**Normal Distribution Test**						**Lognormal Distribution Test**					
135	Shapiro Wilk Test Statistic					0.77	Shapiro Wilk Test Statistic					0.874
136	Shapiro Wilk Critical Value					0.926	Shapiro Wilk Critical Value					0.926
137	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
138												
139	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
140	95% Student's-t UCL					0.621	95% H-UCL					1.487
141	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					1.366
142	95% Adjusted-CLT UCL (Chen-1995)					0.638	97.5% Chebyshev (MVUE) UCL					1.731
143	95% Modified-t UCL (Johnson-1978)					0.625	99% Chebyshev (MVUE) UCL					2.446
144												
145	**Gamma Distribution Test**						**Data Distribution**					
146	k star (bias corrected)					0.582	**Data do not follow a Discernable Distribution (0.05)**					
147	Theta Star					0.772						
148	MLE of Mean					0.449						
149	MLE of Standard Deviation					0.589						
150	nu star					33.76						

151	Approximate Chi Square Value (.05)					21.47	**Nonparametric Statistics**					
152	Adjusted Level of Significance					0.0407	95% CLT UCL					0.616
153	Adjusted Chi Square Value					20.89	95% Jackknife UCL					0.621
154							95% Standard Bootstrap UCL					0.613
155	Anderson-Darling Test Statistic					1.353	95% Bootstrap-t UCL					0.651
156	Anderson-Darling 5% Critical Value					0.798	95% Hall's Bootstrap UCL					0.617
157	Kolmogorov-Smirnov Test Statistic					0.178	95% Percentile Bootstrap UCL					0.623
158	Kolmogorov-Smirnov 5% Critical Value					0.171	95% BCA Bootstrap UCL					0.628
159	**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					0.89
160							97.5% Chebyshev(Mean, Sd) UCL					1.081
161	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL					1.456
162	95% Approximate Gamma UCL					0.706						
163	95% Adjusted Gamma UCL					0.726						
164												
165	**Potential UCL to Use**						Use 95% Chebyshev (Mean, Sd) UCL					0.89
166												
167	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
168	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
169	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
170												
171												
172	**Barium**											
173												
174	**General Statistics**											
175	Number of Valid Observations					29	Number of Distinct Observations					26
176												
177	**Raw Statistics**						**Log-transformed Statistics**					
178	Minimum					0.17	Minimum of Log Data					-1.772
179	Maximum					0.63	Maximum of Log Data					-0.462
180	Mean					0.367	Mean of log Data					-1.066
181	Median					0.345	SD of log Data					0.369
182	SD					0.131						
183	Coefficient of Variation					0.358						
184	Skewness					0.382						
185												
186	**Relevant UCL Statistics**											
187	**Normal Distribution Test**						**Lognormal Distribution Test**					
188	Shapiro Wilk Test Statistic					0.951	Shapiro Wilk Test Statistic					0.964
189	Shapiro Wilk Critical Value					0.926	Shapiro Wilk Critical Value					0.926
190	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
191												
192	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
193	95% Student's-t UCL					0.409	95% H-UCL					0.419
194	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					0.48
195	95% Adjusted-CLT UCL (Chen-1995)					0.409	97.5% Chebyshev (MVUE) UCL					0.529
196	95% Modified-t UCL (Johnson-1978)					0.409	99% Chebyshev (MVUE) UCL					0.625
197												
198	**Gamma Distribution Test**						**Data Distribution**					
199	k star (bias corrected)					7.171	**Data appear Normal at 5% Significance Level**					
200	Theta Star					0.0512						

201					MLE of Mean	0.367						
202					MLE of Standard Deviation	0.137						
203					nu star	415.9						
204					Approximate Chi Square Value (.05)	369.6			**Nonparametric Statistics**			
205					Adjusted Level of Significance	0.0407					95% CLT UCL	0.407
206					Adjusted Chi Square Value	367					95% Jackknife UCL	0.409
207											95% Standard Bootstrap UCL	0.406
208					Anderson-Darling Test Statistic	0.285					95% Bootstrap-t UCL	0.41
209					Anderson-Darling 5% Critical Value	0.746					95% Hall's Bootstrap UCL	0.408
210					Kolmogorov-Smirnov Test Statistic	0.095					95% Percentile Bootstrap UCL	0.407
211					Kolmogorov-Smirnov 5% Critical Value	0.163					95% BCA Bootstrap UCL	0.407
212					**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.473
213											97.5% Chebyshev(Mean, Sd) UCL	0.519
214					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.61
215					95% Approximate Gamma UCL	0.413						
216					95% Adjusted Gamma UCL	0.416						
217												
218					**Potential UCL to Use**						Use 95% Student's-t UCL	0.409
219												
220	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
221	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
222	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
223												
224												
225	**Beryllium**											
226												
227	**General Statistics**											
228					Number of Valid Observations	29			Number of Distinct Observations	1		
229												
230												
231	**Warning: There is only one distinct observation value in this data set - resulting in '0' variance!**											
232	**ProUCL (or any other software) should not be used on such a data set!**											
233	**The data set for variable Beryllium was not processed!**											
234												
235	**If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.**											
236	**The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).**											
237												
238												
239												
240	**Bismuth**											
241												
242	**General Statistics**											
243					Number of Valid Observations	29			Number of Distinct Observations	2		
244												
245	**Raw Statistics**								**Log-transformed Statistics**			
246					Minimum	0.025			Minimum of Log Data	-3.689		
247					Maximum	0.208			Maximum of Log Data	-1.573		
248					Mean	0.0313			Mean of log Data	-3.616		
249					Median	0.025			SD of log Data	0.393		
250					SD	0.0339						

Coefficient of Variation	1.083	
Skewness	5.385	

Warning: There are only 2 Distinct Values in this data

There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.191	Shapiro Wilk Test Statistic	0.191
Shapiro Wilk Critical Value	0.926	Shapiro Wilk Critical Value	0.926
Data not Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	0.042	95% H-UCL	0.0334
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.0384
95% Adjusted-CLT UCL (Chen-1995)	0.0484	97.5% Chebyshev (MVUE) UCL	0.0425
95% Modified-t UCL (Johnson-1978)	0.043	99% Chebyshev (MVUE) UCL	0.0506
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	3.122	**Data do not follow a Discernable Distribution (0.05)**	
Theta Star	0.01		
MLE of Mean	0.0313		
MLE of Standard Deviation	0.0177		
nu star	181.1		
Approximate Chi Square Value (.05)	151	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0407	95% CLT UCL	0.0416
Adjusted Chi Square Value	149.3	95% Jackknife UCL	N/A
		95% Standard Bootstrap UCL	N/A
Anderson-Darling Test Statistic	10.89	95% Bootstrap-t UCL	N/A
Anderson-Darling 5% Critical Value	0.752	95% Hall's Bootstrap UCL	N/A
Kolmogorov-Smirnov Test Statistic	0.552	95% Percentile Bootstrap UCL	N/A
Kolmogorov-Smirnov 5% Critical Value	0.164	95% BCA Bootstrap UCL	N/A
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.0587
		97.5% Chebyshev(Mean, Sd) UCL	0.0706
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.0939
95% Approximate Gamma UCL	0.0375		
95% Adjusted Gamma UCL	0.038		
Potential UCL to Use		Use 95% Student's-t UCL	0.042
		or 95% Modified-t UCL	0.043

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Boron

General Statistics

Number of Valid Observations	29	Number of Distinct Observations	1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Boron was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Cadmium

General Statistics

Number of Valid Observations	29	Number of Distinct Observations	26

Raw Statistics		**Log-transformed Statistics**	
Minimum	0.0018	Minimum of Log Data	-6.32
Maximum	0.0198	Maximum of Log Data	-3.925
Mean	0.00737	Mean of log Data	-5.141
Median	0.0071	SD of log Data	0.725
SD	0.00475		
Coefficient of Variation	0.644		
Skewness	0.714		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.912	Shapiro Wilk Test Statistic	0.91
Shapiro Wilk Critical Value	0.926	Shapiro Wilk Critical Value	0.926
Data not Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	0.00886	95% H-UCL	0.0102
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.0123
95% Adjusted-CLT UCL (Chen-1995)	0.00894	97.5% Chebyshev (MVUE) UCL	0.0144
95% Modified-t UCL (Johnson-1978)	0.00888	99% Chebyshev (MVUE) UCL	0.0185
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	2.106	**Data do not follow a Discernable Distribution (0.05)**	
Theta Star	0.0035		
MLE of Mean	0.00737		
MLE of Standard Deviation	0.00508		
nu star	122.1		
Approximate Chi Square Value (.05)	97.63	**Nonparametric Statistics**	

351					Adjusted Level of Significance	0.0407					95% CLT UCL	0.00881
352					Adjusted Chi Square Value	96.32					95% Jackknife UCL	0.00886
353											95% Standard Bootstrap UCL	0.00877
354					Anderson-Darling Test Statistic	0.832					95% Bootstrap-t UCL	0.00914
355					Anderson-Darling 5% Critical Value	0.756					95% Hall's Bootstrap UCL	0.00899
356					Kolmogorov-Smirnov Test Statistic	0.179					95% Percentile Bootstrap UCL	0.00881
357					Kolmogorov-Smirnov 5% Critical Value	0.164					95% BCA Bootstrap UCL	0.00891
358					**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.0112
359											97.5% Chebyshev(Mean, Sd) UCL	0.0129
360					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.0161
361					95% Approximate Gamma UCL	0.00922						
362					95% Adjusted Gamma UCL	0.00934						
363												
364					**Potential UCL to Use**						Use 95% Chebyshev (Mean, Sd) UCL	0.0112
365												
366	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
367	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
368	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
369												
370												
371	**Calcium**											
372												
373	**General Statistics**											
374	Number of Valid Observations					29	Number of Distinct Observations					28
375												
376	**Raw Statistics**						**Log-transformed Statistics**					
377	Minimum					2530	Minimum of Log Data					7.836
378	Maximum					5500	Maximum of Log Data					8.613
379	Mean					4112	Mean of log Data					8.302
380	Median					4150	SD of log Data					0.202
381	SD					806.1						
382	Coefficient of Variation					0.196						
383	Skewness					-0.018						
384												
385	**Relevant UCL Statistics**											
386	**Normal Distribution Test**						**Lognormal Distribution Test**					
387	Shapiro Wilk Test Statistic					0.961	Shapiro Wilk Test Statistic					0.957
388	Shapiro Wilk Critical Value					0.926	Shapiro Wilk Critical Value					0.926
389	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
390												
391	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
392	95% Student's-t UCL					4366	95% H-UCL					4402
393	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					4793
394	95% Adjusted-CLT UCL (Chen-1995)					4357	97.5% Chebyshev (MVUE) UCL					5087
395	95% Modified-t UCL (Johnson-1978)					4366	99% Chebyshev (MVUE) UCL					5664
396												
397	**Gamma Distribution Test**						**Data Distribution**					
398	k star (bias corrected)					23.37	**Data appear Normal at 5% Significance Level**					
399	Theta Star					175.9						
400	MLE of Mean					4112						

401					MLE of Standard Deviation	850.5						
402					nu star	1355						
403					Approximate Chi Square Value (.05)	1271	**Nonparametric Statistics**					
404					Adjusted Level of Significance	0.0407					95% CLT UCL	4358
405					Adjusted Chi Square Value	1266					95% Jackknife UCL	4366
406											95% Standard Bootstrap UCL	4352
407					Anderson-Darling Test Statistic	0.384					95% Bootstrap-t UCL	4381
408					Anderson-Darling 5% Critical Value	0.744					95% Hall's Bootstrap UCL	4364
409					Kolmogorov-Smirnov Test Statistic	0.0951					95% Percentile Bootstrap UCL	4350
410					Kolmogorov-Smirnov 5% Critical Value	0.162					95% BCA Bootstrap UCL	4352
411	**Data appear Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	4764
412											97.5% Chebyshev(Mean, Sd) UCL	5046
413	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	5601
414					95% Approximate Gamma UCL	4385						
415					95% Adjusted Gamma UCL	4402						
416												
417	**Potential UCL to Use**										Use 95% Student's-t UCL	4366
418												
419	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
420	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
421	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
422												
423												
424	**Chromium**											
425												
426	**General Statistics**											
427					Number of Valid Observations	29					Number of Distinct Observations	4
428												
429	**Raw Statistics**						**Log-transformed Statistics**					
430					Minimum	0.025					Minimum of Log Data	-3.689
431					Maximum	0.08					Maximum of Log Data	-2.526
432					Mean	0.0299					Mean of log Data	-3.579
433					Median	0.025					SD of log Data	0.33
434					SD	0.0149						
435					Coefficient of Variation	0.497						
436					Skewness	2.842						
437												
438												
439	**Warning: There are only 4 Distinct Values in this data**											
440	**There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.**											
441	**Those methods will return a 'N/A' value on your output display!**											
442												
443	**It is necessary to have 4 or more Distinct Values to compute bootstrap methods.**											
444	**However, results obtained using 4 to 9 distinct values may not be reliable.**											
445	**It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.**											
446												
447	**Relevant UCL Statistics**											
448	**Normal Distribution Test**						**Lognormal Distribution Test**					
449					Shapiro Wilk Test Statistic	0.368					Shapiro Wilk Test Statistic	0.364
450					Shapiro Wilk Critical Value	0.926					Shapiro Wilk Critical Value	0.926

451	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
452												
453	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
454	95% Student's-t UCL					0.0346	95% H-UCL					0.033
455	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					0.0374
456	95% Adjusted-CLT UCL (Chen-1995)					0.036	97.5% Chebyshev (MVUE) UCL					0.0409
457	95% Modified-t UCL (Johnson-1978)					0.0348	99% Chebyshev (MVUE) UCL					0.0477
458												
459	**Gamma Distribution Test**						**Data Distribution**					
460	k star (bias corrected)					6.603	**Data do not follow a Discernable Distribution (0.05)**					
461	Theta Star					0.00453						
462	MLE of Mean					0.0299						
463	MLE of Standard Deviation					0.0116						
464	nu star					383						
465	Approximate Chi Square Value (.05)					338.6	**Nonparametric Statistics**					
466	Adjusted Level of Significance					0.0407	95% CLT UCL					0.0345
467	Adjusted Chi Square Value					336.1	95% Jackknife UCL					0.0346
468							95% Standard Bootstrap UCL					0.0341
469	Anderson-Darling Test Statistic					9.36	95% Bootstrap-t UCL					0.0354
470	Anderson-Darling 5% Critical Value					0.747	95% Hall's Bootstrap UCL					0.0329
471	Kolmogorov-Smirnov Test Statistic					0.532	95% Percentile Bootstrap UCL					0.0348
472	Kolmogorov-Smirnov 5% Critical Value					0.163	95% BCA Bootstrap UCL					0.0353
473	**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					0.0419
474							97.5% Chebyshev(Mean, Sd) UCL					0.0471
475	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL					0.0574
476	95% Approximate Gamma UCL					0.0338						
477	95% Adjusted Gamma UCL					0.0341						
478												
479	**Potential UCL to Use**						Use 95% Student's-t UCL					0.0346
480							or 95% Modified-t UCL					0.0348
481												
482	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
483	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
484	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
485												
486												
487	**Cobalt**											
488												
489	**General Statistics**											
490	Number of Valid Observations					29	Number of Distinct Observations					19
491												
492	**Raw Statistics**						**Log-transformed Statistics**					
493	Minimum					0.01	Minimum of Log Data					-4.605
494	Maximum					0.076	Maximum of Log Data					-2.577
495	Mean					0.0343	Mean of log Data					-3.485
496	Median					0.031	SD of log Data					0.486
497	SD					0.017						
498	Coefficient of Variation					0.495						
499	Skewness					1.161						
500												

501	**Relevant UCL Statistics**											
502	**Normal Distribution Test**						**Lognormal Distribution Test**					
503	Shapiro Wilk Test Statistic				0.871		Shapiro Wilk Test Statistic					0.949
504	Shapiro Wilk Critical Value				0.926		Shapiro Wilk Critical Value					0.926
505	**Data not Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
506												
507	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
508	95% Student's-t UCL				0.0396		95% H-UCL					0.0412
509	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					0.0484
510	95% Adjusted-CLT UCL (Chen-1995)				0.0402		97.5% Chebyshev (MVUE) UCL					0.0545
511	95% Modified-t UCL (Johnson-1978)				0.0398		99% Chebyshev (MVUE) UCL					0.0664
512												
513	**Gamma Distribution Test**						**Data Distribution**					
514	k star (bias corrected)				4.165		**Data Follow Appr. Gamma Distribution at 5% Significance Level**					
515	Theta Star				0.00823							
516	MLE of Mean				0.0343							
517	MLE of Standard Deviation				0.0168							
518	nu star				241.6							
519	Approximate Chi Square Value (.05)				206.6		**Nonparametric Statistics**					
520	Adjusted Level of Significance				0.0407		95% CLT UCL					0.0395
521	Adjusted Chi Square Value				204.7		95% Jackknife UCL					0.0396
522							95% Standard Bootstrap UCL					0.0394
523	Anderson-Darling Test Statistic				0.77		95% Bootstrap-t UCL					0.0404
524	Anderson-Darling 5% Critical Value				0.749		95% Hall's Bootstrap UCL					0.0405
525	Kolmogorov-Smirnov Test Statistic				0.16		95% Percentile Bootstrap UCL					0.0394
526	Kolmogorov-Smirnov 5% Critical Value				0.163		95% BCA Bootstrap UCL					0.0403
527	**Data follow Appr. Gamma Distribution at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					0.048
528							97.5% Chebyshev(Mean, Sd) UCL					0.054
529	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL					0.0656
530	95% Approximate Gamma UCL				0.0401							
531	95% Adjusted Gamma UCL				0.0405							
532												
533	**Potential UCL to Use**						Use 95% Approximate Gamma UCL					0.0401
534												
535	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
536	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
537	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
538												
539												
540	**Copper**											
541												
542	**General Statistics**											
543	Number of Valid Observations				29		Number of Distinct Observations					17
544												
545	**Raw Statistics**						**Log-transformed Statistics**					
546	Minimum				0.26		Minimum of Log Data					-1.347
547	Maximum				0.56		Maximum of Log Data					-0.58
548	Mean				0.383		Mean of log Data					-0.979
549	Median				0.39		SD of log Data					0.197
550	SD				0.0741							

551					Coefficient of Variation	0.194						
552					Skewness	0.246						
553												
554	**Relevant UCL Statistics**											
555	**Normal Distribution Test**						**Lognormal Distribution Test**					
556					Shapiro Wilk Test Statistic	0.97					Shapiro Wilk Test Statistic	0.965
557					Shapiro Wilk Critical Value	0.926					Shapiro Wilk Critical Value	0.926
558	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
559												
560	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
561					95% Student's-t UCL	0.406					95% H-UCL	0.409
562	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.444
563					95% Adjusted-CLT UCL (Chen-1995)	0.406					97.5% Chebyshev (MVUE) UCL	0.471
564					95% Modified-t UCL (Johnson-1978)	0.406					99% Chebyshev (MVUE) UCL	0.523
565												
566	**Gamma Distribution Test**						**Data Distribution**					
567					k star (bias corrected)	24.44	**Data appear Normal at 5% Significance Level**					
568					Theta Star	0.0157						
569					MLE of Mean	0.383						
570					MLE of Standard Deviation	0.0774						
571					nu star	1418						
572					Approximate Chi Square Value (.05)	1331	**Nonparametric Statistics**					
573					Adjusted Level of Significance	0.0407					95% CLT UCL	0.405
574					Adjusted Chi Square Value	1326					95% Jackknife UCL	0.406
575											95% Standard Bootstrap UCL	0.404
576					Anderson-Darling Test Statistic	0.339					95% Bootstrap-t UCL	0.406
577					Anderson-Darling 5% Critical Value	0.744					95% Hall's Bootstrap UCL	0.406
578					Kolmogorov-Smirnov Test Statistic	0.117					95% Percentile Bootstrap UCL	0.406
579					Kolmogorov-Smirnov 5% Critical Value	0.162					95% BCA Bootstrap UCL	0.405
580	**Data appear Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	0.443
581											97.5% Chebyshev(Mean, Sd) UCL	0.469
582	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	0.52
583					95% Approximate Gamma UCL	0.407						
584					95% Adjusted Gamma UCL	0.409						
585												
586	**Potential UCL to Use**										Use 95% Student's-t UCL	0.406
587												
588	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
589	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
590	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
591												
592												
593	**Iron**											
594												
595	**General Statistics**											
596					Number of Valid Observations	29					Number of Distinct Observations	8
597												
598	**Raw Statistics**						**Log-transformed Statistics**					
599					Minimum	3					Minimum of Log Data	1.099
600					Maximum	63					Maximum of Log Data	4.143

601					Mean	6.793					Mean of log Data	1.634
602					Median	5					SD of log Data	0.523
603					SD	10.86						
604					Coefficient of Variation	1.598						
605					Skewness	5.31						
606												
607												
608	**Relevant UCL Statistics**											
609	**Normal Distribution Test**						**Lognormal Distribution Test**					
610					Shapiro Wilk Test Statistic	0.261					Shapiro Wilk Test Statistic	0.525
611					Shapiro Wilk Critical Value	0.926					Shapiro Wilk Critical Value	0.926
612	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
613												
614	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
615					95% Student's-t UCL	10.22					95% H-UCL	7.137
616	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	8.438
617					95% Adjusted-CLT UCL (Chen-1995)	12.23					97.5% Chebyshev (MVUE) UCL	9.559
618					95% Modified-t UCL (Johnson-1978)	10.55					99% Chebyshev (MVUE) UCL	11.76
619												
620	**Gamma Distribution Test**						**Data Distribution**					
621					k star (bias corrected)	1.749	**Data do not follow a Discernable Distribution (0.05)**					
622					Theta Star	3.884						
623					MLE of Mean	6.793						
624					MLE of Standard Deviation	5.137						
625					nu star	101.4						
626					Approximate Chi Square Value (.05)	79.21	**Nonparametric Statistics**					
627					Adjusted Level of Significance	0.0407					95% CLT UCL	10.11
628					Adjusted Chi Square Value	78.03					95% Jackknife UCL	10.22
629											95% Standard Bootstrap UCL	10.07
630					Anderson-Darling Test Statistic	6.286					95% Bootstrap-t UCL	36.25
631					Anderson-Darling 5% Critical Value	0.758					95% Hall's Bootstrap UCL	25.73
632					Kolmogorov-Smirnov Test Statistic	0.366					95% Percentile Bootstrap UCL	10.79
633					Kolmogorov-Smirnov 5% Critical Value	0.165					95% BCA Bootstrap UCL	12.91
634	**Data not Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	15.58
635											97.5% Chebyshev(Mean, Sd) UCL	19.39
636	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	26.86
637					95% Approximate Gamma UCL	8.7						
638					95% Adjusted Gamma UCL	8.831						
639												
640	**Potential UCL to Use**										Use 95% Chebyshev (Mean, Sd) UCL	15.58
641												
642	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
643	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
644	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
645												
646												
647	**Lead**											
648												
649	**General Statistics**											
650					Number of Valid Observations	29					Number of Distinct Observations	18

651												
652	**Raw Statistics**						**Log-transformed Statistics**					
653					Minimum	0.0025					Minimum of Log Data	-5.991
654					Maximum	0.0895					Maximum of Log Data	-2.414
655					Mean	0.0172					Mean of log Data	-4.588
656					Median	0.01					SD of log Data	1.046
657					SD	0.0202						
658					Coefficient of Variation	1.176						
659					Skewness	2.312						
660												
661	**Relevant UCL Statistics**											
662	**Normal Distribution Test**						**Lognormal Distribution Test**					
663					Shapiro Wilk Test Statistic	0.706					Shapiro Wilk Test Statistic	0.925
664					Shapiro Wilk Critical Value	0.926					Shapiro Wilk Critical Value	0.926
665	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
666												
667	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
668					95% Student's-t UCL	0.0236					95% H-UCL	0.029
669	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.0339
670					95% Adjusted-CLT UCL (Chen-1995)	0.0251					97.5% Chebyshev (MVUE) UCL	0.0411
671					95% Modified-t UCL (Johnson-1978)	0.0239					99% Chebyshev (MVUE) UCL	0.0554
672												
673	**Gamma Distribution Test**						**Data Distribution**					
674					k star (bias corrected)	0.999	**Data Follow Appr. Gamma Distribution at 5% Significance Level**					
675					Theta Star	0.0172						
676					MLE of Mean	0.0172						
677					MLE of Standard Deviation	0.0172						
678					nu star	57.92						
679					Approximate Chi Square Value (.05)	41.43	**Nonparametric Statistics**					
680					Adjusted Level of Significance	0.0407					95% CLT UCL	0.0234
681					Adjusted Chi Square Value	40.59					95% Jackknife UCL	0.0236
682											95% Standard Bootstrap UCL	0.0233
683					Anderson-Darling Test Statistic	0.876					95% Bootstrap-t UCL	0.0273
684					Anderson-Darling 5% Critical Value	0.772					95% Hall's Bootstrap UCL	0.0278
685					Kolmogorov-Smirnov Test Statistic	0.136					95% Percentile Bootstrap UCL	0.0241
686					Kolmogorov-Smirnov 5% Critical Value	0.167					95% BCA Bootstrap UCL	0.0263
687	**Data follow Appr. Gamma Distribution at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	0.0336
688											97.5% Chebyshev(Mean, Sd) UCL	0.0406
689	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	0.0546
690					95% Approximate Gamma UCL	0.024						
691					95% Adjusted Gamma UCL	0.0245						
692												
693	**Potential UCL to Use**										Use 95% Approximate Gamma UCL	0.024
694												
695	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
696	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
697	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
698												
699												
700	**Lithium**											

701												
702	**General Statistics**											
703	Number of Valid Observations				29		Number of Distinct Observations					15
704												
705	**Raw Statistics**						**Log-transformed Statistics**					
706	Minimum				0.005		Minimum of Log Data					-5.298
707	Maximum				0.022		Maximum of Log Data					-3.817
708	Mean				0.0119		Mean of log Data					-4.487
709	Median				0.012		SD of log Data					0.342
710	SD				0.00403							
711	Coefficient of Variation				0.339							
712	Skewness				0.752							
713												
714	**Relevant UCL Statistics**											
715	**Normal Distribution Test**						**Lognormal Distribution Test**					
716	Shapiro Wilk Test Statistic				0.951		Shapiro Wilk Test Statistic					0.98
717	Shapiro Wilk Critical Value				0.926		Shapiro Wilk Critical Value					0.926
718	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
719												
720	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
721	95% Student's-t UCL				0.0132		95% H-UCL					0.0134
722	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					0.0153
723	95% Adjusted-CLT UCL (Chen-1995)				0.0132		97.5% Chebyshev (MVUE) UCL					0.0167
724	95% Modified-t UCL (Johnson-1978)				0.0132		99% Chebyshev (MVUE) UCL					0.0196
725												
726	**Gamma Distribution Test**						**Data Distribution**					
727	k star (bias corrected)				8.289		**Data appear Normal at 5% Significance Level**					
728	Theta Star				0.00144							
729	MLE of Mean				0.0119							
730	MLE of Standard Deviation				0.00413							
731	nu star				480.8							
732	Approximate Chi Square Value (.05)				430.9		**Nonparametric Statistics**					
733	Adjusted Level of Significance				0.0407		95% CLT UCL					0.0131
734	Adjusted Chi Square Value				428.1		95% Jackknife UCL					0.0132
735							95% Standard Bootstrap UCL					0.0131
736	Anderson-Darling Test Statistic				0.247		95% Bootstrap-t UCL					0.0132
737	Anderson-Darling 5% Critical Value				0.746		95% Hall's Bootstrap UCL					0.0134
738	Kolmogorov-Smirnov Test Statistic				0.105		95% Percentile Bootstrap UCL					0.0132
739	Kolmogorov-Smirnov 5% Critical Value				0.163		95% BCA Bootstrap UCL					0.0132
740	**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					0.0152
741							97.5% Chebyshev(Mean, Sd) UCL					0.0166
742	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL					0.0193
743	95% Approximate Gamma UCL				0.0133							
744	95% Adjusted Gamma UCL				0.0134							
745												
746	**Potential UCL to Use**						Use 95% Student's-t UCL					0.0132
747												
748	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
749	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
750	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											

Magnesium

General Statistics

Number of Valid Observations	29	Number of Distinct Observations	23

Raw Statistics		**Log-transformed Statistics**	
Minimum	306	Minimum of Log Data	5.724
Maximum	360.5	Maximum of Log Data	5.887
Mean	336.1	Mean of log Data	5.816
Median	338	SD of log Data	0.0453
SD	15.14		
Coefficient of Variation	0.045		
Skewness	-0.244		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.956	Shapiro Wilk Test Statistic	0.953
Shapiro Wilk Critical Value	0.926	Shapiro Wilk Critical Value	0.926
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	340.9	95% H-UCL	N/A
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	348.4
95% Adjusted-CLT UCL (Chen-1995)	340.6	97.5% Chebyshev (MVUE) UCL	353.8
95% Modified-t UCL (Johnson-1978)	340.9	99% Chebyshev (MVUE) UCL	364.3
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	453.9	**Data appear Normal at 5% Significance Level**	
Theta Star	0.74		
MLE of Mean	336.1		
MLE of Standard Deviation	15.78		
nu star	26328		
Approximate Chi Square Value (.05)	25952	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0407	95% CLT UCL	340.7
Adjusted Chi Square Value	25930	95% Jackknife UCL	340.9
		95% Standard Bootstrap UCL	340.7
Anderson-Darling Test Statistic	0.392	95% Bootstrap-t UCL	340.7
Anderson-Darling 5% Critical Value	0.742	95% Hall's Bootstrap UCL	340.5
Kolmogorov-Smirnov Test Statistic	0.0954	95% Percentile Bootstrap UCL	340.7
Kolmogorov-Smirnov 5% Critical Value	0.162	95% BCA Bootstrap UCL	340.2
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	348.4
		97.5% Chebyshev(Mean, Sd) UCL	353.7
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	364.1
95% Approximate Gamma UCL	341		
95% Adjusted Gamma UCL	341.3		
Potential UCL to Use		Use 95% Student's-t UCL	340.9

	A	B	C	D	E	F	G	H	I	J	K	L
801	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
802	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
803	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
804												
805												
806	**Manganese**											
807												
808	**General Statistics**											
809	Number of Valid Observations					29	Number of Distinct Observations					27
810												
811	**Raw Statistics**						**Log-transformed Statistics**					
812	Minimum					1.25	Minimum of Log Data					0.223
813	Maximum					5.57	Maximum of Log Data					1.717
814	Mean					2.513	Mean of log Data					0.862
815	Median					2.36	SD of log Data					0.345
816	SD					0.948						
817	Coefficient of Variation					0.377						
818	Skewness					1.474						
819												
820	**Relevant UCL Statistics**											
821	**Normal Distribution Test**						**Lognormal Distribution Test**					
822	Shapiro Wilk Test Statistic					0.891	Shapiro Wilk Test Statistic					0.981
823	Shapiro Wilk Critical Value					0.926	Shapiro Wilk Critical Value					0.926
824	**Data not Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
825												
826	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
827	95% Student's-t UCL					2.813	95% H-UCL					2.832
828	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					3.223
829	95% Adjusted-CLT UCL (Chen-1995)					2.854	97.5% Chebyshev (MVUE) UCL					3.533
830	95% Modified-t UCL (Johnson-1978)					2.821	99% Chebyshev (MVUE) UCL					4.142
831												
832	**Gamma Distribution Test**						**Data Distribution**					
833	k star (bias corrected)					7.641	**Data appear Gamma Distributed at 5% Significance Level**					
834	Theta Star					0.329						
835	MLE of Mean					2.513						
836	MLE of Standard Deviation					0.909						
837	nu star					443.2						
838	Approximate Chi Square Value (.05)					395.4	**Nonparametric Statistics**					
839	Adjusted Level of Significance					0.0407	95% CLT UCL					2.803
840	Adjusted Chi Square Value					392.7	95% Jackknife UCL					2.813
841							95% Standard Bootstrap UCL					2.795
842	Anderson-Darling Test Statistic					0.299	95% Bootstrap-t UCL					2.892
843	Anderson-Darling 5% Critical Value					0.746	95% Hall's Bootstrap UCL					2.971
844	Kolmogorov-Smirnov Test Statistic					0.0917	95% Percentile Bootstrap UCL					2.801
845	Kolmogorov-Smirnov 5% Critical Value					0.163	95% BCA Bootstrap UCL					2.834
846	**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					3.281
847							97.5% Chebyshev(Mean, Sd) UCL					3.613
848	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL					4.265
849	95% Approximate Gamma UCL					2.817						
850	95% Adjusted Gamma UCL					2.837						

851												
852	**Potential UCL to Use**						Use 95% Approximate Gamma UCL					2.817
853												
854	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
855	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
856	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
857												
858												
859	**Mercury**											
860												
861	**General Statistics**											
862	Number of Valid Observations					29	Number of Distinct Observations					15
863												
864	**Raw Statistics**						**Log-transformed Statistics**					
865	Minimum					0.06	Minimum of Log Data					-2.813
866	Maximum					0.22	Maximum of Log Data					-1.514
867	Mean					0.115	Mean of log Data					-2.224
868	Median					0.11	SD of log Data					0.359
869	SD					0.0411						
870	Coefficient of Variation					0.357						
871	Skewness					0.564						
872												
873	**Relevant UCL Statistics**											
874	**Normal Distribution Test**						**Lognormal Distribution Test**					
875	Shapiro Wilk Test Statistic					0.926	Shapiro Wilk Test Statistic					0.934
876	Shapiro Wilk Critical Value					0.926	Shapiro Wilk Critical Value					0.926
877	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
878												
879	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
880	95% Student's-t UCL					0.128	95% H-UCL					0.131
881	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					0.149
882	95% Adjusted-CLT UCL (Chen-1995)					0.128	97.5% Chebyshev (MVUE) UCL					0.164
883	95% Modified-t UCL (Johnson-1978)					0.128	99% Chebyshev (MVUE) UCL					0.193
884												
885	**Gamma Distribution Test**						**Data Distribution**					
886	k star (bias corrected)					7.437	**Data appear Normal at 5% Significance Level**					
887	Theta Star					0.0155						
888	MLE of Mean					0.115						
889	MLE of Standard Deviation					0.0422						
890	nu star					431.4						
891	Approximate Chi Square Value (.05)					384.2	**Nonparametric Statistics**					
892	Adjusted Level of Significance					0.0407	95% CLT UCL					0.128
893	Adjusted Chi Square Value					381.6	95% Jackknife UCL					0.128
894							95% Standard Bootstrap UCL					0.127
895	Anderson-Darling Test Statistic					0.739	95% Bootstrap-t UCL					0.129
896	Anderson-Darling 5% Critical Value					0.746	95% Hall's Bootstrap UCL					0.13
897	Kolmogorov-Smirnov Test Statistic					0.151	95% Percentile Bootstrap UCL					0.127
898	Kolmogorov-Smirnov 5% Critical Value					0.163	95% BCA Bootstrap UCL					0.127
899	**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					0.148
900							97.5% Chebyshev(Mean, Sd) UCL					0.163

901	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL					0.191
902	95% Approximate Gamma UCL	0.129										
903	95% Adjusted Gamma UCL	0.13										
904												
905	**Potential UCL to Use**						Use 95% Student's-t UCL					0.128
906												
907	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
908	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
909	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
910												
911												
912	**Molybdenum**											
913												
914	**General Statistics**											
915	Number of Valid Observations	29					Number of Distinct Observations					7
916												
917	**Raw Statistics**						**Log-transformed Statistics**					
918	Minimum	0.0025					Minimum of Log Data					-5.991
919	Maximum	0.014					Maximum of Log Data					-4.269
920	Mean	0.00415					Mean of log Data					-5.633
921	Median	0.0025					SD of log Data					0.511
922	SD	0.00273										
923	Coefficient of Variation	0.659										
924	Skewness	2.153										
925												
926												
927	**Relevant UCL Statistics**											
928	**Normal Distribution Test**						**Lognormal Distribution Test**					
929	Shapiro Wilk Test Statistic	0.669					Shapiro Wilk Test Statistic					0.725
930	Shapiro Wilk Critical Value	0.926					Shapiro Wilk Critical Value					0.926
931	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
932												
933	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
934	95% Student's-t UCL	0.00501					95% H-UCL					0.00492
935	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					0.00581
936	95% Adjusted-CLT UCL (Chen-1995)	0.0052					97.5% Chebyshev (MVUE) UCL					0.00657
937	95% Modified-t UCL (Johnson-1978)	0.00504					99% Chebyshev (MVUE) UCL					0.00806
938												
939	**Gamma Distribution Test**						**Data Distribution**					
940	k star (bias corrected)	3.21					**Data do not follow a Discernable Distribution (0.05)**					
941	Theta Star	0.00129										
942	MLE of Mean	0.00415										
943	MLE of Standard Deviation	0.00231										
944	nu star	186.2										
945	Approximate Chi Square Value (.05)	155.6					**Nonparametric Statistics**					
946	Adjusted Level of Significance	0.0407					95% CLT UCL					0.00498
947	Adjusted Chi Square Value	154					95% Jackknife UCL					0.00501
948							95% Standard Bootstrap UCL					0.00498
949	Anderson-Darling Test Statistic	3.593					95% Bootstrap-t UCL					0.00543
950	Anderson-Darling 5% Critical Value	0.751					95% Hall's Bootstrap UCL					0.00577

951					Kolmogorov-Smirnov Test Statistic	0.377					95% Percentile Bootstrap UCL	0.005
952					Kolmogorov-Smirnov 5% Critical Value	0.164					95% BCA Bootstrap UCL	0.00534
953					**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.00636
954											97.5% Chebyshev(Mean, Sd) UCL	0.00731
955					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.00919
956					95% Approximate Gamma UCL	0.00496						
957					95% Adjusted Gamma UCL	0.00501						
958												
959					**Potential UCL to Use**						Use 95% Chebyshev (Mean, Sd) UCL	0.00636
960												
961	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
962	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
963	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
964												
965												
966	**Nickel**											
967												
968	**General Statistics**											
969					Number of Valid Observations	29					Number of Distinct Observations	2
970												
971	**Raw Statistics**						**Log-transformed Statistics**					
972					Minimum	0.025					Minimum of Log Data	-3.689
973					Maximum	0.06					Maximum of Log Data	-2.813
974					Mean	0.0262					Mean of log Data	-3.659
975					Median	0.025					SD of log Data	0.163
976					SD	0.0065						
977					Coefficient of Variation	0.248						
978					Skewness	5.385						
979												
980												
981	**Warning: There are only 2 Distinct Values in this data**											
982	**There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.**											
983	**Those methods will return a 'N/A' value on your output display!**											
984												
985	**It is necessary to have 4 or more Distinct Values to compute bootstrap methods.**											
986	**However, results obtained using 4 to 9 distinct values may not be reliable.**											
987	**It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.**											
988												
989	**Relevant UCL Statistics**											
990	**Normal Distribution Test**						**Lognormal Distribution Test**					
991					Shapiro Wilk Test Statistic	0.191					Shapiro Wilk Test Statistic	0.191
992					Shapiro Wilk Critical Value	0.926					Shapiro Wilk Critical Value	0.926
993	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
994												
995	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
996					95% Student's-t UCL	0.0283					95% H-UCL	0.0275
997	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.0295
998					95% Adjusted-CLT UCL (Chen-1995)	0.0295					97.5% Chebyshev (MVUE) UCL	0.031
999					95% Modified-t UCL (Johnson-1978)	0.0285					99% Chebyshev (MVUE) UCL	0.034
1000												

1001	**Gamma Distribution Test**						**Data Distribution**					
1002	k star (bias corrected)					26.61	**Data do not follow a Discernable Distribution (0.05)**					
1003	Theta Star					0.000985						
1004	MLE of Mean					0.0262						
1005	MLE of Standard Deviation					0.00508						
1006	nu star					1543						
1007	Approximate Chi Square Value (.05)					1453	**Nonparametric Statistics**					
1008	Adjusted Level of Significance					0.0407	95% CLT UCL					0.0282
1009	Adjusted Chi Square Value					1448	95% Jackknife UCL					N/A
1010							95% Standard Bootstrap UCL					N/A
1011	Anderson-Darling Test Statistic					10.76	95% Bootstrap-t UCL					N/A
1012	Anderson-Darling 5% Critical Value					0.744	95% Hall's Bootstrap UCL					N/A
1013	Kolmogorov-Smirnov Test Statistic					0.542	95% Percentile Bootstrap UCL					N/A
1014	Kolmogorov-Smirnov 5% Critical Value					0.162	95% BCA Bootstrap UCL					N/A
1015	**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					0.0315
1016							97.5% Chebyshev(Mean, Sd) UCL					0.0337
1017	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL					0.0382
1018	95% Approximate Gamma UCL					0.0278						
1019	95% Adjusted Gamma UCL					0.0279						
1020												
1021	**Potential UCL to Use**						Use 95% Student's-t UCL					0.0283
1022							or 95% Modified-t UCL					0.0285
1023												
1024	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1025	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1026	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1027												
1028												
1029	**Potassium**											
1030												
1031	**General Statistics**											
1032	Number of Valid Observations					29	Number of Distinct Observations					21
1033												
1034	**Raw Statistics**						**Log-transformed Statistics**					
1035	Minimum					3770	Minimum of Log Data					8.235
1036	Maximum					4310	Maximum of Log Data					8.369
1037	Mean					4132	Mean of log Data					8.326
1038	Median					4140	SD of log Data					0.0274
1039	SD					111.6						
1040	Coefficient of Variation					0.027						
1041	Skewness					-1.091						
1042												
1043	**Relevant UCL Statistics**											
1044	**Normal Distribution Test**						**Lognormal Distribution Test**					
1045	Shapiro Wilk Test Statistic					0.937	Shapiro Wilk Test Statistic					0.927
1046	Shapiro Wilk Critical Value					0.926	Shapiro Wilk Critical Value					0.926
1047	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
1048												
1049	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1050	95% Student's-t UCL					4168	95% H-UCL					N/A

1051	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	4224
1052				95% Adjusted-CLT UCL (Chen-1995)		4162					97.5% Chebyshev (MVUE) UCL	4264
1053				95% Modified-t UCL (Johnson-1978)		4167					99% Chebyshev (MVUE) UCL	4342
1054												
1055	**Gamma Distribution Test**										**Data Distribution**	
1056				k star (bias corrected)		1248					**Data appear Normal at 5% Significance Level**	
1057				Theta Star		3.311						
1058				MLE of Mean		4132						
1059				MLE of Standard Deviation		117						
1060				nu star		72395						
1061				Approximate Chi Square Value (.05)		71770					**Nonparametric Statistics**	
1062				Adjusted Level of Significance		0.0407					95% CLT UCL	4167
1063				Adjusted Chi Square Value		71733					95% Jackknife UCL	4168
1064											95% Standard Bootstrap UCL	4165
1065				Anderson-Darling Test Statistic		0.401					95% Bootstrap-t UCL	4163
1066				Anderson-Darling 5% Critical Value		0.742					95% Hall's Bootstrap UCL	4162
1067				Kolmogorov-Smirnov Test Statistic		0.111					95% Percentile Bootstrap UCL	4165
1068				Kolmogorov-Smirnov 5% Critical Value		0.162					95% BCA Bootstrap UCL	4161
1069	**Data appear Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	4223
1070											97.5% Chebyshev(Mean, Sd) UCL	4262
1071	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	4339
1072				95% Approximate Gamma UCL		4168						
1073				95% Adjusted Gamma UCL		4171						
1074												
1075	**Potential UCL to Use**										Use 95% Student's-t UCL	4168
1076												
1077	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1078	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1079	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1080												
1081												
1082	**Rubidium**											
1083												
1084	**General Statistics**											
1085				Number of Valid Observations		29					Number of Distinct Observations	24
1086												
1087	**Raw Statistics**										**Log-transformed Statistics**	
1088				Minimum		10.7					Minimum of Log Data	2.37
1089				Maximum		17.7					Maximum of Log Data	2.874
1090				Mean		14.53					Mean of log Data	2.667
1091				Median		14.9					SD of log Data	0.136
1092				SD		1.88						
1093				Coefficient of Variation		0.129						
1094				Skewness		-0.514						
1095												
1096	**Relevant UCL Statistics**											
1097	**Normal Distribution Test**										**Lognormal Distribution Test**	
1098				Shapiro Wilk Test Statistic		0.945					Shapiro Wilk Test Statistic	0.92
1099				Shapiro Wilk Critical Value		0.926					Shapiro Wilk Critical Value	0.926
1100	**Data appear Normal at 5% Significance Level**										**Data not Lognormal at 5% Significance Level**	

1101												
1102	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1103					95% Student's-t UCL	15.12					95% H-UCL	15.19
1104	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	16.13
1105					95% Adjusted-CLT UCL (Chen-1995)	15.06					97.5% Chebyshev (MVUE) UCL	16.83
1106					95% Modified-t UCL (Johnson-1978)	15.11					99% Chebyshev (MVUE) UCL	18.19
1107												
1108	**Gamma Distribution Test**						**Data Distribution**					
1109					k star (bias corrected)	52.22	**Data appear Normal at 5% Significance Level**					
1110					Theta Star	0.278						
1111					MLE of Mean	14.53						
1112					MLE of Standard Deviation	2.01						
1113					nu star	3029						
1114					Approximate Chi Square Value (.05)	2902	**Nonparametric Statistics**					
1115					Adjusted Level of Significance	0.0407					95% CLT UCL	15.1
1116					Adjusted Chi Square Value	2894					95% Jackknife UCL	15.12
1117											95% Standard Bootstrap UCL	15.09
1118					Anderson-Darling Test Statistic	0.732					95% Bootstrap-t UCL	15.07
1119					Anderson-Darling 5% Critical Value	0.744					95% Hall's Bootstrap UCL	15.05
1120					Kolmogorov-Smirnov Test Statistic	0.16					95% Percentile Bootstrap UCL	15.07
1121					Kolmogorov-Smirnov 5% Critical Value	0.162					95% BCA Bootstrap UCL	15.04
1122	**Data appear Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	16.05
1123											97.5% Chebyshev(Mean, Sd) UCL	16.71
1124	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	18
1125					95% Approximate Gamma UCL	15.16						
1126					95% Adjusted Gamma UCL	15.2						
1127												
1128	**Potential UCL to Use**										Use 95% Student's-t UCL	15.12
1129												
1130	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1131	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1132	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1133												
1134												
1135	**Selenium**											
1136												
1137	**General Statistics**											
1138					Number of Valid Observations	29					Number of Distinct Observations	20
1139												
1140	**Raw Statistics**						**Log-transformed Statistics**					
1141					Minimum	0.16					Minimum of Log Data	-1.833
1142					Maximum	0.98					Maximum of Log Data	-0.0202
1143					Mean	0.393					Mean of log Data	-1.087
1144					Median	0.27					SD of log Data	0.55
1145					SD	0.235						
1146					Coefficient of Variation	0.597						
1147					Skewness	1.118						
1148												
1149	**Relevant UCL Statistics**											
1150	**Normal Distribution Test**						**Lognormal Distribution Test**					

1151					Shapiro Wilk Test Statistic	0.84					Shapiro Wilk Test Statistic	0.91
1152					Shapiro Wilk Critical Value	0.926					Shapiro Wilk Critical Value	0.926
1153					**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**	
1154												
1155					**Assuming Normal Distribution**						**Assuming Lognormal Distribution**	
1156					95% Student's-t UCL	0.467					95% H-UCL	0.482
1157					**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL	0.572
1158					95% Adjusted-CLT UCL (Chen-1995)	0.475					97.5% Chebyshev (MVUE) UCL	0.651
1159					95% Modified-t UCL (Johnson-1978)	0.469					99% Chebyshev (MVUE) UCL	0.806
1160												
1161					**Gamma Distribution Test**						**Data Distribution**	
1162					k star (bias corrected)	3.086					**Data do not follow a Discernable Distribution (0.05)**	
1163					Theta Star	0.127						
1164					MLE of Mean	0.393						
1165					MLE of Standard Deviation	0.224						
1166					nu star	179						
1167					Approximate Chi Square Value (.05)	149.1					**Nonparametric Statistics**	
1168					Adjusted Level of Significance	0.0407					95% CLT UCL	0.465
1169					Adjusted Chi Square Value	147.4					95% Jackknife UCL	0.467
1170											95% Standard Bootstrap UCL	0.465
1171					Anderson-Darling Test Statistic	1.177					95% Bootstrap-t UCL	0.483
1172					Anderson-Darling 5% Critical Value	0.752					95% Hall's Bootstrap UCL	0.471
1173					Kolmogorov-Smirnov Test Statistic	0.197					95% Percentile Bootstrap UCL	0.469
1174					Kolmogorov-Smirnov 5% Critical Value	0.164					95% BCA Bootstrap UCL	0.476
1175					**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.583
1176											97.5% Chebyshev(Mean, Sd) UCL	0.665
1177					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.827
1178					95% Approximate Gamma UCL	0.472						
1179					95% Adjusted Gamma UCL	0.477						
1180												
1181					**Potential UCL to Use**						Use 95% Chebyshev (Mean, Sd) UCL	0.583
1182												
1183	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1184	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1185	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1186												
1187												
1188	**Silver**											
1189												
1190	**General Statistics**											
1191	Number of Valid Observations					29	Number of Distinct Observations					1
1192												
1193												
1194	**Warning: There is only one distinct observation value in this data set - resulting in '0' variance!**											
1195	**ProUCL (or any other software) should not be used on such a data set!**											
1196	**The data set for variable Silver was not processed!**											
1197												
1198	**If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.**											
1199	**The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).**											
1200												

Sodium

General Statistics

Number of Valid Observations	29	Number of Distinct Observations	25

Raw Statistics		**Log-transformed Statistics**	
Minimum	483	Minimum of Log Data	6.18
Maximum	648.5	Maximum of Log Data	6.475
Mean	583.8	Mean of log Data	6.367
Median	589	SD of log Data	0.0694
SD	39.59		
Coefficient of Variation	0.0678		
Skewness	-0.551		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.967	Shapiro Wilk Test Statistic	0.956
Shapiro Wilk Critical Value	0.926	Shapiro Wilk Critical Value	0.926
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	596.3	95% H-UCL	N/A
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	616.6
95% Adjusted-CLT UCL (Chen-1995)	595.1	97.5% Chebyshev (MVUE) UCL	630.8
95% Modified-t UCL (Johnson-1978)	596.2	99% Chebyshev (MVUE) UCL	658.7
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	196.2	**Data appear Normal at 5% Significance Level**	
Theta Star	2.975		
MLE of Mean	583.8		
MLE of Standard Deviation	41.68		
nu star	11380		
Approximate Chi Square Value (.05)	11133	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0407	95% CLT UCL	595.9
Adjusted Chi Square Value	11119	95% Jackknife UCL	596.3
		95% Standard Bootstrap UCL	596
Anderson-Darling Test Statistic	0.355	95% Bootstrap-t UCL	595.8
Anderson-Darling 5% Critical Value	0.742	95% Hall's Bootstrap UCL	594.8
Kolmogorov-Smirnov Test Statistic	0.137	95% Percentile Bootstrap UCL	595.1
Kolmogorov-Smirnov 5% Critical Value	0.162	95% BCA Bootstrap UCL	595
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	615.8
		97.5% Chebyshev(Mean, Sd) UCL	629.7
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	656.9
95% Approximate Gamma UCL	596.7		
95% Adjusted Gamma UCL	597.5		
Potential UCL to Use		Use 95% Student's-t UCL	596.3

	A	B	C	D	E	F	G	H	I	J	K	L
1251	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1252	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1253	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1254												
1255												
1256	**Strontium**											
1257												
1258	**General Statistics**											
1259	Number of Valid Observations					29	Number of Distinct Observations					29
1260												
1261	**Raw Statistics**						**Log-transformed Statistics**					
1262	Minimum					4.95	Minimum of Log Data					1.599
1263	Maximum					10.4	Maximum of Log Data					2.342
1264	Mean					7.362	Mean of log Data					1.974
1265	Median					7.4	SD of log Data					0.214
1266	SD					1.566						
1267	Coefficient of Variation					0.213						
1268	Skewness					0.298						
1269												
1270	**Relevant UCL Statistics**											
1271	**Normal Distribution Test**						**Lognormal Distribution Test**					
1272	Shapiro Wilk Test Statistic					0.956	Shapiro Wilk Test Statistic					0.964
1273	Shapiro Wilk Critical Value					0.926	Shapiro Wilk Critical Value					0.926
1274	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
1275												
1276	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1277	95% Student's-t UCL					7.856	95% H-UCL					7.911
1278	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					8.647
1279	95% Adjusted-CLT UCL (Chen-1995)					7.857	97.5% Chebyshev (MVUE) UCL					9.202
1280	95% Modified-t UCL (Johnson-1978)					7.859	99% Chebyshev (MVUE) UCL					10.29
1281												
1282	**Gamma Distribution Test**						**Data Distribution**					
1283	k star (bias corrected)					20.61	**Data appear Normal at 5% Significance Level**					
1284	Theta Star					0.357						
1285	MLE of Mean					7.362						
1286	MLE of Standard Deviation					1.621						
1287	nu star					1196						
1288	Approximate Chi Square Value (.05)					1116	**Nonparametric Statistics**					
1289	Adjusted Level of Significance					0.0407	95% CLT UCL					7.84
1290	Adjusted Chi Square Value					1112	95% Jackknife UCL					7.856
1291							95% Standard Bootstrap UCL					7.836
1292	Anderson-Darling Test Statistic					0.277	95% Bootstrap-t UCL					7.896
1293	Anderson-Darling 5% Critical Value					0.744	95% Hall's Bootstrap UCL					7.844
1294	Kolmogorov-Smirnov Test Statistic					0.0915	95% Percentile Bootstrap UCL					7.849
1295	Kolmogorov-Smirnov 5% Critical Value					0.162	95% BCA Bootstrap UCL					7.861
1296	**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					8.629
1297							97.5% Chebyshev(Mean, Sd) UCL					9.177
1298	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL					10.25
1299	95% Approximate Gamma UCL					7.884						
1300	95% Adjusted Gamma UCL					7.917						

1301												
1302	**Potential UCL to Use**						Use 95% Student's-t UCL					7.856
1303												
1304	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1305	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1306	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1307												
1308												
1309	**Tellurium**											
1310												
1311	**General Statistics**											
1312	Number of Valid Observations				29		Number of Distinct Observations					1
1313												
1314												
1315	**Warning: There is only one distinct observation value in this data set - resulting in '0' variance!**											
1316	**ProUCL (or any other software) should not be used on such a data set!**											
1317	**The data set for variable Tellurium was not processed!**											
1318												
1319	**If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.**											
1320	**The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).**											
1321												
1322												
1323												
1324	**Thallium**											
1325												
1326	**General Statistics**											
1327	Number of Valid Observations				29		Number of Distinct Observations					17
1328												
1329	**Raw Statistics**						**Log-transformed Statistics**					
1330	Minimum				0.005		Minimum of Log Data					-5.298
1331	Maximum				0.026		Maximum of Log Data					-3.65
1332	Mean				0.0122		Mean of log Data					-4.496
1333	Median				0.01		SD of log Data					0.43
1334	SD				0.00553							
1335	Coefficient of Variation				0.453							
1336	Skewness				1.043							
1337												
1338	**Relevant UCL Statistics**											
1339	**Normal Distribution Test**						**Lognormal Distribution Test**					
1340	Shapiro Wilk Test Statistic				0.896		Shapiro Wilk Test Statistic					0.967
1341	Shapiro Wilk Critical Value				0.926		Shapiro Wilk Critical Value					0.926
1342	**Data not Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
1343												
1344	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1345	95% Student's-t UCL				0.014		95% H-UCL					0.0143
1346	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					0.0166
1347	95% Adjusted-CLT UCL (Chen-1995)				0.0141		97.5% Chebyshev (MVUE) UCL					0.0185
1348	95% Modified-t UCL (Johnson-1978)				0.014		99% Chebyshev (MVUE) UCL					0.0222
1349												
1350	**Gamma Distribution Test**						**Data Distribution**					

1351					k star (bias corrected)	5.08	**Data appear Gamma Distributed at 5% Significance Level**					
1352					Theta Star	0.00241						
1353					MLE of Mean	0.0122						
1354					MLE of Standard Deviation	0.00542						
1355					nu star	294.6						
1356					Approximate Chi Square Value (.05)	255.9	**Nonparametric Statistics**					
1357					Adjusted Level of Significance	0.0407					95% CLT UCL	0.0139
1358					Adjusted Chi Square Value	253.7					95% Jackknife UCL	0.014
1359											95% Standard Bootstrap UCL	0.0139
1360					Anderson-Darling Test Statistic	0.499					95% Bootstrap-t UCL	0.0142
1361					Anderson-Darling 5% Critical Value	0.747					95% Hall's Bootstrap UCL	0.0141
1362					Kolmogorov-Smirnov Test Statistic	0.142					95% Percentile Bootstrap UCL	0.014
1363					Kolmogorov-Smirnov 5% Critical Value	0.163					95% BCA Bootstrap UCL	0.0142
1364					**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.0167
1365											97.5% Chebyshev(Mean, Sd) UCL	0.0186
1366					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.0225
1367					95% Approximate Gamma UCL	0.0141						
1368					95% Adjusted Gamma UCL	0.0142						
1369												
1370					**Potential UCL to Use**						Use 95% Approximate Gamma UCL	0.0141
1371												
1372	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1373	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1374	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1375												
1376												
1377	**Tin**											
1378												
1379	**General Statistics**											
1380					Number of Valid Observations	29					Number of Distinct Observations	10
1381												
1382	**Raw Statistics**						**Log-transformed Statistics**					
1383					Minimum	0.0025					Minimum of Log Data	-5.991
1384					Maximum	0.013					Maximum of Log Data	-4.343
1385					Mean	0.00569					Mean of log Data	-5.354
1386					Median	0.006					SD of log Data	0.624
1387					SD	0.00345						
1388					Coefficient of Variation	0.606						
1389					Skewness	0.65						
1390												
1391	**Relevant UCL Statistics**											
1392	**Normal Distribution Test**						**Lognormal Distribution Test**					
1393					Shapiro Wilk Test Statistic	0.835					Shapiro Wilk Test Statistic	0.808
1394					Shapiro Wilk Critical Value	0.926					Shapiro Wilk Critical Value	0.926
1395	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
1396												
1397	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1398					95% Student's-t UCL	0.00678					95% H-UCL	0.00733
1399	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.00877
1400					95% Adjusted-CLT UCL (Chen-1995)	0.00683					97.5% Chebyshev (MVUE) UCL	0.0101

1401	95% Modified-t UCL (Johnson-1978)					0.00679	99% Chebyshev (MVUE) UCL					0.0127
1402												
1403	**Gamma Distribution Test**						**Data Distribution**					
1404	k star (bias corrected)					2.594	**Data do not follow a Discernable Distribution (0.05)**					
1405	Theta Star					0.00219						
1406	MLE of Mean					0.00569						
1407	MLE of Standard Deviation					0.00353						
1408	nu star					150.4						
1409	Approximate Chi Square Value (.05)					123.1	**Nonparametric Statistics**					
1410	Adjusted Level of Significance					0.0407	95% CLT UCL					0.00674
1411	Adjusted Chi Square Value					121.6	95% Jackknife UCL					0.00678
1412							95% Standard Bootstrap UCL					0.00674
1413	Anderson-Darling Test Statistic					2.094	95% Bootstrap-t UCL					0.00688
1414	Anderson-Darling 5% Critical Value					0.753	95% Hall's Bootstrap UCL					0.00682
1415	Kolmogorov-Smirnov Test Statistic					0.294	95% Percentile Bootstrap UCL					0.00678
1416	Kolmogorov-Smirnov 5% Critical Value					0.164	95% BCA Bootstrap UCL					0.00688
1417	**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					0.00848
1418							97.5% Chebyshev(Mean, Sd) UCL					0.00969
1419	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL					0.0121
1420	95% Approximate Gamma UCL					0.00695						
1421	95% Adjusted Gamma UCL					0.00704						
1422												
1423	**Potential UCL to Use**						Use 95% Chebyshev (Mean, Sd) UCL					0.00848
1424												
1425	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1426	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1427	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1428												
1429												
1430	**Tungsten**											
1431												
1432	**General Statistics**											
1433	Number of Valid Observations					29	Number of Distinct Observations					3
1434												
1435	**Raw Statistics**						**Log-transformed Statistics**					
1436	Minimum					0.0025	Minimum of Log Data					-5.991
1437	Maximum					0.012	Maximum of Log Data					-4.423
1438	Mean					0.00291	Mean of log Data					-5.913
1439	Median					0.0025	SD of log Data					0.314
1440	SD					0.00181						
1441	Coefficient of Variation					0.621						
1442	Skewness					4.915						
1443												
1444												
1445	**Warning: There are only 3 Distinct Values in this data**											
1446	**There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.**											
1447	**Those methods will return a 'N/A' value on your output display!**											
1448												
1449	**It is necessary to have 4 or more Distinct Values to compute bootstrap methods.**											
1450	**However, results obtained using 4 to 9 distinct values may not be reliable.**											

	A	B	C	D	E	F	G	H	I	J	K	L
1451	**It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.**											
1452												
1453	**Relevant UCL Statistics**											
1454	**Normal Distribution Test**						**Lognormal Distribution Test**					
1455	Shapiro Wilk Test Statistic					0.254	Shapiro Wilk Test Statistic					0.279
1456	Shapiro Wilk Critical Value					0.926	Shapiro Wilk Critical Value					0.926
1457	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
1458												
1459	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1460	95% Student's-t UCL					0.00348	95% H-UCL					0.00316
1461	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					0.00357
1462	95% Adjusted-CLT UCL (Chen-1995)					0.00379	97.5% Chebyshev (MVUE) UCL					0.00389
1463	95% Modified-t UCL (Johnson-1978)					0.00354	99% Chebyshev (MVUE) UCL					0.00451
1464												
1465	**Gamma Distribution Test**						**Data Distribution**					
1466	k star (bias corrected)					6.132	**Data do not follow a Discernable Distribution (0.05)**					
1467	Theta Star					0.0004752						
1468	MLE of Mean					0.00291						
1469	MLE of Standard Deviation					0.00118						
1470	nu star					355.6						
1471	Approximate Chi Square Value (.05)					312.9	**Nonparametric Statistics**					
1472	Adjusted Level of Significance					0.0407	95% CLT UCL					0.00347
1473	Adjusted Chi Square Value					310.6	95% Jackknife UCL					0.00348
1474							95% Standard Bootstrap UCL					N/A
1475	Anderson-Darling Test Statistic					9.731	95% Bootstrap-t UCL					N/A
1476	Anderson-Darling 5% Critical Value					0.747	95% Hall's Bootstrap UCL					N/A
1477	Kolmogorov-Smirnov Test Statistic					0.534	95% Percentile Bootstrap UCL					N/A
1478	Kolmogorov-Smirnov 5% Critical Value					0.163	95% BCA Bootstrap UCL					N/A
1479	**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					0.00438
1480							97.5% Chebyshev(Mean, Sd) UCL					0.00501
1481	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL					0.00625
1482	95% Approximate Gamma UCL					0.00331						
1483	95% Adjusted Gamma UCL					0.00334						
1484												
1485	**Potential UCL to Use**						Use 95% Student's-t UCL					0.00348
1486							or 95% Modified-t UCL					0.00354
1487												
1488	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1489	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1490	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1491												
1492												
1493	**Uranium**											
1494												
1495	**General Statistics**											
1496	Number of Valid Observations					29	Number of Distinct Observations					2
1497												
1498	**Raw Statistics**						**Log-transformed Statistics**					
1499	Minimum					0.0025	Minimum of Log Data					-5.991
1500	Maximum					0.007	Maximum of Log Data					-4.962

1501					Mean	0.00266					Mean of log Data	-5.956
1502					Median	0.0025					SD of log Data	0.191
1503					SD	0.0008356						
1504					Coefficient of Variation	0.315						
1505					Skewness	5.385						
1506												
1507												
1508	**Warning: There are only 2 Distinct Values in this data**											
1509	**There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.**											
1510	**Those methods will return a 'N/A' value on your output display!**											
1511												
1512	**It is necessary to have 4 or more Distinct Values to compute bootstrap methods.**											
1513	**However, results obtained using 4 to 9 distinct values may not be reliable.**											
1514	**It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.**											
1515												
1516	**Relevant UCL Statistics**											
1517	**Normal Distribution Test**						**Lognormal Distribution Test**					
1518					Shapiro Wilk Test Statistic	0.191					Shapiro Wilk Test Statistic	0.191
1519					Shapiro Wilk Critical Value	0.926					Shapiro Wilk Critical Value	0.926
1520	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
1521												
1522	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1523					95% Student's-t UCL	0.00292					95% H-UCL	0.00281
1524	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.00305
1525					95% Adjusted-CLT UCL (Chen-1995)	0.00308					97.5% Chebyshev (MVUE) UCL	0.00322
1526					95% Modified-t UCL (Johnson-1978)	0.00295					99% Chebyshev (MVUE) UCL	0.00357
1527												
1528	**Gamma Distribution Test**						**Data Distribution**					
1529					k star (bias corrected)	18.31	**Data do not follow a Discernable Distribution (0.05)**					
1530					Theta Star	0.000145						
1531					MLE of Mean	0.00266						
1532					MLE of Standard Deviation	0.0006205						
1533					nu star	1062						
1534					Approximate Chi Square Value (.05)	987.3	**Nonparametric Statistics**					
1535					Adjusted Level of Significance	0.0407					95% CLT UCL	0.00291
1536					Adjusted Chi Square Value	983					95% Jackknife UCL	N/A
1537											95% Standard Bootstrap UCL	N/A
1538					Anderson-Darling Test Statistic	10.76					95% Bootstrap-t UCL	N/A
1539					Anderson-Darling 5% Critical Value	0.744					95% Hall's Bootstrap UCL	N/A
1540					Kolmogorov-Smirnov Test Statistic	0.543					95% Percentile Bootstrap UCL	N/A
1541					Kolmogorov-Smirnov 5% Critical Value	0.162					95% BCA Bootstrap UCL	N/A
1542	**Data not Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	0.00333
1543											97.5% Chebyshev(Mean, Sd) UCL	0.00362
1544	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	0.0042
1545					95% Approximate Gamma UCL	0.00286						
1546					95% Adjusted Gamma UCL	0.00287						
1547												
1548	**Potential UCL to Use**										Use 95% Student's-t UCL	0.00292
1549											or 95% Modified-t UCL	0.00295
1550												

	A	B	C	D	E	F	G	H	I	J	K	L
1551	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1552	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1553	and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.											
1554												
1555												
1556	Vanadium											
1557												
1558	General Statistics											
1559	Number of Valid Observations					29	Number of Distinct Observations					1
1560												
1561												
1562	Warning: There is only one distinct observation value in this data set - resulting in '0' variance!											
1563	ProUCL (or any other software) should not be used on such a data set!											
1564	The data set for variable Vanadium was not processed!											
1565												
1566	If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.											
1567	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
1568												
1569												
1570												
1571	Zinc											
1572												
1573	General Statistics											
1574	Number of Valid Observations					29	Number of Distinct Observations					25
1575												
1576	Raw Statistics						Log-transformed Statistics					
1577	Minimum					10.4	Minimum of Log Data					2.342
1578	Maximum					21.5	Maximum of Log Data					3.068
1579	Mean					15.51	Mean of log Data					2.725
1580	Median					15.6	SD of log Data					0.186
1581	SD					2.88						
1582	Coefficient of Variation					0.186						
1583	Skewness					0.325						
1584												
1585	Relevant UCL Statistics											
1586	Normal Distribution Test						Lognormal Distribution Test					
1587	Shapiro Wilk Test Statistic					0.964	Shapiro Wilk Test Statistic					0.972
1588	Shapiro Wilk Critical Value					0.926	Shapiro Wilk Critical Value					0.926
1589	Data appear Normal at 5% Significance Level						Data appear Lognormal at 5% Significance Level					
1590												
1591	Assuming Normal Distribution						Assuming Lognormal Distribution					
1592	95% Student's-t UCL					16.42	95% H-UCL					16.5
1593	95% UCLs (Adjusted for Skewness)						95% Chebyshev (MVUE) UCL					17.86
1594	95% Adjusted-CLT UCL (Chen-1995)					16.42	97.5% Chebyshev (MVUE) UCL					18.88
1595	95% Modified-t UCL (Johnson-1978)					16.42	99% Chebyshev (MVUE) UCL					20.87
1596												
1597	Gamma Distribution Test						Data Distribution					
1598	k star (bias corrected)					27.09	Data appear Normal at 5% Significance Level					
1599	Theta Star					0.572						
1600	MLE of Mean					15.51						

1601	MLE of Standard Deviation					2.979						
1602	nu star					1571						
1603	Approximate Chi Square Value (.05)					1480	**Nonparametric Statistics**					
1604	Adjusted Level of Significance					0.0407					95% CLT UCL	16.39
1605	Adjusted Chi Square Value					1475					95% Jackknife UCL	16.42
1606											95% Standard Bootstrap UCL	16.38
1607	Anderson-Darling Test Statistic					0.307					95% Bootstrap-t UCL	16.43
1608	Anderson-Darling 5% Critical Value					0.744					95% Hall's Bootstrap UCL	16.42
1609	Kolmogorov-Smirnov Test Statistic					0.0953					95% Percentile Bootstrap UCL	16.32
1610	Kolmogorov-Smirnov 5% Critical Value					0.162					95% BCA Bootstrap UCL	16.45
1611	**Data appear Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	17.84
1612											97.5% Chebyshev(Mean, Sd) UCL	18.85
1613	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	20.83
1614	95% Approximate Gamma UCL					16.46						
1615	95% Adjusted Gamma UCL					16.52						
1616												
1617	**Potential UCL to Use**										Use 95% Student's-t UCL	16.42
1618												
1619	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1620	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1621	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1622												

ProUCL Outputs: Whole Fish - West Branch Napadogan River

General UCL Statistics for Full Data Sets	
User Selected Options	
From File	U:\121810356\1_environmental\4_field_data\3_hhera\6_reporting\fish_whole_wnappa.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Aluminum

General Statistics

Number of Valid Observations	29	Number of Distinct Observations	29

Raw Statistics		**Log-transformed Statistics**	
Minimum	0.521	Minimum of Log Data	-0.652
Maximum	53.16	Maximum of Log Data	3.973
Mean	13.9	Mean of log Data	1.919
Median	4.372	SD of log Data	1.317
SD	14.86		
Coefficient of Variation	1.069		
Skewness	1.129		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.82	Shapiro Wilk Test Statistic	0.914
Shapiro Wilk Critical Value	0.926	Shapiro Wilk Critical Value	0.926
Data not Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	18.6	95% H-UCL	33.26
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	35.41
95% Adjusted-CLT UCL (Chen-1995)	19.06	97.5% Chebyshev (MVUE) UCL	44.07
95% Modified-t UCL (Johnson-1978)	18.69	99% Chebyshev (MVUE) UCL	61.07
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	0.766	**Data do not follow a Discernable Distribution (0.05)**	
Theta Star	18.14		
MLE of Mean	13.9		
MLE of Standard Deviation	15.88		
nu star	44.45		
Approximate Chi Square Value (.05)	30.15	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0407	95% CLT UCL	18.44
Adjusted Chi Square Value	29.45	95% Jackknife UCL	18.6
		95% Standard Bootstrap UCL	18.4
Anderson-Darling Test Statistic	1.217	95% Bootstrap-t UCL	19.42
Anderson-Darling 5% Critical Value	0.781	95% Hall's Bootstrap UCL	18.9
Kolmogorov-Smirnov Test Statistic	0.206	95% Percentile Bootstrap UCL	18.68
Kolmogorov-Smirnov 5% Critical Value	0.169	95% BCA Bootstrap UCL	19.25

51	**Data not Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	25.93
52											97.5% Chebyshev(Mean, Sd) UCL	31.14
53	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	41.37
54	95% Approximate Gamma UCL	20.49										
55	95% Adjusted Gamma UCL	20.98										
56												
57	**Potential UCL to Use**										Use 95% Chebyshev (Mean, Sd) UCL	25.93
58												
59	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
60	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
61	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
62												
63												
64	**Antimony**											
65												
66	**General Statistics**											
67	Number of Valid Observations	29									Number of Distinct Observations	28
68												
69	**Raw Statistics**										**Log-transformed Statistics**	
70	Minimum	0.00252									Minimum of Log Data	-5.984
71	Maximum	0.0207									Maximum of Log Data	-3.878
72	Mean	0.00429									Mean of log Data	-5.664
73	Median	0.00261									SD of log Data	0.564
74	SD	0.00399										
75	Coefficient of Variation	0.929										
76	Skewness	3.067										
77												
78	**Relevant UCL Statistics**											
79	**Normal Distribution Test**										**Lognormal Distribution Test**	
80	Shapiro Wilk Test Statistic	0.521									Shapiro Wilk Test Statistic	0.632
81	Shapiro Wilk Critical Value	0.926									Shapiro Wilk Critical Value	0.926
82	**Data not Normal at 5% Significance Level**										**Data not Lognormal at 5% Significance Level**	
83												
84	**Assuming Normal Distribution**										**Assuming Lognormal Distribution**	
85	95% Student's-t UCL	0.00555									95% H-UCL	0.00503
86	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.00598
87	95% Adjusted-CLT UCL (Chen-1995)	0.00596									97.5% Chebyshev (MVUE) UCL	0.00683
88	95% Modified-t UCL (Johnson-1978)	0.00562									99% Chebyshev (MVUE) UCL	0.00848
89												
90	**Gamma Distribution Test**										**Data Distribution**	
91	k star (bias corrected)	2.269									**Data do not follow a Discernable Distribution (0.05)**	
92	Theta Star	0.00189										
93	MLE of Mean	0.00429										
94	MLE of Standard Deviation	0.00285										
95	nu star	131.6										
96	Approximate Chi Square Value (.05)	106.1									**Nonparametric Statistics**	
97	Adjusted Level of Significance	0.0407									95% CLT UCL	0.00551
98	Adjusted Chi Square Value	104.7									95% Jackknife UCL	0.00555
99											95% Standard Bootstrap UCL	0.0055
100	Anderson-Darling Test Statistic	5.096									95% Bootstrap-t UCL	0.00671

101				Anderson-Darling 5% Critical Value	0.755					95% Hall's Bootstrap UCL	0.00662	
102				Kolmogorov-Smirnov Test Statistic	0.36					95% Percentile Bootstrap UCL	0.00561	
103				Kolmogorov-Smirnov 5% Critical Value	0.164					95% BCA Bootstrap UCL	0.0059	
104				**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.00752	
105										97.5% Chebyshev(Mean, Sd) UCL	0.00891	
106				**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.0117	
107				95% Approximate Gamma UCL	0.00532							
108				95% Adjusted Gamma UCL	0.00539							
109												
110				**Potential UCL to Use**						Use 95% Chebyshev (Mean, Sd) UCL	0.00752	
111												
112	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
113	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
114	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
115												
116												
117	**Arsenic**											
118												
119	**General Statistics**											
120				Number of Valid Observations	29					Number of Distinct Observations	29	
121												
122				**Raw Statistics**						**Log-transformed Statistics**		
123				Minimum	0.0255					Minimum of Log Data	-3.668	
124				Maximum	1.341					Maximum of Log Data	0.293	
125				Mean	0.377					Mean of log Data	-1.706	
126				Median	0.115					SD of log Data	1.281	
127				SD	0.428							
128				Coefficient of Variation	1.136							
129				Skewness	1.126							
130												
131	**Relevant UCL Statistics**											
132				**Normal Distribution Test**						**Lognormal Distribution Test**		
133				Shapiro Wilk Test Statistic	0.774					Shapiro Wilk Test Statistic	0.906	
134				Shapiro Wilk Critical Value	0.926					Shapiro Wilk Critical Value	0.926	
135				**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**		
136												
137				**Assuming Normal Distribution**						**Assuming Lognormal Distribution**		
138				95% Student's-t UCL	0.512					95% H-UCL	0.82	
139				**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL	0.887	
140				95% Adjusted-CLT UCL (Chen-1995)	0.525					97.5% Chebyshev (MVUE) UCL	1.101	
141				95% Modified-t UCL (Johnson-1978)	0.515					99% Chebyshev (MVUE) UCL	1.521	
142												
143				**Gamma Distribution Test**						**Data Distribution**		
144				k star (bias corrected)	0.75					**Data do not follow a Discernable Distribution (0.05)**		
145				Theta Star	0.503							
146				MLE of Mean	0.377							
147				MLE of Standard Deviation	0.435							
148				nu star	43.5							
149				Approximate Chi Square Value (.05)	29.38					**Nonparametric Statistics**		
150				Adjusted Level of Significance	0.0407					95% CLT UCL	0.508	

151				Adjusted Chi Square Value	28.69					95% Jackknife UCL	0.512	
152										95% Standard Bootstrap UCL	0.509	
153				Anderson-Darling Test Statistic	1.337					95% Bootstrap-t UCL	0.543	
154				Anderson-Darling 5% Critical Value	0.781					95% Hall's Bootstrap UCL	0.51	
155				Kolmogorov-Smirnov Test Statistic	0.208					95% Percentile Bootstrap UCL	0.511	
156				Kolmogorov-Smirnov 5% Critical Value	0.169					95% BCA Bootstrap UCL	0.524	
157				**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.724	
158										97.5% Chebyshev(Mean, Sd) UCL	0.873	
159				**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	1.168	
160				95% Approximate Gamma UCL	0.558							
161				95% Adjusted Gamma UCL	0.572							
162												
163				**Potential UCL to Use**						Use 95% Chebyshev (Mean, Sd) UCL	0.724	
164												
165	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
166	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
167	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
168												
169												
170	**Barium**											
171												
172	**General Statistics**											
173				Number of Valid Observations	29					Number of Distinct Observations	29	
174												
175	**Raw Statistics**						**Log-transformed Statistics**					
176				Minimum	0.269					Minimum of Log Data	-1.312	
177				Maximum	0.944					Maximum of Log Data	-0.0576	
178				Mean	0.597					Mean of log Data	-0.577	
179				Median	0.631					SD of log Data	0.37	
180				SD	0.198							
181				Coefficient of Variation	0.332							
182				Skewness	-0.127							
183												
184	**Relevant UCL Statistics**											
185	**Normal Distribution Test**						**Lognormal Distribution Test**					
186				Shapiro Wilk Test Statistic	0.951					Shapiro Wilk Test Statistic	0.919	
187				Shapiro Wilk Critical Value	0.926					Shapiro Wilk Critical Value	0.926	
188	**Data appear Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
189												
190	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
191				95% Student's-t UCL	0.659					95% H-UCL	0.684	
192	**95% UCLs (Adjusted for Skewness)**									95% Chebyshev (MVUE) UCL	0.784	
193				95% Adjusted-CLT UCL (Chen-1995)	0.656					97.5% Chebyshev (MVUE) UCL	0.863	
194				95% Modified-t UCL (Johnson-1978)	0.659					99% Chebyshev (MVUE) UCL	1.02	
195												
196	**Gamma Distribution Test**						**Data Distribution**					
197				k star (bias corrected)	7.5		**Data appear Normal at 5% Significance Level**					
198				Theta Star	0.0796							
199				MLE of Mean	0.597							
200				MLE of Standard Deviation	0.218							

201					nu star	435						
202					Approximate Chi Square Value (.05)	387.6		**Nonparametric Statistics**				
203					Adjusted Level of Significance	0.0407					95% CLT UCL	0.657
204					Adjusted Chi Square Value	385					95% Jackknife UCL	0.659
205											95% Standard Bootstrap UCL	0.656
206					Anderson-Darling Test Statistic	0.667					95% Bootstrap-t UCL	0.658
207					Anderson-Darling 5% Critical Value	0.746					95% Hall's Bootstrap UCL	0.658
208					Kolmogorov-Smirnov Test Statistic	0.145					95% Percentile Bootstrap UCL	0.656
209					Kolmogorov-Smirnov 5% Critical Value	0.163					95% BCA Bootstrap UCL	0.657
210					**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.757
211											97.5% Chebyshev(Mean, Sd) UCL	0.826
212					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.963
213					95% Approximate Gamma UCL	0.67						
214					95% Adjusted Gamma UCL	0.674						
215												
216					**Potential UCL to Use**						Use 95% Student's-t UCL	0.659
217												
218	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
219	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
220	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
221												
222												
223	**Beryllium**											
224												
225	**General Statistics**											
226					Number of Valid Observations	29					Number of Distinct Observations	27
227												
228	**Raw Statistics**							**Log-transformed Statistics**				
229					Minimum	0.00252					Minimum of Log Data	-5.984
230					Maximum	0.00993					Maximum of Log Data	-4.612
231					Mean	0.0031					Mean of log Data	-5.834
232					Median	0.00256					SD of log Data	0.303
233					SD	0.00147						
234					Coefficient of Variation	0.474						
235					Skewness	3.937						
236												
237	**Relevant UCL Statistics**											
238	**Normal Distribution Test**							**Lognormal Distribution Test**				
239					Shapiro Wilk Test Statistic	0.448					Shapiro Wilk Test Statistic	0.551
240					Shapiro Wilk Critical Value	0.926					Shapiro Wilk Critical Value	0.926
241	**Data not Normal at 5% Significance Level**							**Data not Lognormal at 5% Significance Level**				
242												
243	**Assuming Normal Distribution**							**Assuming Lognormal Distribution**				
244					95% Student's-t UCL	0.00357					95% H-UCL	0.0034
245	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.00382
246					95% Adjusted-CLT UCL (Chen-1995)	0.00377					97.5% Chebyshev (MVUE) UCL	0.00415
247					95% Modified-t UCL (Johnson-1978)	0.0036					99% Chebyshev (MVUE) UCL	0.0048
248												
249	**Gamma Distribution Test**							**Data Distribution**				
250					k star (bias corrected)	7.768		**Data do not follow a Discernable Distribution (0.05)**				

251					Theta Star	0.0003996						
252					MLE of Mean	0.0031						
253					MLE of Standard Deviation	0.00111						
254					nu star	450.5						
255					Approximate Chi Square Value (.05)	402.3			**Nonparametric Statistics**			
256					Adjusted Level of Significance	0.0407					95% CLT UCL	0.00355
257					Adjusted Chi Square Value	399.6					95% Jackknife UCL	0.00357
258											95% Standard Bootstrap UCL	0.00354
259					Anderson-Darling Test Statistic	5.617					95% Bootstrap-t UCL	0.00427
260					Anderson-Darling 5% Critical Value	0.746					95% Hall's Bootstrap UCL	0.00509
261					Kolmogorov-Smirnov Test Statistic	0.386					95% Percentile Bootstrap UCL	0.0036
262					Kolmogorov-Smirnov 5% Critical Value	0.163					95% BCA Bootstrap UCL	0.00385
263					**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.00429
264											97.5% Chebyshev(Mean, Sd) UCL	0.00481
265					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.00582
266					95% Approximate Gamma UCL	0.00348						
267					95% Adjusted Gamma UCL	0.0035						
268												
269					**Potential UCL to Use**						Use 95% Student's-t UCL	0.00357
270											or 95% Modified-t UCL	0.0036
271												
272	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
273	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
274	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
275												
276												
277	**Bismuth**											
278												
279	**General Statistics**											
280					Number of Valid Observations	29			Number of Distinct Observations	27		
281												
282	**Raw Statistics**								**Log-transformed Statistics**			
283					Minimum	0.0252			Minimum of Log Data	-3.683		
284					Maximum	0.14			Maximum of Log Data	-1.969		
285					Mean	0.0352			Mean of log Data	-3.507		
286					Median	0.0256			SD of log Data	0.468		
287					SD	0.0298						
288					Coefficient of Variation	0.847						
289					Skewness	3.145						
290												
291	**Relevant UCL Statistics**											
292	**Normal Distribution Test**								**Lognormal Distribution Test**			
293					Shapiro Wilk Test Statistic	0.369			Shapiro Wilk Test Statistic	0.397		
294					Shapiro Wilk Critical Value	0.926			Shapiro Wilk Critical Value	0.926		
295	**Data not Normal at 5% Significance Level**								**Data not Lognormal at 5% Significance Level**			
296												
297	**Assuming Normal Distribution**								**Assuming Lognormal Distribution**			
298					95% Student's-t UCL	0.0446			95% H-UCL	0.0397		
299	**95% UCLs (Adjusted for Skewness)**								95% Chebyshev (MVUE) UCL	0.0464		
300					95% Adjusted-CLT UCL (Chen-1995)	0.0477			97.5% Chebyshev (MVUE) UCL	0.0521		

301	95% Modified-t UCL (Johnson-1978)	0.0451					99% Chebyshev (MVUE) UCL	0.0632				
302												
303	**Gamma Distribution Test**						**Data Distribution**					
304	k star (bias corrected)	2.97					**Data do not follow a Discernable Distribution (0.05)**					
305	Theta Star	0.0118										
306	MLE of Mean	0.0352										
307	MLE of Standard Deviation	0.0204										
308	nu star	172.2										
309	Approximate Chi Square Value (.05)	142.9					**Nonparametric Statistics**					
310	Adjusted Level of Significance	0.0407					95% CLT UCL	0.0443				
311	Adjusted Chi Square Value	141.3					95% Jackknife UCL	0.0446				
312							95% Standard Bootstrap UCL	0.0442				
313	Anderson-Darling Test Statistic	8.642					95% Bootstrap-t UCL	0.0593				
314	Anderson-Darling 5% Critical Value	0.752					95% Hall's Bootstrap UCL	0.0464				
315	Kolmogorov-Smirnov Test Statistic	0.49					95% Percentile Bootstrap UCL	0.0449				
316	Kolmogorov-Smirnov 5% Critical Value	0.164					95% BCA Bootstrap UCL	0.0489				
317	**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.0593				
318							97.5% Chebyshev(Mean, Sd) UCL	0.0697				
319	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.0902				
320	95% Approximate Gamma UCL	0.0424										
321	95% Adjusted Gamma UCL	0.0429										
322												
323	**Potential UCL to Use**						Use 95% Student's-t UCL	0.0446				
324							or 95% Modified-t UCL	0.0451				
325												
326	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
327	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
328	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
329												
330												
331	**Boron**											
332												
333	**General Statistics**											
334	Number of Valid Observations	29					Number of Distinct Observations	26				
335												
336	**Raw Statistics**						**Log-transformed Statistics**					
337	Minimum	0.0252					Minimum of Log Data	-3.683				
338	Maximum	0.0351					Maximum of Log Data	-3.348				
339	Mean	0.026					Mean of log Data	-3.651				
340	Median	0.0256					SD of log Data	0.0615				
341	SD	0.00183										
342	Coefficient of Variation	0.0703										
343	Skewness	4.748										
344												
345	**Relevant UCL Statistics**											
346	**Normal Distribution Test**						**Lognormal Distribution Test**					
347	Shapiro Wilk Test Statistic	0.405					Shapiro Wilk Test Statistic	0.44				
348	Shapiro Wilk Critical Value	0.926					Shapiro Wilk Critical Value	0.926				
349	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
350												

351	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
352	95% Student's-t UCL	0.0266					95% H-UCL	N/A				
353	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL	0.0273				
354	95% Adjusted-CLT UCL (Chen-1995)	0.0269					97.5% Chebyshev (MVUE) UCL	0.0279				
355	95% Modified-t UCL (Johnson-1978)	0.0266					99% Chebyshev (MVUE) UCL	0.029				
356												
357	**Gamma Distribution Test**						**Data Distribution**					
358	k star (bias corrected)	225					**Data do not follow a Discernable Distribution (0.05)**					
359	Theta Star	0.0001157										
360	MLE of Mean	0.026										
361	MLE of Standard Deviation	0.00173										
362	nu star	13048										
363	Approximate Chi Square Value (.05)	12784					**Nonparametric Statistics**					
364	Adjusted Level of Significance	0.0407					95% CLT UCL	0.0266				
365	Adjusted Chi Square Value	12768					95% Jackknife UCL	0.0266				
366							95% Standard Bootstrap UCL	0.0266				
367	Anderson-Darling Test Statistic	5.589					95% Bootstrap-t UCL	0.0281				
368	Anderson-Darling 5% Critical Value	0.742					95% Hall's Bootstrap UCL	0.0287				
369	Kolmogorov-Smirnov Test Statistic	0.304					95% Percentile Bootstrap UCL	0.0267				
370	Kolmogorov-Smirnov 5% Critical Value	0.162					95% BCA Bootstrap UCL	0.0271				
371	**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.0275				
372							97.5% Chebyshev(Mean, Sd) UCL	0.0281				
373	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.0294				
374	95% Approximate Gamma UCL	0.0266										
375	95% Adjusted Gamma UCL	0.0266										
376												
377	**Potential UCL to Use**						Use 95% Student's-t UCL	0.0266				
378							or 95% Modified-t UCL	0.0266				
379												
380	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
381	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
382	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
383												
384												
385	**Cadmium**											
386												
387	**General Statistics**											
388	Number of Valid Observations	29					Number of Distinct Observations	29				
389												
390	**Raw Statistics**						**Log-transformed Statistics**					
391	Minimum	0.0127					Minimum of Log Data	-4.363				
392	Maximum	0.152					Maximum of Log Data	-1.887				
393	Mean	0.049					Mean of log Data	-3.311				
394	Median	0.0442					SD of log Data	0.778				
395	SD	0.0401										
396	Coefficient of Variation	0.819										
397	Skewness	1.432										
398												
399	**Relevant UCL Statistics**											
400	**Normal Distribution Test**						**Lognormal Distribution Test**					

401					Shapiro Wilk Test Statistic	0.803					Shapiro Wilk Test Statistic	0.917
402					Shapiro Wilk Critical Value	0.926					Shapiro Wilk Critical Value	0.926
403					**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**	
404												
405					**Assuming Normal Distribution**						**Assuming Lognormal Distribution**	
406					95% Student's-t UCL	0.0616					95% H-UCL	0.0683
407					**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL	0.0824
408					95% Adjusted-CLT UCL (Chen-1995)	0.0633					97.5% Chebyshev (MVUE) UCL	0.097
409					95% Modified-t UCL (Johnson-1978)	0.062					99% Chebyshev (MVUE) UCL	0.126
410												
411					**Gamma Distribution Test**						**Data Distribution**	
412					k star (bias corrected)	1.681					**Data Follow Appr. Gamma Distribution at 5% Significance Level**	
413					Theta Star	0.0291						
414					MLE of Mean	0.049						
415					MLE of Standard Deviation	0.0378						
416					nu star	97.51						
417					Approximate Chi Square Value (.05)	75.73					**Nonparametric Statistics**	
418					Adjusted Level of Significance	0.0407					95% CLT UCL	0.0612
419					Adjusted Chi Square Value	74.59					95% Jackknife UCL	0.0616
420											95% Standard Bootstrap UCL	0.0608
421					Anderson-Darling Test Statistic	0.887					95% Bootstrap-t UCL	0.0651
422					Anderson-Darling 5% Critical Value	0.759					95% Hall's Bootstrap UCL	0.0638
423					Kolmogorov-Smirnov Test Statistic	0.152					95% Percentile Bootstrap UCL	0.0607
424					Kolmogorov-Smirnov 5% Critical Value	0.165					95% BCA Bootstrap UCL	0.0634
425					**Data follow Appr. Gamma Distribution at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.0814
426											97.5% Chebyshev(Mean, Sd) UCL	0.0955
427					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.123
428					95% Approximate Gamma UCL	0.0631						
429					95% Adjusted Gamma UCL	0.064						
430												
431					**Potential UCL to Use**						Use 95% Approximate Gamma UCL	0.0631
432												
433					**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**							
434					**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**							
435					**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**							
436												
437												
438	**Calcium**											
439												
440					**General Statistics**							
441					Number of Valid Observations	29					Number of Distinct Observations	29
442												
443					**Raw Statistics**						**Log-transformed Statistics**	
444					Minimum	4533					Minimum of Log Data	8.419
445					Maximum	7483					Maximum of Log Data	8.92
446					Mean	6232					Mean of log Data	8.732
447					Median	6135					SD of log Data	0.111
448					SD	674.1						
449					Coefficient of Variation	0.108						
450					Skewness	-0.109						

451												
452	**Relevant UCL Statistics**											
453	**Normal Distribution Test**						**Lognormal Distribution Test**					
454					Shapiro Wilk Test Statistic	0.968					Shapiro Wilk Test Statistic	0.958
455					Shapiro Wilk Critical Value	0.926					Shapiro Wilk Critical Value	0.926
456	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
457												
458	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
459					95% Student's-t UCL	6445					95% H-UCL	6461
460	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	6791
461					95% Adjusted-CLT UCL (Chen-1995)	6435					97.5% Chebyshev (MVUE) UCL	7033
462					95% Modified-t UCL (Johnson-1978)	6444					99% Chebyshev (MVUE) UCL	7508
463												
464	**Gamma Distribution Test**						**Data Distribution**					
465					k star (bias corrected)	77.45	**Data appear Normal at 5% Significance Level**					
466					Theta Star	80.47						
467					MLE of Mean	6232						
468					MLE of Standard Deviation	708.1						
469					nu star	4492						
470					Approximate Chi Square Value (.05)	4337	**Nonparametric Statistics**					
471					Adjusted Level of Significance	0.0407					95% CLT UCL	6438
472					Adjusted Chi Square Value	4328					95% Jackknife UCL	6445
473											95% Standard Bootstrap UCL	6432
474					Anderson-Darling Test Statistic	0.344					95% Bootstrap-t UCL	6442
475					Anderson-Darling 5% Critical Value	0.743					95% Hall's Bootstrap UCL	6442
476					Kolmogorov-Smirnov Test Statistic	0.101					95% Percentile Bootstrap UCL	6430
477					Kolmogorov-Smirnov 5% Critical Value	0.162					95% BCA Bootstrap UCL	6435
478	**Data appear Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	6777
479											97.5% Chebyshev(Mean, Sd) UCL	7014
480	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	7477
481					95% Approximate Gamma UCL	6454						
482					95% Adjusted Gamma UCL	6468						
483												
484	**Potential UCL to Use**										Use 95% Student's-t UCL	6445
485												
486	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
487	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
488	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
489												
490												
491	**Chromium**											
492												
493	**General Statistics**											
494					Number of Valid Observations	29					Number of Distinct Observations	29
495												
496	**Raw Statistics**						**Log-transformed Statistics**					
497					Minimum	0.0255					Minimum of Log Data	-3.671
498					Maximum	0.245					Maximum of Log Data	-1.407
499					Mean	0.065					Mean of log Data	-2.982
500					Median	0.0399					SD of log Data	0.675

	A	B	C	D	E	F	G	H	I	J	K	L
501					SD	0.0545						
502					Coefficient of Variation	0.838						
503					Skewness	2.014						
504												
505	**Relevant UCL Statistics**											
506	**Normal Distribution Test**						**Lognormal Distribution Test**					
507					Shapiro Wilk Test Statistic	0.733					Shapiro Wilk Test Statistic	0.875
508					Shapiro Wilk Critical Value	0.926					Shapiro Wilk Critical Value	0.926
509	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
510												
511	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
512					95% Student's-t UCL	0.0822					95% H-UCL	0.0832
513	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.1
514					95% Adjusted-CLT UCL (Chen-1995)	0.0857					97.5% Chebyshev (MVUE) UCL	0.116
515					95% Modified-t UCL (Johnson-1978)	0.0828					99% Chebyshev (MVUE) UCL	0.148
516												
517	**Gamma Distribution Test**						**Data Distribution**					
518					k star (bias corrected)	1.96	**Data do not follow a Discernable Distribution (0.05)**					
519					Theta Star	0.0332						
520					MLE of Mean	0.065						
521					MLE of Standard Deviation	0.0464						
522					nu star	113.7						
523					Approximate Chi Square Value (.05)	90.06	**Nonparametric Statistics**					
524					Adjusted Level of Significance	0.0407					95% CLT UCL	0.0816
525					Adjusted Chi Square Value	88.81					95% Jackknife UCL	0.0822
526											95% Standard Bootstrap UCL	0.0817
527					Anderson-Darling Test Statistic	1.583					95% Bootstrap-t UCL	0.0888
528					Anderson-Darling 5% Critical Value	0.757					95% Hall's Bootstrap UCL	0.0952
529					Kolmogorov-Smirnov Test Statistic	0.207					95% Percentile Bootstrap UCL	0.0833
530					Kolmogorov-Smirnov 5% Critical Value	0.165					95% BCA Bootstrap UCL	0.0858
531	**Data not Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	0.109
532											97.5% Chebyshev(Mean, Sd) UCL	0.128
533	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	0.166
534					95% Approximate Gamma UCL	0.082						
535					95% Adjusted Gamma UCL	0.0832						
536												
537	**Potential UCL to Use**										Use 95% Chebyshev (Mean, Sd) UCL	0.109
538												
539	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
540	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
541	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
542												
543												
544	**Cobalt**											
545												
546	**General Statistics**											
547					Number of Valid Observations	29					Number of Distinct Observations	29
548												
549	**Raw Statistics**						**Log-transformed Statistics**					
550					Minimum	0.0154					Minimum of Log Data	-4.176

551					Maximum	0.141					Maximum of Log Data	-1.958
552					Mean	0.0671					Mean of log Data	-2.815
553					Median	0.0607					SD of log Data	0.496
554					SD	0.0328						
555					Coefficient of Variation	0.489						
556					Skewness	0.99						
557												
558	**Relevant UCL Statistics**											
559	**Normal Distribution Test**						**Lognormal Distribution Test**					
560					Shapiro Wilk Test Statistic	0.879					Shapiro Wilk Test Statistic	0.949
561					Shapiro Wilk Critical Value	0.926					Shapiro Wilk Critical Value	0.926
562	**Data not Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
563												
564	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
565					95% Student's-t UCL	0.0775					95% H-UCL	0.0813
566	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.0957
567					95% Adjusted-CLT UCL (Chen-1995)	0.0784					97.5% Chebyshev (MVUE) UCL	0.108
568					95% Modified-t UCL (Johnson-1978)	0.0777					99% Chebyshev (MVUE) UCL	0.132
569												
570	**Gamma Distribution Test**						**Data Distribution**					
571					k star (bias corrected)	4.114	**Data Follow Appr. Gamma Distribution at 5% Significance Level**					
572					Theta Star	0.0163						
573					MLE of Mean	0.0671						
574					MLE of Standard Deviation	0.0331						
575					nu star	238.6						
576					Approximate Chi Square Value (.05)	203.8	**Nonparametric Statistics**					
577					Adjusted Level of Significance	0.0407					95% CLT UCL	0.0772
578					Adjusted Chi Square Value	201.9					95% Jackknife UCL	0.0775
579											95% Standard Bootstrap UCL	0.077
580					Anderson-Darling Test Statistic	0.707					95% Bootstrap-t UCL	0.0796
581					Anderson-Darling 5% Critical Value	0.749					95% Hall's Bootstrap UCL	0.0789
582					Kolmogorov-Smirnov Test Statistic	0.17					95% Percentile Bootstrap UCL	0.0775
583					Kolmogorov-Smirnov 5% Critical Value	0.163					95% BCA Bootstrap UCL	0.0782
584	**Data follow Appr. Gamma Distribution at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	0.0937
585											97.5% Chebyshev(Mean, Sd) UCL	0.105
586	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	0.128
587					95% Approximate Gamma UCL	0.0786						
588					95% Adjusted Gamma UCL	0.0793						
589												
590	**Potential UCL to Use**										Use 95% Approximate Gamma UCL	0.0786
591												
592	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
593	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
594	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
595												
596												
597	**Copper**											
598												
599	**General Statistics**											
600					Number of Valid Observations	29					Number of Distinct Observations	29

601												
602	**Raw Statistics**						**Log-transformed Statistics**					
603					Minimum	0.435					Minimum of Log Data	-0.831
604					Maximum	1.224					Maximum of Log Data	0.202
605					Mean	0.739					Mean of log Data	-0.331
606					Median	0.703					SD of log Data	0.243
607					SD	0.186						
608					Coefficient of Variation	0.251						
609					Skewness	0.968						
610												
611	**Relevant UCL Statistics**											
612	**Normal Distribution Test**						**Lognormal Distribution Test**					
613					Shapiro Wilk Test Statistic	0.918					Shapiro Wilk Test Statistic	0.962
614					Shapiro Wilk Critical Value	0.926					Shapiro Wilk Critical Value	0.926
615	**Data not Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
616												
617	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
618					95% Student's-t UCL	0.798					95% H-UCL	0.802
619	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.886
620					95% Adjusted-CLT UCL (Chen-1995)	0.802					97.5% Chebyshev (MVUE) UCL	0.949
621					95% Modified-t UCL (Johnson-1978)	0.799					99% Chebyshev (MVUE) UCL	1.074
622												
623	**Gamma Distribution Test**						**Data Distribution**					
624					k star (bias corrected)	15.72	**Data appear Gamma Distributed at 5% Significance Level**					
625					Theta Star	0.047						
626					MLE of Mean	0.739						
627					MLE of Standard Deviation	0.186						
628					nu star	911.8						
629					Approximate Chi Square Value (.05)	842.7	**Nonparametric Statistics**					
630					Adjusted Level of Significance	0.0407					95% CLT UCL	0.796
631					Adjusted Chi Square Value	838.8					95% Jackknife UCL	0.798
632											95% Standard Bootstrap UCL	0.794
633					Anderson-Darling Test Statistic	0.526					95% Bootstrap-t UCL	0.804
634					Anderson-Darling 5% Critical Value	0.745					95% Hall's Bootstrap UCL	0.811
635					Kolmogorov-Smirnov Test Statistic	0.137					95% Percentile Bootstrap UCL	0.798
636					Kolmogorov-Smirnov 5% Critical Value	0.162					95% BCA Bootstrap UCL	0.805
637	**Data appear Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	0.889
638											97.5% Chebyshev(Mean, Sd) UCL	0.954
639	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	1.082
640					95% Approximate Gamma UCL	0.8						
641					95% Adjusted Gamma UCL	0.803						
642												
643	**Potential UCL to Use**										Use 95% Approximate Gamma UCL	0.8
644												
645	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
646	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
647	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
648												
649												
650	**Iron**											

651												
652	**General Statistics**											
653	Number of Valid Observations				29		Number of Distinct Observations					29
654												
655	**Raw Statistics**						**Log-transformed Statistics**					
656	Minimum				9.766		Minimum of Log Data					2.279
657	Maximum				137.9		Maximum of Log Data					4.927
658	Mean				25.53		Mean of log Data					2.988
659	Median				18.27		SD of log Data					0.636
660	SD				25.69							
661	Coefficient of Variation				1.006							
662	Skewness				3.401							
663												
664	**Relevant UCL Statistics**											
665	**Normal Distribution Test**						**Lognormal Distribution Test**					
666	Shapiro Wilk Test Statistic				0.59		Shapiro Wilk Test Statistic					0.877
667	Shapiro Wilk Critical Value				0.926		Shapiro Wilk Critical Value					0.926
668	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
669												
670	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
671	95% Student's-t UCL				33.65		95% H-UCL					31.12
672	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					37.32
673	95% Adjusted-CLT UCL (Chen-1995)				36.6		97.5% Chebyshev (MVUE) UCL					43.04
674	95% Modified-t UCL (Johnson-1978)				34.15		99% Chebyshev (MVUE) UCL					54.29
675												
676	**Gamma Distribution Test**						**Data Distribution**					
677	k star (bias corrected)				1.935		**Data do not follow a Discernable Distribution (0.05)**					
678	Theta Star				13.19							
679	MLE of Mean				25.53							
680	MLE of Standard Deviation				18.35							
681	nu star				112.3							
682	Approximate Chi Square Value (.05)				88.8		**Nonparametric Statistics**					
683	Adjusted Level of Significance				0.0407		95% CLT UCL					33.38
684	Adjusted Chi Square Value				87.55		95% Jackknife UCL					33.65
685							95% Standard Bootstrap UCL					33.08
686	Anderson-Darling Test Statistic				1.793		95% Bootstrap-t UCL					42.57
687	Anderson-Darling 5% Critical Value				0.757		95% Hall's Bootstrap UCL					66.74
688	Kolmogorov-Smirnov Test Statistic				0.204		95% Percentile Bootstrap UCL					34.28
689	Kolmogorov-Smirnov 5% Critical Value				0.165		95% BCA Bootstrap UCL					38.54
690	**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					46.33
691							97.5% Chebyshev(Mean, Sd) UCL					55.32
692	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL					73
693	95% Approximate Gamma UCL				32.28							
694	95% Adjusted Gamma UCL				32.74							
695												
696	**Potential UCL to Use**						Use 95% Chebyshev (Mean, Sd) UCL					46.33
697												
698	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
699	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
700	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											

Lead

General Statistics

Number of Valid Observations	29	Number of Distinct Observations	29

Raw Statistics		**Log-transformed Statistics**	
Minimum	0.00647	Minimum of Log Data	-5.041
Maximum	0.124	Maximum of Log Data	-2.088
Mean	0.039	Mean of log Data	-3.5
Median	0.0284	SD of log Data	0.738
SD	0.0296		
Coefficient of Variation	0.76		
Skewness	1.423		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.831	Shapiro Wilk Test Statistic	0.973
Shapiro Wilk Critical Value	0.926	Shapiro Wilk Critical Value	0.926
Data not Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	0.0484	95% H-UCL	0.0537
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.0647
95% Adjusted-CLT UCL (Chen-1995)	0.0496	97.5% Chebyshev (MVUE) UCL	0.0757
95% Modified-t UCL (Johnson-1978)	0.0486	99% Chebyshev (MVUE) UCL	0.0974
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	1.91	**Data appear Gamma Distributed at 5% Significance Level**	
Theta Star	0.0204		
MLE of Mean	0.039		
MLE of Standard Deviation	0.0282		
nu star	110.8		
Approximate Chi Square Value (.05)	87.48	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0407	95% CLT UCL	0.048
Adjusted Chi Square Value	86.25	95% Jackknife UCL	0.0484
		95% Standard Bootstrap UCL	0.0478
Anderson-Darling Test Statistic	0.535	95% Bootstrap-t UCL	0.0509
Anderson-Darling 5% Critical Value	0.757	95% Hall's Bootstrap UCL	0.0503
Kolmogorov-Smirnov Test Statistic	0.132	95% Percentile Bootstrap UCL	0.0486
Kolmogorov-Smirnov 5% Critical Value	0.165	95% BCA Bootstrap UCL	0.0488
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.063
		97.5% Chebyshev(Mean, Sd) UCL	0.0734
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.0938
95% Approximate Gamma UCL	0.0494		
95% Adjusted Gamma UCL	0.0501		
Potential UCL to Use		Use 95% Approximate Gamma UCL	0.0494

	A	B	C	D	E	F	G	H	I	J	K	L
751	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
752	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
753	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
754												
755												
756	**Lithium**											
757												
758	**General Statistics**											
759	Number of Valid Observations					29	Number of Distinct Observations					29
760												
761	**Raw Statistics**						**Log-transformed Statistics**					
762	Minimum					0.0109	Minimum of Log Data					-4.522
763	Maximum					0.105	Maximum of Log Data					-2.252
764	Mean					0.0357	Mean of log Data					-3.561
765	Median					0.0228	SD of log Data					0.669
766	SD					0.0263						
767	Coefficient of Variation					0.736						
768	Skewness					1.343						
769												
770	**Relevant UCL Statistics**											
771	**Normal Distribution Test**						**Lognormal Distribution Test**					
772	Shapiro Wilk Test Statistic					0.818	Shapiro Wilk Test Statistic					0.929
773	Shapiro Wilk Critical Value					0.926	Shapiro Wilk Critical Value					0.926
774	**Data not Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
775												
776	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
777	95% Student's-t UCL					0.044	95% H-UCL					0.0463
778	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					0.0557
779	95% Adjusted-CLT UCL (Chen-1995)					0.045	97.5% Chebyshev (MVUE) UCL					0.0645
780	95% Modified-t UCL (Johnson-1978)					0.0442	99% Chebyshev (MVUE) UCL					0.0819
781												
782	**Gamma Distribution Test**						**Data Distribution**					
783	k star (bias corrected)					2.132	**Data appear Lognormal at 5% Significance Level**					
784	Theta Star					0.0167						
785	MLE of Mean					0.0357						
786	MLE of Standard Deviation					0.0244						
787	nu star					123.6						
788	Approximate Chi Square Value (.05)					98.96	**Nonparametric Statistics**					
789	Adjusted Level of Significance					0.0407	95% CLT UCL					0.0437
790	Adjusted Chi Square Value					97.64	95% Jackknife UCL					0.044
791							95% Standard Bootstrap UCL					0.0436
792	Anderson-Darling Test Statistic					1.016	95% Bootstrap-t UCL					0.0457
793	Anderson-Darling 5% Critical Value					0.756	95% Hall's Bootstrap UCL					0.0446
794	Kolmogorov-Smirnov Test Statistic					0.178	95% Percentile Bootstrap UCL					0.0438
795	Kolmogorov-Smirnov 5% Critical Value					0.164	95% BCA Bootstrap UCL					0.0454
796	**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					0.0569
797							97.5% Chebyshev(Mean, Sd) UCL					0.0661
798	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL					0.0842
799	95% Approximate Gamma UCL					0.0446						
800	95% Adjusted Gamma UCL					0.0452						

801												
802	**Potential UCL to Use**										Use 95% H-UCL	0.0463
803												
804	**ProUCL computes and outputs H-statistic based UCLs for historical reasons only.**											
805	**H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.**											
806	**It is therefore recommended to avoid the use of H-statistic based 95% UCLs.**											
807	**Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.**											
808												
809	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
810	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
811	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
812												
813												
814	**Magnesium**											
815												
816	**General Statistics**											
817	Number of Valid Observations					29					Number of Distinct Observations	28
818												
819	**Raw Statistics**										**Log-transformed Statistics**	
820	Minimum					301.5					Minimum of Log Data	5.709
821	Maximum					351.7					Maximum of Log Data	5.863
822	Mean					328.8					Mean of log Data	5.795
823	Median					330					SD of log Data	0.0362
824	SD					11.76						
825	Coefficient of Variation					0.0358						
826	Skewness					-0.594						
827												
828	**Relevant UCL Statistics**											
829	**Normal Distribution Test**										**Lognormal Distribution Test**	
830	Shapiro Wilk Test Statistic					0.959					Shapiro Wilk Test Statistic	0.953
831	Shapiro Wilk Critical Value					0.926					Shapiro Wilk Critical Value	0.926
832	**Data appear Normal at 5% Significance Level**										**Data appear Lognormal at 5% Significance Level**	
833												
834	**Assuming Normal Distribution**										**Assuming Lognormal Distribution**	
835	95% Student's-t UCL					332.5					95% H-UCL	N/A
836	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	338.4
837	95% Adjusted-CLT UCL (Chen-1995)					332.1					97.5% Chebyshev (MVUE) UCL	342.6
838	95% Modified-t UCL (Johnson-1978)					332.4					99% Chebyshev (MVUE) UCL	350.7
839												
840	**Gamma Distribution Test**										**Data Distribution**	
841	k star (bias corrected)					715.5					**Data appear Normal at 5% Significance Level**	
842	Theta Star					0.459						
843	MLE of Mean					328.8						
844	MLE of Standard Deviation					12.29						
845	nu star					41501						
846	Approximate Chi Square Value (.05)					41029					**Nonparametric Statistics**	
847	Adjusted Level of Significance					0.0407					95% CLT UCL	332.4
848	Adjusted Chi Square Value					41001					95% Jackknife UCL	332.5
849											95% Standard Bootstrap UCL	332.3
850	Anderson-Darling Test Statistic					0.506					95% Bootstrap-t UCL	332.2

851				Anderson-Darling 5% Critical Value	0.742					95% Hall's Bootstrap UCL	332.1	
852				Kolmogorov-Smirnov Test Statistic	0.133					95% Percentile Bootstrap UCL	332.1	
853				Kolmogorov-Smirnov 5% Critical Value	0.162					95% BCA Bootstrap UCL	332.1	
854				**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	338.3	
855										97.5% Chebyshev(Mean, Sd) UCL	342.4	
856				**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	350.5	
857				95% Approximate Gamma UCL	332.6							
858				95% Adjusted Gamma UCL	332.8							
859												
860				**Potential UCL to Use**						Use 95% Student's-t UCL	332.5	
861												
862	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
863	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
864	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
865												
866												
867	**Manganese**											
868												
869					**General Statistics**							
870				Number of Valid Observations	29					Number of Distinct Observations	29	
871												
872				**Raw Statistics**						**Log-transformed Statistics**		
873				Minimum	2.429					Minimum of Log Data	0.887	
874				Maximum	21.89					Maximum of Log Data	3.086	
875				Mean	5.856					Mean of log Data	1.65	
876				Median	5.104					SD of log Data	0.448	
877				SD	3.743							
878				Coefficient of Variation	0.639							
879				Skewness	3.271							
880												
881					**Relevant UCL Statistics**							
882				**Normal Distribution Test**						**Lognormal Distribution Test**		
883				Shapiro Wilk Test Statistic	0.629					Shapiro Wilk Test Statistic	0.893	
884				Shapiro Wilk Critical Value	0.926					Shapiro Wilk Critical Value	0.926	
885				**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**		
886												
887				**Assuming Normal Distribution**						**Assuming Lognormal Distribution**		
888				95% Student's-t UCL	7.038					95% H-UCL	6.768	
889				**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL	7.892	
890				95% Adjusted-CLT UCL (Chen-1995)	7.45					97.5% Chebyshev (MVUE) UCL	8.825	
891				95% Modified-t UCL (Johnson-1978)	7.108					99% Chebyshev (MVUE) UCL	10.66	
892												
893				**Gamma Distribution Test**						**Data Distribution**		
894				k star (bias corrected)	3.999					**Data do not follow a Discernable Distribution (0.05)**		
895				Theta Star	1.464							
896				MLE of Mean	5.856							
897				MLE of Standard Deviation	2.928							
898				nu star	232							
899				Approximate Chi Square Value (.05)	197.7					**Nonparametric Statistics**		
900				Adjusted Level of Significance	0.0407					95% CLT UCL	6.999	

901					Adjusted Chi Square Value	195.8					95% Jackknife UCL	7.038
902											95% Standard Bootstrap UCL	6.957
903					Anderson-Darling Test Statistic	1.68					95% Bootstrap-t UCL	8.547
904					Anderson-Darling 5% Critical Value	0.749					95% Hall's Bootstrap UCL	12.87
905					Kolmogorov-Smirnov Test Statistic	0.217					95% Percentile Bootstrap UCL	7.164
906					Kolmogorov-Smirnov 5% Critical Value	0.163					95% BCA Bootstrap UCL	7.728
907					**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	8.886
908											97.5% Chebyshev(Mean, Sd) UCL	10.2
909					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	12.77
910					95% Approximate Gamma UCL	6.87						
911					95% Adjusted Gamma UCL	6.936						
912												
913					**Potential UCL to Use**						Use 95% Student's-t UCL	7.038
914											or 95% Modified-t UCL	7.108
915												
916	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
917	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
918	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
919												
920												
921	**Mercury**											
922												
923	**General Statistics**											
924					Number of Valid Observations	29					Number of Distinct Observations	29
925												
926	**Raw Statistics**						**Log-transformed Statistics**					
927					Minimum	0.0504					Minimum of Log Data	-2.988
928					Maximum	0.195					Maximum of Log Data	-1.634
929					Mean	0.101					Mean of log Data	-2.352
930					Median	0.0981					SD of log Data	0.363
931					SD	0.0365						
932					Coefficient of Variation	0.36						
933					Skewness	0.562						
934												
935	**Relevant UCL Statistics**											
936	**Normal Distribution Test**						**Lognormal Distribution Test**					
937					Shapiro Wilk Test Statistic	0.933					Shapiro Wilk Test Statistic	0.946
938					Shapiro Wilk Critical Value	0.926					Shapiro Wilk Critical Value	0.926
939	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
940												
941	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
942					95% Student's-t UCL	0.113					95% H-UCL	0.115
943	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.132
944					95% Adjusted-CLT UCL (Chen-1995)	0.113					97.5% Chebyshev (MVUE) UCL	0.145
945					95% Modified-t UCL (Johnson-1978)	0.113					99% Chebyshev (MVUE) UCL	0.171
946												
947	**Gamma Distribution Test**						**Data Distribution**					
948					k star (bias corrected)	7.299	**Data appear Normal at 5% Significance Level**					
949					Theta Star	0.0139						
950					MLE of Mean	0.101						

MLE of Standard Deviation	0.0375	
nu star	423.4	
Approximate Chi Square Value (.05)	376.7	**Nonparametric Statistics**
Adjusted Level of Significance	0.0407	95% CLT UCL 0.113
Adjusted Chi Square Value	374	95% Jackknife UCL 0.113
		95% Standard Bootstrap UCL 0.113
Anderson-Darling Test Statistic	0.649	95% Bootstrap-t UCL 0.114
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL 0.113
Kolmogorov-Smirnov Test Statistic	0.124	95% Percentile Bootstrap UCL 0.113
Kolmogorov-Smirnov 5% Critical Value	0.163	95% BCA Bootstrap UCL 0.112
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 0.131
		97.5% Chebyshev(Mean, Sd) UCL 0.144
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 0.169
95% Approximate Gamma UCL	0.114	
95% Adjusted Gamma UCL	0.115	
Potential UCL to Use		Use 95% Student's-t UCL 0.113

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Molybdenum

General Statistics

Number of Valid Observations	29	Number of Distinct Observations	28

Raw Statistics		**Log-transformed Statistics**	
Minimum	0.00577	Minimum of Log Data	-5.155
Maximum	0.026	Maximum of Log Data	-3.65
Mean	0.014	Mean of log Data	-4.321
Median	0.0134	SD of log Data	0.328
SD	0.00473		
Coefficient of Variation	0.338		
Skewness	0.966		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.919	Shapiro Wilk Test Statistic	0.971
Shapiro Wilk Critical Value	0.926	Shapiro Wilk Critical Value	0.926
Data not Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	0.0155	95% H-UCL	0.0157
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.0178
95% Adjusted-CLT UCL (Chen-1995)	0.0156	97.5% Chebyshev (MVUE) UCL	0.0194
95% Modified-t UCL (Johnson-1978)	0.0155	99% Chebyshev (MVUE) UCL	0.0226
Gamma Distribution Test		**Data Distribution**	

1001					k star (bias corrected)	8.766	**Data appear Gamma Distributed at 5% Significance Level**					
1002					Theta Star	0.0016						
1003					MLE of Mean	0.014						
1004					MLE of Standard Deviation	0.00473						
1005					nu star	508.4						
1006					Approximate Chi Square Value (.05)	457.1	**Nonparametric Statistics**					
1007					Adjusted Level of Significance	0.0407					95% CLT UCL	0.0154
1008					Adjusted Chi Square Value	454.2					95% Jackknife UCL	0.0155
1009											95% Standard Bootstrap UCL	0.0154
1010					Anderson-Darling Test Statistic	0.477					95% Bootstrap-t UCL	0.0157
1011					Anderson-Darling 5% Critical Value	0.746					95% Hall's Bootstrap UCL	0.0157
1012					Kolmogorov-Smirnov Test Statistic	0.109					95% Percentile Bootstrap UCL	0.0154
1013					Kolmogorov-Smirnov 5% Critical Value	0.162					95% BCA Bootstrap UCL	0.0156
1014					**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.0178
1015											97.5% Chebyshev(Mean, Sd) UCL	0.0195
1016					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.0227
1017					95% Approximate Gamma UCL	0.0156						
1018					95% Adjusted Gamma UCL	0.0157						
1019												
1020					**Potential UCL to Use**						Use 95% Approximate Gamma UCL	0.0156
1021												
1022	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1023	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1024	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1025												
1026												
1027	**Nickel**											
1028												
1029	**General Statistics**											
1030					Number of Valid Observations	29					Number of Distinct Observations	29
1031												
1032					**Raw Statistics**		**Log-transformed Statistics**					
1033					Minimum	0.0252					Minimum of Log Data	-3.68
1034					Maximum	0.0932					Maximum of Log Data	-2.373
1035					Mean	0.0409					Mean of log Data	-3.272
1036					Median	0.0378					SD of log Data	0.376
1037					SD	0.0176						
1038					Coefficient of Variation	0.432						
1039					Skewness	1.544						
1040												
1041	**Relevant UCL Statistics**											
1042					**Normal Distribution Test**						**Lognormal Distribution Test**	
1043					Shapiro Wilk Test Statistic	0.81					Shapiro Wilk Test Statistic	0.888
1044					Shapiro Wilk Critical Value	0.926					Shapiro Wilk Critical Value	0.926
1045					**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**	
1046												
1047					**Assuming Normal Distribution**						**Assuming Lognormal Distribution**	
1048					95% Student's-t UCL	0.0464					95% H-UCL	0.0465
1049					**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL	0.0533
1050					95% Adjusted-CLT UCL (Chen-1995)	0.0472					97.5% Chebyshev (MVUE) UCL	0.0588

1051	95% Modified-t UCL (Johnson-1978)					0.0466	99% Chebyshev (MVUE) UCL					0.0695
1052												
1053	**Gamma Distribution Test**						**Data Distribution**					
1054	k star (bias corrected)					6.223	**Data do not follow a Discernable Distribution (0.05)**					
1055	Theta Star					0.00657						
1056	MLE of Mean					0.0409						
1057	MLE of Standard Deviation					0.0164						
1058	nu star					360.9						
1059	Approximate Chi Square Value (.05)					317.9	**Nonparametric Statistics**					
1060	Adjusted Level of Significance					0.0407	95% CLT UCL					0.0462
1061	Adjusted Chi Square Value					315.5	95% Jackknife UCL					0.0464
1062							95% Standard Bootstrap UCL					0.0462
1063	Anderson-Darling Test Statistic					1.168	95% Bootstrap-t UCL					0.0481
1064	Anderson-Darling 5% Critical Value					0.747	95% Hall's Bootstrap UCL					0.048
1065	Kolmogorov-Smirnov Test Statistic					0.171	95% Percentile Bootstrap UCL					0.0463
1066	Kolmogorov-Smirnov 5% Critical Value					0.163	95% BCA Bootstrap UCL					0.0471
1067	**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					0.0551
1068							97.5% Chebyshev(Mean, Sd) UCL					0.0613
1069	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL					0.0735
1070	95% Approximate Gamma UCL					0.0464						
1071	95% Adjusted Gamma UCL					0.0467						
1072												
1073	**Potential UCL to Use**						Use 95% Student's-t UCL					0.0464
1074							or 95% Modified-t UCL					0.0466
1075												
1076	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1077	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1078	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1079												
1080												
1081	**Potassium**											
1082												
1083	**General Statistics**											
1084	Number of Valid Observations					29	Number of Distinct Observations					27
1085												
1086	**Raw Statistics**						**Log-transformed Statistics**					
1087	Minimum					3321	Minimum of Log Data					8.108
1088	Maximum					3853	Maximum of Log Data					8.257
1089	Mean					3576	Mean of log Data					8.181
1090	Median					3580	SD of log Data					0.0361
1091	SD					128.7						
1092	Coefficient of Variation					0.036						
1093	Skewness					-0.163						
1094												
1095	**Relevant UCL Statistics**											
1096	**Normal Distribution Test**						**Lognormal Distribution Test**					
1097	Shapiro Wilk Test Statistic					0.965	Shapiro Wilk Test Statistic					0.962
1098	Shapiro Wilk Critical Value					0.926	Shapiro Wilk Critical Value					0.926
1099	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
1100												

1101	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1102	95% Student's-t UCL	3617					95% H-UCL	N/A				
1103	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL	3681				
1104	95% Adjusted-CLT UCL (Chen-1995)	3615					97.5% Chebyshev (MVUE) UCL	3726				
1105	95% Modified-t UCL (Johnson-1978)	3617					99% Chebyshev (MVUE) UCL	3815				
1106												
1107	**Gamma Distribution Test**						**Data Distribution**					
1108	k star (bias corrected)	713.7					**Data appear Normal at 5% Significance Level**					
1109	Theta Star	5.011										
1110	MLE of Mean	3576										
1111	MLE of Standard Deviation	133.9										
1112	nu star	41392										
1113	Approximate Chi Square Value (.05)	40920					**Nonparametric Statistics**					
1114	Adjusted Level of Significance	0.0407					95% CLT UCL	3616				
1115	Adjusted Chi Square Value	40892					95% Jackknife UCL	3617				
1116							95% Standard Bootstrap UCL	3615				
1117	Anderson-Darling Test Statistic	0.492					95% Bootstrap-t UCL	3617				
1118	Anderson-Darling 5% Critical Value	0.742					95% Hall's Bootstrap UCL	3616				
1119	Kolmogorov-Smirnov Test Statistic	0.146					95% Percentile Bootstrap UCL	3613				
1120	Kolmogorov-Smirnov 5% Critical Value	0.162					95% BCA Bootstrap UCL	3612				
1121	**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	3680				
1122							97.5% Chebyshev(Mean, Sd) UCL	3725				
1123	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	3814				
1124	95% Approximate Gamma UCL	3618										
1125	95% Adjusted Gamma UCL	3620										
1126												
1127	**Potential UCL to Use**						Use 95% Student's-t UCL	3617				
1128												
1129	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1130	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1131	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1132												
1133												
1134	**Rubidium**											
1135												
1136	**General Statistics**											
1137	Number of Valid Observations	29					Number of Distinct Observations	29				
1138												
1139	**Raw Statistics**						**Log-transformed Statistics**					
1140	Minimum	9.568					Minimum of Log Data	2.258				
1141	Maximum	16.59					Maximum of Log Data	2.809				
1142	Mean	13.05					Mean of log Data	2.56				
1143	Median	13.55					SD of log Data	0.137				
1144	SD	1.721										
1145	Coefficient of Variation	0.132										
1146	Skewness	-0.376										
1147												
1148	**Relevant UCL Statistics**											
1149	**Normal Distribution Test**						**Lognormal Distribution Test**					
1150	Shapiro Wilk Test Statistic	0.957					Shapiro Wilk Test Statistic	0.936				

1151					Shapiro Wilk Critical Value	0.926					Shapiro Wilk Critical Value	0.926
1152	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
1153												
1154	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1155					95% Student's-t UCL	13.6					95% H-UCL	13.66
1156	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	14.51
1157					95% Adjusted-CLT UCL (Chen-1995)	13.56					97.5% Chebyshev (MVUE) UCL	15.15
1158					95% Modified-t UCL (Johnson-1978)	13.59					99% Chebyshev (MVUE) UCL	16.38
1159												
1160	**Gamma Distribution Test**						**Data Distribution**					
1161					k star (bias corrected)	50.81	**Data appear Normal at 5% Significance Level**					
1162					Theta Star	0.257						
1163					MLE of Mean	13.05						
1164					MLE of Standard Deviation	1.831						
1165					nu star	2947						
1166					Approximate Chi Square Value (.05)	2822	**Nonparametric Statistics**					
1167					Adjusted Level of Significance	0.0407					95% CLT UCL	13.58
1168					Adjusted Chi Square Value	2814					95% Jackknife UCL	13.6
1169											95% Standard Bootstrap UCL	13.57
1170					Anderson-Darling Test Statistic	0.728					95% Bootstrap-t UCL	13.57
1171					Anderson-Darling 5% Critical Value	0.744					95% Hall's Bootstrap UCL	13.58
1172					Kolmogorov-Smirnov Test Statistic	0.172					95% Percentile Bootstrap UCL	13.56
1173					Kolmogorov-Smirnov 5% Critical Value	0.162					95% BCA Bootstrap UCL	13.55
1174	**Data follow Appr. Gamma Distribution at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	14.45
1175											97.5% Chebyshev(Mean, Sd) UCL	15.05
1176	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	16.23
1177					95% Approximate Gamma UCL	13.63						
1178					95% Adjusted Gamma UCL	13.67						
1179												
1180	**Potential UCL to Use**										Use 95% Student's-t UCL	13.6
1181												
1182	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1183	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1184	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1185												
1186												
1187	**Selenium**											
1188												
1189	**General Statistics**											
1190					Number of Valid Observations	29					Number of Distinct Observations	29
1191												
1192	**Raw Statistics**						**Log-transformed Statistics**					
1193					Minimum	0.203					Minimum of Log Data	-1.595
1194					Maximum	1.114					Maximum of Log Data	0.108
1195					Mean	0.437					Mean of log Data	-0.977
1196					Median	0.3					SD of log Data	0.534
1197					SD	0.263						
1198					Coefficient of Variation	0.601						
1199					Skewness	1.267						
1200												

1201	**Relevant UCL Statistics**											
1202	**Normal Distribution Test**						**Lognormal Distribution Test**					
1203					Shapiro Wilk Test Statistic	0.811					Shapiro Wilk Test Statistic	0.884
1204					Shapiro Wilk Critical Value	0.926					Shapiro Wilk Critical Value	0.926
1205	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
1206												
1207	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1208					95% Student's-t UCL	0.52					95% H-UCL	0.53
1209	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.628
1210					95% Adjusted-CLT UCL (Chen-1995)	0.529					97.5% Chebyshev (MVUE) UCL	0.712
1211					95% Modified-t UCL (Johnson-1978)	0.521					99% Chebyshev (MVUE) UCL	0.879
1212												
1213	**Gamma Distribution Test**						**Data Distribution**					
1214					k star (bias corrected)	3.182	**Data do not follow a Discernable Distribution (0.05)**					
1215					Theta Star	0.137						
1216					MLE of Mean	0.437						
1217					MLE of Standard Deviation	0.245						
1218					nu star	184.6						
1219					Approximate Chi Square Value (.05)	154.1	**Nonparametric Statistics**					
1220					Adjusted Level of Significance	0.0407					95% CLT UCL	0.517
1221					Adjusted Chi Square Value	152.5					95% Jackknife UCL	0.52
1222											95% Standard Bootstrap UCL	0.515
1223					Anderson-Darling Test Statistic	1.463					95% Bootstrap-t UCL	0.538
1224					Anderson-Darling 5% Critical Value	0.751					95% Hall's Bootstrap UCL	0.525
1225					Kolmogorov-Smirnov Test Statistic	0.201					95% Percentile Bootstrap UCL	0.514
1226					Kolmogorov-Smirnov 5% Critical Value	0.164					95% BCA Bootstrap UCL	0.528
1227	**Data not Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	0.649
1228											97.5% Chebyshev(Mean, Sd) UCL	0.741
1229	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	0.922
1230					95% Approximate Gamma UCL	0.523						
1231					95% Adjusted Gamma UCL	0.528						
1232												
1233	**Potential UCL to Use**										Use 95% Chebyshev (Mean, Sd) UCL	0.649
1234												
1235	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1236	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1237	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1238												
1239												
1240	**Silver**											
1241												
1242	**General Statistics**											
1243					Number of Valid Observations	29					Number of Distinct Observations	29
1244												
1245	**Raw Statistics**						**Log-transformed Statistics**					
1246					Minimum	0.00558					Minimum of Log Data	-5.188
1247					Maximum	0.0308					Maximum of Log Data	-3.48
1248					Mean	0.0127					Mean of log Data	-4.475
1249					Median	0.0111					SD of log Data	0.468
1250					SD	0.00638						

1251					Coefficient of Variation	0.502						
1252					Skewness	1.167						
1253												
1254	**Relevant UCL Statistics**											
1255	**Normal Distribution Test**						**Lognormal Distribution Test**					
1256					Shapiro Wilk Test Statistic	0.889					Shapiro Wilk Test Statistic	0.963
1257					Shapiro Wilk Critical Value	0.926					Shapiro Wilk Critical Value	0.926
1258	**Data not Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
1259												
1260	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1261					95% Student's-t UCL	0.0147					95% H-UCL	0.0151
1262	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.0177
1263					95% Adjusted-CLT UCL (Chen-1995)	0.0149					97.5% Chebyshev (MVUE) UCL	0.0198
1264					95% Modified-t UCL (Johnson-1978)	0.0148					99% Chebyshev (MVUE) UCL	0.024
1265												
1266	**Gamma Distribution Test**						**Data Distribution**					
1267					k star (bias corrected)	4.26	**Data appear Gamma Distributed at 5% Significance Level**					
1268					Theta Star	0.00298						
1269					MLE of Mean	0.0127						
1270					MLE of Standard Deviation	0.00616						
1271					nu star	247.1						
1272					Approximate Chi Square Value (.05)	211.7	**Nonparametric Statistics**					
1273					Adjusted Level of Significance	0.0407					95% CLT UCL	0.0147
1274					Adjusted Chi Square Value	209.7					95% Jackknife UCL	0.0147
1275											95% Standard Bootstrap UCL	0.0146
1276					Anderson-Darling Test Statistic	0.477					95% Bootstrap-t UCL	0.0152
1277					Anderson-Darling 5% Critical Value	0.748					95% Hall's Bootstrap UCL	0.015
1278					Kolmogorov-Smirnov Test Statistic	0.13					95% Percentile Bootstrap UCL	0.0147
1279					Kolmogorov-Smirnov 5% Critical Value	0.163					95% BCA Bootstrap UCL	0.0149
1280	**Data appear Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	0.0179
1281											97.5% Chebyshev(Mean, Sd) UCL	0.0201
1282	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	0.0245
1283					95% Approximate Gamma UCL	0.0148						
1284					95% Adjusted Gamma UCL	0.015						
1285												
1286	**Potential UCL to Use**										Use 95% Approximate Gamma UCL	0.0148
1287												
1288	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1289	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1290	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1291												
1292												
1293	**Sodium**											
1294												
1295	**General Statistics**											
1296					Number of Valid Observations	29					Number of Distinct Observations	29
1297												
1298	**Raw Statistics**						**Log-transformed Statistics**					
1299					Minimum	806.9					Minimum of Log Data	6.693
1300					Maximum	1049					Maximum of Log Data	6.956

1301					Mean	948.4					Mean of log Data	6.853
1302					Median	939.7					SD of log Data	0.0688
1303					SD	64.59						
1304					Coefficient of Variation	0.0681						
1305					Skewness	-0.195						
1306												
1307					**Relevant UCL Statistics**							
1308					**Normal Distribution Test**						**Lognormal Distribution Test**	
1309					Shapiro Wilk Test Statistic	0.958					Shapiro Wilk Test Statistic	0.955
1310					Shapiro Wilk Critical Value	0.926					Shapiro Wilk Critical Value	0.926
1311					**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**	
1312												
1313					**Assuming Normal Distribution**						**Assuming Lognormal Distribution**	
1314					95% Student's-t UCL	968.8					95% H-UCL	N/A
1315					**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL	1001
1316					95% Adjusted-CLT UCL (Chen-1995)	967.7					97.5% Chebyshev (MVUE) UCL	1024
1317					95% Modified-t UCL (Johnson-1978)	968.8					99% Chebyshev (MVUE) UCL	1069
1318												
1319					**Gamma Distribution Test**						**Data Distribution**	
1320					k star (bias corrected)	197.7					**Data appear Normal at 5% Significance Level**	
1321					Theta Star	4.797						
1322					MLE of Mean	948.4						
1323					MLE of Standard Deviation	67.45						
1324					nu star	11467						
1325					Approximate Chi Square Value (.05)	11219					**Nonparametric Statistics**	
1326					Adjusted Level of Significance	0.0407					95% CLT UCL	968.2
1327					Adjusted Chi Square Value	11205					95% Jackknife UCL	968.8
1328											95% Standard Bootstrap UCL	967.9
1329					Anderson-Darling Test Statistic	0.433					95% Bootstrap-t UCL	968.7
1330					Anderson-Darling 5% Critical Value	0.742					95% Hall's Bootstrap UCL	966.6
1331					Kolmogorov-Smirnov Test Statistic	0.12					95% Percentile Bootstrap UCL	968
1332					Kolmogorov-Smirnov 5% Critical Value	0.162					95% BCA Bootstrap UCL	967.6
1333					**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	1001
1334											97.5% Chebyshev(Mean, Sd) UCL	1023
1335					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	1068
1336					95% Approximate Gamma UCL	969.4						
1337					95% Adjusted Gamma UCL	970.7						
1338												
1339					**Potential UCL to Use**						Use 95% Student's-t UCL	968.8
1340												
1341	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1342	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1343	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1344												
1345												
1346	**Strontium**											
1347												
1348					**General Statistics**							
1349					Number of Valid Observations	29					Number of Distinct Observations	29
1350												

	A	B	C	D	E	F	G	H	I	J	K	L
1351	**Raw Statistics**						**Log-transformed Statistics**					
1352					Minimum	7.751					Minimum of Log Data	2.048
1353					Maximum	16.46					Maximum of Log Data	2.801
1354					Mean	11.1					Mean of log Data	2.396
1355					Median	10.54					SD of log Data	0.152
1356					SD	1.734						
1357					Coefficient of Variation	0.156						
1358					Skewness	0.876						
1359												
1360	**Relevant UCL Statistics**											
1361	**Normal Distribution Test**						**Lognormal Distribution Test**					
1362					Shapiro Wilk Test Statistic	0.945					Shapiro Wilk Test Statistic	0.973
1363					Shapiro Wilk Critical Value	0.926					Shapiro Wilk Critical Value	0.926
1364	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
1365												
1366	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1367					95% Student's-t UCL	11.65					95% H-UCL	11.67
1368	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	12.47
1369					95% Adjusted-CLT UCL (Chen-1995)	11.69					97.5% Chebyshev (MVUE) UCL	13.06
1370					95% Modified-t UCL (Johnson-1978)	11.66					99% Chebyshev (MVUE) UCL	14.22
1371												
1372	**Gamma Distribution Test**						**Data Distribution**					
1373					k star (bias corrected)	39.87	**Data appear Normal at 5% Significance Level**					
1374					Theta Star	0.278						
1375					MLE of Mean	11.1						
1376					MLE of Standard Deviation	1.758						
1377					nu star	2312						
1378					Approximate Chi Square Value (.05)	2202	**Nonparametric Statistics**					
1379					Adjusted Level of Significance	0.0407					95% CLT UCL	11.63
1380					Adjusted Chi Square Value	2195					95% Jackknife UCL	11.65
1381											95% Standard Bootstrap UCL	11.62
1382					Anderson-Darling Test Statistic	0.428					95% Bootstrap-t UCL	11.7
1383					Anderson-Darling 5% Critical Value	0.744					95% Hall's Bootstrap UCL	11.73
1384					Kolmogorov-Smirnov Test Statistic	0.132					95% Percentile Bootstrap UCL	11.63
1385					Kolmogorov-Smirnov 5% Critical Value	0.162					95% BCA Bootstrap UCL	11.68
1386	**Data appear Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	12.5
1387											97.5% Chebyshev(Mean, Sd) UCL	13.11
1388	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	14.3
1389					95% Approximate Gamma UCL	11.66						
1390					95% Adjusted Gamma UCL	11.69						
1391												
1392	**Potential UCL to Use**										Use 95% Student's-t UCL	11.65
1393												
1394	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1395	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1396	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1397												
1398												
1399	**Tellurium**											
1400												

1401	**General Statistics**											
1402	Number of Valid Observations				29		Number of Distinct Observations					26
1403												
1404	**Raw Statistics**						**Log-transformed Statistics**					
1405	Minimum				0.00252		Minimum of Log Data					-5.985
1406	Maximum				0.00276		Maximum of Log Data					-5.894
1407	Mean				0.00257		Mean of log Data					-5.964
1408	Median				0.00256		SD of log Data					0.0201
1409	SD				5.242E-05							
1410	Coefficient of Variation				0.0204							
1411	Skewness				1.841							
1412												
1413	**Relevant UCL Statistics**											
1414	**Normal Distribution Test**						**Lognormal Distribution Test**					
1415	Shapiro Wilk Test Statistic				0.824		Shapiro Wilk Test Statistic					0.833
1416	Shapiro Wilk Critical Value				0.926		Shapiro Wilk Critical Value					0.926
1417	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
1418												
1419	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1420	95% Student's-t UCL				0.00259		95% H-UCL					N/A
1421	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					0.00261
1422	95% Adjusted-CLT UCL (Chen-1995)				0.00259		97.5% Chebyshev (MVUE) UCL					0.00263
1423	95% Modified-t UCL (Johnson-1978)				0.00259		99% Chebyshev (MVUE) UCL					0.00267
1424												
1425	**Gamma Distribution Test**						**Data Distribution**					
1426	k star (bias corrected)				2284		**Data do not follow a Discernable Distribution (0.05)**					
1427	Theta Star				1.126E-06							
1428	MLE of Mean				0.00257							
1429	MLE of Standard Deviation				5.379E-05							
1430	nu star				132458							
1431	Approximate Chi Square Value (.05)				131612		**Nonparametric Statistics**					
1432	Adjusted Level of Significance				0.0407		95% CLT UCL					0.00259
1433	Adjusted Chi Square Value				131562		95% Jackknife UCL					0.00259
1434							95% Standard Bootstrap UCL					0.00259
1435	Anderson-Darling Test Statistic				1.705		95% Bootstrap-t UCL					0.00259
1436	Anderson-Darling 5% Critical Value				0.742		95% Hall's Bootstrap UCL					0.0026
1437	Kolmogorov-Smirnov Test Statistic				0.257		95% Percentile Bootstrap UCL					0.00259
1438	Kolmogorov-Smirnov 5% Critical Value				0.162		95% BCA Bootstrap UCL					0.00259
1439	**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					0.00261
1440							97.5% Chebyshev(Mean, Sd) UCL					0.00263
1441	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL					0.00267
1442	95% Approximate Gamma UCL				0.00259							
1443	95% Adjusted Gamma UCL				0.00259							
1444												
1445	**Potential UCL to Use**						Use 95% Student's-t UCL					0.00259
1446							or 95% Modified-t UCL					0.00259
1447												
1448	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1449	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1450	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											

Thallium

General Statistics

Number of Valid Observations	29	Number of Distinct Observations	29

Raw Statistics		**Log-transformed Statistics**	
Minimum	0.00779	Minimum of Log Data	-4.855
Maximum	0.0297	Maximum of Log Data	-3.517
Mean	0.0147	Mean of log Data	-4.3
Median	0.0125	SD of log Data	0.404
SD	0.00636		
Coefficient of Variation	0.432		
Skewness	0.963		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.867	Shapiro Wilk Test Statistic	0.919
Shapiro Wilk Critical Value	0.926	Shapiro Wilk Critical Value	0.926
Data not Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	0.0167	95% H-UCL	0.017
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.0196
95% Adjusted-CLT UCL (Chen-1995)	0.0169	97.5% Chebyshev (MVUE) UCL	0.0217
95% Modified-t UCL (Johnson-1978)	0.0168	99% Chebyshev (MVUE) UCL	0.0259
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	5.638	**Data do not follow a Discernable Distribution (0.05)**	
Theta Star	0.00261		
MLE of Mean	0.0147		
MLE of Standard Deviation	0.0062		
nu star	327		
Approximate Chi Square Value (.05)	286.1	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0407	95% CLT UCL	0.0167
Adjusted Chi Square Value	283.8	95% Jackknife UCL	0.0167
		95% Standard Bootstrap UCL	0.0167
Anderson-Darling Test Statistic	1.027	95% Bootstrap-t UCL	0.0172
Anderson-Darling 5% Critical Value	0.747	95% Hall's Bootstrap UCL	0.0168
Kolmogorov-Smirnov Test Statistic	0.179	95% Percentile Bootstrap UCL	0.0166
Kolmogorov-Smirnov 5% Critical Value	0.163	95% BCA Bootstrap UCL	0.0168
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.0199
		97.5% Chebyshev(Mean, Sd) UCL	0.0221
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.0265
95% Approximate Gamma UCL	0.0168		
95% Adjusted Gamma UCL	0.017		
Potential UCL to Use		Use 95% Student's-t UCL	0.0167
		or 95% Modified-t UCL	0.0168

	A	B	C	D	E	F	G	H	I	J	K	L
1501												
1502	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1503	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1504	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1505												
1506												
1507	**Tin**											
1508												
1509	**General Statistics**											
1510	Number of Valid Observations					29	Number of Distinct Observations					29
1511												
1512	**Raw Statistics**						**Log-transformed Statistics**					
1513	Minimum					0.00255	Minimum of Log Data					-5.97
1514	Maximum					0.0416	Maximum of Log Data					-3.179
1515	Mean					0.00822	Mean of log Data					-5.019
1516	Median					0.00604	SD of log Data					0.622
1517	SD					0.00734						
1518	Coefficient of Variation					0.893						
1519	Skewness					3.591						
1520												
1521	**Relevant UCL Statistics**											
1522	**Normal Distribution Test**						**Lognormal Distribution Test**					
1523	Shapiro Wilk Test Statistic					0.623	Shapiro Wilk Test Statistic					0.946
1524	Shapiro Wilk Critical Value					0.926	Shapiro Wilk Critical Value					0.926
1525	**Data not Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
1526												
1527	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1528	95% Student's-t UCL					0.0105	95% H-UCL					0.0102
1529	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					0.0122
1530	95% Adjusted-CLT UCL (Chen-1995)					0.0114	97.5% Chebyshev (MVUE) UCL					0.0141
1531	95% Modified-t UCL (Johnson-1978)					0.0107	99% Chebyshev (MVUE) UCL					0.0177
1532												
1533	**Gamma Distribution Test**						**Data Distribution**					
1534	k star (bias corrected)					2.217	**Data Follow Appr. Gamma Distribution at 5% Significance Level**					
1535	Theta Star					0.00371						
1536	MLE of Mean					0.00822						
1537	MLE of Standard Deviation					0.00552						
1538	nu star					128.6						
1539	Approximate Chi Square Value (.05)					103.4	**Nonparametric Statistics**					
1540	Adjusted Level of Significance					0.0407	95% CLT UCL					0.0105
1541	Adjusted Chi Square Value					102	95% Jackknife UCL					0.0105
1542							95% Standard Bootstrap UCL					0.0104
1543	Anderson-Darling Test Statistic					0.837	95% Bootstrap-t UCL					0.013
1544	Anderson-Darling 5% Critical Value					0.755	95% Hall's Bootstrap UCL					0.02
1545	Kolmogorov-Smirnov Test Statistic					0.126	95% Percentile Bootstrap UCL					0.0106
1546	Kolmogorov-Smirnov 5% Critical Value					0.164	95% BCA Bootstrap UCL					0.0117
1547	**Data follow Appr. Gamma Distribution at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					0.0142
1548							97.5% Chebyshev(Mean, Sd) UCL					0.0167
1549	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL					0.0218
1550	95% Approximate Gamma UCL					0.0102						

1551					95% Adjusted Gamma UCL	0.0104						
1552												
1553					**Potential UCL to Use**						Use 95% Approximate Gamma UCL	0.0102
1554												
1555					**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**							
1556					**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**							
1557					**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**							
1558												
1559												
1560	**Tungsten**											
1561												
1562					**General Statistics**							
1563					Number of Valid Observations	29					Number of Distinct Observations	29
1564												
1565					**Raw Statistics**						**Log-transformed Statistics**	
1566					Minimum	0.00252					Minimum of Log Data	-5.982
1567					Maximum	0.022					Maximum of Log Data	-3.819
1568					Mean	0.00594					Mean of log Data	-5.293
1569					Median	0.00503					SD of log Data	0.548
1570					SD	0.00424						
1571					Coefficient of Variation	0.713						
1572					Skewness	2.48						
1573												
1574					**Relevant UCL Statistics**							
1575					**Normal Distribution Test**						**Lognormal Distribution Test**	
1576					Shapiro Wilk Test Statistic	0.721					Shapiro Wilk Test Statistic	0.923
1577					Shapiro Wilk Critical Value	0.926					Shapiro Wilk Critical Value	0.926
1578					**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**	
1579												
1580					**Assuming Normal Distribution**						**Assuming Lognormal Distribution**	
1581					95% Student's-t UCL	0.00728					95% H-UCL	0.00718
1582					**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL	0.00852
1583					95% Adjusted-CLT UCL (Chen-1995)	0.00762					97.5% Chebyshev (MVUE) UCL	0.00969
1584					95% Modified-t UCL (Johnson-1978)	0.00734					99% Chebyshev (MVUE) UCL	0.012
1585												
1586					**Gamma Distribution Test**						**Data Distribution**	
1587					k star (bias corrected)	2.858					**Data Follow Appr. Gamma Distribution at 5% Significance Level**	
1588					Theta Star	0.00208						
1589					MLE of Mean	0.00594						
1590					MLE of Standard Deviation	0.00351						
1591					nu star	165.8						
1592					Approximate Chi Square Value (.05)	137					**Nonparametric Statistics**	
1593					Adjusted Level of Significance	0.0407					95% CLT UCL	0.00723
1594					Adjusted Chi Square Value	135.4					95% Jackknife UCL	0.00728
1595											95% Standard Bootstrap UCL	0.00722
1596					Anderson-Darling Test Statistic	1.002					95% Bootstrap-t UCL	0.00823
1597					Anderson-Darling 5% Critical Value	0.752					95% Hall's Bootstrap UCL	0.0115
1598					Kolmogorov-Smirnov Test Statistic	0.137					95% Percentile Bootstrap UCL	0.00728
1599					Kolmogorov-Smirnov 5% Critical Value	0.164					95% BCA Bootstrap UCL	0.00771
1600					**Data follow Appr. Gamma Distribution at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.00937

1601											97.5% Chebyshev(Mean, Sd) UCL	0.0108
1602	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	0.0138
1603					95% Approximate Gamma UCL	0.00719						
1604					95% Adjusted Gamma UCL	0.00727						
1605												
1606	**Potential UCL to Use**										Use 95% Approximate Gamma UCL	0.00719
1607												
1608	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1609	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1610	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1611												
1612												
1613	**Uranium**											
1614												
1615	**General Statistics**											
1616					Number of Valid Observations	29					Number of Distinct Observations	29
1617												
1618	**Raw Statistics**						**Log-transformed Statistics**					
1619					Minimum	0.00252					Minimum of Log Data	-5.983
1620					Maximum	0.0191					Maximum of Log Data	-3.958
1621					Mean	0.00727					Mean of log Data	-5.12
1622					Median	0.0054					SD of log Data	0.628
1623					SD	0.00485						
1624					Coefficient of Variation	0.667						
1625					Skewness	1.11						
1626												
1627	**Relevant UCL Statistics**											
1628	**Normal Distribution Test**						**Lognormal Distribution Test**					
1629					Shapiro Wilk Test Statistic	0.845					Shapiro Wilk Test Statistic	0.934
1630					Shapiro Wilk Critical Value	0.926					Shapiro Wilk Critical Value	0.926
1631	**Data not Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
1632												
1633	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1634					95% Student's-t UCL	0.0088					95% H-UCL	0.00929
1635	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.0111
1636					95% Adjusted-CLT UCL (Chen-1995)	0.00895					97.5% Chebyshev (MVUE) UCL	0.0128
1637					95% Modified-t UCL (Johnson-1978)	0.00883					99% Chebyshev (MVUE) UCL	0.0162
1638												
1639	**Gamma Distribution Test**						**Data Distribution**					
1640					k star (bias corrected)	2.444	**Data Follow Appr. Gamma Distribution at 5% Significance Level**					
1641					Theta Star	0.00298						
1642					MLE of Mean	0.00727						
1643					MLE of Standard Deviation	0.00465						
1644					nu star	141.7						
1645					Approximate Chi Square Value (.05)	115.2	**Nonparametric Statistics**					
1646					Adjusted Level of Significance	0.0407					95% CLT UCL	0.00875
1647					Adjusted Chi Square Value	113.8					95% Jackknife UCL	0.0088
1648											95% Standard Bootstrap UCL	0.00874
1649					Anderson-Darling Test Statistic	0.808					95% Bootstrap-t UCL	0.00911
1650					Anderson-Darling 5% Critical Value	0.754					95% Hall's Bootstrap UCL	0.00893

1651					Kolmogorov-Smirnov Test Statistic	0.163					95% Percentile Bootstrap UCL	0.00881
1652					Kolmogorov-Smirnov 5% Critical Value	0.164					95% BCA Bootstrap UCL	0.00879
1653					**Data follow Appr. Gamma Distribution at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.0112
1654											97.5% Chebyshev(Mean, Sd) UCL	0.0129
1655					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.0162
1656					95% Approximate Gamma UCL	0.00894						
1657					95% Adjusted Gamma UCL	0.00906						
1658												
1659					**Potential UCL to Use**						Use 95% Approximate Gamma UCL	0.00894
1660												
1661	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1662	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1663	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1664												
1665												
1666	**Vanadium**											
1667												
1668	**General Statistics**											
1669					Number of Valid Observations	29					Number of Distinct Observations	28
1670												
1671	**Raw Statistics**						**Log-transformed Statistics**					
1672					Minimum	0.0252					Minimum of Log Data	-3.681
1673					Maximum	0.108					Maximum of Log Data	-2.224
1674					Mean	0.041					Mean of log Data	-3.291
1675					Median	0.0387					SD of log Data	0.425
1676					SD	0.0205						
1677					Coefficient of Variation	0.5						
1678					Skewness	1.691						
1679												
1680	**Relevant UCL Statistics**											
1681	**Normal Distribution Test**						**Lognormal Distribution Test**					
1682					Shapiro Wilk Test Statistic	0.777					Shapiro Wilk Test Statistic	0.837
1683					Shapiro Wilk Critical Value	0.926					Shapiro Wilk Critical Value	0.926
1684	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
1685												
1686	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1687					95% Student's-t UCL	0.0474					95% H-UCL	0.0474
1688	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.055
1689					95% Adjusted-CLT UCL (Chen-1995)	0.0485					97.5% Chebyshev (MVUE) UCL	0.0612
1690					95% Modified-t UCL (Johnson-1978)	0.0476					99% Chebyshev (MVUE) UCL	0.0735
1691												
1692	**Gamma Distribution Test**						**Data Distribution**					
1693					k star (bias corrected)	4.835	**Data do not follow a Discernable Distribution (0.05)**					
1694					Theta Star	0.00847						
1695					MLE of Mean	0.041						
1696					MLE of Standard Deviation	0.0186						
1697					nu star	280.5						
1698					Approximate Chi Square Value (.05)	242.7	**Nonparametric Statistics**					
1699					Adjusted Level of Significance	0.0407					95% CLT UCL	0.0472
1700					Adjusted Chi Square Value	240.6					95% Jackknife UCL	0.0474

1701											95% Standard Bootstrap UCL	0.0471
1702					Anderson-Darling Test Statistic	1.875					95% Bootstrap-t UCL	0.0498
1703					Anderson-Darling 5% Critical Value	0.747					95% Hall's Bootstrap UCL	0.0495
1704					Kolmogorov-Smirnov Test Statistic	0.271					95% Percentile Bootstrap UCL	0.0474
1705					Kolmogorov-Smirnov 5% Critical Value	0.163					95% BCA Bootstrap UCL	0.0486
1706					**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.0576
1707											97.5% Chebyshev(Mean, Sd) UCL	0.0647
1708					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.0788
1709					95% Approximate Gamma UCL	0.0474						
1710					95% Adjusted Gamma UCL	0.0478						
1711												
1712					**Potential UCL to Use**						Use 95% Student's-t UCL	0.0474
1713											or 95% Modified-t UCL	0.0476
1714												
1715	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1716	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1717	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1718												
1719												
1720	**Zinc**											
1721												
1722	**General Statistics**											
1723					Number of Valid Observations	29					Number of Distinct Observations	29
1724												
1725	**Raw Statistics**						**Log-transformed Statistics**					
1726					Minimum	18.96					Minimum of Log Data	2.942
1727					Maximum	32.46					Maximum of Log Data	3.48
1728					Mean	24.78					Mean of log Data	3.202
1729					Median	25.2					SD of log Data	0.13
1730					SD	3.219						
1731					Coefficient of Variation	0.13						
1732					Skewness	0.283						
1733												
1734	**Relevant UCL Statistics**											
1735	**Normal Distribution Test**						**Lognormal Distribution Test**					
1736					Shapiro Wilk Test Statistic	0.983					Shapiro Wilk Test Statistic	0.987
1737					Shapiro Wilk Critical Value	0.926					Shapiro Wilk Critical Value	0.926
1738	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
1739												
1740	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1741					95% Student's-t UCL	25.8					95% H-UCL	25.85
1742	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	27.39
1743					95% Adjusted-CLT UCL (Chen-1995)	25.8					97.5% Chebyshev (MVUE) UCL	28.52
1744					95% Modified-t UCL (Johnson-1978)	25.8					99% Chebyshev (MVUE) UCL	30.74
1745												
1746	**Gamma Distribution Test**						**Data Distribution**					
1747					k star (bias corrected)	55.3	**Data appear Normal at 5% Significance Level**					
1748					Theta Star	0.448						
1749					MLE of Mean	24.78						
1750					MLE of Standard Deviation	3.332						

	A	B	C	D	E	F	G	H	I	J	K	L
1751					nu star	3207						
1752					Approximate Chi Square Value (.05)	3077	**Nonparametric Statistics**					
1753					Adjusted Level of Significance	0.0407					95% CLT UCL	25.76
1754					Adjusted Chi Square Value	3069					95% Jackknife UCL	25.8
1755											95% Standard Bootstrap UCL	25.76
1756					Anderson-Darling Test Statistic	0.171					95% Bootstrap-t UCL	25.79
1757					Anderson-Darling 5% Critical Value	0.744					95% Hall's Bootstrap UCL	25.81
1758					Kolmogorov-Smirnov Test Statistic	0.0941					95% Percentile Bootstrap UCL	25.76
1759					Kolmogorov-Smirnov 5% Critical Value	0.162					95% BCA Bootstrap UCL	25.74
1760			**Data appear Gamma Distributed at 5% Significance Level**								95% Chebyshev(Mean, Sd) UCL	27.38
1761											97.5% Chebyshev(Mean, Sd) UCL	28.51
1762			**Assuming Gamma Distribution**								99% Chebyshev(Mean, Sd) UCL	30.73
1763					95% Approximate Gamma UCL	25.83						
1764					95% Adjusted Gamma UCL	25.89						
1765												
1766			**Potential UCL to Use**								Use 95% Student's-t UCL	25.8
1767												
1768	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1769	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1770	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1771												

ProUCL Outputs: Fish Carcasses - All Fish Collected

General UCL Statistics for Full Data Sets

User Selected Options	
From File	C:\Users\jmcphail\Desktop\UCL for server\fish_carcass_all.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Aluminum

General Statistics

Number of Valid Observations	79	Number of Distinct Observations	61

Raw Statistics		Log-transformed Statistics	
Minimum	0.21	Minimum of Log Data	-1.561
Maximum	13.2	Maximum of Log Data	2.58
Mean	0.969	Mean of log Data	-0.44
Median	0.56	SD of log Data	0.709
SD	1.71		
Coefficient of Variation	1.765		
Skewness	5.756		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Lilliefors Test Statistic	0.344	Lilliefors Test Statistic	0.134
Lilliefors Critical Value	0.0997	Lilliefors Critical Value	0.0997
Data not Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	1.289	95% H-UCL	0.972
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1.142
95% Adjusted-CLT UCL (Chen-1995)	1.418	97.5% Chebyshev (MVUE) UCL	1.279
95% Modified-t UCL (Johnson-1978)	1.31	99% Chebyshev (MVUE) UCL	1.549
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	1.325	**Data do not follow a Discernable Distribution (0.05)**	
Theta Star	0.731		
MLE of Mean	0.969		
MLE of Standard Deviation	0.842		
nu star	209.4		
Approximate Chi Square Value (.05)	176.9	**Nonparametric Statistics**	
Adjusted Level of Significance	0.047	95% CLT UCL	1.285
Adjusted Chi Square Value	176.3	95% Jackknife UCL	1.289
		95% Standard Bootstrap UCL	1.297
Anderson-Darling Test Statistic	7.211	95% Bootstrap-t UCL	1.854
Anderson-Darling 5% Critical Value	0.773	95% Hall's Bootstrap UCL	2.546
Kolmogorov-Smirnov Test Statistic	0.222	95% Percentile Bootstrap UCL	1.301
Kolmogorov-Smirnov 5% Critical Value	0.103	95% BCA Bootstrap UCL	1.456

51	**Data not Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	1.807
52											97.5% Chebyshev(Mean, Sd) UCL	2.17
53	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	2.883
54					95% Approximate Gamma UCL	1.147						
55					95% Adjusted Gamma UCL	1.15						
56												
57	**Potential UCL to Use**										Use 95% Chebyshev (Mean, Sd) UCL	1.807
58												
59	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
60	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
61	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
62												
63												
64	**Antimony**											
65												
66	**General Statistics**											
67	Number of Valid Observations					79					Number of Distinct Observations	9
68												
69	**Raw Statistics**										**Log-transformed Statistics**	
70	Minimum					0.0025					Minimum of Log Data	-5.991
71	Maximum					0.019					Maximum of Log Data	-3.963
72	Mean					0.00367					Mean of log Data	-5.791
73	Median					0.0025					SD of log Data	0.498
74	SD					0.00339						
75	Coefficient of Variation					0.922						
76	Skewness					3.432						
77												
78												
79	**Relevant UCL Statistics**											
80	**Normal Distribution Test**										**Lognormal Distribution Test**	
81	Lilliefors Test Statistic					0.471					Lilliefors Test Statistic	0.492
82	Lilliefors Critical Value					0.0997					Lilliefors Critical Value	0.0997
83	**Data not Normal at 5% Significance Level**										**Data not Lognormal at 5% Significance Level**	
84												
85	**Assuming Normal Distribution**										**Assuming Lognormal Distribution**	
86	95% Student's-t UCL					0.00431					95% H-UCL	0.00384
87	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.00434
88	95% Adjusted-CLT UCL (Chen-1995)					0.00446					97.5% Chebyshev (MVUE) UCL	0.00473
89	95% Modified-t UCL (Johnson-1978)					0.00433					99% Chebyshev (MVUE) UCL	0.00548
90												
91	**Gamma Distribution Test**										**Data Distribution**	
92	k star (bias corrected)					2.77					**Data do not follow a Discernable Distribution (0.05)**	
93	Theta Star					0.00133						
94	MLE of Mean					0.00367						
95	MLE of Standard Deviation					0.00221						
96	nu star					437.6						
97	Approximate Chi Square Value (.05)					390.1					**Nonparametric Statistics**	
98	Adjusted Level of Significance					0.047					95% CLT UCL	0.0043
99	Adjusted Chi Square Value					389.3					95% Jackknife UCL	0.00431
100											95% Standard Bootstrap UCL	0.0043

101					Anderson-Darling Test Statistic	20.3					95% Bootstrap-t UCL	0.00459
102					Anderson-Darling 5% Critical Value	0.759					95% Hall's Bootstrap UCL	0.00438
103					Kolmogorov-Smirnov Test Statistic	0.494					95% Percentile Bootstrap UCL	0.00435
104					Kolmogorov-Smirnov 5% Critical Value	0.101					95% BCA Bootstrap UCL	0.00444
105					**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.00534
106											97.5% Chebyshev(Mean, Sd) UCL	0.00606
107					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.00747
108					95% Approximate Gamma UCL	0.00412						
109					95% Adjusted Gamma UCL	0.00413						
110												
111					**Potential UCL to Use**						Use 95% Student's-t UCL	0.00431
112											or 95% Modified-t UCL	0.00433
113												
114	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
115	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
116	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
117												
118												
119	**Arsenic**											
120												
121	**General Statistics**											
122	Number of Valid Observations					79	Number of Distinct Observations					33
123												
124	**Raw Statistics**						**Log-transformed Statistics**					
125	Minimum					0.025	Minimum of Log Data					-3.689
126	Maximum					1.77	Maximum of Log Data					0.571
127	Mean					0.24	Mean of log Data					-2.152
128	Median					0.11	SD of log Data					1.139
129	SD					0.369						
130	Coefficient of Variation					1.535						
131	Skewness					2.596						
132												
133	**Relevant UCL Statistics**											
134	**Normal Distribution Test**						**Lognormal Distribution Test**					
135	Lilliefors Test Statistic					0.323	Lilliefors Test Statistic					0.101
136	Lilliefors Critical Value					0.0997	Lilliefors Critical Value					0.0997
137	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
138												
139	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
140	95% Student's-t UCL					0.31	95% H-UCL					0.303
141	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					0.371
142	95% Adjusted-CLT UCL (Chen-1995)					0.322	97.5% Chebyshev (MVUE) UCL					0.437
143	95% Modified-t UCL (Johnson-1978)					0.312	99% Chebyshev (MVUE) UCL					0.566
144												
145	**Gamma Distribution Test**						**Data Distribution**					
146	k star (bias corrected)					0.792	**Data do not follow a Discernable Distribution (0.05)**					
147	Theta Star					0.303						
148	MLE of Mean					0.24						
149	MLE of Standard Deviation					0.27						
150	nu star					125.2						

151	Approximate Chi Square Value (.05)					100.4	**Nonparametric Statistics**					
152	Adjusted Level of Significance					0.047	95% CLT UCL					0.309
153	Adjusted Chi Square Value					99.94	95% Jackknife UCL					0.31
154							95% Standard Bootstrap UCL					0.308
155	Anderson-Darling Test Statistic					4.21	95% Bootstrap-t UCL					0.331
156	Anderson-Darling 5% Critical Value					0.79	95% Hall's Bootstrap UCL					0.32
157	Kolmogorov-Smirnov Test Statistic					0.179	95% Percentile Bootstrap UCL					0.312
158	Kolmogorov-Smirnov 5% Critical Value					0.104	95% BCA Bootstrap UCL					0.324
159	**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					0.421
160							97.5% Chebyshev(Mean, Sd) UCL					0.5
161	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL					0.654
162	95% Approximate Gamma UCL					0.3						
163	95% Adjusted Gamma UCL					0.301						
164												
165	**Potential UCL to Use**						Use 95% Chebyshev (Mean, Sd) UCL					0.421
166												
167	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
168	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
169	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
170												
171												
172	**Barium**											
173												
174	**General Statistics**											
175	Number of Valid Observations					79	Number of Distinct Observations					39
176												
177	**Raw Statistics**						**Log-transformed Statistics**					
178	Minimum					0.12	Minimum of Log Data					-2.12
179	Maximum					0.7	Maximum of Log Data					-0.357
180	Mean					0.333	Mean of log Data					-1.167
181	Median					0.3	SD of log Data					0.375
182	SD					0.125						
183	Coefficient of Variation					0.376						
184	Skewness					0.75						
185												
186	**Relevant UCL Statistics**											
187	**Normal Distribution Test**						**Lognormal Distribution Test**					
188	Lilliefors Test Statistic					0.137	Lilliefors Test Statistic					0.0855
189	Lilliefors Critical Value					0.0997	Lilliefors Critical Value					0.0997
190	**Data not Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
191												
192	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
193	95% Student's-t UCL					0.357	95% H-UCL					0.36
194	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					0.397
195	95% Adjusted-CLT UCL (Chen-1995)					0.358	97.5% Chebyshev (MVUE) UCL					0.424
196	95% Modified-t UCL (Johnson-1978)					0.357	99% Chebyshev (MVUE) UCL					0.478
197												
198	**Gamma Distribution Test**						**Data Distribution**					
199	k star (bias corrected)					7.191	**Data appear Gamma Distributed at 5% Significance Level**					
200	Theta Star					0.0463						

201					MLE of Mean	0.333						
202					MLE of Standard Deviation	0.124						
203					nu star	1136						
204					Approximate Chi Square Value (.05)	1059	**Nonparametric Statistics**					
205					Adjusted Level of Significance	0.047					95% CLT UCL	0.356
206					Adjusted Chi Square Value	1058					95% Jackknife UCL	0.357
207											95% Standard Bootstrap UCL	0.356
208					Anderson-Darling Test Statistic	0.641					95% Bootstrap-t UCL	0.358
209					Anderson-Darling 5% Critical Value	0.752					95% Hall's Bootstrap UCL	0.357
210					Kolmogorov-Smirnov Test Statistic	0.0949					95% Percentile Bootstrap UCL	0.357
211					Kolmogorov-Smirnov 5% Critical Value	0.1					95% BCA Bootstrap UCL	0.357
212					**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.395
213											97.5% Chebyshev(Mean, Sd) UCL	0.421
214					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.474
215					95% Approximate Gamma UCL	0.358						
216					95% Adjusted Gamma UCL	0.358						
217												
218					**Potential UCL to Use**						Use 95% Approximate Gamma UCL	0.358
219												
220	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
221	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
222	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
223												
224												
225	**Beryllium**											
226												
227	**General Statistics**											
228					Number of Valid Observations	79					Number of Distinct Observations	1
229												
230												
231	**Warning: There is only one distinct observation value in this data set - resulting in '0' variance!**											
232	**ProUCL (or any other software) should not be used on such a data set!**											
233	**The data set for variable Beryllium was not processed!**											
234												
235	**If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.**											
236	**The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).**											
237												
238												
239												
240	**Bismuth**											
241												
242	**General Statistics**											
243					Number of Valid Observations	79					Number of Distinct Observations	4
244												
245					**Raw Statistics**		**Log-transformed Statistics**					
246					Minimum	0.025					Minimum of Log Data	-3.689
247					Maximum	0.28					Maximum of Log Data	-1.273
248					Mean	0.035					Mean of log Data	-3.579
249					Median	0.025					SD of log Data	0.48
250					SD	0.0441						

Coefficient of Variation	1.261	
Skewness	4.41	

Warning: There are only 4 Distinct Values in this data

There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values to compute bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Lilliefors Test Statistic	0.539	Lilliefors Test Statistic	0.54
Lilliefors Critical Value	0.0997	Lilliefors Critical Value	0.0997
Data not Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	0.0432	95% H-UCL	0.0346
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.039
95% Adjusted-CLT UCL (Chen-1995)	0.0458	97.5% Chebyshev (MVUE) UCL	0.0424
95% Modified-t UCL (Johnson-1978)	0.0436	99% Chebyshev (MVUE) UCL	0.0489
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	2.289	**Data do not follow a Discernable Distribution (0.05)**	
Theta Star	0.0153		
MLE of Mean	0.035		
MLE of Standard Deviation	0.0231		
nu star	361.6		
Approximate Chi Square Value (.05)	318.5	**Nonparametric Statistics**	
Adjusted Level of Significance	0.047	95% CLT UCL	0.0431
Adjusted Chi Square Value	317.8	95% Jackknife UCL	0.0432
		95% Standard Bootstrap UCL	0.0428
Anderson-Darling Test Statistic	28.85	95% Bootstrap-t UCL	0.0453
Anderson-Darling 5% Critical Value	0.762	95% Hall's Bootstrap UCL	0.0418
Kolmogorov-Smirnov Test Statistic	0.554	95% Percentile Bootstrap UCL	0.044
Kolmogorov-Smirnov 5% Critical Value	0.102	95% BCA Bootstrap UCL	0.0459
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.0566
		97.5% Chebyshev(Mean, Sd) UCL	0.066
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.0843
95% Approximate Gamma UCL	0.0397		
95% Adjusted Gamma UCL	0.0398		
Potential UCL to Use		Use 95% Student's-t UCL	0.0432
		or 95% Modified-t UCL	0.0436

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Boron

General Statistics

Number of Valid Observations	79	Number of Distinct Observations	1

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!

ProUCL (or any other software) should not be used on such a data set!

The data set for variable Boron was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Cadmium

General Statistics

Number of Valid Observations	79	Number of Distinct Observations	64

Raw Statistics		**Log-transformed Statistics**	
Minimum	0.0018	Minimum of Log Data	-6.32
Maximum	0.0291	Maximum of Log Data	-3.537
Mean	0.0107	Mean of log Data	-4.755
Median	0.0094	SD of log Data	0.714
SD	0.00663		
Coefficient of Variation	0.618		
Skewness	0.757		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Lilliefors Test Statistic	0.114	Lilliefors Test Statistic	0.0924
Lilliefors Critical Value	0.0997	Lilliefors Critical Value	0.0997
Data not Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	0.012	95% H-UCL	0.0131
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.0154
95% Adjusted-CLT UCL (Chen-1995)	0.012	97.5% Chebyshev (MVUE) UCL	0.0172
95% Modified-t UCL (Johnson-1978)	0.012	99% Chebyshev (MVUE) UCL	0.0209
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	2.349	**Data appear Gamma Distributed at 5% Significance Level**	
Theta Star	0.00456		
MLE of Mean	0.0107		
MLE of Standard Deviation	0.007		
nu star	371.1		
Approximate Chi Square Value (.05)	327.5	**Nonparametric Statistics**	

351	Adjusted Level of Significance	0.047								95% CLT UCL	0.0119	
352	Adjusted Chi Square Value	326.7								95% Jackknife UCL	0.012	
353										95% Standard Bootstrap UCL	0.0119	
354	Anderson-Darling Test Statistic	0.454								95% Bootstrap-t UCL	0.012	
355	Anderson-Darling 5% Critical Value	0.761								95% Hall's Bootstrap UCL	0.0121	
356	Kolmogorov-Smirnov Test Statistic	0.0797								95% Percentile Bootstrap UCL	0.012	
357	Kolmogorov-Smirnov 5% Critical Value	0.101								95% BCA Bootstrap UCL	0.012	
358	**Data appear Gamma Distributed at 5% Significance Level**									95% Chebyshev(Mean, Sd) UCL	0.014	
359										97.5% Chebyshev(Mean, Sd) UCL	0.0154	
360	**Assuming Gamma Distribution**									99% Chebyshev(Mean, Sd) UCL	0.0181	
361	95% Approximate Gamma UCL	0.0122										
362	95% Adjusted Gamma UCL	0.0122										
363												
364	**Potential UCL to Use**									Use 95% Approximate Gamma UCL	0.0122	
365												
366	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
367	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
368	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
369												
370												
371	**Calcium**											
372												
373	**General Statistics**											
374	Number of Valid Observations	79								Number of Distinct Observations	72	
375												
376	**Raw Statistics**						**Log-transformed Statistics**					
377	Minimum	1810								Minimum of Log Data	7.501	
378	Maximum	7230								Maximum of Log Data	8.886	
379	Mean	4139								Mean of log Data	8.3	
380	Median	4105								SD of log Data	0.246	
381	SD	958										
382	Coefficient of Variation	0.231										
383	Skewness	0.162										
384												
385	**Relevant UCL Statistics**											
386	**Normal Distribution Test**						**Lognormal Distribution Test**					
387	Lilliefors Test Statistic	0.0487								Lilliefors Test Statistic	0.0664	
388	Lilliefors Critical Value	0.0997								Lilliefors Critical Value	0.0997	
389	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
390												
391	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
392	95% Student's-t UCL	4318								95% H-UCL	4351	
393	**95% UCLs (Adjusted for Skewness)**									95% Chebyshev (MVUE) UCL	4652	
394	95% Adjusted-CLT UCL (Chen-1995)	4318								97.5% Chebyshev (MVUE) UCL	4871	
395	95% Modified-t UCL (Johnson-1978)	4319								99% Chebyshev (MVUE) UCL	5301	
396												
397	**Gamma Distribution Test**						**Data Distribution**					
398	k star (bias corrected)	17.16					**Data appear Normal at 5% Significance Level**					
399	Theta Star	241.2										
400	MLE of Mean	4139										

MLE of Standard Deviation	999.1	
nu star	2712	
Approximate Chi Square Value (.05)	2592	**Nonparametric Statistics**
Adjusted Level of Significance	0.047	95% CLT UCL 4316
Adjusted Chi Square Value	2589	95% Jackknife UCL 4318
		95% Standard Bootstrap UCL 4315
Anderson-Darling Test Statistic	0.399	95% Bootstrap-t UCL 4314
Anderson-Darling 5% Critical Value	0.751	95% Hall's Bootstrap UCL 4320
Kolmogorov-Smirnov Test Statistic	0.0548	95% Percentile Bootstrap UCL 4314
Kolmogorov-Smirnov 5% Critical Value	0.1	95% BCA Bootstrap UCL 4310
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 4609
		97.5% Chebyshev(Mean, Sd) UCL 4812
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 5211
95% Approximate Gamma UCL	4331	
95% Adjusted Gamma UCL	4334	
Potential UCL to Use		Use 95% Student's-t UCL 4318

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations	79	Number of Distinct Observations	7

Raw Statistics		**Log-transformed Statistics**	
Minimum	0.025	Minimum of Log Data	-3.689
Maximum	0.15	Maximum of Log Data	-1.897
Mean	0.0306	Mean of log Data	-3.582
Median	0.025	SD of log Data	0.359
SD	0.0202		
Coefficient of Variation	0.661		
Skewness	4.135		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Lilliefors Test Statistic	0.52	Lilliefors Test Statistic	0.529
Lilliefors Critical Value	0.0997	Lilliefors Critical Value	0.0997
Data not Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	0.0344	95% H-UCL	0.0319
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.035
95% Adjusted-CLT UCL (Chen-1995)	0.0355	97.5% Chebyshev (MVUE) UCL	0.0373
95% Modified-t UCL (Johnson-1978)	0.0346	99% Chebyshev (MVUE) UCL	0.0419

451	**Gamma Distribution Test**						**Data Distribution**					
452	k star (bias corrected)					5.21	**Data do not follow a Discernable Distribution (0.05)**					
453	Theta Star					0.00587						
454	MLE of Mean					0.0306						
455	MLE of Standard Deviation					0.0134						
456	nu star					823.2						
457	Approximate Chi Square Value (.05)					757.6	**Nonparametric Statistics**					
458	Adjusted Level of Significance					0.047	95% CLT UCL					0.0343
459	Adjusted Chi Square Value					756.4	95% Jackknife UCL					0.0344
460							95% Standard Bootstrap UCL					0.0343
461	Anderson-Darling Test Statistic					25.37	95% Bootstrap-t UCL					0.0365
462	Anderson-Darling 5% Critical Value					0.754	95% Hall's Bootstrap UCL					0.0352
463	Kolmogorov-Smirnov Test Statistic					0.533	95% Percentile Bootstrap UCL					0.0345
464	Kolmogorov-Smirnov 5% Critical Value					0.101	95% BCA Bootstrap UCL					0.0357
465	**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					0.0405
466							97.5% Chebyshev(Mean, Sd) UCL					0.0448
467	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL					0.0532
468	95% Approximate Gamma UCL					0.0333						
469	95% Adjusted Gamma UCL					0.0333						
470												
471	**Potential UCL to Use**						Use 95% Student's-t UCL					0.0344
472							or 95% Modified-t UCL					0.0346
473												
474	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
475	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
476	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
477												
478												
479	**Cobalt**											
480												
481	**General Statistics**											
482	Number of Valid Observations					79	Number of Distinct Observations					46
483												
484	**Raw Statistics**						**Log-transformed Statistics**					
485	Minimum					0.007	Minimum of Log Data					-4.962
486	Maximum					0.157	Maximum of Log Data					-1.852
487	Mean					0.037	Mean of log Data					-3.454
488	Median					0.032	SD of log Data					0.568
489	SD					0.0228						
490	Coefficient of Variation					0.615						
491	Skewness					2.22						
492												
493	**Relevant UCL Statistics**											
494	**Normal Distribution Test**						**Lognormal Distribution Test**					
495	Lilliefors Test Statistic					0.152	Lilliefors Test Statistic					0.0487
496	Lilliefors Critical Value					0.0997	Lilliefors Critical Value					0.0997
497	**Data not Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
498												
499	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
500	95% Student's-t UCL					0.0413	95% H-UCL					0.042

501	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.0481
502	95% Adjusted-CLT UCL (Chen-1995)					0.0419					97.5% Chebyshev (MVUE) UCL	0.0529
503	95% Modified-t UCL (Johnson-1978)					0.0414					99% Chebyshev (MVUE) UCL	0.0623
504												
505	**Gamma Distribution Test**										**Data Distribution**	
506	k star (bias corrected)					3.206					**Data appear Gamma Distributed at 5% Significance Level**	
507	Theta Star					0.0116						
508	MLE of Mean					0.037						
509	MLE of Standard Deviation					0.0207						
510	nu star					506.6						
511	Approximate Chi Square Value (.05)					455.4					**Nonparametric Statistics**	
512	Adjusted Level of Significance					0.047					95% CLT UCL	0.0413
513	Adjusted Chi Square Value					454.5					95% Jackknife UCL	0.0413
514											95% Standard Bootstrap UCL	0.0413
515	Anderson-Darling Test Statistic					0.37					95% Bootstrap-t UCL	0.0421
516	Anderson-Darling 5% Critical Value					0.758					95% Hall's Bootstrap UCL	0.0427
517	Kolmogorov-Smirnov Test Statistic					0.0779					95% Percentile Bootstrap UCL	0.0415
518	Kolmogorov-Smirnov 5% Critical Value					0.101					95% BCA Bootstrap UCL	0.0422
519	**Data appear Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	0.0482
520											97.5% Chebyshev(Mean, Sd) UCL	0.053
521	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	0.0625
522	95% Approximate Gamma UCL					0.0412						
523	95% Adjusted Gamma UCL					0.0413						
524												
525	**Potential UCL to Use**										Use 95% Approximate Gamma UCL	0.0412
526												
527	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
528	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
529	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
530												
531												
532	**Copper**											
533												
534	**General Statistics**											
535	Number of Valid Observations					79					Number of Distinct Observations	29
536												
537	**Raw Statistics**										**Log-transformed Statistics**	
538	Minimum					0.26					Minimum of Log Data	-1.347
539	Maximum					0.56					Maximum of Log Data	-0.58
540	Mean					0.378					Mean of log Data	-0.989
541	Median					0.38					SD of log Data	0.18
542	SD					0.0691						
543	Coefficient of Variation					0.183						
544	Skewness					0.525						
545												
546	**Relevant UCL Statistics**											
547	**Normal Distribution Test**										**Lognormal Distribution Test**	
548	Lilliefors Test Statistic					0.0968					Lilliefors Test Statistic	0.0765
549	Lilliefors Critical Value					0.0997					Lilliefors Critical Value	0.0997
550	**Data appear Normal at 5% Significance Level**										**Data appear Lognormal at 5% Significance Level**	

551												
552	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
553					95% Student's-t UCL	0.391					95% H-UCL	0.391
554	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.412
555					95% Adjusted-CLT UCL (Chen-1995)	0.391					97.5% Chebyshev (MVUE) UCL	0.426
556					95% Modified-t UCL (Johnson-1978)	0.391					99% Chebyshev (MVUE) UCL	0.455
557												
558	**Gamma Distribution Test**						**Data Distribution**					
559					k star (bias corrected)	29.96	**Data appear Normal at 5% Significance Level**					
560					Theta Star	0.0126						
561					MLE of Mean	0.378						
562					MLE of Standard Deviation	0.0691						
563					nu star	4733						
564					Approximate Chi Square Value (.05)	4574	**Nonparametric Statistics**					
565					Adjusted Level of Significance	0.047					95% CLT UCL	0.391
566					Adjusted Chi Square Value	4572					95% Jackknife UCL	0.391
567											95% Standard Bootstrap UCL	0.391
568					Anderson-Darling Test Statistic	0.414					95% Bootstrap-t UCL	0.392
569					Anderson-Darling 5% Critical Value	0.75					95% Hall's Bootstrap UCL	0.392
570					Kolmogorov-Smirnov Test Statistic	0.0792					95% Percentile Bootstrap UCL	0.391
571					Kolmogorov-Smirnov 5% Critical Value	0.1					95% BCA Bootstrap UCL	0.391
572	**Data appear Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	0.412
573											97.5% Chebyshev(Mean, Sd) UCL	0.427
574	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	0.455
575					95% Approximate Gamma UCL	0.391						
576					95% Adjusted Gamma UCL	0.391						
577												
578	**Potential UCL to Use**										Use 95% Student's-t UCL	0.391
579												
580	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
581	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
582	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
583												
584												
585	**Iron**											
586												
587	**General Statistics**											
588					Number of Valid Observations	79					Number of Distinct Observations	11
589												
590	**Raw Statistics**						**Log-transformed Statistics**					
591					Minimum	3					Minimum of Log Data	1.099
592					Maximum	63					Maximum of Log Data	4.143
593					Mean	5.62					Mean of log Data	1.591
594					Median	5					SD of log Data	0.372
595					SD	6.647						
596					Coefficient of Variation	1.183						
597					Skewness	8.455						
598												
599	**Relevant UCL Statistics**											
600	**Normal Distribution Test**						**Lognormal Distribution Test**					

601					Lilliefors Test Statistic	0.389					Lilliefors Test Statistic	0.24
602					Lilliefors Critical Value	0.0997					Lilliefors Critical Value	0.0997
603					**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**	
604												
605					**Assuming Normal Distribution**						**Assuming Lognormal Distribution**	
606					95% Student's-t UCL	6.865					95% H-UCL	5.672
607					**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL	6.243
608					95% Adjusted-CLT UCL (Chen-1995)	7.611					97.5% Chebyshev (MVUE) UCL	6.67
609					95% Modified-t UCL (Johnson-1978)	6.984					99% Chebyshev (MVUE) UCL	7.509
610												
611					**Gamma Distribution Test**						**Data Distribution**	
612					k star (bias corrected)	3.724					**Data do not follow a Discernable Distribution (0.05)**	
613					Theta Star	1.509						
614					MLE of Mean	5.62						
615					MLE of Standard Deviation	2.912						
616					nu star	588.4						
617					Approximate Chi Square Value (.05)	533.1					**Nonparametric Statistics**	
618					Adjusted Level of Significance	0.047					95% CLT UCL	6.85
619					Adjusted Chi Square Value	532.1					95% Jackknife UCL	6.865
620											95% Standard Bootstrap UCL	6.836
621					Anderson-Darling Test Statistic	10.46					95% Bootstrap-t UCL	11.1
622					Anderson-Darling 5% Critical Value	0.757					95% Hall's Bootstrap UCL	12
623					Kolmogorov-Smirnov Test Statistic	0.294					95% Percentile Bootstrap UCL	7.082
624					Kolmogorov-Smirnov 5% Critical Value	0.101					95% BCA Bootstrap UCL	7.93
625					**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	8.88
626											97.5% Chebyshev(Mean, Sd) UCL	10.29
627					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	13.06
628					95% Approximate Gamma UCL	6.203						
629					95% Adjusted Gamma UCL	6.214						
630												
631					**Potential UCL to Use**						Use 95% Student's-t UCL	6.865
632											or 95% Modified-t UCL	6.984
633												
634	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
635	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
636	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
637												
638												
639	**Lead**											
640												
641	**General Statistics**											
642	Number of Valid Observations					79	Number of Distinct Observations					36
643												
644	**Raw Statistics**						**Log-transformed Statistics**					
645	Minimum					0.0025	Minimum of Log Data					-5.991
646	Maximum					0.0895	Maximum of Log Data					-2.414
647	Mean					0.0171	Mean of log Data					-4.335
648	Median					0.013	SD of log Data					0.768
649	SD					0.0139						
650	Coefficient of Variation					0.811						

	Skewness	2.607
	Relevant UCL Statistics	
	Normal Distribution Test	**Lognormal Distribution Test**
	Lilliefors Test Statistic 0.168	Lilliefors Test Statistic 0.11
	Lilliefors Critical Value 0.0997	Lilliefors Critical Value 0.0997
	Data not Normal at 5% Significance Level	**Data not Lognormal at 5% Significance Level**
	Assuming Normal Distribution	**Assuming Lognormal Distribution**
	95% Student's-t UCL 0.0197	95% H-UCL 0.021
	95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL 0.0249
	95% Adjusted-CLT UCL (Chen-1995) 0.0202	97.5% Chebyshev (MVUE) UCL 0.0281
	95% Modified-t UCL (Johnson-1978) 0.0198	99% Chebyshev (MVUE) UCL 0.0344
	Gamma Distribution Test	**Data Distribution**
	k star (bias corrected) 1.941	**Data appear Gamma Distributed at 5% Significance Level**
	Theta Star 0.00883	
	MLE of Mean 0.0171	
	MLE of Standard Deviation 0.0123	
	nu star 306.7	
	Approximate Chi Square Value (.05) 267.1	**Nonparametric Statistics**
	Adjusted Level of Significance 0.047	95% CLT UCL 0.0197
	Adjusted Chi Square Value 266.4	95% Jackknife UCL 0.0197
		95% Standard Bootstrap UCL 0.0197
	Anderson-Darling Test Statistic 0.724	95% Bootstrap-t UCL 0.0204
	Anderson-Darling 5% Critical Value 0.763	95% Hall's Bootstrap UCL 0.0208
	Kolmogorov-Smirnov Test Statistic 0.0794	95% Percentile Bootstrap UCL 0.0198
	Kolmogorov-Smirnov 5% Critical Value 0.102	95% BCA Bootstrap UCL 0.0203
	Data appear Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL 0.024
		97.5% Chebyshev(Mean, Sd) UCL 0.0269
	Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL 0.0327
	95% Approximate Gamma UCL 0.0197	
	95% Adjusted Gamma UCL 0.0197	
	Potential UCL to Use	Use 95% Approximate Gamma UCL 0.0197
	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.	
	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)	
	and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.	
	Lithium	
	General Statistics	
	Number of Valid Observations 79	Number of Distinct Observations 19
	Raw Statistics	**Log-transformed Statistics**
	Minimum 0.0025	Minimum of Log Data -5.991
	Maximum 0.022	Maximum of Log Data -3.817
	Mean 0.00785	Mean of log Data -5.018

701					Median	0.007					SD of log Data	0.608
702					SD	0.00459						
703					Coefficient of Variation	0.584						
704					Skewness	1.07						
705												
706	**Relevant UCL Statistics**											
707	**Normal Distribution Test**						**Lognormal Distribution Test**					
708					Lilliefors Test Statistic	0.169					Lilliefors Test Statistic	0.158
709					Lilliefors Critical Value	0.0997					Lilliefors Critical Value	0.0997
710	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
711												
712	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
713					95% Student's-t UCL	0.00871					95% H-UCL	0.00909
714	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.0105
715					95% Adjusted-CLT UCL (Chen-1995)	0.00877					97.5% Chebyshev (MVUE) UCL	0.0116
716					95% Modified-t UCL (Johnson-1978)	0.00872					99% Chebyshev (MVUE) UCL	0.0138
717												
718	**Gamma Distribution Test**						**Data Distribution**					
719					k star (bias corrected)	2.963	**Data do not follow a Discernable Distribution (0.05)**					
720					Theta Star	0.00265						
721					MLE of Mean	0.00785						
722					MLE of Standard Deviation	0.00456						
723					nu star	468.1						
724					Approximate Chi Square Value (.05)	418.9	**Nonparametric Statistics**					
725					Adjusted Level of Significance	0.047					95% CLT UCL	0.0087
726					Adjusted Chi Square Value	418.1					95% Jackknife UCL	0.00871
727											95% Standard Bootstrap UCL	0.00871
728					Anderson-Darling Test Statistic	1.452					95% Bootstrap-t UCL	0.00879
729					Anderson-Darling 5% Critical Value	0.759					95% Hall's Bootstrap UCL	0.0088
730					Kolmogorov-Smirnov Test Statistic	0.133					95% Percentile Bootstrap UCL	0.00873
731					Kolmogorov-Smirnov 5% Critical Value	0.101					95% BCA Bootstrap UCL	0.00872
732	**Data not Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	0.0101
733											97.5% Chebyshev(Mean, Sd) UCL	0.0111
734	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	0.013
735					95% Approximate Gamma UCL	0.00878						
736					95% Adjusted Gamma UCL	0.00879						
737												
738	**Potential UCL to Use**										Use 95% Chebyshev (Mean, Sd) UCL	0.0101
739												
740	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
741	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
742	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
743												
744												
745	**Magnesium**											
746												
747	**General Statistics**											
748					Number of Valid Observations	79					Number of Distinct Observations	49
749												
750	**Raw Statistics**						**Log-transformed Statistics**					

751					Minimum	268				Minimum of Log Data	5.591	
752					Maximum	366				Maximum of Log Data	5.903	
753					Mean	329.2				Mean of log Data	5.794	
754					Median	332				SD of log Data	0.0682	
755					SD	21.91						
756					Coefficient of Variation	0.0665						
757					Skewness	-0.623						
758												
759					**Relevant UCL Statistics**							
760					**Normal Distribution Test**					**Lognormal Distribution Test**		
761					Lilliefors Test Statistic	0.115				Lilliefors Test Statistic	0.127	
762					Lilliefors Critical Value	0.0997				Lilliefors Critical Value	0.0997	
763					**Data not Normal at 5% Significance Level**					**Data not Lognormal at 5% Significance Level**		
764												
765					**Assuming Normal Distribution**					**Assuming Lognormal Distribution**		
766					95% Student's-t UCL	333.3				95% H-UCL	N/A	
767					**95% UCLs (Adjusted for Skewness)**					95% Chebyshev (MVUE) UCL	340.2	
768					95% Adjusted-CLT UCL (Chen-1995)	333.1				97.5% Chebyshev (MVUE) UCL	345	
769					95% Modified-t UCL (Johnson-1978)	333.3				99% Chebyshev (MVUE) UCL	354.4	
770												
771					**Gamma Distribution Test**					**Data Distribution**		
772					k star (bias corrected)	213.1				**Data do not follow a Discernable Distribution (0.05)**		
773					Theta Star	1.545						
774					MLE of Mean	329.2						
775					MLE of Standard Deviation	22.55						
776					nu star	33668						
777					Approximate Chi Square Value (.05)	33242				**Nonparametric Statistics**		
778					Adjusted Level of Significance	0.047				95% CLT UCL	333.3	
779					Adjusted Chi Square Value	33235				95% Jackknife UCL	333.3	
780										95% Standard Bootstrap UCL	333.1	
781					Anderson-Darling Test Statistic	1.148				95% Bootstrap-t UCL	333.2	
782					Anderson-Darling 5% Critical Value	0.749				95% Hall's Bootstrap UCL	333	
783					Kolmogorov-Smirnov Test Statistic	0.123				95% Percentile Bootstrap UCL	333.2	
784					Kolmogorov-Smirnov 5% Critical Value	0.1				95% BCA Bootstrap UCL	332.7	
785					**Data not Gamma Distributed at 5% Significance Level**					95% Chebyshev(Mean, Sd) UCL	339.9	
786										97.5% Chebyshev(Mean, Sd) UCL	344.6	
787					**Assuming Gamma Distribution**					99% Chebyshev(Mean, Sd) UCL	353.7	
788					95% Approximate Gamma UCL	333.4						
789					95% Adjusted Gamma UCL	333.5						
790												
791					**Potential UCL to Use**					Use 95% Student's-t UCL	333.3	
792										or 95% Modified-t UCL	333.3	
793												
794	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
795	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
796	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
797												
798												
799	**Manganese**											
800												

	A	B	C	D	E	F	G	H	I	J	K	L
801	**General Statistics**											
802	Number of Valid Observations					79	Number of Distinct Observations					70
803												
804	**Raw Statistics**						**Log-transformed Statistics**					
805	Minimum					1.25	Minimum of Log Data					0.223
806	Maximum					9.81	Maximum of Log Data					2.283
807	Mean					2.91	Mean of log Data					0.975
808	Median					2.55	SD of log Data					0.416
809	SD					1.449						
810	Coefficient of Variation					0.498						
811	Skewness					2.283						
812												
813	**Relevant UCL Statistics**											
814	**Normal Distribution Test**						**Lognormal Distribution Test**					
815	Lilliefors Test Statistic					0.158	Lilliefors Test Statistic					0.0738
816	Lilliefors Critical Value					0.0997	Lilliefors Critical Value					0.0997
817	**Data not Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
818												
819	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
820	95% Student's-t UCL					3.182	95% H-UCL					3.149
821	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					3.5
822	95% Adjusted-CLT UCL (Chen-1995)					3.223	97.5% Chebyshev (MVUE) UCL					3.765
823	95% Modified-t UCL (Johnson-1978)					3.189	99% Chebyshev (MVUE) UCL					4.285
824												
825	**Gamma Distribution Test**						**Data Distribution**					
826	k star (bias corrected)					5.329	**Data appear Lognormal at 5% Significance Level**					
827	Theta Star					0.546						
828	MLE of Mean					2.91						
829	MLE of Standard Deviation					1.261						
830	nu star					841.9						
831	Approximate Chi Square Value (.05)					775.6	**Nonparametric Statistics**					
832	Adjusted Level of Significance					0.047	95% CLT UCL					3.179
833	Adjusted Chi Square Value					774.4	95% Jackknife UCL					3.182
834							95% Standard Bootstrap UCL					3.181
835	Anderson-Darling Test Statistic					1.032	95% Bootstrap-t UCL					3.224
836	Anderson-Darling 5% Critical Value					0.754	95% Hall's Bootstrap UCL					3.281
837	Kolmogorov-Smirnov Test Statistic					0.102	95% Percentile Bootstrap UCL					3.19
838	Kolmogorov-Smirnov 5% Critical Value					0.101	95% BCA Bootstrap UCL					3.233
839	**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					3.621
840							97.5% Chebyshev(Mean, Sd) UCL					3.929
841	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL					4.533
842	95% Approximate Gamma UCL					3.159						
843	95% Adjusted Gamma UCL					3.164						
844												
845	**Potential UCL to Use**						Use 95% Student's-t UCL					3.182
846							or 95% Modified-t UCL					3.189
847							or 95% H-UCL					3.149
848												
849	**ProUCL computes and outputs H-statistic based UCLs for historical reasons only.**											
850	**H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.**											

	A	B	C	D	E	F	G	H	I	J	K	L
851	**It is therefore recommended to avoid the use of H-statistic based 95% UCLs.**											
852	**Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.**											
853												
854	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
855	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
856	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
857												
858												
859	**Mercury**											
860												
861	**General Statistics**											
862	Number of Valid Observations					79	Number of Distinct Observations					21
863												
864	**Raw Statistics**						**Log-transformed Statistics**					
865	Minimum					0.06	Minimum of Log Data					-2.813
866	Maximum					0.27	Maximum of Log Data					-1.309
867	Mean					0.128	Mean of log Data					-2.11
868	Median					0.13	SD of log Data					0.328
869	SD					0.0412						
870	Coefficient of Variation					0.323						
871	Skewness					0.693						
872												
873	**Relevant UCL Statistics**											
874	**Normal Distribution Test**						**Lognormal Distribution Test**					
875	Lilliefors Test Statistic					0.0849	Lilliefors Test Statistic					0.108
876	Lilliefors Critical Value					0.0997	Lilliefors Critical Value					0.0997
877	**Data appear Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
878												
879	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
880	95% Student's-t UCL					0.135	95% H-UCL					0.137
881	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					0.149
882	95% Adjusted-CLT UCL (Chen-1995)					0.136	97.5% Chebyshev (MVUE) UCL					0.158
883	95% Modified-t UCL (Johnson-1978)					0.135	99% Chebyshev (MVUE) UCL					0.176
884												
885	**Gamma Distribution Test**						**Data Distribution**					
886	k star (bias corrected)					9.47	**Data appear Normal at 5% Significance Level**					
887	Theta Star					0.0135						
888	MLE of Mean					0.128						
889	MLE of Standard Deviation					0.0415						
890	nu star					1496						
891	Approximate Chi Square Value (.05)					1407	**Nonparametric Statistics**					
892	Adjusted Level of Significance					0.047	95% CLT UCL					0.135
893	Adjusted Chi Square Value					1406	95% Jackknife UCL					0.135
894							95% Standard Bootstrap UCL					0.135
895	Anderson-Darling Test Statistic					0.532	95% Bootstrap-t UCL					0.136
896	Anderson-Darling 5% Critical Value					0.751	95% Hall's Bootstrap UCL					0.137
897	Kolmogorov-Smirnov Test Statistic					0.0864	95% Percentile Bootstrap UCL					0.135
898	Kolmogorov-Smirnov 5% Critical Value					0.1	95% BCA Bootstrap UCL					0.135
899	**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					0.148
900							97.5% Chebyshev(Mean, Sd) UCL					0.157

901	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	0.174
902					95% Approximate Gamma UCL	0.136						
903					95% Adjusted Gamma UCL	0.136						
904												
905	**Potential UCL to Use**										Use 95% Student's-t UCL	0.135
906												
907	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
908	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
909	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
910												
911												
912	**Molybdenum**											
913												
914	**General Statistics**											
915					Number of Valid Observations	79					Number of Distinct Observations	18
916												
917	**Raw Statistics**						**Log-transformed Statistics**					
918					Minimum	0.0025					Minimum of Log Data	-5.991
919					Maximum	0.026					Maximum of Log Data	-3.65
920					Mean	0.00699					Mean of log Data	-5.187
921					Median	0.006					SD of log Data	0.663
922					SD	0.00511						
923					Coefficient of Variation	0.731						
924					Skewness	1.657						
925												
926	**Relevant UCL Statistics**											
927	**Normal Distribution Test**						**Lognormal Distribution Test**					
928					Lilliefors Test Statistic	0.221					Lilliefors Test Statistic	0.204
929					Lilliefors Critical Value	0.0997					Lilliefors Critical Value	0.0997
930	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
931												
932	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
933					95% Student's-t UCL	0.00795					95% H-UCL	0.00807
934	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.00941
935					95% Adjusted-CLT UCL (Chen-1995)	0.00805					97.5% Chebyshev (MVUE) UCL	0.0105
936					95% Modified-t UCL (Johnson-1978)	0.00797					99% Chebyshev (MVUE) UCL	0.0126
937												
938	**Gamma Distribution Test**						**Data Distribution**					
939					k star (bias corrected)	2.308	**Data do not follow a Discernable Distribution (0.05)**					
940					Theta Star	0.00303						
941					MLE of Mean	0.00699						
942					MLE of Standard Deviation	0.0046						
943					nu star	364.6						
944					Approximate Chi Square Value (.05)	321.4	**Nonparametric Statistics**					
945					Adjusted Level of Significance	0.047					95% CLT UCL	0.00794
946					Adjusted Chi Square Value	320.6					95% Jackknife UCL	0.00795
947											95% Standard Bootstrap UCL	0.00794
948					Anderson-Darling Test Statistic	2.688					95% Bootstrap-t UCL	0.00814
949					Anderson-Darling 5% Critical Value	0.761					95% Hall's Bootstrap UCL	0.00808
950					Kolmogorov-Smirnov Test Statistic	0.187					95% Percentile Bootstrap UCL	0.00793

951	Kolmogorov-Smirnov 5% Critical Value	0.102								95% BCA Bootstrap UCL	0.00804	
952	**Data not Gamma Distributed at 5% Significance Level**									95% Chebyshev(Mean, Sd) UCL	0.0095	
953										97.5% Chebyshev(Mean, Sd) UCL	0.0106	
954	**Assuming Gamma Distribution**									99% Chebyshev(Mean, Sd) UCL	0.0127	
955	95% Approximate Gamma UCL	0.00793										
956	95% Adjusted Gamma UCL	0.00795										
957												
958	**Potential UCL to Use**									Use 95% Chebyshev (Mean, Sd) UCL	0.0095	
959												
960	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
961	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
962	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
963												
964												
965	**Nickel**											
966												
967	**General Statistics**											
968	Number of Valid Observations	79								Number of Distinct Observations	2	
969												
970	**Raw Statistics**									**Log-transformed Statistics**		
971	Minimum	0.025								Minimum of Log Data	-3.689	
972	Maximum	0.06								Maximum of Log Data	-2.813	
973	Mean	0.0259								Mean of log Data	-3.667	
974	Median	0.025								SD of log Data	0.138	
975	SD	0.00553										
976	Coefficient of Variation	0.214										
977	Skewness	6.161										
978												
979												
980	**Warning: There are only 2 Distinct Values in this data**											
981	**There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.**											
982	**Those methods will return a 'N/A' value on your output display!**											
983												
984	**It is necessary to have 4 or more Distinct Values to compute bootstrap methods.**											
985	**However, results obtained using 4 to 9 distinct values may not be reliable.**											
986	**It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.**											
987												
988	**Relevant UCL Statistics**											
989	**Normal Distribution Test**									**Lognormal Distribution Test**		
990	Lilliefors Test Statistic	0.538								Lilliefors Test Statistic	0.538	
991	Lilliefors Critical Value	0.0997								Lilliefors Critical Value	0.0997	
992	**Data not Normal at 5% Significance Level**									**Data not Lognormal at 5% Significance Level**		
993												
994	**Assuming Normal Distribution**									**Assuming Lognormal Distribution**		
995	95% Student's-t UCL	0.0269								95% H-UCL	0.0265	
996	**95% UCLs (Adjusted for Skewness)**									95% Chebyshev (MVUE) UCL	0.0276	
997	95% Adjusted-CLT UCL (Chen-1995)	0.0274								97.5% Chebyshev (MVUE) UCL	0.0283	
998	95% Modified-t UCL (Johnson-1978)	0.027								99% Chebyshev (MVUE) UCL	0.0298	
999												
1000	**Gamma Distribution Test**									**Data Distribution**		

1001					k star (bias corrected)	38.15	**Data do not follow a Discernable Distribution (0.05)**					
1002					Theta Star	0.0006786						
1003					MLE of Mean	0.0259						
1004					MLE of Standard Deviation	0.00419						
1005					nu star	6027						
1006					Approximate Chi Square Value (.05)	5848	**Nonparametric Statistics**					
1007					Adjusted Level of Significance	0.047					95% CLT UCL	0.0269
1008					Adjusted Chi Square Value	5844					95% Jackknife UCL	N/A
1009											95% Standard Bootstrap UCL	N/A
1010					Anderson-Darling Test Statistic	29.68					95% Bootstrap-t UCL	N/A
1011					Anderson-Darling 5% Critical Value	0.749					95% Hall's Bootstrap UCL	N/A
1012					Kolmogorov-Smirnov Test Statistic	0.54					95% Percentile Bootstrap UCL	N/A
1013					Kolmogorov-Smirnov 5% Critical Value	0.1					95% BCA Bootstrap UCL	N/A
1014					**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.0286
1015											97.5% Chebyshev(Mean, Sd) UCL	0.0298
1016					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.0321
1017					95% Approximate Gamma UCL	0.0267						
1018					95% Adjusted Gamma UCL	0.0267						
1019												
1020					**Potential UCL to Use**						Use 95% Student's-t UCL	0.0269
1021											or 95% Modified-t UCL	0.027
1022												
1023	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1024	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1025	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1026												
1027												
1028	**Potassium**											
1029												
1030	**General Statistics**											
1031					Number of Valid Observations	79					Number of Distinct Observations	46
1032												
1033	**Raw Statistics**						**Log-transformed Statistics**					
1034					Minimum	3710					Minimum of Log Data	8.219
1035					Maximum	4310					Maximum of Log Data	8.369
1036					Mean	4033					Mean of log Data	8.302
1037					Median	4040					SD of log Data	0.0354
1038					SD	142.1						
1039					Coefficient of Variation	0.0352						
1040					Skewness	-0.207						
1041												
1042	**Relevant UCL Statistics**											
1043	**Normal Distribution Test**						**Lognormal Distribution Test**					
1044					Lilliefors Test Statistic	0.054					Lilliefors Test Statistic	0.0608
1045					Lilliefors Critical Value	0.0997					Lilliefors Critical Value	0.0997
1046	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
1047												
1048	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1049					95% Student's-t UCL	4060					95% H-UCL	N/A
1050	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	4103

1051	95% Adjusted-CLT UCL (Chen-1995)					4059	97.5% Chebyshev (MVUE) UCL					4133
1052	95% Modified-t UCL (Johnson-1978)					4059	99% Chebyshev (MVUE) UCL					4193
1053												
1054	**Gamma Distribution Test**						**Data Distribution**					
1055	k star (bias corrected)					780.6	**Data appear Normal at 5% Significance Level**					
1056	Theta Star					5.167						
1057	MLE of Mean					4033						
1058	MLE of Standard Deviation					144.3						
1059	nu star					123331						
1060	Approximate Chi Square Value (.05)					122515	**Nonparametric Statistics**					
1061	Adjusted Level of Significance					0.047	95% CLT UCL					4059
1062	Adjusted Chi Square Value					122500	95% Jackknife UCL					4060
1063							95% Standard Bootstrap UCL					4058
1064	Anderson-Darling Test Statistic					0.346	95% Bootstrap-t UCL					4060
1065	Anderson-Darling 5% Critical Value					0.749	95% Hall's Bootstrap UCL					4059
1066	Kolmogorov-Smirnov Test Statistic					0.0579	95% Percentile Bootstrap UCL					4059
1067	Kolmogorov-Smirnov 5% Critical Value					0.1	95% BCA Bootstrap UCL					4059
1068	**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					4103
1069							97.5% Chebyshev(Mean, Sd) UCL					4133
1070	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL					4192
1071	95% Approximate Gamma UCL					4060						
1072	95% Adjusted Gamma UCL					4060						
1073												
1074	**Potential UCL to Use**						Use 95% Student's-t UCL					4060
1075												
1076	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1077	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1078	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1079												
1080												
1081	**Rubidium**											
1082												
1083	**General Statistics**											
1084	Number of Valid Observations					79	Number of Distinct Observations					57
1085												
1086	**Raw Statistics**						**Log-transformed Statistics**					
1087	Minimum					5.5	Minimum of Log Data					1.705
1088	Maximum					17.7	Maximum of Log Data					2.874
1089	Mean					12.6	Mean of log Data					2.506
1090	Median					12.9	SD of log Data					0.246
1091	SD					2.834						
1092	Coefficient of Variation					0.225						
1093	Skewness					-0.298						
1094												
1095	**Relevant UCL Statistics**											
1096	**Normal Distribution Test**						**Lognormal Distribution Test**					
1097	Lilliefors Test Statistic					0.0886	Lilliefors Test Statistic					0.101
1098	Lilliefors Critical Value					0.0997	Lilliefors Critical Value					0.0997
1099	**Data appear Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
1100												

1101	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1102	95% Student's-t UCL	13.13					95% H-UCL	13.26				
1103	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL	14.17				
1104	95% Adjusted-CLT UCL (Chen-1995)	13.12					97.5% Chebyshev (MVUE) UCL	14.84				
1105	95% Modified-t UCL (Johnson-1978)	13.13					99% Chebyshev (MVUE) UCL	16.16				
1106												
1107	**Gamma Distribution Test**						**Data Distribution**					
1108	k star (bias corrected)	17.35					**Data appear Normal at 5% Significance Level**					
1109	Theta Star	0.727										
1110	MLE of Mean	12.6										
1111	MLE of Standard Deviation	3.026										
1112	nu star	2741										
1113	Approximate Chi Square Value (.05)	2620					**Nonparametric Statistics**					
1114	Adjusted Level of Significance	0.047					95% CLT UCL	13.13				
1115	Adjusted Chi Square Value	2618					95% Jackknife UCL	13.13				
1116							95% Standard Bootstrap UCL	13.14				
1117	Anderson-Darling Test Statistic	0.859					95% Bootstrap-t UCL	13.14				
1118	Anderson-Darling 5% Critical Value	0.751					95% Hall's Bootstrap UCL	13.1				
1119	Kolmogorov-Smirnov Test Statistic	0.0927					95% Percentile Bootstrap UCL	13.13				
1120	Kolmogorov-Smirnov 5% Critical Value	0.1					95% BCA Bootstrap UCL	13.11				
1121	**Data follow Appr. Gamma Distribution at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	13.99				
1122							97.5% Chebyshev(Mean, Sd) UCL	14.59				
1123	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	15.78				
1124	95% Approximate Gamma UCL	13.18										
1125	95% Adjusted Gamma UCL	13.19										
1126												
1127	**Potential UCL to Use**						Use 95% Student's-t UCL	13.13				
1128												
1129	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1130	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1131	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1132												
1133												
1134	**Selenium**											
1135												
1136	**General Statistics**											
1137	Number of Valid Observations	79					Number of Distinct Observations	38				
1138												
1139	**Raw Statistics**						**Log-transformed Statistics**					
1140	Minimum	0.15					Minimum of Log Data	-1.897				
1141	Maximum	0.98					Maximum of Log Data	-0.0202				
1142	Mean	0.336					Mean of log Data	-1.175				
1143	Median	0.31					SD of log Data	0.396				
1144	SD	0.16										
1145	Coefficient of Variation	0.474										
1146	Skewness	2.024										
1147												
1148	**Relevant UCL Statistics**											
1149	**Normal Distribution Test**						**Lognormal Distribution Test**					
1150	Lilliefors Test Statistic	0.202					Lilliefors Test Statistic	0.11				

1151					Lilliefors Critical Value	0.0997					Lilliefors Critical Value	0.0997
1152	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
1153												
1154	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1155					95% Student's-t UCL	0.366					95% H-UCL	0.362
1156	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.401
1157					95% Adjusted-CLT UCL (Chen-1995)	0.37					97.5% Chebyshev (MVUE) UCL	0.43
1158					95% Modified-t UCL (Johnson-1978)	0.367					99% Chebyshev (MVUE) UCL	0.487
1159												
1160	**Gamma Distribution Test**						**Data Distribution**					
1161					k star (bias corrected)	5.81	**Data do not follow a Discernable Distribution (0.05)**					
1162					Theta Star	0.0579						
1163					MLE of Mean	0.336						
1164					MLE of Standard Deviation	0.139						
1165					nu star	917.9						
1166					Approximate Chi Square Value (.05)	848.6	**Nonparametric Statistics**					
1167					Adjusted Level of Significance	0.047					95% CLT UCL	0.366
1168					Adjusted Chi Square Value	847.4					95% Jackknife UCL	0.366
1169											95% Standard Bootstrap UCL	0.366
1170					Anderson-Darling Test Statistic	1.75					95% Bootstrap-t UCL	0.371
1171					Anderson-Darling 5% Critical Value	0.754					95% Hall's Bootstrap UCL	0.372
1172					Kolmogorov-Smirnov Test Statistic	0.139					95% Percentile Bootstrap UCL	0.367
1173					Kolmogorov-Smirnov 5% Critical Value	0.101					95% BCA Bootstrap UCL	0.372
1174	**Data not Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	0.414
1175											97.5% Chebyshev(Mean, Sd) UCL	0.448
1176	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	0.515
1177					95% Approximate Gamma UCL	0.364						
1178					95% Adjusted Gamma UCL	0.364						
1179												
1180	**Potential UCL to Use**										Use 95% Student's-t UCL	0.366
1181											or 95% Modified-t UCL	0.367
1182												
1183	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1184	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1185	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1186												
1187												
1188	**Silver**											
1189												
1190	**General Statistics**											
1191					Number of Valid Observations	79					Number of Distinct Observations	1
1192												
1193												
1194	**Warning: There is only one distinct observation value in this data set - resulting in '0' variance!**											
1195	**ProUCL (or any other software) should not be used on such a data set!**											
1196	**The data set for variable Silver was not processed!**											
1197												
1198	**If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.**											
1199	**The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).**											
1200												

Sodium

General Statistics

Number of Valid Observations	79	Number of Distinct Observations	66

Raw Statistics		**Log-transformed Statistics**	
Minimum	483	Minimum of Log Data	6.18
Maximum	846	Maximum of Log Data	6.741
Mean	620.8	Mean of log Data	6.427
Median	616	SD of log Data	0.0951
SD	60.03		
Coefficient of Variation	0.0967		
Skewness	0.679		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Lilliefors Test Statistic	0.0566	Lilliefors Test Statistic	0.0511
Lilliefors Critical Value	0.0997	Lilliefors Critical Value	0.0997
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	632.1	95% H-UCL	N/A
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	649.8
95% Adjusted-CLT UCL (Chen-1995)	632.5	97.5% Chebyshev (MVUE) UCL	662.4
95% Modified-t UCL (Johnson-1978)	632.2	99% Chebyshev (MVUE) UCL	687

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	107	**Data appear Normal at 5% Significance Level**	
Theta Star	5.801		
MLE of Mean	620.8		
MLE of Standard Deviation	60.01		
nu star	16909		
Approximate Chi Square Value (.05)	16608	**Nonparametric Statistics**	
Adjusted Level of Significance	0.047	95% CLT UCL	632
Adjusted Chi Square Value	16602	95% Jackknife UCL	632.1
		95% Standard Bootstrap UCL	631.5
Anderson-Darling Test Statistic	0.293	95% Bootstrap-t UCL	632.1
Anderson-Darling 5% Critical Value	0.749	95% Hall's Bootstrap UCL	632.9
Kolmogorov-Smirnov Test Statistic	0.0511	95% Percentile Bootstrap UCL	631.4
Kolmogorov-Smirnov 5% Critical Value	0.1	95% BCA Bootstrap UCL	632.3
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	650.3
		97.5% Chebyshev(Mean, Sd) UCL	663
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	688
95% Approximate Gamma UCL	632.1		
95% Adjusted Gamma UCL	632.3		

Potential UCL to Use		Use 95% Student's-t UCL	632.1

	A	B	C	D	E	F	G	H	I	J	K	L
1251	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1252	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1253	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1254												
1255												
1256	**Strontium**											
1257												
1258	**General Statistics**											
1259	Number of Valid Observations					79	Number of Distinct Observations					72
1260												
1261	**Raw Statistics**						**Log-transformed Statistics**					
1262	Minimum					3.13	Minimum of Log Data					1.141
1263	Maximum					15.5	Maximum of Log Data					2.741
1264	Mean					8.071	Mean of log Data					2.039
1265	Median					7.8	SD of log Data					0.323
1266	SD					2.511						
1267	Coefficient of Variation					0.311						
1268	Skewness					0.544						
1269												
1270	**Relevant UCL Statistics**											
1271	**Normal Distribution Test**						**Lognormal Distribution Test**					
1272	Lilliefors Test Statistic					0.0776	Lilliefors Test Statistic					0.0612
1273	Lilliefors Critical Value					0.0997	Lilliefors Critical Value					0.0997
1274	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
1275												
1276	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1277	95% Student's-t UCL					8.541	95% H-UCL					8.631
1278	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					9.398
1279	95% Adjusted-CLT UCL (Chen-1995)					8.554	97.5% Chebyshev (MVUE) UCL					9.965
1280	95% Modified-t UCL (Johnson-1978)					8.544	99% Chebyshev (MVUE) UCL					11.08
1281												
1282	**Gamma Distribution Test**						**Data Distribution**					
1283	k star (bias corrected)					9.911	**Data appear Normal at 5% Significance Level**					
1284	Theta Star					0.814						
1285	MLE of Mean					8.071						
1286	MLE of Standard Deviation					2.564						
1287	nu star					1566						
1288	Approximate Chi Square Value (.05)					1475	**Nonparametric Statistics**					
1289	Adjusted Level of Significance					0.047	95% CLT UCL					8.535
1290	Adjusted Chi Square Value					1473	95% Jackknife UCL					8.541
1291							95% Standard Bootstrap UCL					8.531
1292	Anderson-Darling Test Statistic					0.209	95% Bootstrap-t UCL					8.565
1293	Anderson-Darling 5% Critical Value					0.751	95% Hall's Bootstrap UCL					8.566
1294	Kolmogorov-Smirnov Test Statistic					0.0507	95% Percentile Bootstrap UCL					8.513
1295	Kolmogorov-Smirnov 5% Critical Value					0.1	95% BCA Bootstrap UCL					8.554
1296	**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					9.302
1297							97.5% Chebyshev(Mean, Sd) UCL					9.835
1298	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL					10.88
1299	95% Approximate Gamma UCL					8.568						
1300	95% Adjusted Gamma UCL					8.577						

1301												
1302	**Potential UCL to Use**						Use 95% Student's-t UCL					8.541
1303												
1304	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1305	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1306	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1307												
1308												
1309	**Tellurium**											
1310												
1311	**General Statistics**											
1312	Number of Valid Observations					79	Number of Distinct Observations					1
1313												
1314												
1315	**Warning: There is only one distinct observation value in this data set - resulting in '0' variance!**											
1316	**ProUCL (or any other software) should not be used on such a data set!**											
1317	**The data set for variable Tellurium was not processed!**											
1318												
1319	**If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.**											
1320	**The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).**											
1321												
1322												
1323												
1324	**Thallium**											
1325												
1326	**General Statistics**											
1327	Number of Valid Observations					79	Number of Distinct Observations					25
1328												
1329	**Raw Statistics**						**Log-transformed Statistics**					
1330	Minimum					0.0025	Minimum of Log Data					-5.991
1331	Maximum					0.048	Maximum of Log Data					-3.037
1332	Mean					0.0121	Mean of log Data					-4.526
1333	Median					0.01	SD of log Data					0.459
1334	SD					0.00669						
1335	Coefficient of Variation					0.553						
1336	Skewness					2.528						
1337												
1338	**Relevant UCL Statistics**											
1339	**Normal Distribution Test**						**Lognormal Distribution Test**					
1340	Lilliefors Test Statistic					0.211	Lilliefors Test Statistic					0.151
1341	Lilliefors Critical Value					0.0997	Lilliefors Critical Value					0.0997
1342	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
1343												
1344	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1345	95% Student's-t UCL					0.0134	95% H-UCL					0.0132
1346	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					0.0148
1347	95% Adjusted-CLT UCL (Chen-1995)					0.0136	97.5% Chebyshev (MVUE) UCL					0.0161
1348	95% Modified-t UCL (Johnson-1978)					0.0134	99% Chebyshev (MVUE) UCL					0.0185
1349												
1350	**Gamma Distribution Test**						**Data Distribution**					

1351					k star (bias corrected)	4.459	**Data do not follow a Discernable Distribution (0.05)**					
1352					Theta Star	0.00272						
1353					MLE of Mean	0.0121						
1354					MLE of Standard Deviation	0.00573						
1355					nu star	704.5						
1356					Approximate Chi Square Value (.05)	643.9	**Nonparametric Statistics**					
1357					Adjusted Level of Significance	0.047					95% CLT UCL	0.0133
1358					Adjusted Chi Square Value	642.8					95% Jackknife UCL	0.0134
1359											95% Standard Bootstrap UCL	0.0133
1360					Anderson-Darling Test Statistic	2.249					95% Bootstrap-t UCL	0.0137
1361					Anderson-Darling 5% Critical Value	0.755					95% Hall's Bootstrap UCL	0.0139
1362					Kolmogorov-Smirnov Test Statistic	0.177					95% Percentile Bootstrap UCL	0.0134
1363					Kolmogorov-Smirnov 5% Critical Value	0.101					95% BCA Bootstrap UCL	0.0136
1364					**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.0154
1365											97.5% Chebyshev(Mean, Sd) UCL	0.0168
1366					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.0196
1367					95% Approximate Gamma UCL	0.0132						
1368					95% Adjusted Gamma UCL	0.0133						
1369												
1370					**Potential UCL to Use**						Use 95% Student's-t UCL	0.0134
1371											or 95% Modified-t UCL	0.0134
1372												
1373	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1374	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1375	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1376												
1377												
1378	**Tin**											
1379												
1380	**General Statistics**											
1381					Number of Valid Observations	79					Number of Distinct Observations	22
1382												
1383	**Raw Statistics**						**Log-transformed Statistics**					
1384					Minimum	0.0025					Minimum of Log Data	-5.991
1385					Maximum	0.457					Maximum of Log Data	-0.783
1386					Mean	0.0132					Mean of log Data	-5.08
1387					Median	0.006					SD of log Data	0.848
1388					SD	0.0509						
1389					Coefficient of Variation	3.867						
1390					Skewness	8.737						
1391												
1392	**Relevant UCL Statistics**											
1393	**Normal Distribution Test**						**Lognormal Distribution Test**					
1394					Lilliefors Test Statistic	0.429					Lilliefors Test Statistic	0.175
1395					Lilliefors Critical Value	0.0997					Lilliefors Critical Value	0.0997
1396	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
1397												
1398	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1399					95% Student's-t UCL	0.0227					95% H-UCL	0.0109
1400	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.0131

1401	95% Adjusted-CLT UCL (Chen-1995)					0.0286	97.5% Chebyshev (MVUE) UCL					0.0149
1402	95% Modified-t UCL (Johnson-1978)					0.0236	99% Chebyshev (MVUE) UCL					0.0185
1403												
1404	**Gamma Distribution Test**						**Data Distribution**					
1405	k star (bias corrected)					0.772	**Data do not follow a Discernable Distribution (0.05)**					
1406	Theta Star					0.017						
1407	MLE of Mean					0.0132						
1408	MLE of Standard Deviation					0.015						
1409	nu star					121.9						
1410	Approximate Chi Square Value (.05)					97.44	**Nonparametric Statistics**					
1411	Adjusted Level of Significance					0.047	95% CLT UCL					0.0226
1412	Adjusted Chi Square Value					97.04	95% Jackknife UCL					0.0227
1413							95% Standard Bootstrap UCL					0.0227
1414	Anderson-Darling Test Statistic					8.496	95% Bootstrap-t UCL					0.0816
1415	Anderson-Darling 5% Critical Value					0.791	95% Hall's Bootstrap UCL					0.0626
1416	Kolmogorov-Smirnov Test Statistic					0.237	95% Percentile Bootstrap UCL					0.0245
1417	Kolmogorov-Smirnov 5% Critical Value					0.104	95% BCA Bootstrap UCL					0.0311
1418	**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					0.0381
1419							97.5% Chebyshev(Mean, Sd) UCL					0.0489
1420	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL					0.0701
1421	95% Approximate Gamma UCL					0.0165						
1422	95% Adjusted Gamma UCL					0.0165						
1423												
1424	**Potential UCL to Use**						Use 95% Chebyshev (Mean, Sd) UCL					0.0381
1425												
1426	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1427	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1428	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1429												
1430												
1431	**Tungsten**											
1432												
1433	**General Statistics**											
1434	Number of Valid Observations					79	Number of Distinct Observations					27
1435												
1436	**Raw Statistics**						**Log-transformed Statistics**					
1437	Minimum					0.0025	Minimum of Log Data					-5.991
1438	Maximum					0.124	Maximum of Log Data					-2.087
1439	Mean					0.0167	Mean of log Data					-5.025
1440	Median					0.0025	SD of log Data					1.309
1441	SD					0.0244						
1442	Coefficient of Variation					1.46						
1443	Skewness					1.977						
1444												
1445	**Relevant UCL Statistics**											
1446	**Normal Distribution Test**						**Lognormal Distribution Test**					
1447	Lilliefors Test Statistic					0.315	Lilliefors Test Statistic					0.365
1448	Lilliefors Critical Value					0.0997	Lilliefors Critical Value					0.0997
1449	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
1450												

1451	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1452	95% Student's-t UCL	0.0213					95% H-UCL	0.0227				
1453	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL	0.0278				
1454	95% Adjusted-CLT UCL (Chen-1995)	0.0219					97.5% Chebyshev (MVUE) UCL	0.0333				
1455	95% Modified-t UCL (Johnson-1978)	0.0214					99% Chebyshev (MVUE) UCL	0.0441				
1456												
1457	**Gamma Distribution Test**						**Data Distribution**					
1458	k star (bias corrected)	0.637					**Data do not follow a Discernable Distribution (0.05)**					
1459	Theta Star	0.0262										
1460	MLE of Mean	0.0167										
1461	MLE of Standard Deviation	0.0209										
1462	nu star	100.7										
1463	Approximate Chi Square Value (.05)	78.51					**Nonparametric Statistics**					
1464	Adjusted Level of Significance	0.047					95% CLT UCL	0.0212				
1465	Adjusted Chi Square Value	78.14					95% Jackknife UCL	0.0213				
1466							95% Standard Bootstrap UCL	0.0212				
1467	Anderson-Darling Test Statistic	10.42					95% Bootstrap-t UCL	0.0223				
1468	Anderson-Darling 5% Critical Value	0.803					95% Hall's Bootstrap UCL	0.022				
1469	Kolmogorov-Smirnov Test Statistic	0.361					95% Percentile Bootstrap UCL	0.0213				
1470	Kolmogorov-Smirnov 5% Critical Value	0.105					95% BCA Bootstrap UCL	0.0218				
1471	**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.0287				
1472							97.5% Chebyshev(Mean, Sd) UCL	0.0339				
1473	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.044				
1474	95% Approximate Gamma UCL	0.0214										
1475	95% Adjusted Gamma UCL	0.0215										
1476												
1477	**Potential UCL to Use**						Use 95% Chebyshev (Mean, Sd) UCL	0.0287				
1478												
1479	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1480	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1481	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1482												
1483												
1484	**Uranium**											
1485												
1486	**General Statistics**											
1487	Number of Valid Observations	79					Number of Distinct Observations	2				
1488												
1489	**Raw Statistics**						**Log-transformed Statistics**					
1490	Minimum	0.0025					Minimum of Log Data	-5.991				
1491	Maximum	0.007					Maximum of Log Data	-4.962				
1492	Mean	0.00256					Mean of log Data	-5.978				
1493	Median	0.0025					SD of log Data	0.116				
1494	SD	0.0005063										
1495	Coefficient of Variation	0.198										
1496	Skewness	8.888										
1497												
1498												
1499	**Warning: There are only 2 Distinct Values in this data**											
1500	**There are insufficient Distinct Values to perform some GOF tests and bootstrap methods.**											

	A	B	C	D	E	F	G	H	I	J	K	L
1501	**Those methods will return a 'N/A' value on your output display!**											
1502												
1503	**It is necessary to have 4 or more Distinct Values to compute bootstrap methods.**											
1504	**However, results obtained using 4 to 9 distinct values may not be reliable.**											
1505	**It is recommended to have 10-15 or more observations for accurate and meaningful bootstrap results.**											
1506												
1507	**Relevant UCL Statistics**											
1508	**Normal Distribution Test**						**Lognormal Distribution Test**					
1509					Lilliefors Test Statistic	0.532					Lilliefors Test Statistic	0.532
1510					Lilliefors Critical Value	0.0997					Lilliefors Critical Value	0.0997
1511	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
1512												
1513	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1514					95% Student's-t UCL	0.00265					95% H-UCL	0.00261
1515	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.00269
1516					95% Adjusted-CLT UCL (Chen-1995)	0.00271					97.5% Chebyshev (MVUE) UCL	0.00276
1517					95% Modified-t UCL (Johnson-1978)	0.00266					99% Chebyshev (MVUE) UCL	0.00288
1518												
1519	**Gamma Distribution Test**						**Data Distribution**					
1520					k star (bias corrected)	50.82	**Data do not follow a Discernable Distribution (0.05)**					
1521					Theta Star	5.031E-05						
1522					MLE of Mean	0.00256						
1523					MLE of Standard Deviation	0.0003587						
1524					nu star	8030						
1525					Approximate Chi Square Value (.05)	7823	**Nonparametric Statistics**					
1526					Adjusted Level of Significance	0.047					95% CLT UCL	0.00265
1527					Adjusted Chi Square Value	7819					95% Jackknife UCL	N/A
1528											95% Standard Bootstrap UCL	N/A
1529					Anderson-Darling Test Statistic	1.266E+29					95% Bootstrap-t UCL	N/A
1530					Anderson-Darling 5% Critical Value	0.748					95% Hall's Bootstrap UCL	N/A
1531					Kolmogorov-Smirnov Test Statistic	0.534					95% Percentile Bootstrap UCL	N/A
1532					Kolmogorov-Smirnov 5% Critical Value	0.1					95% BCA Bootstrap UCL	N/A
1533	**Data not Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	0.00281
1534											97.5% Chebyshev(Mean, Sd) UCL	0.00291
1535	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	0.00312
1536					95% Approximate Gamma UCL	0.00262						
1537					95% Adjusted Gamma UCL	0.00263						
1538												
1539	**Potential UCL to Use**										Use 95% Student's-t UCL	0.00265
1540											or 95% Modified-t UCL	0.00266
1541												
1542	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1543	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1544	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1545												
1546												
1547	**Vanadium**											
1548												
1549	**General Statistics**											
1550					Number of Valid Observations	79					Number of Distinct Observations	1

1551												
1552												
1553	**Warning: There is only one distinct observation value in this data set - resulting in '0' variance!**											
1554	**ProUCL (or any other software) should not be used on such a data set!**											
1555	**The data set for variable Vanadium was not processed!**											
1556												
1557	**If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.**											
1558	**The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).**											
1559												
1560												
1561												
1562	**Zinc**											
1563												
1564	**General Statistics**											
1565						Number of Valid Observations	79			Number of Distinct Observations	53	
1566												
1567	**Raw Statistics**							**Log-transformed Statistics**				
1568						Minimum	10.1			Minimum of Log Data	2.313	
1569						Maximum	22			Maximum of Log Data	3.091	
1570						Mean	14.62			Mean of log Data	2.666	
1571						Median	14.3			SD of log Data	0.183	
1572						SD	2.753					
1573						Coefficient of Variation	0.188					
1574						Skewness	0.684					
1575												
1576	**Relevant UCL Statistics**											
1577	**Normal Distribution Test**							**Lognormal Distribution Test**				
1578						Lilliefors Test Statistic	0.0977			Lilliefors Test Statistic	0.0617	
1579						Lilliefors Critical Value	0.0997			Lilliefors Critical Value	0.0997	
1580	**Data appear Normal at 5% Significance Level**							**Data appear Lognormal at 5% Significance Level**				
1581												
1582	**Assuming Normal Distribution**							**Assuming Lognormal Distribution**				
1583						95% Student's-t UCL	15.13			95% H-UCL	15.14	
1584	**95% UCLs (Adjusted for Skewness)**									95% Chebyshev (MVUE) UCL	15.94	
1585						95% Adjusted-CLT UCL (Chen-1995)	15.15			97.5% Chebyshev (MVUE) UCL	16.51	
1586						95% Modified-t UCL (Johnson-1978)	15.14			99% Chebyshev (MVUE) UCL	17.63	
1587												
1588	**Gamma Distribution Test**							**Data Distribution**				
1589						k star (bias corrected)	28.8	**Data appear Normal at 5% Significance Level**				
1590						Theta Star	0.508					
1591						MLE of Mean	14.62					
1592						MLE of Standard Deviation	2.724					
1593						nu star	4550					
1594						Approximate Chi Square Value (.05)	4394	**Nonparametric Statistics**				
1595						Adjusted Level of Significance	0.047			95% CLT UCL	15.13	
1596						Adjusted Chi Square Value	4391			95% Jackknife UCL	15.13	
1597										95% Standard Bootstrap UCL	15.14	
1598						Anderson-Darling Test Statistic	0.559			95% Bootstrap-t UCL	15.14	
1599						Anderson-Darling 5% Critical Value	0.75			95% Hall's Bootstrap UCL	15.16	
1600						Kolmogorov-Smirnov Test Statistic	0.0735			95% Percentile Bootstrap UCL	15.14	

	A	B	C	D	E	F	G	H	I	J	K	L
1601	Kolmogorov-Smirnov 5% Critical Value					0.1	95% BCA Bootstrap UCL					15.14
1602	**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					15.97
1603							97.5% Chebyshev(Mean, Sd) UCL					16.55
1604	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL					17.7
1605	95% Approximate Gamma UCL					15.14						
1606	95% Adjusted Gamma UCL					15.15						
1607												
1608	**Potential UCL to Use**						Use 95% Student's-t UCL					15.13
1609												
1610	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1611	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1612	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1613												

ProUCL Outputs: Whole Fish - All Fish Collected

General UCL Statistics for Full Data Sets

User Selected Options	
From File	U:\121810356\1_environmental\4_field_data\3_hhera\6_reporting\fish_whole_all.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Aluminum

General Statistics

Number of Valid Observations	76	Number of Distinct Observations	76

Raw Statistics		**Log-transformed Statistics**	
Minimum	0.476	Minimum of Log Data	-0.743
Maximum	63.16	Maximum of Log Data	4.146
Mean	11.06	Mean of log Data	1.548
Median	3.248	SD of log Data	1.299
SD	15.57		
Coefficient of Variation	1.408		
Skewness	1.899		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Lilliefors Test Statistic	0.306	Lilliefors Test Statistic	0.149
Lilliefors Critical Value	0.102	Lilliefors Critical Value	0.102
Data not Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	14.04	95% H-UCL	16.08
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	19.73
95% Adjusted-CLT UCL (Chen-1995)	14.42	97.5% Chebyshev (MVUE) UCL	23.63
95% Modified-t UCL (Johnson-1978)	14.1	99% Chebyshev (MVUE) UCL	31.3
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	0.687	**Data do not follow a Discernable Distribution (0.05)**	
Theta Star	16.11		
MLE of Mean	11.06		
MLE of Standard Deviation	13.35		
nu star	104.4		
Approximate Chi Square Value (.05)	81.78	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0468	95% CLT UCL	14
Adjusted Chi Square Value	81.39	95% Jackknife UCL	14.04
		95% Standard Bootstrap UCL	13.93
Anderson-Darling Test Statistic	4.037	95% Bootstrap-t UCL	14.64
Anderson-Darling 5% Critical Value	0.797	95% Hall's Bootstrap UCL	14.32
Kolmogorov-Smirnov Test Statistic	0.229	95% Percentile Bootstrap UCL	14.03
Kolmogorov-Smirnov 5% Critical Value	0.107	95% BCA Bootstrap UCL	14.6

51	**Data not Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	18.85
52											97.5% Chebyshev(Mean, Sd) UCL	22.22
53	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	28.84
54					95% Approximate Gamma UCL	14.12						
55					95% Adjusted Gamma UCL	14.18						
56												
57	**Potential UCL to Use**										Use 95% Chebyshev (Mean, Sd) UCL	18.85
58												
59	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
60	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
61	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
62												
63												
64	**Antimony**											
65												
66	**General Statistics**											
67	Number of Valid Observations					76					Number of Distinct Observations	70
68												
69	**Raw Statistics**										**Log-transformed Statistics**	
70	Minimum					0.00252					Minimum of Log Data	-5.984
71	Maximum					0.0207					Maximum of Log Data	-3.878
72	Mean					0.00422					Mean of log Data	-5.641
73	Median					0.00263					SD of log Data	0.518
74	SD					0.00335						
75	Coefficient of Variation					0.795						
76	Skewness					2.827						
77												
78	**Relevant UCL Statistics**											
79	**Normal Distribution Test**										**Lognormal Distribution Test**	
80	Lilliefors Test Statistic					0.306					Lilliefors Test Statistic	0.309
81	Lilliefors Critical Value					0.102					Lilliefors Critical Value	0.102
82	**Data not Normal at 5% Significance Level**										**Data not Lognormal at 5% Significance Level**	
83												
84	**Assuming Normal Distribution**										**Assuming Lognormal Distribution**	
85	95% Student's-t UCL					0.00486					95% H-UCL	0.00454
86	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.00516
87	95% Adjusted-CLT UCL (Chen-1995)					0.00499					97.5% Chebyshev (MVUE) UCL	0.00564
88	95% Modified-t UCL (Johnson-1978)					0.00488					99% Chebyshev (MVUE) UCL	0.00658
89												
90	**Gamma Distribution Test**										**Data Distribution**	
91	k star (bias corrected)					2.921					**Data do not follow a Discernable Distribution (0.05)**	
92	Theta Star					0.00145						
93	MLE of Mean					0.00422						
94	MLE of Standard Deviation					0.00247						
95	nu star					444						
96	Approximate Chi Square Value (.05)					396.1					**Nonparametric Statistics**	
97	Adjusted Level of Significance					0.0468					95% CLT UCL	0.00485
98	Adjusted Chi Square Value					395.3					95% Jackknife UCL	0.00486
99											95% Standard Bootstrap UCL	0.00486
100	Anderson-Darling Test Statistic					10.36					95% Bootstrap-t UCL	0.00511

101					Anderson-Darling 5% Critical Value	0.758					95% Hall's Bootstrap UCL	0.005
102					Kolmogorov-Smirnov Test Statistic	0.311					95% Percentile Bootstrap UCL	0.0049
103					Kolmogorov-Smirnov 5% Critical Value	0.103					95% BCA Bootstrap UCL	0.00502
104					**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.0059
105											97.5% Chebyshev(Mean, Sd) UCL	0.00662
106					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.00805
107					95% Approximate Gamma UCL	0.00473						
108					95% Adjusted Gamma UCL	0.00474						
109												
110					**Potential UCL to Use**						Use 95% Chebyshev (Mean, Sd) UCL	0.0059
111												
112	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
113	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
114	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
115												
116												
117	**Arsenic**											
118												
119	**General Statistics**											
120					Number of Valid Observations	76					Number of Distinct Observations	76
121												
122					**Raw Statistics**						**Log-transformed Statistics**	
123					Minimum	0.0255					Minimum of Log Data	-3.668
124					Maximum	1.341					Maximum of Log Data	0.293
125					Mean	0.228					Mean of log Data	-2.025
126					Median	0.11					SD of log Data	0.992
127					SD	0.296						
128					Coefficient of Variation	1.296						
129					Skewness	2.426						
130												
131	**Relevant UCL Statistics**											
132					**Normal Distribution Test**						**Lognormal Distribution Test**	
133					Lilliefors Test Statistic	0.257					Lilliefors Test Statistic	0.115
134					Lilliefors Critical Value	0.102					Lilliefors Critical Value	0.102
135					**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**	
136												
137					**Assuming Normal Distribution**						**Assuming Lognormal Distribution**	
138					95% Student's-t UCL	0.285					95% H-UCL	0.279
139					**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL	0.34
140					95% Adjusted-CLT UCL (Chen-1995)	0.294					97.5% Chebyshev (MVUE) UCL	0.394
141					95% Modified-t UCL (Johnson-1978)	0.286					99% Chebyshev (MVUE) UCL	0.501
142												
143					**Gamma Distribution Test**						**Data Distribution**	
144					k star (bias corrected)	1.016					**Data do not follow a Discernable Distribution (0.05)**	
145					Theta Star	0.225						
146					MLE of Mean	0.228						
147					MLE of Standard Deviation	0.226						
148					nu star	154.4						
149					Approximate Chi Square Value (.05)	126.7					**Nonparametric Statistics**	
150					Adjusted Level of Significance	0.0468					95% CLT UCL	0.284

151					Adjusted Chi Square Value	126.2					95% Jackknife UCL	0.285
152											95% Standard Bootstrap UCL	0.284
153					Anderson-Darling Test Statistic	3.113					95% Bootstrap-t UCL	0.294
154					Anderson-Darling 5% Critical Value	0.78					95% Hall's Bootstrap UCL	0.293
155					Kolmogorov-Smirnov Test Statistic	0.176					95% Percentile Bootstrap UCL	0.287
156					Kolmogorov-Smirnov 5% Critical Value	0.105					95% BCA Bootstrap UCL	0.292
157					**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.376
158											97.5% Chebyshev(Mean, Sd) UCL	0.44
159					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.566
160					95% Approximate Gamma UCL	0.278						
161					95% Adjusted Gamma UCL	0.279						
162												
163					**Potential UCL to Use**						Use 95% Chebyshev (Mean, Sd) UCL	0.376
164												
165	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
166	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
167	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
168												
169												
170	**Barium**											
171												
172	**General Statistics**											
173					Number of Valid Observations	76					Number of Distinct Observations	76
174												
175	**Raw Statistics**						**Log-transformed Statistics**					
176					Minimum	0.212					Minimum of Log Data	-1.551
177					Maximum	0.944					Maximum of Log Data	-0.0576
178					Mean	0.529					Mean of log Data	-0.695
179					Median	0.475					SD of log Data	0.343
180					SD	0.179						
181					Coefficient of Variation	0.34						
182					Skewness	0.506						
183												
184	**Relevant UCL Statistics**											
185	**Normal Distribution Test**						**Lognormal Distribution Test**					
186					Lilliefors Test Statistic	0.126					Lilliefors Test Statistic	0.0764
187					Lilliefors Critical Value	0.102					Lilliefors Critical Value	0.102
188	**Data not Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
189												
190	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
191					95% Student's-t UCL	0.563					95% H-UCL	0.568
192	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.622
193					95% Adjusted-CLT UCL (Chen-1995)	0.564					97.5% Chebyshev (MVUE) UCL	0.662
194					95% Modified-t UCL (Johnson-1978)	0.563					99% Chebyshev (MVUE) UCL	0.741
195												
196	**Gamma Distribution Test**						**Data Distribution**					
197					k star (bias corrected)	8.569	**Data appear Gamma Distributed at 5% Significance Level**					
198					Theta Star	0.0617						
199					MLE of Mean	0.529						
200					MLE of Standard Deviation	0.181						

201					nu star	1303						
202					Approximate Chi Square Value (.05)	1220				Nonparametric Statistics		
203					Adjusted Level of Significance	0.0468				95% CLT UCL	0.562	
204					Adjusted Chi Square Value	1218				95% Jackknife UCL	0.563	
205										95% Standard Bootstrap UCL	0.562	
206					Anderson-Darling Test Statistic	0.719				95% Bootstrap-t UCL	0.564	
207					Anderson-Darling 5% Critical Value	0.751				95% Hall's Bootstrap UCL	0.563	
208					Kolmogorov-Smirnov Test Statistic	0.0947				95% Percentile Bootstrap UCL	0.562	
209					Kolmogorov-Smirnov 5% Critical Value	0.102				95% BCA Bootstrap UCL	0.566	
210					**Data appear Gamma Distributed at 5% Significance Level**					95% Chebyshev(Mean, Sd) UCL	0.618	
211										97.5% Chebyshev(Mean, Sd) UCL	0.657	
212					**Assuming Gamma Distribution**					99% Chebyshev(Mean, Sd) UCL	0.733	
213					95% Approximate Gamma UCL	0.564						
214					95% Adjusted Gamma UCL	0.565						
215												
216					**Potential UCL to Use**					Use 95% Approximate Gamma UCL	0.564	
217												
218	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
219	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
220	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
221												
222												
223	**Beryllium**											
224												
225	**General Statistics**											
226					Number of Valid Observations	76				Number of Distinct Observations	63	
227												
228	**Raw Statistics**						**Log-transformed Statistics**					
229					Minimum	0.00251				Minimum of Log Data	-5.987	
230					Maximum	0.00993				Maximum of Log Data	-4.612	
231					Mean	0.00291				Mean of log Data	-5.876	
232					Median	0.00256				SD of log Data	0.234	
233					SD	0.00104						
234					Coefficient of Variation	0.358						
235					Skewness	4.772						
236												
237	**Relevant UCL Statistics**											
238	**Normal Distribution Test**						**Lognormal Distribution Test**					
239					Lilliefors Test Statistic	0.426				Lilliefors Test Statistic	0.416	
240					Lilliefors Critical Value	0.102				Lilliefors Critical Value	0.102	
241	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
242												
243	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
244					95% Student's-t UCL	0.0031				95% H-UCL	0.00302	
245	**95% UCLs (Adjusted for Skewness)**									95% Chebyshev (MVUE) UCL	0.00322	
246					95% Adjusted-CLT UCL (Chen-1995)	0.00317				97.5% Chebyshev (MVUE) UCL	0.00337	
247					95% Modified-t UCL (Johnson-1978)	0.00312				99% Chebyshev (MVUE) UCL	0.00366	
248												
249	**Gamma Distribution Test**						**Data Distribution**					
250					k star (bias corrected)	13.79	**Data do not follow a Discernable Distribution (0.05)**					

251					Theta Star	0.0002107						
252					MLE of Mean	0.00291						
253					MLE of Standard Deviation	0.0007825						
254					nu star	2096						
255					Approximate Chi Square Value (.05)	1991			**Nonparametric Statistics**			
256					Adjusted Level of Significance	0.0468					95% CLT UCL	0.0031
257					Adjusted Chi Square Value	1989					95% Jackknife UCL	0.0031
258											95% Standard Bootstrap UCL	0.0031
259					Anderson-Darling Test Statistic	16.86					95% Bootstrap-t UCL	0.00326
260					Anderson-Darling 5% Critical Value	0.75					95% Hall's Bootstrap UCL	0.00378
261					Kolmogorov-Smirnov Test Statistic	0.424					95% Percentile Bootstrap UCL	0.00312
262					Kolmogorov-Smirnov 5% Critical Value	0.102					95% BCA Bootstrap UCL	0.0032
263				**Data not Gamma Distributed at 5% Significance Level**							95% Chebyshev(Mean, Sd) UCL	0.00343
264											97.5% Chebyshev(Mean, Sd) UCL	0.00365
265				**Assuming Gamma Distribution**							99% Chebyshev(Mean, Sd) UCL	0.00409
266					95% Approximate Gamma UCL	0.00306						
267					95% Adjusted Gamma UCL	0.00306						
268												
269				**Potential UCL to Use**							Use 95% Student's-t UCL	0.0031
270											or 95% Modified-t UCL	0.00312
271												
272	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
273	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
274	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
275												
276												
277	**Bismuth**											
278												
279	**General Statistics**											
280					Number of Valid Observations	76					Number of Distinct Observations	62
281												
282	**Raw Statistics**								**Log-transformed Statistics**			
283					Minimum	0.0251					Minimum of Log Data	-3.684
284					Maximum	0.187					Maximum of Log Data	-1.679
285					Mean	0.0379					Mean of log Data	-3.463
286					Median	0.0256					SD of log Data	0.512
287					SD	0.034						
288					Coefficient of Variation	0.897						
289					Skewness	2.904						
290												
291	**Relevant UCL Statistics**											
292	**Normal Distribution Test**								**Lognormal Distribution Test**			
293					Lilliefors Test Statistic	0.475					Lilliefors Test Statistic	0.461
294					Lilliefors Critical Value	0.102					Lilliefors Critical Value	0.102
295	**Data not Normal at 5% Significance Level**								**Data not Lognormal at 5% Significance Level**			
296												
297	**Assuming Normal Distribution**								**Assuming Lognormal Distribution**			
298					95% Student's-t UCL	0.0444					95% H-UCL	0.0399
299	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.0453
300					95% Adjusted-CLT UCL (Chen-1995)	0.0457					97.5% Chebyshev (MVUE) UCL	0.0495

301	95% Modified-t UCL (Johnson-1978)	0.0446					99% Chebyshev (MVUE) UCL	0.0577				
302												
303	**Gamma Distribution Test**						**Data Distribution**					
304	k star (bias corrected)	2.676					**Data do not follow a Discernable Distribution (0.05)**					
305	Theta Star	0.0142										
306	MLE of Mean	0.0379										
307	MLE of Standard Deviation	0.0232										
308	nu star	406.8										
309	Approximate Chi Square Value (.05)	361					**Nonparametric Statistics**					
310	Adjusted Level of Significance	0.0468					95% CLT UCL	0.0444				
311	Adjusted Chi Square Value	360.2					95% Jackknife UCL	0.0444				
312							95% Standard Bootstrap UCL	0.0445				
313	Anderson-Darling Test Statistic	20.33					95% Bootstrap-t UCL	0.0467				
314	Anderson-Darling 5% Critical Value	0.759					95% Hall's Bootstrap UCL	0.0451				
315	Kolmogorov-Smirnov Test Statistic	0.474					95% Percentile Bootstrap UCL	0.0444				
316	Kolmogorov-Smirnov 5% Critical Value	0.103					95% BCA Bootstrap UCL	0.0464				
317	**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.0549				
318							97.5% Chebyshev(Mean, Sd) UCL	0.0623				
319	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.0768				
320	95% Approximate Gamma UCL	0.0427										
321	95% Adjusted Gamma UCL	0.0428										
322												
323	**Potential UCL to Use**						Use 95% Chebyshev (Mean, Sd) UCL	0.0549				
324												
325	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
326	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
327	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
328												
329												
330	**Boron**											
331												
332	**General Statistics**											
333	Number of Valid Observations	76					Number of Distinct Observations	61				
334												
335	**Raw Statistics**						**Log-transformed Statistics**					
336	Minimum	0.0251					Minimum of Log Data	-3.684				
337	Maximum	0.0514					Maximum of Log Data	-2.969				
338	Mean	0.0266					Mean of log Data	-3.633				
339	Median	0.0256					SD of log Data	0.108				
340	SD	0.00369										
341	Coefficient of Variation	0.139										
342	Skewness	4.985										
343												
344	**Relevant UCL Statistics**											
345	**Normal Distribution Test**						**Lognormal Distribution Test**					
346	Lilliefors Test Statistic	0.396					Lilliefors Test Statistic	0.371				
347	Lilliefors Critical Value	0.102					Lilliefors Critical Value	0.102				
348	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
349												
350	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					

351					95% Student's-t UCL	0.0273					95% H-UCL	0.0272
352				**95% UCLs (Adjusted for Skewness)**							95% Chebyshev (MVUE) UCL	0.028
353				95% Adjusted-CLT UCL (Chen-1995)		0.0276					97.5% Chebyshev (MVUE) UCL	0.0287
354				95% Modified-t UCL (Johnson-1978)		0.0274					99% Chebyshev (MVUE) UCL	0.0299
355												
356				**Gamma Distribution Test**							**Data Distribution**	
357				k star (bias corrected)		70.78					**Data do not follow a Discernable Distribution (0.05)**	
358				Theta Star		0.0003761						
359				MLE of Mean		0.0266						
360				MLE of Standard Deviation		0.00316						
361				nu star		10758						
362				Approximate Chi Square Value (.05)		10518					**Nonparametric Statistics**	
363				Adjusted Level of Significance		0.0468					95% CLT UCL	0.0273
364				Adjusted Chi Square Value		10513					95% Jackknife UCL	0.0273
365											95% Standard Bootstrap UCL	0.0273
366				Anderson-Darling Test Statistic		17.74					95% Bootstrap-t UCL	0.028
367				Anderson-Darling 5% Critical Value		0.749					95% Hall's Bootstrap UCL	0.0277
368				Kolmogorov-Smirnov Test Statistic		0.38					95% Percentile Bootstrap UCL	0.0274
369				Kolmogorov-Smirnov 5% Critical Value		0.102					95% BCA Bootstrap UCL	0.0277
370				**Data not Gamma Distributed at 5% Significance Level**							95% Chebyshev(Mean, Sd) UCL	0.0285
371											97.5% Chebyshev(Mean, Sd) UCL	0.0293
372				**Assuming Gamma Distribution**							99% Chebyshev(Mean, Sd) UCL	0.0308
373				95% Approximate Gamma UCL		0.0272						
374				95% Adjusted Gamma UCL		0.0272						
375												
376				**Potential UCL to Use**							Use 95% Student's-t UCL	0.0273
377											or 95% Modified-t UCL	0.0274
378												
379	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
380	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
381	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
382												
383												
384	**Cadmium**											
385												
386	**General Statistics**											
387	Number of Valid Observations					76	Number of Distinct Observations					76
388												
389	**Raw Statistics**						**Log-transformed Statistics**					
390	Minimum					0.012	Minimum of Log Data					-4.422
391	Maximum					0.175	Maximum of Log Data					-1.746
392	Mean					0.0592	Mean of log Data					-3.069
393	Median					0.0484	SD of log Data					0.721
394	SD					0.0411						
395	Coefficient of Variation					0.694						
396	Skewness					1.023						
397												
398	**Relevant UCL Statistics**											
399	**Normal Distribution Test**						**Lognormal Distribution Test**					
400	Lilliefors Test Statistic					0.145	Lilliefors Test Statistic					0.0661

401					Lilliefors Critical Value	0.102					Lilliefors Critical Value	0.102
402	**Data not Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
403												
404	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
405					95% Student's-t UCL	0.0671					95% H-UCL	0.0712
406	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.084
407					95% Adjusted-CLT UCL (Chen-1995)	0.0676					97.5% Chebyshev (MVUE) UCL	0.0943
408					95% Modified-t UCL (Johnson-1978)	0.0672					99% Chebyshev (MVUE) UCL	0.115
409												
410	**Gamma Distribution Test**						**Data Distribution**					
411					k star (bias corrected)	2.133	**Data appear Gamma Distributed at 5% Significance Level**					
412					Theta Star	0.0278						
413					MLE of Mean	0.0592						
414					MLE of Standard Deviation	0.0405						
415					nu star	324.2						
416					Approximate Chi Square Value (.05)	283.5	**Nonparametric Statistics**					
417					Adjusted Level of Significance	0.0468					95% CLT UCL	0.067
418					Adjusted Chi Square Value	282.8					95% Jackknife UCL	0.0671
419											95% Standard Bootstrap UCL	0.0667
420					Anderson-Darling Test Statistic	0.599					95% Bootstrap-t UCL	0.0684
421					Anderson-Darling 5% Critical Value	0.762					95% Hall's Bootstrap UCL	0.0677
422					Kolmogorov-Smirnov Test Statistic	0.0674					95% Percentile Bootstrap UCL	0.0672
423					Kolmogorov-Smirnov 5% Critical Value	0.104					95% BCA Bootstrap UCL	0.0675
424	**Data appear Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	0.0798
425											97.5% Chebyshev(Mean, Sd) UCL	0.0887
426	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	0.106
427					95% Approximate Gamma UCL	0.0677						
428					95% Adjusted Gamma UCL	0.0679						
429												
430	**Potential UCL to Use**										Use 95% Approximate Gamma UCL	0.0677
431												
432	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
433	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
434	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
435												
436												
437	**Calcium**											
438												
439	**General Statistics**											
440					Number of Valid Observations	76					Number of Distinct Observations	76
441												
442	**Raw Statistics**						**Log-transformed Statistics**					
443					Minimum	3143					Minimum of Log Data	8.053
444					Maximum	8188					Maximum of Log Data	9.01
445					Mean	6337					Mean of log Data	8.744
446					Median	6357					SD of log Data	0.151
447					SD	871.3						
448					Coefficient of Variation	0.137						
449					Skewness	-0.673						
450												

451	**Relevant UCL Statistics**											
452	**Normal Distribution Test**						**Lognormal Distribution Test**					
453	Lilliefors Test Statistic				0.066		Lilliefors Test Statistic				0.101	
454	Lilliefors Critical Value				0.102		Lilliefors Critical Value				0.102	
455	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
456												
457	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
458	95% Student's-t UCL				6503		95% H-UCL				6532	
459	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL				6822	
460	95% Adjusted-CLT UCL (Chen-1995)				6493		97.5% Chebyshev (MVUE) UCL				7030	
461	95% Modified-t UCL (Johnson-1978)				6502		99% Chebyshev (MVUE) UCL				7438	
462												
463	**Gamma Distribution Test**						**Data Distribution**					
464	k star (bias corrected)				46.11		**Data appear Normal at 5% Significance Level**					
465	Theta Star				137.4							
466	MLE of Mean				6337							
467	MLE of Standard Deviation				933.2							
468	nu star				7008							
469	Approximate Chi Square Value (.05)				6815		**Nonparametric Statistics**					
470	Adjusted Level of Significance				0.0468		95% CLT UCL				6501	
471	Adjusted Chi Square Value				6811		95% Jackknife UCL				6503	
472							95% Standard Bootstrap UCL				6495	
473	Anderson-Darling Test Statistic				0.783		95% Bootstrap-t UCL				6500	
474	Anderson-Darling 5% Critical Value				0.749		95% Hall's Bootstrap UCL				6498	
475	Kolmogorov-Smirnov Test Statistic				0.0885		95% Percentile Bootstrap UCL				6498	
476	Kolmogorov-Smirnov 5% Critical Value				0.102		95% BCA Bootstrap UCL				6492	
477	**Data follow Appr. Gamma Distribution at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL				6772	
478							97.5% Chebyshev(Mean, Sd) UCL				6961	
479	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL				7331	
480	95% Approximate Gamma UCL				6517							
481	95% Adjusted Gamma UCL				6520							
482												
483	**Potential UCL to Use**						Use 95% Student's-t UCL				6503	
484												
485	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
486	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
487	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
488												
489												
490	**Chromium**											
491												
492	**General Statistics**											
493	Number of Valid Observations				76		Number of Distinct Observations				75	
494												
495	**Raw Statistics**						**Log-transformed Statistics**					
496	Minimum				0.0255		Minimum of Log Data				-3.671	
497	Maximum				1.011		Maximum of Log Data				0.0109	
498	Mean				0.0886		Mean of log Data				-2.875	
499	Median				0.044		SD of log Data				0.807	
500	SD				0.139							

501					Coefficient of Variation	1.572						
502					Skewness	4.89						
503												
504	**Relevant UCL Statistics**											
505	**Normal Distribution Test**						**Lognormal Distribution Test**					
506					Lilliefors Test Statistic	0.325					Lilliefors Test Statistic	0.165
507					Lilliefors Critical Value	0.102					Lilliefors Critical Value	0.102
508	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
509												
510	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
511					95% Student's-t UCL	0.115					95% H-UCL	0.0949
512	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.113
513					95% Adjusted-CLT UCL (Chen-1995)	0.124					97.5% Chebyshev (MVUE) UCL	0.129
514					95% Modified-t UCL (Johnson-1978)	0.117					99% Chebyshev (MVUE) UCL	0.159
515												
516	**Gamma Distribution Test**						**Data Distribution**					
517					k star (bias corrected)	1.207	**Data do not follow a Discernable Distribution (0.05)**					
518					Theta Star	0.0734						
519					MLE of Mean	0.0886						
520					MLE of Standard Deviation	0.0807						
521					nu star	183.5						
522					Approximate Chi Square Value (.05)	153.2	**Nonparametric Statistics**					
523					Adjusted Level of Significance	0.0468					95% CLT UCL	0.115
524					Adjusted Chi Square Value	152.6					95% Jackknife UCL	0.115
525											95% Standard Bootstrap UCL	0.115
526					Anderson-Darling Test Statistic	5.359					95% Bootstrap-t UCL	0.14
527					Anderson-Darling 5% Critical Value	0.776					95% Hall's Bootstrap UCL	0.231
528					Kolmogorov-Smirnov Test Statistic	0.202					95% Percentile Bootstrap UCL	0.115
529					Kolmogorov-Smirnov 5% Critical Value	0.105					95% BCA Bootstrap UCL	0.128
530	**Data not Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	0.158
531											97.5% Chebyshev(Mean, Sd) UCL	0.188
532	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	0.248
533					95% Approximate Gamma UCL	0.106						
534					95% Adjusted Gamma UCL	0.107						
535												
536	**Potential UCL to Use**										Use 95% Chebyshev (Mean, Sd) UCL	0.158
537												
538	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
539	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
540	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
541												
542												
543	**Cobalt**											
544												
545	**General Statistics**											
546					Number of Valid Observations	76					Number of Distinct Observations	76
547												
548	**Raw Statistics**						**Log-transformed Statistics**					
549					Minimum	0.0118					Minimum of Log Data	-4.437
550					Maximum	0.162					Maximum of Log Data	-1.821

551					Mean	0.0665					Mean of log Data	-2.856
552					Median	0.0597					SD of log Data	0.562
553					SD	0.0349						
554					Coefficient of Variation	0.525						
555					Skewness	0.737						
556												
557	**Relevant UCL Statistics**											
558	**Normal Distribution Test**						**Lognormal Distribution Test**					
559					Lilliefors Test Statistic	0.132					Lilliefors Test Statistic	0.0593
560					Lilliefors Critical Value	0.102					Lilliefors Critical Value	0.102
561	**Data not Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
562												
563	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
564					95% Student's-t UCL	0.0731					95% H-UCL	0.0762
565	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.0874
566					95% Adjusted-CLT UCL (Chen-1995)	0.0734					97.5% Chebyshev (MVUE) UCL	0.0961
567					95% Modified-t UCL (Johnson-1978)	0.0732					99% Chebyshev (MVUE) UCL	0.113
568												
569	**Gamma Distribution Test**						**Data Distribution**					
570					k star (bias corrected)	3.489	**Data appear Gamma Distributed at 5% Significance Level**					
571					Theta Star	0.019						
572					MLE of Mean	0.0665						
573					MLE of Standard Deviation	0.0356						
574					nu star	530.3						
575					Approximate Chi Square Value (.05)	477.9	**Nonparametric Statistics**					
576					Adjusted Level of Significance	0.0468					95% CLT UCL	0.073
577					Adjusted Chi Square Value	476.9					95% Jackknife UCL	0.0731
578											95% Standard Bootstrap UCL	0.0731
579					Anderson-Darling Test Statistic	0.442					95% Bootstrap-t UCL	0.0733
580					Anderson-Darling 5% Critical Value	0.757					95% Hall's Bootstrap UCL	0.0734
581					Kolmogorov-Smirnov Test Statistic	0.0705					95% Percentile Bootstrap UCL	0.0727
582					Kolmogorov-Smirnov 5% Critical Value	0.103					95% BCA Bootstrap UCL	0.0732
583	**Data appear Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	0.0839
584											97.5% Chebyshev(Mean, Sd) UCL	0.0914
585	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	0.106
586					95% Approximate Gamma UCL	0.0737						
587					95% Adjusted Gamma UCL	0.0739						
588												
589	**Potential UCL to Use**										Use 95% Approximate Gamma UCL	0.0737
590												
591	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
592	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
593	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
594												
595												
596	**Copper**											
597												
598	**General Statistics**											
599					Number of Valid Observations	76					Number of Distinct Observations	76
600												

601	**Raw Statistics**						**Log-transformed Statistics**					
602					Minimum	0.435					Minimum of Log Data	-0.831
603					Maximum	1.408					Maximum of Log Data	0.342
604					Mean	0.762					Mean of log Data	-0.299
605					Median	0.731					SD of log Data	0.231
606					SD	0.185						
607					Coefficient of Variation	0.243						
608					Skewness	1.11						
609												
610	**Relevant UCL Statistics**											
611	**Normal Distribution Test**						**Lognormal Distribution Test**					
612					Lilliefors Test Statistic	0.124					Lilliefors Test Statistic	0.0782
613					Lilliefors Critical Value	0.102					Lilliefors Critical Value	0.102
614	**Data not Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
615												
616	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
617					95% Student's-t UCL	0.798					95% H-UCL	0.798
618	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.85
619					95% Adjusted-CLT UCL (Chen-1995)	0.8					97.5% Chebyshev (MVUE) UCL	0.889
620					95% Modified-t UCL (Johnson-1978)	0.798					99% Chebyshev (MVUE) UCL	0.964
621												
622	**Gamma Distribution Test**						**Data Distribution**					
623					k star (bias corrected)	18	**Data appear Gamma Distributed at 5% Significance Level**					
624					Theta Star	0.0423						
625					MLE of Mean	0.762						
626					MLE of Standard Deviation	0.18						
627					nu star	2736						
628					Approximate Chi Square Value (.05)	2615	**Nonparametric Statistics**					
629					Adjusted Level of Significance	0.0468					95% CLT UCL	0.797
630					Adjusted Chi Square Value	2613					95% Jackknife UCL	0.798
631											95% Standard Bootstrap UCL	0.797
632					Anderson-Darling Test Statistic	0.568					95% Bootstrap-t UCL	0.799
633					Anderson-Darling 5% Critical Value	0.75					95% Hall's Bootstrap UCL	0.801
634					Kolmogorov-Smirnov Test Statistic	0.092					95% Percentile Bootstrap UCL	0.796
635					Kolmogorov-Smirnov 5% Critical Value	0.102					95% BCA Bootstrap UCL	0.8
636	**Data appear Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	0.855
637											97.5% Chebyshev(Mean, Sd) UCL	0.895
638	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	0.974
639					95% Approximate Gamma UCL	0.797						
640					95% Adjusted Gamma UCL	0.798						
641												
642	**Potential UCL to Use**										Use 95% Approximate Gamma UCL	0.797
643												
644	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
645	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
646	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
647												
648												
649	**Iron**											
650												

	A	B	C	D	E	F	G	H	I	J	K	L
651	**General Statistics**											
652	Number of Valid Observations					76	Number of Distinct Observations					74
653												
654	**Raw Statistics**						**Log-transformed Statistics**					
655	Minimum					9.766	Minimum of Log Data					2.279
656	Maximum					137.9	Maximum of Log Data					4.927
657	Mean					20.93	Mean of log Data					2.867
658	Median					14.95	SD of log Data					0.516
659	SD					17.99						
660	Coefficient of Variation					0.859						
661	Skewness					4.282						
662												
663	**Relevant UCL Statistics**											
664	**Normal Distribution Test**						**Lognormal Distribution Test**					
665	Lilliefors Test Statistic					0.27	Lilliefors Test Statistic					0.156
666	Lilliefors Critical Value					0.102	Lilliefors Critical Value					0.102
667	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
668												
669	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
670	95% Student's-t UCL					24.37	95% H-UCL					22.45
671	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					25.51
672	95% Adjusted-CLT UCL (Chen-1995)					25.41	97.5% Chebyshev (MVUE) UCL					27.88
673	95% Modified-t UCL (Johnson-1978)					24.54	99% Chebyshev (MVUE) UCL					32.53
674												
675	**Gamma Distribution Test**						**Data Distribution**					
676	k star (bias corrected)					2.909	**Data do not follow a Discernable Distribution (0.05)**					
677	Theta Star					7.197						
678	MLE of Mean					20.93						
679	MLE of Standard Deviation					12.27						
680	nu star					442.1						
681	Approximate Chi Square Value (.05)					394.4	**Nonparametric Statistics**					
682	Adjusted Level of Significance					0.0468	95% CLT UCL					24.33
683	Adjusted Chi Square Value					393.5	95% Jackknife UCL					24.37
684							95% Standard Bootstrap UCL					24.33
685	Anderson-Darling Test Statistic					5.761	95% Bootstrap-t UCL					26.5
686	Anderson-Darling 5% Critical Value					0.758	95% Hall's Bootstrap UCL					29.88
687	Kolmogorov-Smirnov Test Statistic					0.203	95% Percentile Bootstrap UCL					24.55
688	Kolmogorov-Smirnov 5% Critical Value					0.103	95% BCA Bootstrap UCL					25.31
689	**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					29.93
690							97.5% Chebyshev(Mean, Sd) UCL					33.82
691	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL					41.47
692	95% Approximate Gamma UCL					23.47						
693	95% Adjusted Gamma UCL					23.52						
694												
695	**Potential UCL to Use**						Use 95% Chebyshev (Mean, Sd) UCL					29.93
696												
697	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
698	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
699	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
700												

Lead

General Statistics

Number of Valid Observations	76	Number of Distinct Observations	75

Raw Statistics		**Log-transformed Statistics**	
Minimum	0.00647	Minimum of Log Data	-5.041
Maximum	0.124	Maximum of Log Data	-2.088
Mean	0.0364	Mean of log Data	-3.512
Median	0.0301	SD of log Data	0.635
SD	0.0244		
Coefficient of Variation	0.672		
Skewness	1.533		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Lilliefors Test Statistic	0.162	Lilliefors Test Statistic	0.0552
Lilliefors Critical Value	0.102	Lilliefors Critical Value	0.102
Data not Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	0.041	95% H-UCL	0.0421
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.0489
95% Adjusted-CLT UCL (Chen-1995)	0.0415	97.5% Chebyshev (MVUE) UCL	0.0543
95% Modified-t UCL (Johnson-1978)	0.0411	99% Chebyshev (MVUE) UCL	0.065

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	2.594	**Data appear Gamma Distributed at 5% Significance Level**	
Theta Star	0.014		
MLE of Mean	0.0364		
MLE of Standard Deviation	0.0226		
nu star	394.3		
Approximate Chi Square Value (.05)	349.3	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0468	95% CLT UCL	0.041
Adjusted Chi Square Value	348.5	95% Jackknife UCL	0.041
		95% Standard Bootstrap UCL	0.0408
Anderson-Darling Test Statistic	0.735	95% Bootstrap-t UCL	0.0416
Anderson-Darling 5% Critical Value	0.76	95% Hall's Bootstrap UCL	0.0416
Kolmogorov-Smirnov Test Statistic	0.0805	95% Percentile Bootstrap UCL	0.041
Kolmogorov-Smirnov 5% Critical Value	0.103	95% BCA Bootstrap UCL	0.0418
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.0486
		97.5% Chebyshev(Mean, Sd) UCL	0.0539
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.0642
95% Approximate Gamma UCL	0.041		
95% Adjusted Gamma UCL	0.0411		
Potential UCL to Use		Use 95% Approximate Gamma UCL	0.041

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Lithium

General Statistics

Number of Valid Observations	76	Number of Distinct Observations	76

Raw Statistics		**Log-transformed Statistics**	
Minimum	0.00405	Minimum of Log Data	-5.508
Maximum	0.105	Maximum of Log Data	-2.252
Mean	0.0243	Mean of log Data	-4.086
Median	0.014	SD of log Data	0.819
SD	0.0243		
Coefficient of Variation	0.999		
Skewness	1.781		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Lilliefors Test Statistic	0.265	Lilliefors Test Statistic	0.123
Lilliefors Critical Value	0.102	Lilliefors Critical Value	0.102
Data not Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	0.029	95% H-UCL	0.0286
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.0342
95% Adjusted-CLT UCL (Chen-1995)	0.0295	97.5% Chebyshev (MVUE) UCL	0.0389
95% Modified-t UCL (Johnson-1978)	0.0291	99% Chebyshev (MVUE) UCL	0.0482

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	1.443	**Data do not follow a Discernable Distribution (0.05)**	
Theta Star	0.0169		
MLE of Mean	0.0243		
MLE of Standard Deviation	0.0203		
nu star	219.3		
Approximate Chi Square Value (.05)	186.1	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0468	95% CLT UCL	0.0289
Adjusted Chi Square Value	185.5	95% Jackknife UCL	0.029
		95% Standard Bootstrap UCL	0.0288
Anderson-Darling Test Statistic	3.629	95% Bootstrap-t UCL	0.0297
Anderson-Darling 5% Critical Value	0.77	95% Hall's Bootstrap UCL	0.0294
Kolmogorov-Smirnov Test Statistic	0.185	95% Percentile Bootstrap UCL	0.0292
Kolmogorov-Smirnov 5% Critical Value	0.104	95% BCA Bootstrap UCL	0.0294
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.0365
		97.5% Chebyshev(Mean, Sd) UCL	0.0418
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.0521
95% Approximate Gamma UCL	0.0287		
95% Adjusted Gamma UCL	0.0288		

801	**Potential UCL to Use**										Use 95% Chebyshev (Mean, Sd) UCL	0.0365
802												
803	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
804	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
805	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
806												
807												
808	**Magnesium**											
809												
810	**General Statistics**											
811	Number of Valid Observations	76					Number of Distinct Observations	73				
812												
813	**Raw Statistics**						**Log-transformed Statistics**					
814	Minimum	280.1					Minimum of Log Data	5.635				
815	Maximum	352.8					Maximum of Log Data	5.866				
816	Mean	325					Mean of log Data	5.783				
817	Median	329.1					SD of log Data	0.0487				
818	SD	15.51										
819	Coefficient of Variation	0.0477										
820	Skewness	-0.752										
821												
822	**Relevant UCL Statistics**											
823	**Normal Distribution Test**						**Lognormal Distribution Test**					
824	Lilliefors Test Statistic	0.14					Lilliefors Test Statistic	0.146				
825	Lilliefors Critical Value	0.102					Lilliefors Critical Value	0.102				
826	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
827												
828	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
829	95% Student's-t UCL	327.9					95% H-UCL	N/A				
830	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL	332.9				
831	95% Adjusted-CLT UCL (Chen-1995)	327.7					97.5% Chebyshev (MVUE) UCL	336.3				
832	95% Modified-t UCL (Johnson-1978)	327.9					99% Chebyshev (MVUE) UCL	343				
833												
834	**Gamma Distribution Test**						**Data Distribution**					
835	k star (bias corrected)	416.1					**Data do not follow a Discernable Distribution (0.05)**					
836	Theta Star	0.781										
837	MLE of Mean	325										
838	MLE of Standard Deviation	15.93										
839	nu star	63249										
840	Approximate Chi Square Value (.05)	62666					**Nonparametric Statistics**					
841	Adjusted Level of Significance	0.0468					95% CLT UCL	327.9				
842	Adjusted Chi Square Value	62654					95% Jackknife UCL	327.9				
843							95% Standard Bootstrap UCL	327.9				
844	Anderson-Darling Test Statistic	1.333					95% Bootstrap-t UCL	327.8				
845	Anderson-Darling 5% Critical Value	0.749					95% Hall's Bootstrap UCL	327.9				
846	Kolmogorov-Smirnov Test Statistic	0.145					95% Percentile Bootstrap UCL	327.8				
847	Kolmogorov-Smirnov 5% Critical Value	0.102					95% BCA Bootstrap UCL	327.7				
848	**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	332.7				
849							97.5% Chebyshev(Mean, Sd) UCL	336.1				
850	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	342.7				

851				95% Approximate Gamma UCL	328							
852				95% Adjusted Gamma UCL	328.1							
853												
854				**Potential UCL to Use**						Use 95% Student's-t UCL	327.9	
855										or 95% Modified-t UCL	327.9	
856												
857	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
858	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
859	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
860												
861												
862	**Manganese**											
863												
864	**General Statistics**											
865				Number of Valid Observations	76					Number of Distinct Observations	76	
866												
867	**Raw Statistics**							**Log-transformed Statistics**				
868				Minimum	1.974					Minimum of Log Data	0.68	
869				Maximum	23.41					Maximum of Log Data	3.153	
870				Mean	6.279					Mean of log Data	1.715	
871				Median	5.352					SD of log Data	0.468	
872				SD	3.779							
873				Coefficient of Variation	0.602							
874				Skewness	2.64							
875												
876	**Relevant UCL Statistics**											
877	**Normal Distribution Test**							**Lognormal Distribution Test**				
878				Lilliefors Test Statistic	0.198					Lilliefors Test Statistic	0.1	
879				Lilliefors Critical Value	0.102					Lilliefors Critical Value	0.102	
880	**Data not Normal at 5% Significance Level**							**Data appear Lognormal at 5% Significance Level**				
881												
882	**Assuming Normal Distribution**							**Assuming Lognormal Distribution**				
883				95% Student's-t UCL	7.001					95% H-UCL	6.847	
884	**95% UCLs (Adjusted for Skewness)**									95% Chebyshev (MVUE) UCL	7.707	
885				95% Adjusted-CLT UCL (Chen-1995)	7.132					97.5% Chebyshev (MVUE) UCL	8.363	
886				95% Modified-t UCL (Johnson-1978)	7.023					99% Chebyshev (MVUE) UCL	9.652	
887												
888	**Gamma Distribution Test**							**Data Distribution**				
889				k star (bias corrected)	4.101			**Data appear Lognormal at 5% Significance Level**				
890				Theta Star	1.531							
891				MLE of Mean	6.279							
892				MLE of Standard Deviation	3.101							
893				nu star	623.4							
894				Approximate Chi Square Value (.05)	566.4			**Nonparametric Statistics**				
895				Adjusted Level of Significance	0.0468					95% CLT UCL	6.992	
896				Adjusted Chi Square Value	565.4					95% Jackknife UCL	7.001	
897										95% Standard Bootstrap UCL	6.989	
898				Anderson-Darling Test Statistic	2.066					95% Bootstrap-t UCL	7.214	
899				Anderson-Darling 5% Critical Value	0.756					95% Hall's Bootstrap UCL	7.277	
900				Kolmogorov-Smirnov Test Statistic	0.137					95% Percentile Bootstrap UCL	6.986	

901					Kolmogorov-Smirnov 5% Critical Value	0.103					95% BCA Bootstrap UCL	7.131
902					**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	8.168
903											97.5% Chebyshev(Mean, Sd) UCL	8.986
904					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	10.59
905					95% Approximate Gamma UCL	6.91						
906					95% Adjusted Gamma UCL	6.923						
907												
908					**Potential UCL to Use**						Use 95% Student's-t UCL	7.001
909											or 95% Modified-t UCL	7.023
910											or 95% H-UCL	6.847
911												
912	**ProUCL computes and outputs H-statistic based UCLs for historical reasons only.**											
913	**H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.**											
914	**It is therefore recommended to avoid the use of H-statistic based 95% UCLs.**											
915	**Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.**											
916												
917	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
918	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
919	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
920												
921												
922	**Mercury**											
923												
924	**General Statistics**											
925					Number of Valid Observations	76					Number of Distinct Observations	76
926												
927	**Raw Statistics**						**Log-transformed Statistics**					
928					Minimum	0.0504					Minimum of Log Data	-2.988
929					Maximum	0.242					Maximum of Log Data	-1.419
930					Mean	0.114					Mean of log Data	-2.231
931					Median	0.11					SD of log Data	0.341
932					SD	0.0385						
933					Coefficient of Variation	0.339						
934					Skewness	0.764						
935												
936	**Relevant UCL Statistics**											
937	**Normal Distribution Test**						**Lognormal Distribution Test**					
938					Lilliefors Test Statistic	0.0609					Lilliefors Test Statistic	0.0786
939					Lilliefors Critical Value	0.102					Lilliefors Critical Value	0.102
940	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
941												
942	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
943					95% Student's-t UCL	0.121					95% H-UCL	0.122
944	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.134
945					95% Adjusted-CLT UCL (Chen-1995)	0.121					97.5% Chebyshev (MVUE) UCL	0.142
946					95% Modified-t UCL (Johnson-1978)	0.121					99% Chebyshev (MVUE) UCL	0.159
947												
948	**Gamma Distribution Test**						**Data Distribution**					
949					k star (bias corrected)	8.695	**Data appear Normal at 5% Significance Level**					
950					Theta Star	0.0131						

951					MLE of Mean	0.114						
952					MLE of Standard Deviation	0.0385						
953					nu star	1322						
954					Approximate Chi Square Value (.05)	1238	**Nonparametric Statistics**					
955					Adjusted Level of Significance	0.0468					95% CLT UCL	0.121
956					Adjusted Chi Square Value	1237					95% Jackknife UCL	0.121
957											95% Standard Bootstrap UCL	0.121
958					Anderson-Darling Test Statistic	0.279					95% Bootstrap-t UCL	0.122
959					Anderson-Darling 5% Critical Value	0.751					95% Hall's Bootstrap UCL	0.121
960					Kolmogorov-Smirnov Test Statistic	0.0562					95% Percentile Bootstrap UCL	0.121
961					Kolmogorov-Smirnov 5% Critical Value	0.102					95% BCA Bootstrap UCL	0.121
962	**Data appear Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	0.133
963											97.5% Chebyshev(Mean, Sd) UCL	0.141
964	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	0.158
965					95% Approximate Gamma UCL	0.121						
966					95% Adjusted Gamma UCL	0.121						
967												
968	**Potential UCL to Use**										Use 95% Student's-t UCL	0.121
969												
970	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
971	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
972	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
973												
974												
975	**Molybdenum**											
976												
977	**General Statistics**											
978					Number of Valid Observations	76					Number of Distinct Observations	75
979												
980	**Raw Statistics**						**Log-transformed Statistics**					
981					Minimum	0.00577					Minimum of Log Data	-5.155
982					Maximum	0.108					Maximum of Log Data	-2.227
983					Mean	0.0222					Mean of log Data	-3.997
984					Median	0.016					SD of log Data	0.557
985					SD	0.0182						
986					Coefficient of Variation	0.818						
987					Skewness	2.965						
988												
989	**Relevant UCL Statistics**											
990	**Normal Distribution Test**						**Lognormal Distribution Test**					
991					Lilliefors Test Statistic	0.246					Lilliefors Test Statistic	0.149
992					Lilliefors Critical Value	0.102					Lilliefors Critical Value	0.102
993	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
994												
995	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
996					95% Student's-t UCL	0.0257					95% H-UCL	0.0242
997	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.0278
998					95% Adjusted-CLT UCL (Chen-1995)	0.0264					97.5% Chebyshev (MVUE) UCL	0.0305
999					95% Modified-t UCL (Johnson-1978)	0.0258					99% Chebyshev (MVUE) UCL	0.0359
1000												

1001	**Gamma Distribution Test**						**Data Distribution**					
1002	k star (bias corrected)	2.692					**Data do not follow a Discernable Distribution (0.05)**					
1003	Theta Star	0.00825										
1004	MLE of Mean	0.0222										
1005	MLE of Standard Deviation	0.0135										
1006	nu star	409.1										
1007	Approximate Chi Square Value (.05)	363.3					**Nonparametric Statistics**					
1008	Adjusted Level of Significance	0.0468					95% CLT UCL	0.0256				
1009	Adjusted Chi Square Value	362.4					95% Jackknife UCL	0.0257				
1010							95% Standard Bootstrap UCL	0.0256				
1011	Anderson-Darling Test Statistic	4.113					95% Bootstrap-t UCL	0.027				
1012	Anderson-Darling 5% Critical Value	0.759					95% Hall's Bootstrap UCL	0.0268				
1013	Kolmogorov-Smirnov Test Statistic	0.186					95% Percentile Bootstrap UCL	0.026				
1014	Kolmogorov-Smirnov 5% Critical Value	0.103					95% BCA Bootstrap UCL	0.0263				
1015	**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.0313				
1016							97.5% Chebyshev(Mean, Sd) UCL	0.0352				
1017	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.0429				
1018	95% Approximate Gamma UCL	0.025										
1019	95% Adjusted Gamma UCL	0.0251										
1020												
1021	**Potential UCL to Use**						Use 95% Chebyshev (Mean, Sd) UCL	0.0313				
1022												
1023	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1024	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1025	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1026												
1027												
1028	**Nickel**											
1029												
1030	**General Statistics**											
1031	Number of Valid Observations	76					Number of Distinct Observations	72				
1032												
1033	**Raw Statistics**						**Log-transformed Statistics**					
1034	Minimum	0.0251					Minimum of Log Data	-3.684				
1035	Maximum	0.0932					Maximum of Log Data	-2.373				
1036	Mean	0.0358					Mean of log Data	-3.397				
1037	Median	0.0266					SD of log Data	0.344				
1038	SD	0.0153										
1039	Coefficient of Variation	0.426										
1040	Skewness	1.978										
1041												
1042	**Relevant UCL Statistics**											
1043	**Normal Distribution Test**						**Lognormal Distribution Test**					
1044	Lilliefors Test Statistic	0.261					Lilliefors Test Statistic	0.279				
1045	Lilliefors Critical Value	0.102					Lilliefors Critical Value	0.102				
1046	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
1047												
1048	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1049	95% Student's-t UCL	0.0387					95% H-UCL	0.0381				
1050	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL	0.0418				

1051	95% Adjusted-CLT UCL (Chen-1995)					0.0391	97.5% Chebyshev (MVUE) UCL					0.0445
1052	95% Modified-t UCL (Johnson-1978)					0.0388	99% Chebyshev (MVUE) UCL					0.0498
1053												
1054	**Gamma Distribution Test**						**Data Distribution**					
1055	k star (bias corrected)					7.353	**Data do not follow a Discernable Distribution (0.05)**					
1056	Theta Star					0.00487						
1057	MLE of Mean					0.0358						
1058	MLE of Standard Deviation					0.0132						
1059	nu star					1118						
1060	Approximate Chi Square Value (.05)					1041	**Nonparametric Statistics**					
1061	Adjusted Level of Significance					0.0468	95% CLT UCL					0.0387
1062	Adjusted Chi Square Value					1040	95% Jackknife UCL					0.0387
1063							95% Standard Bootstrap UCL					0.0386
1064	Anderson-Darling Test Statistic					6.18	95% Bootstrap-t UCL					0.0393
1065	Anderson-Darling 5% Critical Value					0.752	95% Hall's Bootstrap UCL					0.0392
1066	Kolmogorov-Smirnov Test Statistic					0.277	95% Percentile Bootstrap UCL					0.0388
1067	Kolmogorov-Smirnov 5% Critical Value					0.102	95% BCA Bootstrap UCL					0.0391
1068	**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					0.0434
1069							97.5% Chebyshev(Mean, Sd) UCL					0.0467
1070	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL					0.0532
1071	95% Approximate Gamma UCL					0.0384						
1072	95% Adjusted Gamma UCL					0.0385						
1073												
1074	**Potential UCL to Use**						Use 95% Student's-t UCL					0.0387
1075							or 95% Modified-t UCL					0.0388
1076												
1077	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1078	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1079	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1080												
1081												
1082	**Potassium**											
1083												
1084	**General Statistics**											
1085	Number of Valid Observations					76	Number of Distinct Observations					71
1086												
1087	**Raw Statistics**						**Log-transformed Statistics**					
1088	Minimum					3117	Minimum of Log Data					8.045
1089	Maximum					3853	Maximum of Log Data					8.257
1090	Mean					3527	Mean of log Data					8.168
1091	Median					3536	SD of log Data					0.0404
1092	SD					142.2						
1093	Coefficient of Variation					0.0403						
1094	Skewness					-0.0721						
1095												
1096	**Relevant UCL Statistics**											
1097	**Normal Distribution Test**						**Lognormal Distribution Test**					
1098	Lilliefors Test Statistic					0.0778	Lilliefors Test Statistic					0.0858
1099	Lilliefors Critical Value					0.102	Lilliefors Critical Value					0.102
1100	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					

1101												
1102	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1103					95% Student's-t UCL	3555					95% H-UCL	N/A
1104	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	3599
1105					95% Adjusted-CLT UCL (Chen-1995)	3554					97.5% Chebyshev (MVUE) UCL	3630
1106					95% Modified-t UCL (Johnson-1978)	3555					99% Chebyshev (MVUE) UCL	3690
1107												
1108	**Gamma Distribution Test**						**Data Distribution**					
1109					k star (bias corrected)	596.7	**Data appear Normal at 5% Significance Level**					
1110					Theta Star	5.911						
1111					MLE of Mean	3527						
1112					MLE of Standard Deviation	144.4						
1113					nu star	90705						
1114					Approximate Chi Square Value (.05)	90005	**Nonparametric Statistics**					
1115					Adjusted Level of Significance	0.0468					95% CLT UCL	3554
1116					Adjusted Chi Square Value	89992					95% Jackknife UCL	3555
1117											95% Standard Bootstrap UCL	3554
1118					Anderson-Darling Test Statistic	0.498					95% Bootstrap-t UCL	3555
1119					Anderson-Darling 5% Critical Value	0.749					95% Hall's Bootstrap UCL	3554
1120					Kolmogorov-Smirnov Test Statistic	0.0831					95% Percentile Bootstrap UCL	3554
1121					Kolmogorov-Smirnov 5% Critical Value	0.102					95% BCA Bootstrap UCL	3555
1122	**Data appear Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	3598
1123											97.5% Chebyshev(Mean, Sd) UCL	3629
1124	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	3690
1125					95% Approximate Gamma UCL	3555						
1126					95% Adjusted Gamma UCL	3555						
1127												
1128	**Potential UCL to Use**										Use 95% Student's-t UCL	3555
1129												
1130	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1131	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1132	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1133												
1134												
1135	**Rubidium**											
1136												
1137	**General Statistics**											
1138					Number of Valid Observations	76					Number of Distinct Observations	73
1139												
1140	**Raw Statistics**						**Log-transformed Statistics**					
1141					Minimum	5.091					Minimum of Log Data	1.627
1142					Maximum	16.59					Maximum of Log Data	2.809
1143					Mean	11.36					Mean of log Data	2.404
1144					Median	11.68					SD of log Data	0.239
1145					SD	2.484						
1146					Coefficient of Variation	0.219						
1147					Skewness	-0.303						
1148												
1149	**Relevant UCL Statistics**											
1150	**Normal Distribution Test**						**Lognormal Distribution Test**					

1151					Lilliefors Test Statistic	0.107					Lilliefors Test Statistic	0.111
1152					Lilliefors Critical Value	0.102					Lilliefors Critical Value	0.102
1153					**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**	
1154												
1155					**Assuming Normal Distribution**						**Assuming Lognormal Distribution**	
1156					95% Student's-t UCL	11.83					95% H-UCL	11.94
1157					**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL	12.76
1158					95% Adjusted-CLT UCL (Chen-1995)	11.82					97.5% Chebyshev (MVUE) UCL	13.35
1159					95% Modified-t UCL (Johnson-1978)	11.83					99% Chebyshev (MVUE) UCL	14.52
1160												
1161					**Gamma Distribution Test**						**Data Distribution**	
1162					k star (bias corrected)	18.39					**Data do not follow a Discernable Distribution (0.05)**	
1163					Theta Star	0.618						
1164					MLE of Mean	11.36						
1165					MLE of Standard Deviation	2.649						
1166					nu star	2796						
1167					Approximate Chi Square Value (.05)	2674					**Nonparametric Statistics**	
1168					Adjusted Level of Significance	0.0468					95% CLT UCL	11.83
1169					Adjusted Chi Square Value	2672					95% Jackknife UCL	11.83
1170											95% Standard Bootstrap UCL	11.82
1171					Anderson-Darling Test Statistic	0.914					95% Bootstrap-t UCL	11.83
1172					Anderson-Darling 5% Critical Value	0.75					95% Hall's Bootstrap UCL	11.81
1173					Kolmogorov-Smirnov Test Statistic	0.112					95% Percentile Bootstrap UCL	11.8
1174					Kolmogorov-Smirnov 5% Critical Value	0.102					95% BCA Bootstrap UCL	11.8
1175					**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	12.6
1176											97.5% Chebyshev(Mean, Sd) UCL	13.14
1177					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	14.2
1178					95% Approximate Gamma UCL	11.88						
1179					95% Adjusted Gamma UCL	11.89						
1180												
1181					**Potential UCL to Use**						Use 95% Student's-t UCL	11.83
1182											or 95% Modified-t UCL	11.83
1183												
1184	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1185	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1186	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1187												
1188												
1189	**Selenium**											
1190												
1191					**General Statistics**							
1192					Number of Valid Observations	76					Number of Distinct Observations	76
1193												
1194					**Raw Statistics**						**Log-transformed Statistics**	
1195					Minimum	0.18					Minimum of Log Data	-1.716
1196					Maximum	1.114					Maximum of Log Data	0.108
1197					Mean	0.376					Mean of log Data	-1.06
1198					Median	0.333					SD of log Data	0.388
1199					SD	0.18						
1200					Coefficient of Variation	0.477						

Skewness	2.179	
Relevant UCL Statistics		
Normal Distribution Test		**Lognormal Distribution Test**
Lilliefors Test Statistic	0.205	Lilliefors Test Statistic 0.112
Lilliefors Critical Value	0.102	Lilliefors Critical Value 0.102
Data not Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**
Assuming Normal Distribution		**Assuming Lognormal Distribution**
95% Student's-t UCL	0.411	95% H-UCL 0.405
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL 0.448
95% Adjusted-CLT UCL (Chen-1995)	0.416	97.5% Chebyshev (MVUE) UCL 0.48
95% Modified-t UCL (Johnson-1978)	0.412	99% Chebyshev (MVUE) UCL 0.544
Gamma Distribution Test		**Data Distribution**
k star (bias corrected)	5.926	**Data do not follow a Discernable Distribution (0.05)**
Theta Star	0.0635	
MLE of Mean	0.376	
MLE of Standard Deviation	0.155	
nu star	900.7	
Approximate Chi Square Value (.05)	832.1	**Nonparametric Statistics**
Adjusted Level of Significance	0.0468	95% CLT UCL 0.41
Adjusted Chi Square Value	830.8	95% Jackknife UCL 0.411
		95% Standard Bootstrap UCL 0.41
Anderson-Darling Test Statistic	1.936	95% Bootstrap-t UCL 0.415
Anderson-Darling 5% Critical Value	0.753	95% Hall's Bootstrap UCL 0.421
Kolmogorov-Smirnov Test Statistic	0.141	95% Percentile Bootstrap UCL 0.411
Kolmogorov-Smirnov 5% Critical Value	0.103	95% BCA Bootstrap UCL 0.417
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 0.466
		97.5% Chebyshev(Mean, Sd) UCL 0.505
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 0.581
95% Approximate Gamma UCL	0.407	
95% Adjusted Gamma UCL	0.408	
Potential UCL to Use		Use 95% Student's-t UCL 0.411
		or 95% Modified-t UCL 0.412
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.		
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)		
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.		
Silver		
General Statistics		
Number of Valid Observations	76	Number of Distinct Observations 75
Raw Statistics		**Log-transformed Statistics**
Minimum	0.00524	Minimum of Log Data -5.251
Maximum	0.0399	Maximum of Log Data -3.222

1251					Mean	0.0134					Mean of log Data	-4.421
1252					Median	0.0116					SD of log Data	0.463
1253					SD	0.00695						
1254					Coefficient of Variation	0.517						
1255					Skewness	1.529						
1256												
1257	**Relevant UCL Statistics**											
1258	**Normal Distribution Test**						**Lognormal Distribution Test**					
1259					Lilliefors Test Statistic	0.178					Lilliefors Test Statistic	0.0892
1260					Lilliefors Critical Value	0.102					Lilliefors Critical Value	0.102
1261	**Data not Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
1262												
1263	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1264					95% Student's-t UCL	0.0148					95% H-UCL	0.0148
1265	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.0166
1266					95% Adjusted-CLT UCL (Chen-1995)	0.0149					97.5% Chebyshev (MVUE) UCL	0.018
1267					95% Modified-t UCL (Johnson-1978)	0.0148					99% Chebyshev (MVUE) UCL	0.0208
1268												
1269	**Gamma Distribution Test**						**Data Distribution**					
1270					k star (bias corrected)	4.477	**Data appear Lognormal at 5% Significance Level**					
1271					Theta Star	0.003						
1272					MLE of Mean	0.0134						
1273					MLE of Standard Deviation	0.00635						
1274					nu star	680.4						
1275					Approximate Chi Square Value (.05)	620.9	**Nonparametric Statistics**					
1276					Adjusted Level of Significance	0.0468					95% CLT UCL	0.0147
1277					Adjusted Chi Square Value	619.8					95% Jackknife UCL	0.0148
1278											95% Standard Bootstrap UCL	0.0147
1279					Anderson-Darling Test Statistic	1.04					95% Bootstrap-t UCL	0.0149
1280					Anderson-Darling 5% Critical Value	0.755					95% Hall's Bootstrap UCL	0.0149
1281					Kolmogorov-Smirnov Test Statistic	0.122					95% Percentile Bootstrap UCL	0.0148
1282					Kolmogorov-Smirnov 5% Critical Value	0.103					95% BCA Bootstrap UCL	0.015
1283	**Data not Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	0.0169
1284											97.5% Chebyshev(Mean, Sd) UCL	0.0184
1285	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	0.0214
1286					95% Approximate Gamma UCL	0.0147						
1287					95% Adjusted Gamma UCL	0.0148						
1288												
1289	**Potential UCL to Use**										Use 95% Student's-t UCL	0.0148
1290											or 95% Modified-t UCL	0.0148
1291											or 95% H-UCL	0.0148
1292												
1293	**ProUCL computes and outputs H-statistic based UCLs for historical reasons only.**											
1294	**H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.**											
1295	**It is therefore recommended to avoid the use of H-statistic based 95% UCLs.**											
1296	**Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.**											
1297												
1298	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1299	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1300	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											

Sodium

General Statistics

Number of Valid Observations	76	Number of Distinct Observations	72

Raw Statistics		**Log-transformed Statistics**	
Minimum	795.3	Minimum of Log Data	6.679
Maximum	1186	Maximum of Log Data	7.078
Mean	961.4	Mean of log Data	6.866
Median	965.8	SD of log Data	0.0754
SD	72.17		
Coefficient of Variation	0.0751		
Skewness	0.108		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Lilliefors Test Statistic	0.0581	Lilliefors Test Statistic	0.0629
Lilliefors Critical Value	0.102	Lilliefors Critical Value	0.102
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	975.2	95% H-UCL	N/A
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	997.7
95% Adjusted-CLT UCL (Chen-1995)	975.1	97.5% Chebyshev (MVUE) UCL	1013
95% Modified-t UCL (Johnson-1978)	975.2	99% Chebyshev (MVUE) UCL	1044

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	172.2	**Data appear Normal at 5% Significance Level**	
Theta Star	5.583		
MLE of Mean	961.4		
MLE of Standard Deviation	73.27		
nu star	26173		
Approximate Chi Square Value (.05)	25797	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0468	95% CLT UCL	975
Adjusted Chi Square Value	25790	95% Jackknife UCL	975.2
		95% Standard Bootstrap UCL	975
Anderson-Darling Test Statistic	0.294	95% Bootstrap-t UCL	975.1
Anderson-Darling 5% Critical Value	0.749	95% Hall's Bootstrap UCL	975.7
Kolmogorov-Smirnov Test Statistic	0.0596	95% Percentile Bootstrap UCL	975
Kolmogorov-Smirnov 5% Critical Value	0.102	95% BCA Bootstrap UCL	974.8
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	997.5
		97.5% Chebyshev(Mean, Sd) UCL	1013
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1044
95% Approximate Gamma UCL	975.4		
95% Adjusted Gamma UCL	975.7		

Potential UCL to Use			
		Use 95% Student's-t UCL	975.2

	A	B	C	D	E	F	G	H	I	J	K	L
1351	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1352	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1353	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1354												
1355												
1356	**Strontium**											
1357												
1358	**General Statistics**											
1359	Number of Valid Observations					76	Number of Distinct Observations					74
1360												
1361	**Raw Statistics**						**Log-transformed Statistics**					
1362	Minimum					5.319	Minimum of Log Data					1.671
1363	Maximum					20.78	Maximum of Log Data					3.034
1364	Mean					12.24	Mean of log Data					2.475
1365	Median					11.99	SD of log Data					0.249
1366	SD					2.977						
1367	Coefficient of Variation					0.243						
1368	Skewness					0.44						
1369												
1370	**Relevant UCL Statistics**											
1371	**Normal Distribution Test**						**Lognormal Distribution Test**					
1372	Lilliefors Test Statistic					0.0902	Lilliefors Test Statistic					0.0603
1373	Lilliefors Critical Value					0.102	Lilliefors Critical Value					0.102
1374	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
1375												
1376	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1377	95% Student's-t UCL					12.81	95% H-UCL					12.88
1378	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					13.79
1379	95% Adjusted-CLT UCL (Chen-1995)					12.82	97.5% Chebyshev (MVUE) UCL					14.46
1380	95% Modified-t UCL (Johnson-1978)					12.81	99% Chebyshev (MVUE) UCL					15.77
1381												
1382	**Gamma Distribution Test**						**Data Distribution**					
1383	k star (bias corrected)					16.31	**Data appear Normal at 5% Significance Level**					
1384	Theta Star					0.75						
1385	MLE of Mean					12.24						
1386	MLE of Standard Deviation					3.03						
1387	nu star					2480						
1388	Approximate Chi Square Value (.05)					2365	**Nonparametric Statistics**					
1389	Adjusted Level of Significance					0.0468	95% CLT UCL					12.8
1390	Adjusted Chi Square Value					2363	95% Jackknife UCL					12.81
1391							95% Standard Bootstrap UCL					12.8
1392	Anderson-Darling Test Statistic					0.263	95% Bootstrap-t UCL					12.82
1393	Anderson-Darling 5% Critical Value					0.75	95% Hall's Bootstrap UCL					12.81
1394	Kolmogorov-Smirnov Test Statistic					0.0615	95% Percentile Bootstrap UCL					12.81
1395	Kolmogorov-Smirnov 5% Critical Value					0.102	95% BCA Bootstrap UCL					12.8
1396	**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					13.73
1397							97.5% Chebyshev(Mean, Sd) UCL					14.37
1398	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL					15.64
1399	95% Approximate Gamma UCL					12.83						
1400	95% Adjusted Gamma UCL					12.85						

1401												
1402	**Potential UCL to Use**						Use 95% Student's-t UCL					12.81
1403												
1404	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1405	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1406	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1407												
1408												
1409	**Tellurium**											
1410												
1411	**General Statistics**											
1412	Number of Valid Observations					76	Number of Distinct Observations					57
1413												
1414	**Raw Statistics**						**Log-transformed Statistics**					
1415	Minimum					0.00251	Minimum of Log Data					-5.987
1416	Maximum					0.00276	Maximum of Log Data					-5.894
1417	Mean					0.00258	Mean of log Data					-5.962
1418	Median					0.00256	SD of log Data					0.0179
1419	SD					4.66E-05						
1420	Coefficient of Variation					0.0181						
1421	Skewness					1.385						
1422												
1423	**Relevant UCL Statistics**											
1424	**Normal Distribution Test**						**Lognormal Distribution Test**					
1425	Lilliefors Test Statistic					0.206	Lilliefors Test Statistic					0.203
1426	Lilliefors Critical Value					0.102	Lilliefors Critical Value					0.102
1427	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
1428												
1429	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1430	95% Student's-t UCL					0.00258	95% H-UCL					N/A
1431	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					0.0026
1432	95% Adjusted-CLT UCL (Chen-1995)					0.00258	97.5% Chebyshev (MVUE) UCL					0.00261
1433	95% Modified-t UCL (Johnson-1978)					0.00258	99% Chebyshev (MVUE) UCL					0.00263
1434												
1435	**Gamma Distribution Test**						**Data Distribution**					
1436	k star (bias corrected)					3019	**Data do not follow a Discernable Distribution (0.05)**					
1437	Theta Star					8.529E-07						
1438	MLE of Mean					0.00258						
1439	MLE of Standard Deviation					4.686E-05						
1440	nu star					458943						
1441	Approximate Chi Square Value (.05)					457369	**Nonparametric Statistics**					
1442	Adjusted Level of Significance					0.0468	95% CLT UCL					0.00258
1443	Adjusted Chi Square Value					457339	95% Jackknife UCL					0.00258
1444							95% Standard Bootstrap UCL					0.00258
1445	Anderson-Darling Test Statistic					4.068	95% Bootstrap-t UCL					0.00259
1446	Anderson-Darling 5% Critical Value					0.749	95% Hall's Bootstrap UCL					0.00259
1447	Kolmogorov-Smirnov Test Statistic					0.234	95% Percentile Bootstrap UCL					0.00258
1448	Kolmogorov-Smirnov 5% Critical Value					0.102	95% BCA Bootstrap UCL					0.00258
1449	**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					0.0026
1450							97.5% Chebyshev(Mean, Sd) UCL					0.00261

1451	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	0.00263
1452					95% Approximate Gamma UCL	0.00258						
1453					95% Adjusted Gamma UCL	0.00258						
1454												
1455	**Potential UCL to Use**										Use 95% Student's-t UCL	0.00258
1456											or 95% Modified-t UCL	0.00258
1457												
1458	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1459	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1460	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1461												
1462												
1463	**Thallium**											
1464												
1465	**General Statistics**											
1466					Number of Valid Observations	76					Number of Distinct Observations	74
1467												
1468	**Raw Statistics**						**Log-transformed Statistics**					
1469					Minimum	0.00419					Minimum of Log Data	-5.476
1470					Maximum	0.0308					Maximum of Log Data	-3.479
1471					Mean	0.0142					Mean of log Data	-4.339
1472					Median	0.012					SD of log Data	0.401
1473					SD	0.00618						
1474					Coefficient of Variation	0.436						
1475					Skewness	1.207						
1476												
1477	**Relevant UCL Statistics**											
1478	**Normal Distribution Test**						**Lognormal Distribution Test**					
1479					Lilliefors Test Statistic	0.179					Lilliefors Test Statistic	0.107
1480					Lilliefors Critical Value	0.102					Lilliefors Critical Value	0.102
1481	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
1482												
1483	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1484					95% Student's-t UCL	0.0154					95% H-UCL	0.0154
1485	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.0171
1486					95% Adjusted-CLT UCL (Chen-1995)	0.0154					97.5% Chebyshev (MVUE) UCL	0.0183
1487					95% Modified-t UCL (Johnson-1978)	0.0154					99% Chebyshev (MVUE) UCL	0.0208
1488												
1489	**Gamma Distribution Test**						**Data Distribution**					
1490					k star (bias corrected)	5.977	**Data do not follow a Discernable Distribution (0.05)**					
1491					Theta Star	0.00237						
1492					MLE of Mean	0.0142						
1493					MLE of Standard Deviation	0.0058						
1494					nu star	908.5						
1495					Approximate Chi Square Value (.05)	839.5	**Nonparametric Statistics**					
1496					Adjusted Level of Significance	0.0468					95% CLT UCL	0.0153
1497					Adjusted Chi Square Value	838.3					95% Jackknife UCL	0.0154
1498											95% Standard Bootstrap UCL	0.0153
1499					Anderson-Darling Test Statistic	1.969					95% Bootstrap-t UCL	0.0155
1500					Anderson-Darling 5% Critical Value	0.753					95% Hall's Bootstrap UCL	0.0154

1501					Kolmogorov-Smirnov Test Statistic	0.134					95% Percentile Bootstrap UCL	0.0153
1502					Kolmogorov-Smirnov 5% Critical Value	0.103					95% BCA Bootstrap UCL	0.0153
1503					**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.0173
1504											97.5% Chebyshev(Mean, Sd) UCL	0.0186
1505					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.0212
1506					95% Approximate Gamma UCL	0.0153						
1507					95% Adjusted Gamma UCL	0.0154						
1508												
1509					**Potential UCL to Use**						Use 95% Student's-t UCL	0.0154
1510											or 95% Modified-t UCL	0.0154
1511												
1512	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1513	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1514	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1515												
1516												
1517	**Tin**											
1518												
1519	**General Statistics**											
1520					Number of Valid Observations	76					Number of Distinct Observations	76
1521												
1522					**Raw Statistics**						**Log-transformed Statistics**	
1523					Minimum	0.00255					Minimum of Log Data	-5.97
1524					Maximum	0.296					Maximum of Log Data	-1.216
1525					Mean	0.0149					Mean of log Data	-4.64
1526					Median	0.00973					SD of log Data	0.72
1527					SD	0.0337						
1528					Coefficient of Variation	2.264						
1529					Skewness	7.994						
1530												
1531	**Relevant UCL Statistics**											
1532					**Normal Distribution Test**						**Lognormal Distribution Test**	
1533					Lilliefors Test Statistic	0.396					Lilliefors Test Statistic	0.14
1534					Lilliefors Critical Value	0.102					Lilliefors Critical Value	0.102
1535					**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**	
1536												
1537					**Assuming Normal Distribution**						**Assuming Lognormal Distribution**	
1538					95% Student's-t UCL	0.0213					95% H-UCL	0.0148
1539					**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL	0.0174
1540					95% Adjusted-CLT UCL (Chen-1995)	0.025					97.5% Chebyshev (MVUE) UCL	0.0196
1541					95% Modified-t UCL (Johnson-1978)	0.0219					99% Chebyshev (MVUE) UCL	0.0238
1542												
1543					**Gamma Distribution Test**						**Data Distribution**	
1544					k star (bias corrected)	1.253					**Data do not follow a Discernable Distribution (0.05)**	
1545					Theta Star	0.0119						
1546					MLE of Mean	0.0149						
1547					MLE of Standard Deviation	0.0133						
1548					nu star	190.5						
1549					Approximate Chi Square Value (.05)	159.5					**Nonparametric Statistics**	
1550					Adjusted Level of Significance	0.0468					95% CLT UCL	0.0213

1551					Adjusted Chi Square Value	159					95% Jackknife UCL	0.0213
1552											95% Standard Bootstrap UCL	0.0212
1553					Anderson-Darling Test Statistic	5.651					95% Bootstrap-t UCL	0.0411
1554					Anderson-Darling 5% Critical Value	0.775					95% Hall's Bootstrap UCL	0.0443
1555					Kolmogorov-Smirnov Test Statistic	0.251					95% Percentile Bootstrap UCL	0.0225
1556					Kolmogorov-Smirnov 5% Critical Value	0.105					95% BCA Bootstrap UCL	0.0271
1557					**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.0317
1558											97.5% Chebyshev(Mean, Sd) UCL	0.039
1559					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.0534
1560					95% Approximate Gamma UCL	0.0178						
1561					95% Adjusted Gamma UCL	0.0178						
1562												
1563					**Potential UCL to Use**						Use 95% Chebyshev (Mean, Sd) UCL	0.0317
1564												
1565	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1566	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1567	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1568												
1569												
1570	**Tungsten**											
1571												
1572	**General Statistics**											
1573					Number of Valid Observations	76					Number of Distinct Observations	75
1574												
1575	**Raw Statistics**						**Log-transformed Statistics**					
1576					Minimum	0.00252					Minimum of Log Data	-5.982
1577					Maximum	0.214					Maximum of Log Data	-1.541
1578					Mean	0.0311					Mean of log Data	-4.327
1579					Median	0.0079					SD of log Data	1.284
1580					SD	0.0443						
1581					Coefficient of Variation	1.421						
1582					Skewness	2.046						
1583												
1584	**Relevant UCL Statistics**											
1585	**Normal Distribution Test**						**Lognormal Distribution Test**					
1586					Lilliefors Test Statistic	0.315					Lilliefors Test Statistic	0.165
1587					Lilliefors Critical Value	0.102					Lilliefors Critical Value	0.102
1588	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
1589												
1590	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1591					95% Student's-t UCL	0.0396					95% H-UCL	0.044
1592	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.054
1593					95% Adjusted-CLT UCL (Chen-1995)	0.0408					97.5% Chebyshev (MVUE) UCL	0.0645
1594					95% Modified-t UCL (Johnson-1978)	0.0398					99% Chebyshev (MVUE) UCL	0.0853
1595												
1596	**Gamma Distribution Test**						**Data Distribution**					
1597					k star (bias corrected)	0.685	**Data do not follow a Discernable Distribution (0.05)**					
1598					Theta Star	0.0455						
1599					MLE of Mean	0.0311						
1600					MLE of Standard Deviation	0.0376						

1601					nu star	104.1						
1602					Approximate Chi Square Value (.05)	81.54			Nonparametric Statistics			
1603					Adjusted Level of Significance	0.0468					95% CLT UCL	0.0395
1604					Adjusted Chi Square Value	81.16					95% Jackknife UCL	0.0396
1605											95% Standard Bootstrap UCL	0.0392
1606					Anderson-Darling Test Statistic	4.802					95% Bootstrap-t UCL	0.0411
1607					Anderson-Darling 5% Critical Value	0.798					95% Hall's Bootstrap UCL	0.0411
1608					Kolmogorov-Smirnov Test Statistic	0.207					95% Percentile Bootstrap UCL	0.0395
1609					Kolmogorov-Smirnov 5% Critical Value	0.107					95% BCA Bootstrap UCL	0.0414
1610					**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	0.0533
1611											97.5% Chebyshev(Mean, Sd) UCL	0.0628
1612					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	0.0817
1613					95% Approximate Gamma UCL	0.0398						
1614					95% Adjusted Gamma UCL	0.0399						
1615												
1616					**Potential UCL to Use**						Use 95% Chebyshev (Mean, Sd) UCL	0.0533
1617												
1618	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1619	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1620	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1621												
1622												
1623	**Uranium**											
1624												
1625	**General Statistics**											
1626					Number of Valid Observations	76			Number of Distinct Observations			73
1627												
1628					**Raw Statistics**				**Log-transformed Statistics**			
1629					Minimum	0.00251			Minimum of Log Data			-5.987
1630					Maximum	0.0191			Maximum of Log Data			-3.958
1631					Mean	0.0051			Mean of log Data			-5.477
1632					Median	0.00327			SD of log Data			0.587
1633					SD	0.00384						
1634					Coefficient of Variation	0.753						
1635					Skewness	1.913						
1636												
1637	**Relevant UCL Statistics**											
1638					**Normal Distribution Test**				**Lognormal Distribution Test**			
1639					Lilliefors Test Statistic	0.25			Lilliefors Test Statistic			0.235
1640					Lilliefors Critical Value	0.102			Lilliefors Critical Value			0.102
1641					**Data not Normal at 5% Significance Level**				**Data not Lognormal at 5% Significance Level**			
1642												
1643					**Assuming Normal Distribution**				**Assuming Lognormal Distribution**			
1644					95% Student's-t UCL	0.00583			95% H-UCL			0.00566
1645					**95% UCLs (Adjusted for Skewness)**				95% Chebyshev (MVUE) UCL			0.00652
1646					95% Adjusted-CLT UCL (Chen-1995)	0.00593			97.5% Chebyshev (MVUE) UCL			0.00719
1647					95% Modified-t UCL (Johnson-1978)	0.00585			99% Chebyshev (MVUE) UCL			0.00852
1648												
1649					**Gamma Distribution Test**				**Data Distribution**			
1650					k star (bias corrected)	2.574			**Data do not follow a Discernable Distribution (0.05)**			

1651					Theta Star	0.00198						
1652					MLE of Mean	0.0051						
1653					MLE of Standard Deviation	0.00318						
1654					nu star	391.3						
1655					Approximate Chi Square Value (.05)	346.5	**Nonparametric Statistics**					
1656					Adjusted Level of Significance	0.0468					95% CLT UCL	0.00583
1657					Adjusted Chi Square Value	345.7					95% Jackknife UCL	0.00583
1658											95% Standard Bootstrap UCL	0.00582
1659					Anderson-Darling Test Statistic	5.883					95% Bootstrap-t UCL	0.00601
1660					Anderson-Darling 5% Critical Value	0.76					95% Hall's Bootstrap UCL	0.00592
1661					Kolmogorov-Smirnov Test Statistic	0.229					95% Percentile Bootstrap UCL	0.00586
1662					Kolmogorov-Smirnov 5% Critical Value	0.103					95% BCA Bootstrap UCL	0.00595
1663	**Data not Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	0.00702
1664											97.5% Chebyshev(Mean, Sd) UCL	0.00785
1665	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	0.00948
1666					95% Approximate Gamma UCL	0.00576						
1667					95% Adjusted Gamma UCL	0.00577						
1668												
1669	**Potential UCL to Use**										Use 95% Chebyshev (Mean, Sd) UCL	0.00702
1670												
1671	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1672	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1673	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1674												
1675												
1676	**Vanadium**											
1677												
1678	**General Statistics**											
1679					Number of Valid Observations	76					Number of Distinct Observations	72
1680												
1681	**Raw Statistics**						**Log-transformed Statistics**					
1682					Minimum	0.0251					Minimum of Log Data	-3.684
1683					Maximum	0.108					Maximum of Log Data	-2.224
1684					Mean	0.0375					Mean of log Data	-3.38
1685					Median	0.0263					SD of log Data	0.409
1686					SD	0.0197						
1687					Coefficient of Variation	0.525						
1688					Skewness	1.952						
1689												
1690	**Relevant UCL Statistics**											
1691	**Normal Distribution Test**						**Lognormal Distribution Test**					
1692					Lilliefors Test Statistic	0.311					Lilliefors Test Statistic	0.324
1693					Lilliefors Critical Value	0.102					Lilliefors Critical Value	0.102
1694	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
1695												
1696	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1697					95% Student's-t UCL	0.0413					95% H-UCL	0.0403
1698	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.0448
1699					95% Adjusted-CLT UCL (Chen-1995)	0.0418					97.5% Chebyshev (MVUE) UCL	0.0482
1700					95% Modified-t UCL (Johnson-1978)	0.0414					99% Chebyshev (MVUE) UCL	0.0549

1701												
1702	**Gamma Distribution Test**						**Data Distribution**					
1703					k star (bias corrected)	5.112	**Data do not follow a Discernable Distribution (0.05)**					
1704					Theta Star	0.00734						
1705					MLE of Mean	0.0375						
1706					MLE of Standard Deviation	0.0166						
1707					nu star	777.1						
1708					Approximate Chi Square Value (.05)	713.4	**Nonparametric Statistics**					
1709					Adjusted Level of Significance	0.0468					95% CLT UCL	0.0412
1710					Adjusted Chi Square Value	712.2					95% Jackknife UCL	0.0413
1711											95% Standard Bootstrap UCL	0.0413
1712					Anderson-Darling Test Statistic	8.482					95% Bootstrap-t UCL	0.0421
1713					Anderson-Darling 5% Critical Value	0.754					95% Hall's Bootstrap UCL	0.0416
1714					Kolmogorov-Smirnov Test Statistic	0.325					95% Percentile Bootstrap UCL	0.0412
1715					Kolmogorov-Smirnov 5% Critical Value	0.103					95% BCA Bootstrap UCL	0.0416
1716	**Data not Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	0.0474
1717											97.5% Chebyshev(Mean, Sd) UCL	0.0516
1718	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	0.06
1719					95% Approximate Gamma UCL	0.0409						
1720					95% Adjusted Gamma UCL	0.0409						
1721												
1722	**Potential UCL to Use**										Use 95% Student's-t UCL	0.0413
1723											or 95% Modified-t UCL	0.0414
1724												
1725	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1726	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1727	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1728												
1729												
1730	**Zinc**											
1731												
1732	**General Statistics**											
1733					Number of Valid Observations	76					Number of Distinct Observations	74
1734												
1735	**Raw Statistics**						**Log-transformed Statistics**					
1736					Minimum	16.65					Minimum of Log Data	2.812
1737					Maximum	32.46					Maximum of Log Data	3.48
1738					Mean	24.17					Mean of log Data	3.177
1739					Median	23.92					SD of log Data	0.132
1740					SD	3.165						
1741					Coefficient of Variation	0.131						
1742					Skewness	0.209						
1743												
1744	**Relevant UCL Statistics**											
1745	**Normal Distribution Test**						**Lognormal Distribution Test**					
1746					Lilliefors Test Statistic	0.0545					Lilliefors Test Statistic	0.0558
1747					Lilliefors Critical Value	0.102					Lilliefors Critical Value	0.102
1748	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
1749												
1750	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					

1751	95% Student's-t UCL	24.78					95% H-UCL	24.81				
1752	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL	25.78				
1753	95% Adjusted-CLT UCL (Chen-1995)	24.78					97.5% Chebyshev (MVUE) UCL	26.47				
1754	95% Modified-t UCL (Johnson-1978)	24.78					99% Chebyshev (MVUE) UCL	27.83				
1755												
1756	**Gamma Distribution Test**						**Data Distribution**					
1757	k star (bias corrected)	56.57					**Data appear Normal at 5% Significance Level**					
1758	Theta Star	0.427										
1759	MLE of Mean	24.17										
1760	MLE of Standard Deviation	3.214										
1761	nu star	8598										
1762	Approximate Chi Square Value (.05)	8383					**Nonparametric Statistics**					
1763	Adjusted Level of Significance	0.0468					95% CLT UCL	24.77				
1764	Adjusted Chi Square Value	8379					95% Jackknife UCL	24.78				
1765							95% Standard Bootstrap UCL	24.76				
1766	Anderson-Darling Test Statistic	0.178					95% Bootstrap-t UCL	24.81				
1767	Anderson-Darling 5% Critical Value	0.749					95% Hall's Bootstrap UCL	24.79				
1768	Kolmogorov-Smirnov Test Statistic	0.0501					95% Percentile Bootstrap UCL	24.77				
1769	Kolmogorov-Smirnov 5% Critical Value	0.102					95% BCA Bootstrap UCL	24.76				
1770	**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	25.76				
1771							97.5% Chebyshev(Mean, Sd) UCL	26.44				
1772	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	27.79				
1773	95% Approximate Gamma UCL	24.79										
1774	95% Adjusted Gamma UCL	24.81										
1775												
1776	**Potential UCL to Use**						Use 95% Student's-t UCL	24.78				
1777												
1778	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
1779	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
1780	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
1781												

Appendix G

QA/QC Data

Table G.1 Method Blanks - Soil

Total Method Blanks Non-Compliant	8.08%
Total Method Blanks Compliant	91.92%

RPC Sample ID:			RB002141	RB002142	RB002143	Total Detected	Percent Non-Compliant
Type:			Blank	Blank	Blank		
Analytes	**Units**	**RL**					
Aluminum	mg/kg	1	1	< 1	1	2	66.67
Antimony	mg/kg	0.1	0.2	0.1	< 0.1	2	66.67
Arsenic	mg/kg	1	< 1	< 1	< 1	0	0.00
Barium	mg/kg	1	< 1	< 1	< 1	0	0.00
Beryllium	mg/kg	0.1	< 0.1	< 0.1	< 0.1	0	0.00
Bismuth	mg/kg	1	< 1	< 1	< 1	0	0.00
Boron	mg/kg	1	< 1	< 1	< 1	0	0.00
Cadmium	mg/kg	0.01	< 0.01	< 0.01	< 0.01	0	0.00
Calcium	mg/kg	50	< 50	< 50	< 50	0	0.00
Chromium	mg/kg	1	< 1	< 1	< 1	0	0.00
Cobalt	mg/kg	0.1	< 0.1	< 0.1	< 0.1	0	0.00
Copper	mg/kg	1	< 1	< 1	< 1	0	0.00
Iron	mg/kg	20	< 20	< 20	< 20	0	0.00
Lead	mg/kg	0.1	< 0.1	< 0.1	< 0.1	0	0.00
Lithium	mg/kg	0.1	< 0.1	< 0.1	< 0.1	0	0.00
Magnesium	mg/kg	10	< 10	< 10	< 10	0	0.00
Manganese	mg/kg	1	< 1	< 1	< 1	0	0.00
Mercury	mg/kg	0.01	< 0.01	< 0.01	-	1	33.33
Molybdenum	mg/kg	0.1	< 0.1	< 0.1	< 0.1	0	0.00
Nickel	mg/kg	1	< 1	< 1	< 1	0	0.00
Potassium	mg/kg	20	< 20	< 20	< 20	0	0.00
Rubidium	mg/kg	0.1	< 0.1	< 0.1	< 0.1	0	0.00
Selenium	mg/kg	1	< 1	< 1	< 1	0	0.00
Silver	mg/kg	0.1	< 0.1	< 0.1	< 0.1	0	0.00
Sodium	mg/kg	50	< 50	< 50	< 50	0	0.00
Strontium	mg/kg	1	< 1	< 1	< 1	0	0.00
Tellurium	mg/kg	0.1	< 0.1	< 0.1	< 0.1	0	0.00
Thallium	mg/kg	0.1	< 0.1	< 0.1	< 0.1	0	0.00
Tin	mg/kg	0.1	4.2	4.3	4.1	3	100.00
Tungsten	mg/kg	0.1	< 0.1	< 0.1	< 0.1	0	0.00
Uranium	mg/kg	0.1	< 0.1	< 0.1	< 0.1	0	0.00
Vanadium	mg/kg	1	< 1	< 1	< 1	0	0.00
Zinc	mg/kg	1	< 1	< 1	< 1	0	0.00

Table G.2 Method Blanks - Excluding Soil

Total Method Blanks Non-Compliant	4.71%
Total Method Blanks Compliant	95.29%

RPC Sample ID:			RB002175	RB002176	RB002198	RB002199	RB002200	RB002201	RB002202	RB002203	RB002208	Total Detected	Percent Non-Compliant
Type:			Blank	Blank	Blank	Blank	Blank	Blank	Blank	Blank	Blank		
Analytes	**Units**	**RL**											
Aluminum	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.3	1	11.11
Antimony	mg/kg	0.005	< 0.005	< 0.005	0.008	0.006	< 0.005	0.012	0.005	< 0.005	< 0.005	4	44.44
Arsenic	mg/kg	0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0	0.00
Barium	mg/kg	0.02	< 0.02	< 0.02	< 0.02	0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	1	11.11
Beryllium	mg/kg	0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0	0.00
Bismuth	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.05	< 0.05	< 0.05	< 0.05	1	11.11
Boron	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0	0.00
Cadmium	mg/kg	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0	0.00
Calcium	mg/kg	5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	0	0.00
Chromium	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0	0.00
Cobalt	mg/kg	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0	0.00
Copper	mg/kg	0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0	0.00
Iron	mg/kg	1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	0	0.00
Lead	mg/kg	0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0	0.00
Lithium	mg/kg	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0	0.00
Magnesium	mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0	0.00
Manganese	mg/kg	0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.03	0.02	0.02	< 0.02	3	33.33
Mercury	mg/kg	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0	0.00
Molybdenum	mg/kg	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0	0.00
Nickel	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0	0.00
Potassium	mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0	0.00
Rubidium	mg/kg	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0	0.00
Selenium	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0	0.00
Silver	mg/kg	0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0	0.00
Sodium	mg/kg	2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	0	0.00
Strontium	mg/kg	0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0	0.00
Tellurium	mg/kg	0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0	0.00
Thallium	mg/kg	0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0	0.00
Tin	mg/kg	0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	1	11.11
Tungsten	mg/kg	0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0	0.00
Uranium	mg/kg	0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0	0.00
Vanadium	mg/kg	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0	0.00
Zinc	mg/kg	0.05	< 0.05	< 0.05	0.06	< 0.05	< 0.05	< 0.05	< 0.05	0.14	0.07	3	33.33

Table G.3 Laboratory Duplicates

Average RPD (all lab duplicates):	**10.08**
Maximum RPD (all lab duplicates):	**159.18**

Total Lab Duplicate Analyses:	**564**
Total RPD >40%	**33**
Total Percent Non-Compliance:	**5.85**
Total Percent Compliance:	**94.15**

Analysis of Non-Soil Samples

Sample ID:	5518-GS-1	Lab Duplicate	RPD	5518-MM-1	Lab Duplicate	RPD	25083-MM-3	Lab Duplicate	RPD	15924-EW-1	Lab Duplicate	RPD
Analytes												
Aluminum	3.1	2.4	25.45	26.0	20.0	26.09	2.7	2.4	11.76	781.	1150	38.22
Antimony	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.00	0.022	0.029	27.45
Arsenic	< 0.02	< 0.02	0.00	0.03	0.03	0.00	0.03	0.03	0.00	2.53	3.22	24.00
Barium	14.1	14.2	0.71	3.10	3.45	10.69	7.85	7.88	0.38	4.69	6.52	32.65
Beryllium	< 0.002	< 0.002	0.00	< 0.002	< 0.002	0.00	< 0.002	< 0.002	0.00	0.021	0.033	44.44
Bismuth	< 0.05	< 0.05	0.00	< 0.05	< 0.05	0.00	< 0.05	< 0.05	0.00	< 0.05	< 0.05	0.00
Boron	0.7	0.7	0.00	0.3	0.2	40.00	0.1	0.1	0.00	0.2	0.2	0.00
Cadmium	0.006	0.007	15.38	0.024	0.023	4.26	0.101	0.111	9.43	7.20	6.61	8.54
Calcium	1060	1070	0.94	9850	11500	15.46	6530	6300	3.59	475	386	20.67
Chromium	0.25	0.71	95.83	1.14	1.23	7.59	0.025	0.05	66.67	1.31	1.95	39.26
Cobalt	0.05	0.05	0.00	0.02	0.02	0.00	< 0.01	< 0.01	0.00	1.23	1.30	5.53
Copper	1.67	1.73	3.53	3.78	3.31	13.26	2.32	2.41	3.81	2.25	2.45	8.51
Iron	22	25	12.77	140	139	0.72	112	116	3.51	931	1340	36.02
Lead	0.052	0.053	1.90	0.161	0.213	27.81	0.129	0.129	0.00	15.7	18.9	18.50
Lithium	< 0.01	< 0.01	0.00	0.03	0.02	40.00	< 0.01	< 0.01	0.00	0.77	1.11	36.17
Magnesium	485.	493.	1.64	374.	399.	6.47	313.	306.	2.26	344.	441.	24.71
Manganese	108.	108.	0.00	8.23	7.16	13.91	5.41	4.50	18.37	31.5	39.5	22.54
Mercury	0.02	0.03	40.00	< 0.01	< 0.01	0.00	0.03	0.03	0.00	0.07	0.08	13.33
Molybdenum	0.11	0.11	0.00	0.10	0.09	10.53	0.10	0.13	26.09	0.14	0.15	6.90
Nickel	0.14	0.14	0.00	0.12	0.13	8.00	0.06	0.05	18.18	0.85	1.21	34.95
Potassium	4830	4870	0.82	3190	3160	0.94	3190	3070	3.83	1490	1520	1.99
Rubidium	19.2	19.5	1.55	54.8	54.2	1.10	74.6	72.8	2.44	2.93	3.41	15.14
Selenium	0.16	0.12	28.57	0.13	0.14	7.41	0.34	0.35	2.90	3.04	3.14	3.24
Silver	< 0.002	< 0.002	0.00	0.005	0.002	85.71	0.055	0.048	13.59	0.163	0.171	4.79
Sodium	4	4	0.00	1100	1130	2.69	1180	1130	4.33	830	816	1.70
Strontium	6.39	6.46	1.09	6.71	7.89	16.16	1.47	1.53	4.00	1.38	1.26	9.09
Tellurium	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.00	0.013	0.014	7.41
Thallium	< 0.002	< 0.002	0.00	0.097	0.024	120.66	0.019	0.018	5.41	0.017	0.021	21.05
Tin	0.005	0.01	66.67	< 0.01	< 0.01	0.00	< 0.01	< 0.01	0.00	0.02	0.02	0.00
Tungsten	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.00	0.063	0.056	11.76
Uranium	< 0.002	< 0.002	0.00	< 0.002	< 0.002	0.00	< 0.002	< 0.002	0.00	0.058	0.071	20.16
Vanadium	0.005	0.01	66.67	0.05	0.04	22.22	< 0.01	< 0.01	0.00	1.81	2.77	41.92
Zinc	8.38	8.40	0.24	33.7	34.2	1.47	26.5	25.1	5.43	75.1	61.6	19.75

This report relates only to the sample(s) and information provided to the laboratory.

RL = Reporting Limit

Table G.3 Laboratory Duplicates

Analysis of Non-Soil Samples

Sample ID:	14534-BB-1	Lab Duplicate	RPD	14534-MM-4	Lab Duplicate	RPD	10070-GS-1	Lab Duplicate	RPD	24738-MM-4	Lab Duplicate	RPD
Analytes												
Aluminum	5.2	6.1	15.93	2.5	2.7	7.69	5.3	6.0	12.39	2.9	2.8	3.51
Antimony	< 0.005	< 0.005	0.00	0.007	0.0025	94.74	0.025	0.011	77.78	0.0025	0.006	82.35
Arsenic	< 0.02	< 0.02	0.00	0.08	0.08	0.00	0.06	0.05	18.18	0.01	0.02	66.67
Barium	4.95	5.24	5.69	1.62	1.48	9.03	21.1	21.7	2.80	2.58	4.08	45.05
Beryllium	< 0.002	< 0.002	0.00	< 0.002	< 0.002	0.00	< 0.002	< 0.002	0.00	< 0.002	< 0.002	0.00
Bismuth	< 0.05	< 0.05	0.00	< 0.05	< 0.05	0.00	< 0.05	< 0.05	0.00	< 0.05	< 0.05	0.00
Boron	1.7	1.7	0.00	0.1	0.1	0.00	1.7	1.7	0.00	0.9	0.8	11.76
Cadmium	0.007	0.007	0.00	0.342	0.305	11.44	0.005	0.005	0.00	0.006	0.006	0.00
Calcium	828	759	8.70	10100	9580	5.28	987	1020	3.29	5540	11300	68.41
Chromium	< 0.05	< 0.05	0.00	0.09	0.09	0.00	0.18	0.20	10.53	0.52	0.35	39.08
Cobalt	< 0.01	< 0.01	0.00	0.03	0.02	40.00	< 0.01	< 0.01	0.00	< 0.01	< 0.01	0.00
Copper	0.50	0.48	4.08	2.77	2.61	5.95	1.77	1.76	0.57	4.08	3.00	30.51
Iron	6	6	0.00	138	126	9.09	34	36	5.71	92	68	30.00
Lead	< 0.005	< 0.005	0.00	0.295	0.344	15.34	0.125	0.125	0.00	0.052	0.088	51.43
Lithium	< 0.01	< 0.01	0.00	< 0.01	< 0.01	0.00	< 0.01	< 0.01	0.00	< 0.01	< 0.01	0.00
Magnesium	191.	189.	1.05	364.	351.	3.64	228.	225.	1.32	336.	405.	18.62
Manganese	3.69	3.69	0.00	2.97	2.65	11.39	133.	133.	0.00	27.4	22.1	21.41
Mercury	< 0.01	< 0.01	0.00	0.02	0.03	40.00	0.01	0.01	0.00	< 0.01	< 0.01	0.00
Molybdenum	0.01	0.005	66.67	0.15	0.14	6.90	0.39	0.39	0.00	0.06	0.05	18.18
Nickel	0.29	0.28	3.51	0.07	0.06	15.38	0.13	0.13	0.00	0.28	0.26	7.41
Potassium	1590	1560	1.90	2900	2900	0.00	2110	2110	0.00	2760	2720	1.46
Rubidium	17.4	17.0	2.33	21.9	21.9	0.00	4.73	4.57	3.44	35.0	34.6	1.15
Selenium	< 0.05	< 0.05	0.00	0.61	0.61	0.00	0.05	0.025	66.67	0.06	0.06	0.00
Silver	< 0.002	< 0.002	0.00	0.003	0.002	40.00	< 0.002	< 0.002	0.00	< 0.002	< 0.002	0.00
Sodium	6	6	0.00	1420	1400	1.42	5	6	18.18	851	936	9.51
Strontium	3.87	3.51	9.76	3.23	3.07	5.08	10.3	10.5	1.92	2.54	5.59	75.03
Tellurium	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.00
Thallium	< 0.002	< 0.002	0.00	0.012	0.011	8.70	< 0.002	< 0.002	0.00	0.021	0.017	21.05
Tin	< 0.01	< 0.01	0.00	< 0.01	< 0.01	0.00	0.02	0.02	0.00	< 0.01	< 0.01	0.00
Tungsten	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.00	0.016	0.017	6.06	< 0.005	< 0.005	0.00
Uranium	< 0.002	< 0.002	0.00	< 0.002	< 0.002	0.00	< 0.002	< 0.002	0.00	< 0.002	< 0.002	0.00
Vanadium	< 0.01	< 0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.02	66.67
Zinc	1.23	1.21	1.64	26.1	27.5	5.22	30.8	28.6	7.41	19.9	26.7	29.18

This report relates only to the sample(s) and information prov

RL = Reporting Limit

Table G.3 Laboratory Duplicates

Analysis of Non-Soil Samples

Sample ID:	24738-MM-9	Lab Duplicate	RPD	17099-MM-2	Lab Duplicate	RPD	14956-BB-0	Lab Duplicate	RPD	13508-SS-0	Lab Duplicate	RPD
Analytes												
Aluminum	2.6	2.3	12.24	17.7	22.3	23.00	4.1	3.9	5.00	17200	16900	1.76
Antimony	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.00	< 0.1	< 0.1	0.00
Arsenic	0.07	0.07	0.00	0.02	0.03	40.00	< 0.02	< 0.02	0.00	34	38	11.11
Barium	2.40	2.87	17.84	4.74	2.58	59.02	3.28	3.44	4.76	43	43	0.00
Beryllium	< 0.002	< 0.002	0.00	< 0.002	< 0.002	0.00	< 0.002	< 0.002	0.00	0.4	0.4	0.00
Bismuth	< 0.05	< 0.05	0.00	< 0.05	< 0.05	0.00	< 0.05	< 0.05	0.00	3	3	0.00
Boron	0.1	0.1	0.00	0.3	0.4	28.57	1.5	1.6	6.45	2	2	0.00
Cadmium	0.152	0.118	25.19	0.052	0.070	29.51	0.011	0.010	9.52	0.20	0.21	4.88
Calcium	7400	8830	17.62	16100	7300	75.21	765	762	0.39	900	860	4.55
Chromium	0.15	0.14	6.90	0.025	0.06	82.35	< 0.05	< 0.05	0.00	21	19	10.00
Cobalt	0.02	0.02	0.00	0.02	0.02	0.00	< 0.01	< 0.01	0.00	6.0	8.2	30.99
Copper	3.27	3.22	1.54	3.82	4.24	10.42	0.68	0.63	7.63	33	31	6.25
Iron	93	103	10.20	87	95	8.79	5	4	22.22	23700	22000	7.44
Lead	0.135	0.138	2.20	0.174	0.115	40.83	0.024	0.024	0.00	21.3	19.8	7.30
Lithium	< 0.01	< 0.01	0.00	0.02	0.02	0.00	< 0.01	< 0.01	0.00	12.7	11.9	6.50
Magnesium	368.	366.	0.54	525.	374.	33.59	204.	198.	2.99	3160	2890	8.93
Manganese	21.5	20.8	3.31	12.1	13.5	10.94	8.81	8.59	2.53	384	463	18.65
Mercury	0.02	0.02	0.00	< 0.01	< 0.01	0.00	< 0.01	< 0.01	0.00	0.06	0.07	15.38
Molybdenum	0.15	0.12	22.22	0.10	0.10	0.00	0.03	0.02	40.00	3.2	3.2	0.00
Nickel	0.06	0.06	0.00	0.14	0.11	24.00	0.15	0.14	6.90	14	12	15.38
Potassium	3260	3180	2.48	3200	3200	0.00	1520	1540	1.31	630	640	1.57
Rubidium	20.4	20.0	1.98	95.7	94.4	1.37	11.4	11.5	0.87	25.3	25.6	1.18
Selenium	0.49	0.50	2.02	0.07	0.06	15.38	< 0.05	< 0.05	0.00	< 1	< 1	0.00
Silver	0.006	0.007	15.38	0.020	0.021	4.88	< 0.002	< 0.002	0.00	< 0.1	< 0.1	0.00
Sodium	1360	1360	0.00	1240	1090	12.88	2	2	0.00	< 50	< 50	0.00
Strontium	2.87	3.73	26.06	12.7	6.08	70.50	2.81	2.87	2.11	7	7	0.00
Tellurium	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.00	< 0.1	< 0.1	0.00
Thallium	0.011	0.011	0.00	0.007	0.007	0.00	< 0.002	< 0.002	0.00	0.3	0.2	40.00
Tin	< 0.01	< 0.01	0.00	< 0.01	< 0.01	0.00	< 0.01	< 0.01	0.00	< 0.1	< 0.1	0.00
Tungsten	0.005	0.0025	66.67	0.005	0.006	18.18	< 0.005	< 0.005	0.00	4.7	5.1	8.16
Uranium	< 0.002	< 0.002	0.00	< 0.002	< 0.002	0.00	< 0.002	< 0.002	0.00	1.0	1.0	0.00
Vanadium	< 0.01	< 0.01	0.00	0.04	0.04	0.00	< 0.01	< 0.01	0.00	44	46	4.44
Zinc	30.5	30.7	0.65	38.0	27.1	33.49	1.28	1.17	8.98	51	49	4.00

This report relates only to the sample(s) and information pro

RL = Reporting Limit

Table G.3 Laboratory Duplicates

Analysis of Non-Soil Samples

Sample ID:	28064-SS-1	Lab Duplicate	RPD	17627-SS-1	Lab Duplicate	RPD	5518-SS-1	Lab Duplicate	RPD	34090-SS-1	Lab Duplicate	RPD
Analytes												
Aluminum	1610	1820	12.24	11500	11500	0.00	20300	21100	3.86	6330	5960	6.02
Antimony	< 0.1	< 0.1	0.00	0.1	0.05	66.67	0.2	0.2	0.00	0.2	0.2	0.00
Arsenic	2	2	0.00	3	3	0.00	10	10	0.00	4	4	0.00
Barium	7	8	13.33	12	11	8.70	31	32	3.17	40	38	5.13
Beryllium	< 0.1	< 0.1	0.00	0.2	0.2	0.00	0.9	1.0	10.53	0.4	0.3	28.57
Bismuth	< 1	< 1	0.00	1	0.5	66.67	1	0.5	66.67	< 1	< 1	0.00
Boron	2	2	0.00	2	2	0.00	3	3	0.00	1	1	0.00
Cadmium	0.04	0.04	0.00	0.07	0.07	0.00	0.32	0.31	3.17	0.25	0.23	8.33
Calcium	180	190	5.41	200	240	18.18	860	860	0.00	8250	7710	6.77
Chromium	1	2	66.67	5	5	0.00	19	20	5.13	8	8	0.00
Cobalt	0.3	0.3	0.00	0.9	1.0	10.53	12.3	13.2	7.06	1.3	1.1	16.67
Copper	1	1	0.00	2	2	0.00	9	9	0.00	2	2	0.00
Iron	1760	1940	9.73	12200	12700	4.02	17600	17400	1.14	4390	3750	15.72
Lead	4.0	4.0	0.00	8.5	8.5	0.00	40.6	40.8	0.49	17.5	17.2	1.73
Lithium	0.8	1.1	31.58	4.3	4.5	4.55	8.4	8.4	0.00	15.4	13.2	15.38
Magnesium	100	120	18.18	550	620	11.97	1120	1110	0.90	1060	950	10.95
Manganese	11	13	16.67	57	59	3.45	1170	1290	9.76	43	32	29.33
Mercury	0.02	0.02	0.00	0.10	-	0.00	0.33	-	0.00	0.13	0.14	7.41
Molybdenum	0.1	0.2	66.67	0.2	0.2	0.00	1.6	1.6	0.00	1.2	1.2	0.00
Nickel	< 1	< 1	0.00	2	2	0.00	6	6	0.00	3	3	0.00
Potassium	210	250	17.39	310	310	0.00	720	560	25.00	670	590	12.70
Rubidium	2.9	3.6	21.54	7.9	7.7	2.56	12.9	12.5	3.15	10.4	8.8	16.67
Selenium	< 1	< 1	0.00	< 1	< 1	0.00	2	2	0.00	< 1	< 1	0.00
Silver	< 0.1	< 0.1	0.00	0.1	0.1	0.00	1.1	1.2	8.70	0.1	0.05	66.67
Sodium	< 50	< 50	0.00	< 50	< 50	0.00	220	25	159.18	80	70	13.33
Strontium	2	2	0.00	2	2	0.00	7	7	0.00	37	35	5.56
Tellurium	< 0.1	< 0.1	0.00	< 0.1	< 0.1	0.00	< 0.1	< 0.1	0.00	< 0.1	< 0.1	0.00
Thallium	< 0.1	< 0.1	0.00	< 0.1	< 0.1	0.00	0.2	0.2	0.00	0.2	0.1	66.67
Tin	< 0.1	< 0.1	0.00	< 0.1	< 0.1	0.00	< 0.1	< 0.1	0.00	< 0.1	< 0.1	0.00
Tungsten	0.2	0.2	0.00	< 0.1	< 0.1	0.00	0.4	0.3	28.57	0.2	0.2	0.00
Uranium	0.9	1.0	10.53	0.6	0.6	0.00	2.5	2.6	3.92	2.5	2.5	0.00
Vanadium	6	7	15.38	23	24	4.26	35	35	0.00	7	6	15.38
Zinc	5	6	18.18	10	10	0.00	34	33	2.99	14	12	15.38

This report relates only to the sample(s) and information pro\

RL = Reporting Limit

Table G.3 Laboratory Duplicates

Analysis of Non-Soil Samples

Sample ID:	25466-SS-1	Lab Duplicate	RPD
Analytes			
Aluminum	5060	4780	5.69
Antimony	< 0.1	< 0.1	0.00
Arsenic	2	2	0.00
Barium	15	14	6.90
Beryllium	0.2	0.2	0.00
Bismuth	< 1	< 1	0.00
Boron	2	2	0.00
Cadmium	0.10	0.09	10.53
Calcium	270	250	7.69
Chromium	3	3	0.00
Cobalt	1.0	0.9	10.53
Copper	2	2	0.00
Iron	5490	5330	2.96
Lead	10.1	9.3	8.25
Lithium	4.1	3.7	10.26
Magnesium	310	360	14.93
Manganese	69	62	10.69
Mercury	0.06	0.06	0.00
Molybdenum	0.1	0.1	0.00
Nickel	3	2	40.00
Potassium	250	290	14.81
Rubidium	6.1	6.7	9.38
Selenium	< 1	< 1	0.00
Silver	< 0.1	< 0.1	0.00
Sodium	< 50	< 50	0.00
Strontium	2	2	0.00
Tellurium	< 0.1	< 0.1	0.00
Thallium	< 0.1	< 0.1	0.00
Tin	< 0.1	< 0.1	0.00
Tungsten	< 0.1	< 0.1	0.00
Uranium	0.8	0.7	13.33
Vanadium	9	11	20.00
Zinc	10	9	10.53

This report relates only to the sample(s) and information pro\

RL = Reporting Limit

Table G.4 Field Duplicates

Total RPDs Calculated	134
Total RPDs Non-Compliant	17
Total Percent Non-Complaince	12.69

Non-Soil Samples

Sample ID:			24738-PP-0	24738-PP-1	RPD	14953-BB-1	14953-BB-0	RPD
Analytes	**Units**	**RL**						
Aluminum	mg/kg	0.1	10.3	6.0	52.76	8.3	4.1	67.74
Antimony	mg/kg	0.005	0.005	< 0.005	NA	< 0.005	< 0.005	NA
Arsenic	mg/kg	0.02	< 0.02	< 0.02	NA	< 0.02	< 0.02	NA
Barium	mg/kg	0.02	24.1	23.3	3.38	2.68	3.28	20.13
Beryllium	mg/kg	0.002	< 0.002	< 0.002	NA	< 0.002	< 0.002	NA
Bismuth	mg/kg	0.05	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA
Boron	mg/kg	0.1	7.2	6.9	4.26	2.0	1.5	28.57
Cadmium	mg/kg	0.001	0.358	0.342	4.57	0.016	0.011	37.04
Calcium	mg/kg	5	2290	2330	1.73	889	765	14.99
Chromium	mg/kg	0.05	0.12	< 0.05	NA	< 0.05	< 0.05	NA
Cobalt	mg/kg	0.01	0.02	0.01	NA	< 0.01	< 0.01	NA
Copper	mg/kg	0.02	2.77	2.16	24.75	0.48	0.68	34.48
Iron	mg/kg	1	23	18	24.39	4	5	NA
Lead	mg/kg	0.005	0.134	0.043	102.82	< 0.005	0.024	NA
Lithium	mg/kg	0.01	< 0.01	< 0.01	NA	< 0.01	< 0.01	NA
Magnesium	mg/kg	0.5	410.	373.	9.45	205.	204.	0.49
Manganese	mg/kg	0.02	1210	842.	35.87	10.2	8.81	14.62
Mercury	mg/kg	0.01	0.02	0.01	NA	< 0.01	< 0.01	NA
Molybdenum	mg/kg	0.01	< 0.01	< 0.01	NA	0.02	0.03	NA
Nickel	mg/kg	0.05	0.31	0.50	46.91	0.19	0.15	NA
Potassium	mg/kg	0.5	1830	2660	36.97	1600	1520	5.13
Rubidium	mg/kg	0.01	8.94	13.1	37.75	12.8	11.4	11.57
Selenium	mg/kg	0.05	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA
Silver	mg/kg	0.002	< 0.002	< 0.002	NA	< 0.002	< 0.002	NA
Sodium	mg/kg	2	5	4	NA	3	2	NA
Strontium	mg/kg	0.02	5.84	6.20	5.98	3.09	2.81	9.49
Tellurium	mg/kg	0.005	< 0.005	< 0.005	NA	< 0.005	< 0.005	NA
Thallium	mg/kg	0.002	0.003	< 0.002	NA	< 0.002	< 0.002	NA
Tin	mg/kg	0.01	0.05	< 0.01	NA	< 0.01	< 0.01	NA
Tungsten	mg/kg	0.005	< 0.005	< 0.005	NA	< 0.005	< 0.005	NA
Uranium	mg/kg	0.002	< 0.002	< 0.002	NA	< 0.002	< 0.002	NA
Vanadium	mg/kg	0.01	0.02	0.01	NA	< 0.01	< 0.01	NA
Zinc	mg/kg	0.05	32.7	40.1	20.33	1.62	1.28	23.45
Total RPDs not calculated					**18**			**21**
Total RPDs calculated					**15**			**12**
Number Non-Compliant					**3**			**1**
Average RPD					**24.88**			**20.11**
Percent Non-Compliant					**20.00**			**8.33**

Table G.4 Field Duplicates

Soil Samples

Client Sample ID:			13508-SS-0	13508-SS-1	RPD	12724-SS-1	12724-SS-1	RPD
Analytes	**Units**	**RL**						
Aluminum	mg/kg	1	17200	22900	28.43	12100	9370	25.43
Antimony	mg/kg	0.1	< 0.1	< 0.1	NA	< 0.1	< 0.1	NA
Arsenic	mg/kg	1	34	38	11.11	30	28	6.90
Barium	mg/kg	1	43	52	18.95	27	24	11.76
Beryllium	mg/kg	0.1	0.4	0.6	40.00	0.2	0.1	NA
Bismuth	mg/kg	1	3	3	NA	2	1	NA
Boron	mg/kg	1	2	2	NA	3	3	NA
Cadmium	mg/kg	0.01	0.20	0.27	29.79	0.17	0.22	25.64
Calcium	mg/kg	50	900	960	6.45	290	220	27.45
Chromium	mg/kg	1	21	27	25.00	15	13	14.29
Cobalt	mg/kg	0.1	6.0	5.9	1.68	2.2	1.9	14.63
Copper	mg/kg	1	33	24	31.58	7	5	33.33
Iron	mg/kg	20	23700	23000	3.00	26900	18400	37.53
Lead	mg/kg	0.1	21.3	26.4	21.38	22.4	15.5	36.41
Lithium	mg/kg	0.1	12.7	19.5	42.24	10.3	7.6	30.17
Magnesium	mg/kg	10	3160	3320	4.94	1290	1100	15.90
Manganese	mg/kg	1	384	514	28.95	256	218	16.03
Mercury	mg/kg	0.01	0.06	0.09	40.00	0.10	0.07	35.29
Molybdenum	mg/kg	0.1	3.2	2.8	13.33	0.6	0.4	NA
Nickel	mg/kg	1	14	16	13.33	6	5	18.18
Potassium	mg/kg	20	630	590	6.56	340	420	21.05
Rubidium	mg/kg	0.1	25.3	16.1	44.44	8.6	10.8	22.68
Selenium	mg/kg	1	< 1	< 1	NA	< 1	< 1	NA
Silver	mg/kg	0.1	< 0.1	0.1	NA	0.1	0.1	NA
Sodium	mg/kg	50	< 50	< 50	NA	< 50	< 50	NA
Strontium	mg/kg	1	7	7	0.00	3	3	NA
Tellurium	mg/kg	0.1	< 0.1	< 0.1	NA	< 0.1	< 0.1	NA
Thallium	mg/kg	0.1	0.3	0.3	NA	0.2	0.2	NA
Tin	mg/kg	0.1	< 0.1	< 0.1	NA	< 0.1	< 0.1	NA
Tungsten	mg/kg	0.1	4.7	8.4	56.49	0.4	0.3	NA
Uranium	mg/kg	0.1	1.0	1.0	0.00	0.8	0.7	13.33
Vanadium	mg/kg	1	44	42	4.65	50	42	17.39
Zinc	mg/kg	1	51	57	11.11	25	23	8.33
Total RPDs not calculated					**9**			**13**
Total RPDs calculated					**24**			**20**
Number Non-Compliant					**3**			**0**
Average RPD					**19.24**			**21.59**
Percent Non-Compliant					**12.50**			**0.00**

Table G.4 Field Duplicates

Soil Samples

Client Sample ID:			28064-SS-0	28064-SS-1	RPD	20953-SS-0	20953-SS-1	RPD
Analytes	**Units**	**RL**						
Aluminum	mg/kg	1	840	1610	62.86	11100	10400	6.51
Antimony	mg/kg	0.1	< 0.1	< 0.1	NA	< 0.1	0.2	NA
Arsenic	mg/kg	1	< 1	2	NA	4	6	NA
Barium	mg/kg	1	15	7	72.73	31	48	43.04
Beryllium	mg/kg	0.1	< 0.1	< 0.1	NA	0.1	0.2	NA
Bismuth	mg/kg	1	< 1	< 1	NA	< 1	< 1	NA
Boron	mg/kg	1	2	2	NA	2	2	NA
Cadmium	mg/kg	0.01	0.08	0.04	NA	0.15	0.23	42.11
Calcium	mg/kg	50	570	180	NA	1030	1460	34.54
Chromium	mg/kg	1	< 1	1	NA	43	39	9.76
Cobalt	mg/kg	0.1	0.2	0.3	NA	4.3	5.2	18.95
Copper	mg/kg	1	1	1	NA	10	11	9.52
Iron	mg/kg	20	640	1760	93.33	27200	28200	3.61
Lead	mg/kg	0.1	11.1	4.0	94.04	10.0	10.5	4.88
Lithium	mg/kg	0.1	0.4	0.8	NA	10.2	8.9	13.61
Magnesium	mg/kg	10	90	100	10.53	3510	3360	4.37
Manganese	mg/kg	1	21	11	62.50	148	258	54.19
Mercury	mg/kg	0.01	0.05	0.02	NA	0.06	0.07	15.38
Molybdenum	mg/kg	0.1	0.1	0.1	NA	0.1	0.3	NA
Nickel	mg/kg	1	1	< 1	NA	10	10	0.00
Potassium	mg/kg	20	180	210	15.38	380	430	12.35
Rubidium	mg/kg	0.1	2.3	2.9	23.08	9.0	8.8	2.25
Selenium	mg/kg	1	< 1	< 1	NA	< 1	< 1	NA
Silver	mg/kg	0.1	< 0.1	< 0.1	NA	< 0.1	< 0.1	NA
Sodium	mg/kg	50	< 50	< 50	NA	< 50	< 50	NA
Strontium	mg/kg	1	4	2	NA	8	12	40.00
Tellurium	mg/kg	0.1	< 0.1	< 0.1	NA	< 0.1	< 0.1	NA
Thallium	mg/kg	0.1	< 0.1	< 0.1	NA	0.1	0.1	NA
Tin	mg/kg	0.1	< 0.1	< 0.1	NA	< 0.1	< 0.1	NA
Tungsten	mg/kg	0.1	< 0.1	0.2	NA	< 0.1	< 0.1	NA
Uranium	mg/kg	0.1	0.4	0.9	NA	0.5	0.5	0.00
Vanadium	mg/kg	1	3	6	NA	115	113	1.75
Zinc	mg/kg	1	8	5	46.15	33	41	21.62
Total RPDs not calculated					**24**			**13**
Total RPDs calculated					**9**			**20**
Number Non-Compliant					**6**			**3**
Average RPD					**53.40**			**16.92**
Percent Non-Compliant					**66.67**			**15.00**

Table G.4 Field Duplicates

Soil Samples

Client Sample ID:			22897-SS-0	22897-SS-1	RPD	28890-SS-0	28890-SS-1	RPD
Analytes	**Units**	**RL**						
Aluminum	mg/kg	1	10900	11400	4.48	5410	4780	12.37
Antimony	mg/kg	0.1	< 0.1	< 0.1	NA	< 0.1	0.2	NA
Arsenic	mg/kg	1	6	6	0.00	2	2	NA
Barium	mg/kg	1	25	25	0.00	11	11	0.00
Beryllium	mg/kg	0.1	0.5	0.5	0.00	< 0.1	< 0.1	NA
Bismuth	mg/kg	1	< 1	< 1	NA	< 1	< 1	NA
Boron	mg/kg	1	1	1	NA	2	2	NA
Cadmium	mg/kg	0.01	0.08	0.07	13.33	0.10	0.10	0.00
Calcium	mg/kg	50	650	500	26.09	520	480	8.00
Chromium	mg/kg	1	7	7	0.00	3	3	NA
Cobalt	mg/kg	0.1	3.1	3.5	12.12	0.2	0.2	NA
Copper	mg/kg	1	4	4	NA	< 1	< 1	NA
Iron	mg/kg	20	11000	11600	5.31	3670	3410	7.34
Lead	mg/kg	0.1	13.2	8.6	42.20	5.8	5.3	9.01
Lithium	mg/kg	0.1	13.4	14.4	7.19	2.0	2.2	9.52
Magnesium	mg/kg	10	1960	2040	4.00	120	160	28.57
Manganese	mg/kg	1	146	144	1.38	9	13	36.36
Mercury	mg/kg	0.01	0.04	0.03	NA	0.11	0.12	8.70
Molybdenum	mg/kg	0.1	0.3	0.3	NA	0.4	0.4	NA
Nickel	mg/kg	1	6	6	0.00	< 1	< 1	NA
Potassium	mg/kg	20	950	1060	10.95	190	170	11.11
Rubidium	mg/kg	0.1	15.7	17.9	13.10	3.5	3.3	5.88
Selenium	mg/kg	1	< 1	< 1	NA	< 1	< 1	NA
Silver	mg/kg	0.1	< 0.1	< 0.1	NA	< 0.1	< 0.1	NA
Sodium	mg/kg	50	< 50	< 50	NA	< 50	< 50	NA
Strontium	mg/kg	1	3	2	NA	4	3	NA
Tellurium	mg/kg	0.1	< 0.1	< 0.1	NA	< 0.1	< 0.1	NA
Thallium	mg/kg	0.1	0.1	0.2	NA	< 0.1	< 0.1	NA
Tin	mg/kg	0.1	< 0.1	< 0.1	NA	< 0.1	< 0.1	NA
Tungsten	mg/kg	0.1	0.1	0.1	NA	< 0.1	< 0.1	NA
Uranium	mg/kg	0.1	1.3	1.4	7.41	0.7	0.7	0.00
Vanadium	mg/kg	1	16	16	0.00	8	6	28.57
Zinc	mg/kg	1	28	28	0.00	10	10	0.00
Total RPDs not calculated					**14**			**18**
Total RPDs calculated					**19**			**15**
Number Non-Compliant					**1**			**0**
Average RPD					**7.77**			**11.03**
Percent Non-Compliant					**5.26**			**0.00**

Appendix H

List of Acronyms and Units

LIST OF ACRONYMS AND UNITS

Acronym/Unit	Definition
CAEAL	Canadian Association of Environmental Analytical Laboratories
EIA	environmental impact assessment
EQL	estimated limit of quantification
HHERA	human health and ecological risk assessment
kg	kilogram
max	maximum
mg	milligram
min	minimum
QA/QC	quality assurance/quality control
RDL	reportable detection limit
RPC	Research and Productivity Council
RPD	relative percent difference
SOP	Standard Operating Procedure
UCL	upper confidence limit
US EPA	United States Environmental Protection Agency