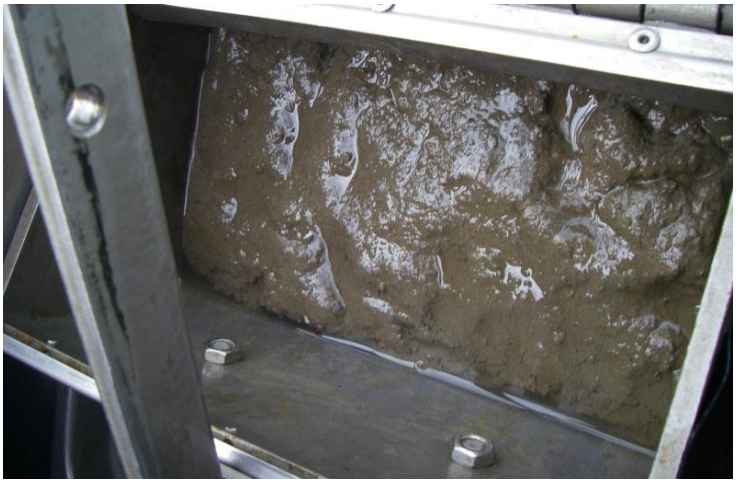
CANPOTEX POTASH EXPORT TERMINAL AND RIDLEY ISLAND ROAD, RAIL, AND UTILITY CORRIDOR

Sediment Technical Data Report

FINAL REPORT



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EXECUTIVE SUMMARY

Canpotex Terminals Limited (Canpotex) and the Prince Rupert Port Authority (PRPA) engaged Stantec Consulting Ltd. (Stantec) to conduct an environmental assessment under the *Canadian Environmental Assessment Act* and the Canada Port Authority Environmental Assessment Regulations for its proposed potash export terminal on Ridley Island in the Port of Prince Rupert, British Columbia. The project is planned to include estimated dredging of 840,000 m^3 of sediment. Detailed geotechnical and geophysical data, along with engineering design, will determine the final dredge volume. Marine sediment quality was characterized through field sampling programs in 2008 and 2009 to provide baseline information for the assessment of potential Project effects on the marine environment and for preparation of a Disposal at Sea permit, which would be required for disposal of dredged materials at a designated ocean disposal site.

This report presents an overview of the local environment, field methods and results of the marine sediment quality surveys. Sediment samples were collected from eight stations in December 2008 and 24 stations in June 2009 (a total of 56 samples). The June program included depth samples from cores taken in the geotechnical drilling program. Concentrations of metals and organic compounds were compared to Canadian Council of Ministers of Environment (CCME) guidelines for the protection of aquatic life, both Interim Sediment Quality Guidelines (ISQGs) and Probable Effects Levels (PELs). The BC working sediment guideline based on the National Status and Trends Program Approach (NSTPA) was used for nickel. Cadmium, mercury, polychlorinated biphenyl (PCB) and total polycyclic aromatic hydrocarbon (PAH) levels were also assessed in relation to Disposal at Sea screening criteria.

The following results were reported in relation to CCME sediment quality guidelines for protection of aquatic life:

- Nickel concentrations were above the BC Working Guideline in four of 32 surface sediment samples, four of 12 samples collected at 2 m depth, and four of 12 samples collected at 5 m depth.
- Arsenic exceeded the ISQG at all stations, but concentrations were well below the PEL.
- Copper exceeded the ISQG at all stations, but concentrations were well below the PEL.
- Fluoranthene in surface sediment at one station exceeded the CCME ISQG concentration, but the concentration was well below the PEL.

The results of the 2008 and 2009 field investigations indicate that most of the 32 stations contained relatively low levels of the analyzed parameters and all met the Disposal at Sea screening criteria for dredged materials.

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1 INTRODUCTION

Canpotex Terminals Limited (Canpotex) is proposing to construct a potash export terminal on Ridley Island in the Port of Prince Rupert, British Columbia (BC). The Project will include construction of a marine wharf, trestle and causeway. The sediment depths and undulations in the bedrock offshore of Ridley Island limit where the wharf and access trestle can be constructed. To create the water depth needed for safe moorage of vessels at the berth face, it will be necessary to dredge. For the purposes of this report, the proposed marine wharf and associated infrastructure are collectively called the Project.

Canpotex is responsible for ensuring that an assessment of environmental effects is conducted under the *Canada Port Authority Environmental Assessment Regulations* (CPAEAR) prior to constructing the Project. The Project is a prescribed project in respect of which a comprehensive study is required pursuant to the Comprehensive Study List Regulations under the *Canadian Environmental Assessment Act* (CEAA). In addition, Fisheries and Oceans Canada (DFO), Environment Canada (EC), and the Canadian Transportation Agency (CTA) may have to issue authorizations for works or undertakings associated with the Project. These agencies, therefore, have the responsibility of ensuring that an environmental assessment (EA) is conducted in accordance with CEAA prior to issuing their authorizations.

This Technical Data Report (TDR) summarizes the characteristics of marine sediment in the vicinity of the Project where dredging will occur, to establish if it meets criteria set by the *Disposal at Sea Regulation*, administered by Environment Canada under authority of the CEPA 1999, Part 7, Division 3, Disposal at Sea. Characteristics of sediment to be dredged in the marine area have been summarized and include particle size, moisture content, total organic carbon, total metals (ICP-MS), PAHs and PCBs. These parameters were determined from field surveys conducted for the Project.

Other baseline studies completed in support of the Project have focused on marine environment, vegetation resources, wildlife, sound quality, air quality and socio-economic environment.

1.1 Background Information

Marine sediments are formed by the accumulation of particulate matter that settles out of the water column, and may consist of anything from coarse gravel and sand to clay and organic matter. In some areas, discharges of hazardous chemicals over many years have resulted in high levels of contaminants in sediments, and processes occurring in surface marine sediments can have a profound effect on the local and global cycling of these elements. Pollutants in sediments can spread to surrounding areas through diffusion to water, re-suspension when sediments are disturbed or accumulation by benthic organisms. Because of these mechanisms, contaminated sediments may continue to release hazardous chemicals to the environment long after the sources of pollution have been eliminated, and thus have potential for serious effects on living organisms and ecosystems.

In the present assessment, a total of 56 sediment samples were collected at 32 stations in December 2008 and June 2009, to assess conditions in areas that would be dredged to accommodate the proposed terminal and to support the assessment of potential project effects on

the marine environment. The dredged material will be disposed of in the sea if it meets criteria set by the *Disposal at Sea Regulation*, administered by Environment Canada under authority of the CEPA 1999, Part 7, Division 3, Disposal at Sea.

1.2 Objectives

The purpose of this document is to describe the baseline characteristics of marine sediment for the marine component of the Canpotex Potash Export Terminal Environmental Assessment (EA). Information on marine sediment chemistry, organic carbon content and particle size has been generated from field surveys in order to:

- Collect preliminary information on sediment quality for a *Disposal at Sea* application
- Characterize baseline sediment condition in the proposed dredging area to support preparation of an EA
- Identify construction and operational measures required to minimize or avoid adverse effects on the marine environment
- Assess Project effects on the marine environment.

2 METHODS

2.1 Study Area Boundaries

The proposed project location is Ridley Island in the Port of Prince Rupert, BC.

2.1.1 Study Area for Field Surveys

In the present study, marine sediment samples were collected at 32 stations in the proposed dredge footprint (Figure 1). Ponar grab samples were composites of three individual grabs from the same general location. Specific waypoints were recorded for each grab; however for simplicity, in Figure 1 and Table 1, station locations are represented by the waypoint recorded for the second grab taken at each station. Sediment cores were also taken, and samples collected from the surface, 2 m and 5 m depths, with waypoints were also recorded, as indicated in Table 1.

2.2 Field Surveys

Marine sediment samples were collected in December 2008 and June 2009 using a petit Ponar grab and June 2009 using a vibra-corer as part of the geotechnical surveys:

- December 12, 2008 (surface grab samples were collected from eight stations)
- June 15 and 17, 2009 (surface grab samples were collected at 12 stations)
- June 16 and 17, 2009 (core samples were collected from 12 stations with three samples collected from each core at surface, 2 m and 5 m depth at each station)

Table 1: Sampling Dates, Station Coordinates and Physical Characteristics of Sediment Collected at the Proposed Canpotex Potash Export Terminal in 2008 and 2009

Collection Date	Station	Coordinates[1]		Sample Type	Smell	Material
		Latitude	Longitude			
12-Dec-08	S1	54.21936	-130.34059	Grab	None	Grey/brown colour; no shells in sediment
12-Dec-08	S2	54.21863	-130.34076	Grab	None	Grey/brown colour; no shells
12-Dec-08	S3	54.21811	-130.34096	Grab	None	Grey/brown colour; no shells
12-Dec-08	S4	54.21757	-130.34067	Grab	None	Grey/brown colour; no shells
12-Dec-08	S5	54.21936	-130.34059	Grab	None	Grey/brown colour; no shells
12-Dec-08	S6	54.21726	-130.33964	Grab	None	Grey/brown colour; no shells
12-Dec-08	S7	54.21660	-130.33914	Grab	None	Grey/brown colour; no shells
12-Dec-08	S8	54.21620	-130.33927	Grab	None	Grey/brown colour; no shells
16-Jun-09	C10	54.21890	-130.33784	Core	Strong organic, anoxic	Mud, mud/clay
16-Jun-09	C11	54.21854	-130.34026	Core	Strong anoxic	Fine silt/clay
15-Jun-09	C13	54.21817	-130.33743	Core	Organic, anoxic	Fine silt/clay
15-Jun-09	C14	54.21794	-130.33905	Core	Slight organic	Fine clay, clay/mud
15-Jun-09	C16	54.21716	-130.33826	Core	Strong anoxic at 5 m	Fine sediment
15-Jun-09	C17	54.21696	-130.33951	Core	Strong anoxic at 5 m	Clay/mud, clay
16-Jun-09	C21	54.21671	-130.33649	Core	Slight organic	Fine sediment, clay; shell, organic material at surface
15-Jun-09	C23	54.21598	-130.33996	Core	Organic smell at 2 m	Silt and clay, fine clay
16-Jun-09	C24	54.21596	-130.33615	Core	Strong organic at surface, less at depth	Silt, clay, shells at surface; fine clay and silt at depth
16-Jun-09	C25	54.21554	-130.33826	Core	Strong anoxic at surface, less at depth	Mud at surface; fine silt/clay at depth
15-Jun-09	C26	54.21517	-130.33958	Core	Mild organic	Fine silt and clay to clay at 5 m
16-Jun-09	C29	54.21477	-130.33681	Core	Strong organic, slightly anoxic at 5 m	Fine silt and clay
15-Jun-09	P1	54.21933	-130.34031	Grab	None	Very fine sediment, mud; worms
15-Jun-09	P2	54.21875	-130.34047	Grab	Organic	Fine sediment

Collection Date	Station	Coordinates[1]		Sample Type	Smell	Material
		Latitude	Longitude			
15-Jun-09	P3	54.21817	-130.34064	Grab	None	Fine mud, silt, clay
17-Jun-09	P4	54.21760	-130.34080	Grab	Slight organic	Fine silt/mud
17-Jun-09	P5	54.21798	-130.33952	Grab	None	Fine silt/mud; organics and worms
17-Jun-09	P6	54.21740	-130.33952	Grab	Slight anoxic	Fine silt/mud; wood, worms, shell
17-Jun-09	P7	54.21681	-130.33951	Grab	Slight organic, anoxic	Fine silt/mud; shell
17-Jun-09	P8	54.21623	-130.33951	Grab	Slight smell at depth	Fine silt/clay
17-Jun-09	P9	54.22031	-130.33556	Grab	Anoxic below 3 cm	Fine silt/mud; bark, organics
17-Jun-09	P10	54.22008	-130.33175	Grab	Anoxic below 3 cm	Fine silt/mud; worms
17-Jun-09	P11	54.21928	-130.33559	Grab	Anoxic, organic	Fine silt on top/clay below
17-Jun-09	P12	54.21943	-130.33176	Grab	None	Fine silt on top/clay below; bark, shells

NOTE:
Ponar grab sediment samples were collected at 'S' (2008) and 'P' (2009) stations. 'C' stations denote core samples.
[1] Coordinates are as Lat/Long Zone 9

Sampling locations were geo-referenced using GPS (handheld unit, accurate to within 15 m). Station coordinates and characteristics are provided in Table 1 and Figure 1 shows their locations. Samples were collected from a total of 32 stations (12 vibra-core, 20 Ponar) within the dredge footprint for the baseline sediment sampling.

All sampling procedures followed a protocol developed to meet Environment Canada guidelines for sample collection and quality control for the Disposal at Sea program (Environment Canada 2000).

For vibra-core sampling, sediment was collected from each core at the surface, 2 m and 5 m depths. Approximately 0.2 m of the total 6 m long core was collected at each of the three depths. Each individual sample was homogenized in a stainless steel bowl then put into glass jars.

For surface grab sampling, Ponar samples consisted of three grabs taken at each station. The top 7.5 cm of each grab was collected and the three grabs were homogenized onsite in a clean stainless steel bowl yielding one composite sample per station for analysis.

All sediment samples were put into three 250 mL jars and kept in a cooler at ~ 4°C. Samples were shipped to the analytical laboratory in Vancouver within 48 hours of collection.

2.3 Laboratory Analyses

Samples were analyzed by ALS Environmental Services for particle size, moisture content, total organic carbon, total metals (ICP-MS), PAHs and PCBs. A detailed list of analyzed parameters and results for all stations is provided in Appendix A.

2.4 Data Analyses

The following summary statistics were calculated for all parameters: total number of samples, range of values, median, average, standard deviation, coefficient of variation, number of samples exceeding guidelines and number of samples with values equal to or lower than the corresponding detection level. Values less than detection were treated as one-half the detection limit for statistical purposes.

Sediment quality in each of the 56 samples was assessed in relation to the Canadian Council of Ministers of the Environment (CCME 2002) guidelines for the protection of aquatic life, which include Interim Marine Sediment Quality Guidelines (ISQGs) and Probable Effects Levels (PELs). Concentrations below the ISQG values are not expected to be associated with any adverse biological effects, whereas concentrations above the PEL are expected to be frequently associated with adverse biological effects. Concentrations between the ISQG and the PEL represent the range in which effects are occasionally observed. The BC working sediment guideline based on the NSTPA (National Status and Trends Program Approach) was used for nickel.

Cadmium, mercury, PCB and total PAH levels were also assessed in relation to Disposal at Sea screening criteria, which are listed in Table 2.

Table 2: Disposal at Sea Screening Criteria

Parameter	Screening Limit
Cadmium	0.6 µg/g dry weight
Mercury	0.75 µg/g dry weight
Polycyclic Aromatic Hydrocarbons (PAHs)	2.5 µg/g dry weight (total PAH)
Polychlorinated biphenyls (PCBs)	0.1 µg/g

Source: Interim Contaminant Testing Guidelines (EC 2006)

2.5 Quality Assurance/Quality Control (QA/QC)

2.5.1 Field Procedures

In the field, measures taken to reduce potential contamination included wearing of latex gloves during sampling, following standard protocols to avoid contamination of sampling jars and lids, turning off of bilge pumps on the vessel prior to deployment of the grab, and cleaning of the grab, mixing bowl and scoop with de-ionized water between samples.

2.5.1.1 Grab Samples and Field Duplicates

Three grab samples were taken at each sampling station and composited in the field. Each composited sample was put in three jars for submission to the laboratory. Duplicate samples for stations P1, P2, P3, P6 and P8 were collected in the field and submitted to the laboratory for trace metals analysis (CCME package).

2.5.2 Laboratory Procedures

Laboratory QA/QC measures included analysis of replicate sub-samples, replicates of digested material and certified reference materials at the same time as the test samples. Results are summarized below.

2.5.2.1 Replicate Sub-samples for Metals

In the laboratory, precision of the test method was determined by following protocols established for the Disposal at Sea program. Replicate sub-samples were taken of composite grab samples collected in June 2009. Analyses for three of the trace metals (cadmium, lead and mercury) were performed on five replicates per station for five of the stations (P1, P2, P3, P6 and P8, 10% of 56 samples).

Sub-sampling was carried out following homogenization but prior to digestion of the sample. Analyses of replicate sub-samples were not performed consecutively. The precision of five replicate sub-samples was estimated using the coefficient of variation (CV):

$$CV = \left(\frac{\text{Standard Deviation}}{\text{Mean}} \right) * 100$$

Maximum acceptable variability that might be expected was 20% for the CV from five replicate sub-samples, for values greater than five times the detection limit. All CVs were below 20% for concentrations of cadmium, lead, and mercury, meeting QA/QC objectives.

2.5.2.2 Duplicate Samples for PAHs

Ten duplicate samples were submitted for PAH analysis (stations P1 through P10, 20% of 56 samples).

The precision of duplicates was calculated using the relative percent difference (RPD) as described below, with a level of 25% adopted to reflect maximum acceptable variability that might be expected from duplicate samples for parameters with values greater than five times the detection limit.

$$RPD = \left(\frac{|\text{Result of Replicate 1} - \text{Result of Replicate 2}|}{\text{Average of Result of Replicate 1 and Result of Replicate 2}} \right) * 100$$

All duplicates met the QA/QC objectives, as all RPD values were below 25%.

2.5.2.3 Laboratory Replicates

Analyses of duplicates of sample digest were conducted concurrently with sediment sample analyses in 2008 and 2009, as part of laboratory QA/QC procedures. RPD for the duplicates were estimated. Results for duplicates of sample digest met the analytical laboratory quality objectives, with RPD values ranging from 0 to 6.7%.

2.5.2.4 Certified Reference Materials

Certified reference materials (CRM) were analyzed concurrently with sediment samples in 2008 and 2009. Results were reported as percent of target values and met the expected limits for all parameters analyzed.

3 RESULTS OF BASELINE INVESTIGATIONS

Analytical results for sediment are summarized in this section, and all raw data are provided in Appendix A.

3.1 Sediment Particle Size and TOC Content

Particle size and TOC data are summarized in Tables 3, 4 and 5 for surface sediments, sediments at 2 m depth, and sediments at 5 m depth, respectively.

Table 3: Summary Statistics for Particle Size and TOC Content in Surface Sediments

	N	Min.	Max.	Median	Mean	SD	CV	N < DL
% Gravel (>2 mm)	32	<1.0	1.0	0.5	0.55	0.15	0.27	29
% Sand (2.0 – 0.063 mm)	32	2	20	6	7.56	4.83	0.64	0
% Silt (0.063 – 0.004 mm)	32	53	69	65	63.6	4.20	0.07	0
% Clay (<4 mm)	32	25	33	28.5	28.72	2.30	0.08	0
% TOC	**32**	**0.98**	**2.1**	**1.4**	**1.41**	**0.24**	**0.17**	**0**

NOTE:
SD = standard deviation
CV = coefficient of variation
DL = detection level

Table 4: Summary Statistics for Particle Size and TOC Content in Sediment Core Samples (2 m depth)

	N	Min.	Max.	Median	Mean	SD	CV	N < DL
% Gravel (>2 mm)	12	<1.0	1	–	–	–	–	11
% Sand (2.0 – 0.063 mm)	12	3	9	4.5	5.00	1.65	0.33	0
% Silt (0.063 – 0.004 mm)	12	59	66	63.5	62.92	2.07	0.03	0
% Clay (<4 mm)	12	29	35	32.5	32.25	1.91	0.06	0
% TOC	**12**	**0.78**	**0.94**	**0.86**	**0.86**	**0.06**	**0.07**	**0**

NOTE:
SD = standard deviation
CV = coefficient of variation
DL = detection level.

Table 5: Summary Statistics for Particle Size and TOC Content in Sediment Core Samples (5 m depth)

	N	Min.	Max.	Median	Mean	SD	CV	N < DL
% Gravel (>2 mm)	12	<1.0	<1.0	-	-	-	-	12
% Sand (2.0 – 0.063 mm)	12	3	17	9	9.58	4.32	0.45	0
% Silt (0.063 – 0.004 mm)	12	54	64	58.5	58.58	3.20	0.05	0
% Clay (<4 mm)	12	27	43	31.5	31.92	4.17	0.13	0
% TOC	**12**	**0.67**	**1.07**	**0.885**	**0.89**	**0.10**	**0.11**	**0**

NOTE:
SD = standard deviation
CV = coefficient of variation
DL = detection level.

Particle size is a fundamental physical property of sediments because it provides information on dynamic conditions of transport and deposition, and can also influence contaminant distribution and bioavailability. In the monitored area, surface sediment consisted predominantly of silt (range of 53% to 69%), followed by clay (25% to 33%), sand (2% to 20%) and gravel (<1% to 1%). Similar particle size profiles were observed in sediment at 2 m and 5 m depth (Tables 4 and 5).

Total organic carbon (TOC) provides a measure of how much organic matter occurs in sediments. In surface sediment, TOC values ranged from 1.0% to 2.1% with an average of 1.4%. At 2 m depth, TOC values ranged from 0.78% to 0.94%, and at 5 m depth TOC values varied from 0.67% to 1.1%.

3.2 Metals

Table 6 provides a summary of the metals data for surface sediment. Metal concentrations in sediment core samples collected at 2 m and 5 m depths are shown in Tables 7 and 8, respectively. Overall, sediment samples from the 32 stations were characterized by relatively low levels of most of the analyzed metals, with the exception of arsenic and copper.

Table 6: Summary Statistics for Metal Concentrations (mg/kg) in Surface Sediments

Metal	N	Min.	Max.	Median	Mean	SD	CV	N < DL	N > guid.	N > limit for sea disposal
Antimony	32	<10	<10	–	–	–	–	32	0	0
Arsenic	32	8.2	15.2	11.6	11.5	1.57	0.14	0	32	0
Barium	32	94	115	104	104	5.55	0.053	0	0	0
Beryllium	32	<0.5	0.5	–	–	–	–	31	0	0
Cadmium	32	0.1	<0.50	0.17	0.18	0.047	0.26	8	0	0
Chromium	32	28.8	33.7	30.65	30.8	1.21	0.039	0	0	0
Cobalt	32	12.5	14.1	13.2	13.3	0.42	0.032	0	0	0
Copper	32	39.9	50.1	42.6	43.6	2.88	0.066	0	32	0
Lead	32	7.6	<30	11	11.6	2.38	0.21	8	0	0
Mercury	32	0.051	0.082	0.061	0.061	0.007	0.11	0	0	0
Molybdenum	32	>2.0	<2.0	–	–	–	–	32	0	0
Nickel	32	27.2	31	28.6	28.6	1.0	0.035	0	4	0
Selenium	32	>0.5	<3.0	–	–	–	–	32	0	0
Silver	32	<2.0	<2.0	–	–	–	–	32	0	0
Thallium	32	<1.0	<1.0	–	–	–	–	32	0	0
Tin (Sn)	32	<5.0	<5.0	–	–	–	–	32	0	0
Vanadium	32	76.8	86.3	81.0	81.3	2.24	0.028	0	0	0
Zinc	32	93.5	108	98.9	100	3.98	0.040	0		0

NOTES:

SD = standard deviation; CV = coefficient of variation; DL = detection level; guid. = CCME Interim Marine Sediment Quality Guidelines or BC working sediment guideline for nickel

Table 7: Summary Statistics for Metal Concentrations (mg/kg) in Sediment Cores (2 m depth)

Metal	N	Min.	Max.	Median	Mean	SD	CV	N < DL	N > guid.	N > limit for sea disposal
Antimony	12	<10	<10	–	–	–	–	12	0	0
Arsenic	12	9.1	12	10.75	10.6	0.99	0.088	0	12	0
Barium	12	102	133	117	117	8.69	0.074	0	0	0
Beryllium	12	<0.50	0.53	0.25	0.337	0.128	0.381	8	0	0
Cadmium	12	0.13	0.22	0.155	0.159	0.023	0.143	0	0	0
Chromium	12	29.1	32.3	31.6	31.3	0.855	0.027	0	0	0
Cobalt	12	13.4	14.8	14.2	14.1	0.442	0.031	0	0	0
Copper	12	43	46.9	44	44.5	1.34	0.030	0	12	0
Lead	12	<2.0	10.9	4.8	5.23	4.46	0.852	6	0	0
Mercury	12	0.040	0.068	0.050	0.050	0.007	0.134	0	0	0
Molybdenum	12	<2.0	<2.0	–	–	–	–	12	0	0
Nickel	12	28.2	31.8	29.7	29.7	0.96	0.032	0	4	0
Selenium	12	<0.5	<3.0	–	–	–	–	12	0	0
Silver	12	<2.0	<2.0	–	–	–	–	12	0	0
Thallium	12	<1.0	<1.0	–	–	–	–	12	0	0
Tin (Sn)	12	<2.5	<2.5	–	–	–	–	12	0	0
Vanadium	12	80.4	87.3	84.4	83.6	2.31	0.028	0	0	0
Zinc	12	97.8	107	103	103	2.88	0.028	0	0	0

NOTES:
SD = standard deviation; CV = coefficient of variation; DL = detection level; guid. = CCME Interim Marine Sediment Quality Guidelines or BC working sediment guideline for nickel

Table 8: Summary Statistics for Metal Concentrations (mg/kg) in Sediment Cores (5 m depth)

Metal	N	Min.	Max.	Median	Mean	SD	CV	N < DL	N > guid.	N > limit for sea disposal
Antimony	12	<10	<10	–	–	–	–	12	0	0
Arsenic	12	9.3	13.4	10.2	10.7	1.31	0.122	0	12	0
Barium	12	95.8	124	106.5	108	9.658	0.089	0	0	0
Beryllium	12	<0.50	0.56	0.25	0.322	0.13	0.404	9	0	0
Cadmium	12	0.15	0.21	0.165	0.168	0.017	0.101	0	0	0
Chromium	12	29.8	33.1	31.2	31.2	0.97	0.031	0	0	0
Cobalt	12	13.2	16	14.1	14.3	0.767	0.054	0	0	0
Copper	12	40.1	54.4	43.9	44.6	3.50	0.079	0	12	0
Lead	12	8.5	11.6	9.55	9.76	0.86	0.089	0	0	0
Mercury	12	0.039	0.082	0.051	0.053	0.011	0.214	0	0	0

Metal	N	Min.	Max.	Median	Mean	SD	CV	N < DL	N > guid.	N > limit for sea disposal
Molybdenum	12	<4.0	<4.0	–	–	–	–	12	0	0
Nickel	12	28.4	31.9	29.9	30.0	1.11	0.037	0	5	0
Selenium	12	<0.5	<3.0	–	–	–	–	12	0	0
Silver	12	<2.0	<2.0	–	–	–	–	12	0	0
Thallium	12	<1.0	<1.0	–	–	–	–	12	0	0
Tin (Sn)	12	<5.0	<5.0	–	–	–	–	12	0	0
Vanadium	12	77.6	88.8	82.55	82.6	3.19	0.039	0	0	0
Zinc	12	98.2	113	102	103	4.24	0.041	0	0	0

NOTES:

SD = standard deviation; CV = coefficient of variation; DL = detection level; guid. = CCME Interim Marine Sediment Quality Guidelines or BC working sediment guideline for nickel

Cadmium and mercury concentrations in all sediment samples were compared to the Disposal at Sea screening criteria (Table 2). The highest cadmium and mercury concentrations were 0.22 and 0.082 mg/kg dry mass, respectively, which are three and eight times lower, respectively than the screening criteria for dredged material (0.6 mg/kg dry mass for cadmium and 0.75 mg/kg dry mass for mercury).

Antimony, molybdenum, selenium, silver, thallium and tin were present at concentrations below the detection limit at all stations, and in surface sediment beryllium levels were higher than detection levels only at station C11. Levels of chromium, lead, mercury and zinc, although detectable at most stations, were below CCME ISQG or BC Working Guidelines.

Nickel concentrations were above the BC Working Guideline (30 mg/kg) in four of 32 surface sediment samples, four of 12 samples collected from 2 m depth, and four of 12 samples collected at 5 m depth. Concentrations of arsenic exceeded the ISQG of 7.24 mg/kg at all stations at all depths; however, all concentrations were well below the guideline levels for probable biological effects (PEL = 41.6 mg/kg). The ISQG for copper (18.7 mg/kg) was exceeded at all stations at all depths, but no copper value higher than the PEL (108 mg/kg) was reported.

3.3 Polycyclic Aromatic Hydrocarbons (PAH)

All samples collected were analyzed for total PAH (sum of 16 USEPA priority PAHs) and for 17 individual compounds. PAH concentrations in surface sediment collected by Ponar grab and vibra-core are shown in Table 9. PAH concentrations in sediment cores collected at 2 m and 5 m depths were all below the detection limit and are not shown below.

Total PAH levels met the Disposal at Sea screening limit of 2.5 mg/kg at all stations sampled. The fluoranthene concentration in surface sediment at station P6 exceeded the CCME ISQG concentration; however, the concentration was well below the PEL, and the fluoranthene concentration measured in a replicate sample collected at P6 met the ISQG.

Table 9: Summary Statistics for PAH Concentrations (mg/kg) in Marine Surface Sediments

Parameter	N	Min.	Max.	Median	Mean	SD	CV	N<DL	N > ISQG	N > limits for sea disposal
Total PAHs	32	<0.05	0.328	0.025	0.044	0.057	1.29	24	0	0
Acenaphthene	32	<0.04	<0.05	–	–	–	–	32	0	0
Acenaphthylene	32	<0.05	<0.05	–	–	–	–	32	0	0
Anthracene	32	<0.05	<0.05	–	–	–	–	32	0	0
Benz(a)anthracene	32	<0.05	<0.05	–	–	–	–	32	0	0
Benzo(a)pyrene	32	<0.05	<0.05	–	–	–	–	32	0	0
Benzo(b)fluoranthene	32	<0.05	<0.05	–	–	–	–	32	0	0
Benzo(g,h,i)perylene	32	<0.05	<0.05	–	–	–	–	32	0	0
Benzo(k)fluoranthene	32	<0.05	<0.05	–	–	–	–	32	0	0
Chrysene	32	<0.05	<0.05	–	–	–	–	32	0	0
Dibenz(a,h)anthracene	32	<0.05	<0.05	–	–	–	–	32	0	0
Fluoranthene	32	<0.05	0.122	–	–	–	–	31	1	0
Fluorene	32	<0.05	<0.05	–	–	–	–	32	0	0
Indeno(1,2,3-,d)pyrene	32	<0.05	<0.05	–	–	–	–	32	0	0
2-Methylnaphthalene	32	<0.05	0.085	0.025	0.031	0.015	0.48	27	0	0
Naphthalene	32	<0.05	<0.05	–	–	–	–	32	0	0
Phenanthrene	32	<0.05	0.083	0.025	0.031	0.014	0.45	27	0	0
Pyrene	32	<0.05	0.067	–	–	–	–	31	0	0

NOTES:
SD = standard deviation
CV = coefficient of variation
DL = detection level
ISQG = CCME Interim Marine Sediment Quality Guidelines

At 24 stations, all total and individual PAH values were below analytical detection limits, and all PAHs were below detection limits in core sediment samples at 2 m and 5 m depths. At the other eight stations, between one and four compounds showed detectable concentrations of PAHs. 2-methylnaphthalene and phenanthrene were the most frequently reported compounds in the monitored area. Fluoranthene and pyrene showed detectable levels at one station each. Only fluoranthene exceeded the ISQG in one sample.

3.4 Polychlorinated Biphenyls (PCBs)

Sediment samples at all stations were analyzed for nine PCB compounds, as shown in Table 10. All compounds were below analytical detection limits and lower than the Disposal at Sea screening limit of 0.1 mg/kg total PCB. As analytical detection limits for PCB compounds varied from 0.05 to 0.07 mg/kg, it was not possible to assess whether PCB-1254 and total PCB concentrations were below the CCME ISQGs (0.06 mg/kg and 0.02 mg/kg, respectively) for all samples.

Table 10: Polychlorinated Biphenyls Analyzed at All Monitored Stations

Polychlorinated Biphenyls	
PCB-1016	PCB-1254
PCB-1221	PCB-1260
PCB-1232	PCB-1262
PCB-1242	PCB-1268
PCB-1248	Total PCB

4 REFERENCES

Canadian Council of Ministers of Environment (CCME). 2002. Canadian Sediment Quality Guidelines for the Protection of Aquatic Life. Accessed at: http://ceqg-rcqe.ccme.ca/

Environment Canada. 2000. Interim Contaminant Testing Guidelines for Ocean Disposal Pacific and Yukon Region (March 2000). Accessed at: http://www.pyr.ec.gc.ca/ep/ocean-disposal/english/oldictg_e.htm

5 FIGURES

Please see the following pages.

412400.000000 412600.000000 412800.000000 413000.000000 413200.000000 413400.000000

6009600.000000 6009400.000000 6009200.000000 6009000.000000 6008800.000000 6008600.000000 6008400.000000 6008200.000000 6008000.000000

N

S1 S2 S3 S4 S5 S6 S7 S8

P1 P2 P3 P4 P5 P6 P7 P8 P9 P10 P11 P12

C10 C11 C13 C14 C16 C17 C21 C23 C24 C25 C26 C29

Berth 1

KEY PLAN
1:20,000

2008 Sediment Sampling (Grabs)
2009 Sediment Sampling (Grabs)
2009 Sediment Sampling (Cores)
Berth
Dredge Footprint

Metres
0 70 140 210
1:5,000

1048843-006

412400.000000 412600.000000 412800.000000 413000.000000 413200.000000 413400.000000

R:\2009Fiscal\1048843.01_Canpotex_RidleyIsland\GIS\MXD\1048843-006 Fig 1_SedimentSamplingLocations_Dec2009& June2009.mxd

Stantec (formerly Jacques Whitford)
4370 Dominion Street
Burnaby, British Columbia
V5G 4L7
Tel. (604) 436 3014
Fax. (604) 436 3752

Canpotex

SEDIMENT SAMPLING LOCATIONS (DECEMBER 2008 & JUNE 2009)

PROJECTION: UTM	DRAWN BY: NP
DATUM: NAD 83 - ZONE 9	CHECKED BY: CL
DATE: 07-Aug-09	FIGURE NO.: 1

APPENDIX A

Results of Analysis of Marine Sediment

Table A-1: Metal and Total Organic Carbon Levels (mg/kg) in Surface Sediment Collected from the Proposed Dredge Footprint (Dec 2008)

Parameter	Detection Limit (mg/kg)	Sediment Sample Station								Sediment Quality Guidelines (mg/kg)			
		SDT1	SDT2	SDT3	SDT4	SDT5	SDT6	SDT7	SDT8	Ocean Disposal	ISQG	PEL	BC
Antimony	10	<10	<10	<10	<10	<10	<10	<10	<10	NA	NA	NA	
Arsenic	5	12.9	13.5	13.1	13.5	15.2	12.2	12.9	13.5	NA	7.24	41.6	
Barium	1	104	101	102	101	101	102	105	102	NA	NA	NA	
Beryllium	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	
Cadmium	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.6	0.7	4.2	
Chromium	2	30.9	29.9	30.4	30.4	30.0	29.8	30.7	30.2	NA	52.3	160	
Cobalt	2	13.3	13.0	13.1	12.9	13.0	13.1	13.6	13.5	NA	NA	NA	
Copper	1	43.5	42.2	41.7	41.5	41.8	41.3	42.5	42.0	NA	18.7	108	
Lead	30	<30	<30	<30	<30	<30	<30	<30	<30	NA	30.2	112	
Mercury	0.005	0.068	0.063	0.064	0.062	0.060	0.061	0.062	0.066	0.75	0.13	0.70	
Molybdenum	4	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	NA	NA	NA	
Nickel	5	28.6	28.3	28.2	27.6	27.6	27.6	28.2	28.0	NA	NA	NA	30
Selenium	2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	NA	NA	NA	
Silver	2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	NA	NA	NA	
Thallium	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	NA	NA	
Tin	5	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	NA	NA	NA	
Vanadium	2	82.1	81.1	80.6	79.9	80.2	80.4	82.2	80.2	NA	NA	NA	
Zinc	1	101	98.1	98.1	97.8	96.6	96.2	101	98.1	NA	124	271	
Moisture	%	47.4	48.8	49.5	46.4	48.4	46.3	45.6	47.6	NA	NA	NA	
Total Organic Carbon	**n/a**	**2.1**	**1.7**	**1.7**	**1.5**	**1.6**	**1.7**	**1.5**	**1.4**	**NA**	**NA**	**NA**	

NOTES:

Value at or above CCME Interim Sediment Quality Guideline (ISQG) but below Probable Effects Level (PEL)

Value at or above CCME PEL

Value at or above the Disposal at Sea Lower Action Levels for chemicals in sediments

Higher than BC low effects range level

n/a = not applicable; NA = no guideline available

Table A-2: Polycyclic Aromatic Hydrocarbon (PAH) Levels (mg/kg) in Surface Sediment Collected from the Proposed Dredge Footprint (December 2008)

Parameter	Sediment Sample Station								Canadian Sediment Quality Guidelines (mg/kg)		
	SDT1	SDT2	SDT3	SDT4	SDT5	SDT6	SDT7	SDT8	Ocean Disposal	ISQG	PEL
Naphthalene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	NA	0.0346	0.391
2-Methylnaphthalene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.085	NA	0.0202	0.201
Acenaphthylene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	NA	0.0059	0.128
Acenaphthene	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	NA	0.0067	0.089
Fluorene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	NA	0.0212	0.144
Phenanthrene	0.052	<0.050	0.056	<0.050	<0.050	0.052	<0.050	0.059	NA	0.0867	0.544
Anthracene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	NA	0.0469	0.245
Fluoranthene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	NA	0.1130	1.494
Pyrene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	NA	0.1530	1.398
Benzo(a) anthracene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	NA	0.0748	0.693
Chrysene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	NA	0.1080	0.846
Benzo(b) fluoranthene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	NA	NA	NA
Benzo(k) fluoranthene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	NA	NA	NA
Benzo(a) pyrene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	NA	0.0888	0.763
Indeno(1,2,3-cd)pyrene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	NA	NA	NA
Dibenz(a,h)anthracene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	NA	0.0062	0.135
Benzo(g,h,i)perylene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	NA	NA	NA
Total PAHs	**0.052**	**<0.050**	**0.056**	**<0.050**	**<0.050**	**0.052**	**<0.050**	**0.144**	**2.5**	**NA**	**NA**

NOTES:

Value at or above Interim Sediment Quality Guideline (ISQG) but below Probable Effects Level (PEL)

Value at or above PEL

Value at or above the Disposal at Sea Lower Action Levels for chemicals in sediments

NA = no guideline available

Table A-3: Polychlorinated Biphenyl (PCB) levels (mg/kg) in Surface Sediment Collected from the Proposed Dredge Footprint (December 2008)

Parameter	Sediment Sample Site								Canadian Sediment Quality Guidelines (mg/kg)		
	SDT1	SDT2	SDT3	SDT4	SDT5	SDT6	SDT7	SDT8	Ocean Disposal	ISQG	PEL
PCB-1016	<0.06	<0.06	<0.06	<0.06	<0.06	<0.05	<0.06	<0.06	NA	NA	NA
PCB-1221	<0.06	<0.06	<0.06	<0.06	<0.06	<0.05	<0.06	<0.06	NA	NA	NA
PCB-1232	<0.06	<0.06	<0.06	<0.06	<0.06	<0.05	<0.06	<0.06	NA	NA	NA
PCB-1242	<0.06	<0.06	<0.06	<0.06	<0.06	<0.05	<0.06	<0.06	NA	NA	NA
PCB-1248	<0.06	<0.06	<0.06	<0.06	<0.06	<0.05	<0.06	<0.06	NA	NA	NA
PCB-1254	<0.06	<0.06	<0.06	<0.06	<0.06	<0.05	<0.06	<0.06	NA	0.06	0.71
PCB-1260	<0.06	<0.06	<0.06	<0.06	<0.06	<0.05	<0.06	<0.06	NA	NA	NA
PCB-1262	<0.06	<0.06	<0.06	<0.06	<0.06	<0.05	<0.06	<0.06	NA	NA	NA
PCB-1268	<0.06	<0.06	<0.06	<0.06	<0.06	<0.05	<0.06	<0.06	NA	NA	NA
Total PCB	**<0.06**	**<0.06**	**<0.06**	**<0.06**	**<0.06**	**<0.05**	**<0.06**	**<0.06**	**0.1**	**NA**	**NA**

NOTES:

Value at or above Interim Sediment Quality Guideline (ISQG) but below Probable Effects Level (PEL)

Value at or above PEL

Value at or above the Disposal at Sea Lower Action Levels for chemicals in sediments

NA = no guideline available

Table A-4: Metal and Total Organic Carbon Levels (mg/kg) in Surface Sediment Collected from the Proposed Dredge Footprint (June 2009)

Parameter	Detection Limit (mg/kg)	Sediment Sample Station																							Sediment Quality Guidelines			
		C10	C11	C13	C14	C16	C17	C21	C23	C24	C25	C26	C29	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	Ocean Disposal	ISQG	PEL	BC
Antimony	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	NA	NA	NA	
Arsenic	5	11	11	9.4	9.8	10.9	11.5	11.2	10.7	10.3	9.8	8.2	8.9	12.8	11.6	12.5	10.3	12.7	12	12.7	10.9	12	9.6	10.5	11.7	NA	7.24	41.6	
Barium	1	115	113	113	111	104	111	111	112	106	104	106	101	95.7	96.4	108	96	94	107	100	101	103	97.4	104	99.8	NA	NA	NA	
Beryllium	0.5	<0.50	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	
Cadmium	0.5	0.17	0.18	0.16	0.13	0.14	0.18	0.2	0.19	0.17	0.19	0.17	0.17	0.14	0.15	0.13	0.12	0.13	0.14	0.1	0.14	0.16	0.15	0.18	0.16	0.6	0.7	4.2	
Chromium	2	33.7	31.6	31.7	32.4	30.7	32.4	32.8	31.1	31.4	30.3	33.4	30.6	30.6	31.4	31.7	30.2	29.8	30.7	28.9	29.7	31.6	28.8	30	29.1	NA	52.3	160	
Cobalt	2	14.1	14.1	13.7	13.7	13.5	13.4	13.9	13.8	14	13.4	13.9	13.1	13	13.2	13.3	13.2	12.8	13	12.7	13	13	12.5	13.2	12.9	NA	NA	NA	
Copper	1	47.6	50.1	46.5	42.9	45	45.6	48.9	48.5	47	46.1	47.5	43.6	43	45	41.8	41.3	40.1	40.4	40.2	41.1	42.6	39.9	41.4	41.1	NA	18.7	108	
Lead	2	11.8	11.3	11.1	8.4	9.2	11.4	13.5	13.2	10.9	12.5	10.8	12.3	10.4	10.3	9.4	8.5	9.1	9.9	7.6	9.1	10.1	9.9	9.7	10.6	NA	30.2	112	
Mercury	0.005	0.063	0.0611	0.0584	0.0537	0.0541	0.0611	0.0689	0.0783	0.0614	0.0687	0.0658	0.0535	0.0641	0.0625	0.0602	0.0555	0.0547	0.0565	0.0539	0.0563	0.0821	0.0514	0.0551	0.0623	0.75	0.13	0.70	
Molybdenum	4	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	NA	NA	NA	
Nickel	5	31	31	28.8	30.2	29.4	28.9	29.5	29	30.6	29.3	29.1	28.7	27.2	27.6	28.8	27.9	28	28.6	28	28.5	29	27.7	27.9	27.6	NA	NA	NA	30
Selenium	2	<3.0	<2.0	<2.0	<2.0	<3.0	<3.0	<2.0	<0.50	<2.0	<2.0	<2.0	<2.0	<0.50	<2.0	<2.0	<2.0	<2.0	<3.0	<2.0	<2.0	<3.0	<2.0	<2.0	<2.0	NA	NA	NA	
Silver	2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	NA	NA	NA	
Thallium	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	NA	NA	
Tin	5	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	NA	NA	NA	
Vanadium	2	86.3	84.5	81.8	84.6	81	84.3	86.2	81.4	83.8	81.9	80.8	80.9	76.8	79.2	82.8	78.7	78.2	81.8	79.4	80.7	81.6	78.2	80.9	79.1	NA	NA	NA	
Zinc	1	108	108	101	104	105	103	107	104	106	104	100	102	93.5	96.3	98.4	96.6	95.8	97	95.7	98.8	101	95.2	98.9	97.4	NA	124	271	
TOC	**n/a**	**1.4**	**1.5**	**0.98**	**1.61**	**1.25**	**1.38**	**1.2**	**1.22**	**1.21**	**1.14**	**1.09**	**1.09**	**1.64**	**1.56**	**1.78**	**1.46**	**1.43**	**1.44**	**1.4**	**1.32**	**1.26**	**1.23**	**1.09**	**1.36**	**NA**	**NA**	**NA**	

NOTES:

Value at or above Interim Sediment Quality Guideline (ISQG) but below Probable Effects Level (PEL)

Value at or above PEL

Higher than Disposal at Sea Lower Action Levels for chemicals in sediments

Higher than BC low effects range level

Table A-5: Metal and Total Organic Carbon Levels (mg/kg) in Sediment Cores (2 m and 5 m depth) Collected from the Proposed Dredge Footprint (June 2009)

Parameter	Detection Limit (mg/kg)	Sediment Sample Station																							Sediment Quality Guidelines			
		C10 (2 m)	C11 (2 m)	C13 (2 m)	C14 (2 m)	C16 (2 m)	C17 (2 m)	C21 (2 m)	C23 (2 m)	C24 (2 m)	C25 (2 m)	C26 (2 m)	C29 (2 m)	C10 (5 m)	C11 (5 m)	C13 (5 m)	C14 (5 m)	C16 (5 m)	C17 (5 m)	C21 (5 m)	C23 (5 m)	C24 (5 m)	C25 (5 m)	C26 (5 m)	C29 (5 m)	Ocean Disposal	ISQC	PEL	BC
Antimony	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	NA	NA	NA	
Arsenic	5	11.8	9.4	12	9.1	10.6	11.3	9.3	10.8	10.4	10.7	10.9	10.8	9.7	12.5	11.1	13.4	9.8	10	9.3	12	9.4	10.9	10.3	10.1	NA	7.24	41.6	
Barium	1	118	133	113	126	119	126	102	118	116	111	108	110	110	123	98.1	124	108	119	98.6	95.8	105	103	109	101	NA	NA	NA	
Beryllium	0.5	0.5	0.5	<0.5	<0.5	0.51	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.53	<0.5	0.56	<0.5	0.51	<0.5	0.54	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	NA	NA	NA	
Cadmium	0.5	0.18	0.16	0.15	0.15	0.14	0.13	0.22	0.15	0.16	0.16	0.15	0.16	0.16	0.21	0.17	0.16	0.15	0.16	0.19	0.17	0.15	0.17	0.17	0.16	0.6	0.7	4.2	
Chromium	2	31.7	32.3	32.1	31.7	31.3	31.7	29.1	31	30.6	30.8	31.4	31.8	31	32.4	31	31.8	31.4	33.1	29.8	30.1	31.4	30.8	31.3	30	NA	52.3	160	
Cobalt	2	14.6	14.2	14.3	13.8	14.8	13.9	14	13.6	14.2	13.4	14.1	14.8	14.8	16	14	14.4	14.5	15.2	13.9	14.1	13.2	14	13.5	13.8	NA	NA	NA	
Copper	1	46.5	44.1	45.1	43	45.4	43.3	43.3	43.2	43.9	43.7	45.4	46.9	44	54.4	44.9	44.4	43.5	46	40.1	45.6	41.7	43.8	43.6	42.7	NA	18.7	108	
Lead	2	10.7	9.3	10.4	9	8.6	18.4	10.9	9	10	9	10.2	10	9.3	11.6	10.8	8.9	9.3	10.1	10.5	9.7	8.5	9.7	9.4	9.3	NA	30.2	112	
Mercury	0.005	0.0499	0.0499	0.0676	0.0468	0.0491	0.0439	0.0513	0.0542	0.0485	0.049	0.0544	0.0397	0.0605	0.0525	0.06	0.047	0.0461	0.045	0.049	0.0819	0.0436	0.0539	0.053	0.0388	0.75	0.13	0.70	
Molybdenum	4	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	NA	NA	NA	
Nickel	5	30.3	30.6	29.2	30.3	29.7	29.8	29.3	28.2	29.6	28.5	29.4	31.8	31.1	31.8	30.3	30.1	29.4	31.9	28.4	30.1	29.1	29.7	28.8	29.7	NA	NA	NA	30
Selenium	2	<3.0	<2.0	<0.50	<2.0	<2.0	<2.0	<2.0	<3.0	<2.0	<2.0	<0.50	<2.0	<2.0	<2.0	<0.50	<2.0	<2.0	<3.0	<3.0	<2.0	<2.0	<2.0	<3.0	<2.0	NA	NA	NA	
Silver	2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	NA	NA	NA	
Thallium	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	NA	NA	
Tin	5	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	NA	NA	NA	
Vanadium	2	84.3	87.3	81.3	85.3	86	84.6	81.4	81.6	84.5	81.1	80.4	85.5	83.2	85.1	79.6	86.7	83.3	88.8	79.3	77.6	82	82.2	80.6	82.9	NA	NA	NA	
Zinc	1	106	107	101	104	104	104	102	97.8	102	99.8	101	107	105	113	100	104	102	108	101	99.8	98.6	103	98.2	102	NA	124	271	
TOC	**n/a**	**0.88**	**0.93**	**0.85**	**0.91**	**0.87**	**0.94**	**0.83**	**0.94**	**0.79**	**0.83**	**0.78**	**0.81**	**0.88**	**0.93**	**0.86**	**0.98**	**0.91**	**0.86**	**0.67**	**0.81**	**0.95**	**0.85**	**1.07**	**0.89**	**NA**	**NA**	**NA**	

NOTES:

Value at or above Interim Sediment Quality Guideline (ISQG) but below Probable Effects Level (PEL)
Value at or above PEL
Higher than Disposal at Sea Lower Action Levels for chemicals in sediments
Higher than BC low effects range level

Table A-6: Polycyclic Aromatic Hydrocarbon Levels (mg/kg) in Surface Sediment Collected from the Proposed Dredge Footprint (June 2009)

Parameter	Sediment Sample Station																								Sediment Quality Guidelines		
	C10	C11	C13	C14	C16	C17	C21	C23	C24	C25	C26	C29	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	Ocean Disposal	ISQG	PEL
Acenaphthene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NA	0.0346	0.391
Acenaphthylene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NA	0.0202	0.201
Anthracene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NA	0.0059	0.128
Benz(a)anthracene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NA	0.0067	0.089
Benzo(a)pyrene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NA	0.0212	0.144
Benzo(b)fluoranthene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NA	0.0867	0.544
Benzo(g,h,i)perylene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NA	0.0469	0.245
Benzo(k)fluoranthene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NA	0.1130	1.494
Chrysene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NA	0.1530	1.398
Dibenz(a,h)anthracene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NA	0.0748	0.693
Fluoranthene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.122	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NA	0.1080	0.846
Fluorene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NA	NA	NA
Indeno (1,2,3-c,d)pyrene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NA	NA	NA
2-Methylnaphthalene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.06	0.059	0.056	0.055	<0.05	<0.05	<0.05	<0.05	<0.05	NA	0.0888	0.763
Naphthalene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NA	NA	NA
Phenanthrene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.083	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NA	0.0062	0.135
Pyrene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.067	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NA	NA	NA
Total PAHs	**<0.05**	**<0.05**	**<0.05**	**<0.05**	**<0.05**	**<0.05**	**<0.05**	**<0.05**	**<0.05**	**<0.05**	**<0.05**	**<0.05**	**<0.05**	**<0.05**	**<0.05**	**0.06**	**0.06**	**0.328**	**0.06**	**<0.05**	**<0.05**	**<0.05**	**<0.05**	**<0.05**	**2.5**	**NA**	**NA**

NOTES:

Value at or above Interim Sediment Quality Guideline (ISQG) but below Probable Effects Level (PEL)

Value at or above PEL

Higher than Disposal at Sea Lower Action Levels for chemicals in sediments

Table A-7: Polycyclic Aromatic Hydrocarbon Levels (mg/kg) in Sediment Cores (2 m and 5 m depth) Collected from the Proposed Dredge Footprint (June 2009)

Parameter	Sediment Sample Station																							Sediment Quality Guidelines		
	C10 (2 m)	C11 (2 m)	C13 (2 m)	C14 (2 m)	C16 (2 m)	C17 (2 m)	C21 (2 m)	C23 (2 m)	C24 (2 m)	C25 (2 m)	C26 (2 m)	C29 (2 m)	C10 (5 m)	C11 (5 m)	C13 (5 m)	C14 (5 m)	C16 (5 m)	C17 (5 m)	C21 (5 m)	C23 (5 m)	C24 (5 m)	C25 5 m)	C26 5 m)	C29 5 m)	Ocean Disposal	ISQG	PEL
Acenaphthene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NA	0.0346	0.391
Acenaphthylene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NA	0.0202	0.201
Anthracene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NA	0.0059	0.128
Benz(a)anthracene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NA	0.0067	0.089
Benzo(a)pyrene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NA	0.0212	0.144
Benzo(b)fluoranthene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NA	0.0867	0.544
Benzo(g,h,i)perylene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NA	0.0469	0.245
Benzo(k)fluoranthene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NA	0.1130	1.494
Chrysene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NA	0.1530	1.398
Dibenz(a,h)anthracene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NA	0.0748	0.693
Fluoranthene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NA	0.1080	0.846
Fluorene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NA	NA	NA
Indeno(1,2,3-c,d)pyrene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NA	NA	NA
2-Methylnaphthalene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NA	0.0888	0.763
Naphthalene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NA	NA	NA
Phenanthrene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NA	0.0062	0.135
Pyrene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NA	NA	NA
Total PAHs	**<0.05**	**<0.05**	**<0.05**	**<0.05**	**<0.05**	**<0.05**	**<0.05**	**<0.05**	**<0.05**	**<0.05**	**<0.05**	**<0.05**	**<0.05**	**<0.05**	**<0.05**	**<0.05**	**<0.05**	**<0.05**	**<0.05**	**<0.05**	**<0.05**	**<0.05**	**<0.05**	**<0.05**	**2.5**	**NA**	**NA**

NOTES:

Value at or above Interim Sediment Quality Guideline (ISQG) but below Probable Effects Level (PEL)

Value at or above PEL

Higher than Disposal at Sea Lower Action Levels for chemicals in sediments

Table A-8: Polychlorinated Biphenyl (PCB) levels (mg/kg) in Surface Sediment collected from the Proposed Dredge Footprint (June 2009)

Site	Sediment Sample Station																								Sediment Quality Guidelines		
	C10	C11	C13	C14	C16	C17	C21	C23	C24	C25	C26	C29	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	Ocean Disposal	ISQG	PEL
PCB-1016	<0.070	<0.070	<0.070	<0.070	<0.070	<0.070	<0.070	<0.060	<0.070	<0.070	<0.070	<0.070	<0.060	<0.070	<0.070	<0.060	<0.080	<0.080	<0.080	<0.070	<0.070	<0.070	<0.070	<0.070	NA	NA	NA
PCB-1221	<0.070	<0.070	<0.070	<0.070	<0.070	<0.070	<0.070	<0.060	<0.070	<0.070	<0.070	<0.070	<0.060	<0.070	<0.070	<0.060	<0.080	<0.080	<0.080	<0.070	<0.070	<0.070	<0.070	<0.070	NA	NA	NA
PCB-1232	<0.070	<0.070	<0.070	<0.070	<0.070	<0.070	<0.070	<0.060	<0.070	<0.070	<0.070	<0.070	<0.060	<0.070	<0.070	<0.060	<0.080	<0.080	<0.080	<0.070	<0.070	<0.070	<0.070	<0.070	NA	NA	NA
PCB-1242	<0.070	<0.070	<0.070	<0.070	<0.070	<0.070	<0.070	<0.060	<0.070	<0.070	<0.070	<0.070	<0.060	<0.070	<0.070	<0.060	<0.080	<0.080	<0.080	<0.070	<0.070	<0.070	<0.070	<0.070	NA	NA	NA
PCB-1248	<0.070	<0.070	<0.070	<0.070	<0.070	<0.070	<0.070	<0.060	<0.070	<0.070	<0.070	<0.070	<0.060	<0.070	<0.070	<0.060	<0.080	<0.080	<0.080	<0.070	<0.070	<0.070	<0.070	<0.070	NA	NA	NA
PCB-1254	<0.070	<0.070	<0.070	<0.070	<0.070	<0.070	<0.070	<0.060	<0.070	<0.070	<0.070	<0.070	<0.060	<0.070	<0.070	<0.060	<0.080	<0.080	<0.080	<0.070	<0.070	<0.070	<0.070	<0.070	NA	0.06	0.71
PCB-1260	<0.070	<0.070	<0.070	<0.070	<0.070	<0.070	<0.070	<0.060	<0.070	<0.070	<0.070	<0.070	<0.060	<0.070	<0.070	<0.060	<0.080	<0.080	<0.080	<0.070	<0.070	<0.070	<0.070	<0.070	NA	NA	NA
PCB-1262	<0.070	<0.070	<0.070	<0.070	<0.070	<0.070	<0.070	<0.060	<0.070	<0.070	<0.070	<0.070	<0.060	<0.070	<0.070	<0.060	<0.080	<0.080	<0.080	<0.070	<0.070	<0.070	<0.070	<0.070	NA	NA	NA
PCB-1268	<0.070	<0.070	<0.070	<0.070	<0.070	<0.070	<0.070	<0.060	<0.070	<0.070	<0.070	<0.070	<0.060	<0.070	<0.070	<0.060	<0.080	<0.080	<0.080	<0.070	<0.070	<0.070	<0.070	<0.070	NA	NA	NA
Total PCBs	**<0.070**	**<0.070**	**<0.070**	**<0.070**	**<0.070**	**<0.070**	**<0.070**	**<0.060**	**<0.070**	**<0.070**	**<0.070**	**<0.070**	**<0.060**	**<0.070**	**<0.070**	**<0.060**	**<0.080**	**<0.080**	**<0.080**	**<0.070**	**<0.070**	**<0.070**	**<0.070**	**<0.070**	**0.1**	**NA**	**NA**

NOTES:
Value at or above Interim Sediment Quality Guideline (ISQG) but below Probable Effects Level (PEL)
Value at or above PEL
Higher than Disposal at Sea Lower Action Levels for chemicals in sediments

Table A-9: Polychlorinated Biphenyl (PCB) levels (mg/kg) in Sediment Cores (2 m and 5 m depth) collected from the Proposed Dredge Footprint (June 2009)

Site	Sediment Sample Station																								Sediment Quality Guidelines		
	C10 (2 m)	C11 (2 m)	C13 (2 m)	C14 (2 m)	C16 (2 m)	C17 (2 m)	C21 (2 m)	C23 (2 m)	C24 (2 m)	C25 (2 m)	C26 (2 m)	C29 (2 m)	C10 (5 m)	C11 (5 m)	C13 (5 m)	C14 (5 m)	C16 (5 m)	C17 (5 m)	C21 (5 m)	C23 (5 m)	C24 (5 m)	C25 (5 m)	C26 (5 m)	C29 (5 m)	Ocean Disposal	ISQG	PEL
PCB-1016	<0.060	<0.070	<0.060	<0.070	<0.060	<0.070	<0.060	<0.060	<0.060	<0.060	<0.070	<0.060	<0.070	<0.060	<0.060	<0.070	<0.060	<0.060	<0.060	<0.060	<0.070	<0.070	<0.060	<0.060	NA	NA	NA
PCB-1221	<0.060	<0.070	<0.060	<0.070	<0.060	<0.070	<0.060	<0.060	<0.060	<0.060	<0.070	<0.060	<0.070	<0.060	<0.060	<0.070	<0.060	<0.060	<0.060	<0.060	<0.070	<0.070	<0.060	<0.060	NA	NA	NA
PCB-1232	<0.060	<0.070	<0.060	<0.070	<0.060	<0.070	<0.060	<0.060	<0.060	<0.060	<0.070	<0.060	<0.070	<0.060	<0.060	<0.070	<0.060	<0.060	<0.060	<0.060	<0.070	<0.070	<0.060	<0.060	NA	NA	NA
PCB-1242	<0.060	<0.070	<0.060	<0.070	<0.060	<0.070	<0.060	<0.060	<0.060	<0.060	<0.070	<0.060	<0.070	<0.060	<0.060	<0.070	<0.060	<0.060	<0.060	<0.060	<0.070	<0.070	<0.060	<0.060	NA	NA	NA
PCB-1248	<0.060	<0.070	<0.060	<0.070	<0.060	<0.070	<0.060	<0.060	<0.060	<0.060	<0.070	<0.060	<0.070	<0.060	<0.060	<0.070	<0.060	<0.060	<0.060	<0.060	<0.070	<0.070	<0.060	<0.060	NA	NA	NA
PCB-1254	<0.060	<0.070	<0.060	<0.070	<0.060	<0.070	<0.060	<0.060	<0.060	<0.060	<0.070	<0.060	<0.070	<0.060	<0.060	<0.070	<0.060	<0.060	<0.060	<0.060	<0.070	<0.070	<0.060	<0.060	NA	0.06	0.71
PCB-1260	<0.060	<0.070	<0.060	<0.070	<0.060	<0.070	<0.060	<0.060	<0.060	<0.060	<0.070	<0.060	<0.070	<0.060	<0.060	<0.070	<0.060	<0.060	<0.060	<0.060	<0.070	<0.070	<0.060	<0.060	NA	NA	NA
PCB-1262	<0.060	<0.070	<0.060	<0.070	<0.060	<0.070	<0.060	<0.060	<0.060	<0.060	<0.070	<0.060	<0.070	<0.060	<0.060	<0.070	<0.060	<0.060	<0.060	<0.060	<0.070	<0.070	<0.060	<0.060	NA	NA	NA
PCB-1268	<0.060	<0.070	<0.060	<0.070	<0.060	<0.070	<0.060	<0.060	<0.060	<0.060	<0.070	<0.060	<0.070	<0.060	<0.060	<0.070	<0.060	<0.060	<0.060	<0.060	<0.070	<0.070	<0.060	<0.060	NA	NA	NA
Total PCBs	**<0.060**	**<0.070**	**<0.060**	**<0.070**	**<0.060**	**<0.070**	**<0.060**	**<0.060**	**<0.060**	**<0.060**	**<0.070**	**<0.060**	**<0.070**	**<0.060**	**<0.060**	**<0.070**	**<0.060**	**<0.060**	**<0.060**	**<0.060**	**<0.070**	**<0.070**	**<0.060**	**<0.060**	**0.1**	**NA**	**NA**

NOTES:
Value at or above Interim Sediment Quality Guideline (ISQG) but below Probable Effects Level (PEL)
Value at or above PEL
Higher than Disposal at Sea Lower Action Levels for chemicals in sediments