

WHITESHELL REACTOR 1 ENVIRONMENTAL IMPACT STATEMENT PACKAGE

This document provides a high-level summary of changes to the draft Environment Impact Statement (EIS) and Technical Supporting Documents that were submitted with the 2017, 2020, and 2022 Environmental Assessment (EA) package.

Revision history information is provided for the documents in Table 1. Some of the documents listed here are not indicated in the document map shown below in Figure 1.

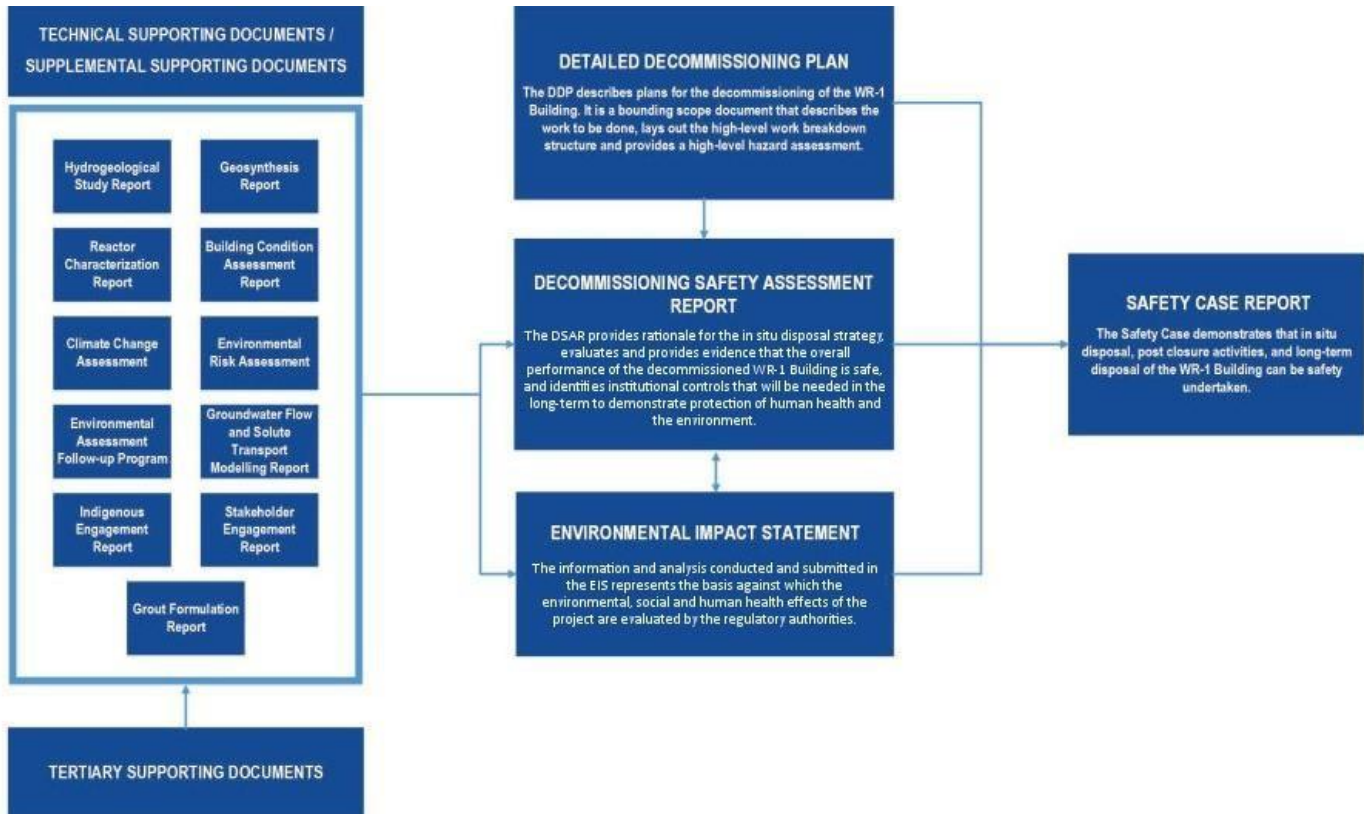


Figure 1

Documents not listed on the figure, but included in Table 1 are:

- Environmental Impact Statement - Executive Summary
- Estimate of Residual Tritium Inventory of Whiteshell Reactor 1 (WR-1)
- WR-1 Fuel Channel Survey Results
- Non-Radiological Inventory of WR-1
- WR-1 Lead Estimates
- Whiteshell Seismic Hazard
- Whiteshell Laboratories Decommissioning Project Comprehensive Study Report
- Cone Penetration Testing Investigation for Whiteshell Main Campus
- Analysis of Scrape Samples from Selected WR-1 Fuel Channels

Major Change
Minor Change
No Change
New Document

Table 1

Document Title	Document Number	Rev.
Environmental Impact Statement In Situ Decommissioning of WR-1 at the Whiteshell Laboratories Site (2022 June)	WLDP-26000-ENA-001	4
Environmental Impact Statement for the In Situ Decommissioning of WR-1 at the Whiteshell Laboratories - Executive Summary	WLDP-26000-ENA-002	4
WR-1 Hydrogeological Study Report	WLDP-26000-REPT-004	1
WR-1 at the Whiteshell Laboratories Site Environmental Risk Assessment	WLDP-26000-REPT-006	5
In Situ Decommissioning of Whiteshell Reactor 1 Project - Decommissioning Safety Assessment Report	WLDP-26000-SAR-001	4
WR-1 Reactor Decommissioning Indigenous Engagement Report	WLDP-26000-REPT-002	8
WR-1 Reactor Radiological Characterization Summary and Radionuclide Inventory Estimates	WLDP-26100-041-000-0001	2
In Situ Decommissioning of WR-1 at the Whiteshell Laboratories Site - WR-1 Groundwater Flow and Solute Transport Modelling	WLDP-26000-REPT-005	4
Climate Change Assessment for WR-1 In Situ Decommissioning	WLDP-26000-REPT-007	0
Whiteshell Laboratories Decommissioning Project Comprehensive Study Report Volume 1: Main Report	WLDP-03702-041-000-0008	2
Whiteshell Laboratories Decommissioning Project Comprehensive Study Report Volume 2: Appendices	WLDP-03702-041-000-0009	2
Whiteshell Laboratories Decommissioning Project Comprehensive Study Report Volume 3: Addendum	WLDP-03702-041-000-0010	0
Geosynthesis for WR-1 Environmental Impact Statement	WLDP-26400-041-000	3
Environmental Assessment Stakeholder Engagement Report – WR-1 In Situ Decommissioning	WLDP-26000-REPT-010	4
Environmental Assessment Follow-Up Program for Whiteshell Laboratories	WL-509246-STD-001	0
Whiteshell Reactor 1 - Phase 1000 Grout Formulation Testing Report	WLDP-26000-REPT-012	1
Estimate of Residual Tritium Inventory of WR-1	WLDP-26400-036-000	0
WR-1 Fuel Channel Survey Results	WLDP-26000-021-000-0011	0
Non-Radiological Inventory of WR-1	WLDP-26000-021-000-0005	0
WR-1 Lead Estimates	WLDP-26000-021-000-0010	0
Building Condition Assessment In-Situ Decommissioning of Whiteshell Reactor 1 (WR-1)	WLDP-26000-REPT-011	1
Whiteshell Seismic Hazard	WLDP-26000-021-000-0009	0

Document Title	Document Number	Rev.
Cone Penetration Testing Investigation for Whiteshell Main Campus	WLDP-26000-041-000	0
Analysis of Scrape Samples from Selected WR-1 Fuel Channels	WLDP-26000-041-000-0006	0

Document Title: Environmental Impact Statement In-Situ Decommissioning of WR-1 at the Whiteshell Laboratories Site

Document Number: WLDP-26000-ENA-001 Rev. 4

Changes from Last EA Submission: WLDP-26000-ENA-001 Rev. 4 supersedes WLDP-26000-ENA-001 Rev. 3

Revision History

Section	March 2020 Submission	June 2022 Submission	December 2022 Submission
1.0	<ul style="list-style-type: none"> Revised schedule of project. Added information describing the nearby Indigenous Nations. Revised organization of Relevant Standards. Added information on Structure of overall Submission Package. 	<ul style="list-style-type: none"> Changed the institutional control period from 300 years (100 years of active institutional control and 200 years of passive institutional control) to 100 years of institutional control with active measures and removed the passive Institutional control period. Revised the project schedule. Updated the Indigenous community locations for accuracy. 	
2.0	<ul style="list-style-type: none"> Revised to improve overall clarity of Alternatives Assessment. Divided assessment into 3 distinct time periods – Closure, Institutional Control, and Post- Institutional Control. Included Alternatives from Public and Indigenous engagement feedback. Added justification that all alternatives, including ISD, meet IAEA GSR Part 6. Added semi-quantitative assessment of alternatives. 	<ul style="list-style-type: none"> Clarified adherence to REGDOC-2.1.2. Clarified site licensing and WR-1 licensing as per the federal review comments, including types of Canadian Nuclear Laboratories (CNL) work performed under Canadian Nuclear Safety Commission (CNSC) license. Changed the institutional control period from 300 years (100 years of active institutional control and 200 years of passive institutional control) to 100 years of institutional control with active measures and removed the passive Institutional control period. Removed text about using grout for radiation shielding and stipulated using local materials. Updated discussions of a grout batch plant to include alternative options, such as a Reimer truck. Added a section on Sagkeeng’s Alternative Means Assessment. Revised the Selection of Assessment Criteria section to include a discussion of Sagkeeng’s criteria weighting. Added a numerical rating to each alternative in the Summary of the Evaluation of Alternatives table. 	<ul style="list-style-type: none"> Added details regarding the Project meeting all the requirements for a legacy site as defined in REGDOC-2.11.2. Added details regarding all 4 technically feasible alternatives aligning with IAEA’s General Safety Requirements Part 6, Decommissioning of Facilities (2014). Identified focus of EIS, DSAR, and supporting documents on Alternative #3 and safety of other alternatives.
3.0	<ul style="list-style-type: none"> Revised description of WR-1 systems and facility. Added information on hazardous materials and inventory remaining. Added information on grout design and testing completed to date. 	<ul style="list-style-type: none"> Updated the project schedule. Changed the institutional control period from 300 years (100 years of active institutional control and 200 years of passive institutional control) to 100 years of institutional control with active measures and removed the passive Institutional control period. Improved the description of the Active Drainage System and differentiated it from the non-radiological drainage and sump systems. Added a discussion of the remaining cooling water in the thermal shield and concrete bioshield. Updated the summary of WR-1 systems status. Updated the decommissioning plan table for the WR-1 Building Systems. Updated the description of the Fire Protection System. Improved the description of lead in Building 100 (B100). Improved the description of Polychlorinated Biphenyls (PCBs) in B100. Revised the Grout of Below-Grade Structures and Systems section to clarify the process. Clarified the purpose of grout filling and confirmed that cold joints do not present an issue. 	

Section	March 2020 Submission	June 2022 Submission	December 2022 Submission
		<ul style="list-style-type: none"> Revised the Removal of Above-Grade WR-1 Building Structures section to clarify the plan for the remediation of soil surrounding B100. Significantly revised the In Situ Disposal System subsections (Reactor Core and Bioshield Components, Grout, Internal Walls, Building Walls and Foundation, Local Geosphere, Concrete Cap and Engineered Cover, and Post-Closure Monitoring) to provide an updated description of the system components, and provide references to relevant designs, studies, and testing reports. 	
4.0	<ul style="list-style-type: none"> Revised to include information on additional engagements and provide additional detail on each community and Key Areas of Interest or Concern for each. 	<ul style="list-style-type: none"> Reformatted and significantly restructured entire Section 4.0 to align with other CNL Indigenous Engagement sections for similar projects. Updated the goals of the Engagement Objectives section. Updated to include all new engagement activities that took place since the 2020 submission. Updated the CNL's Long-term Relationship with Indigenous Peoples section to reflect current progress and increased understanding of the path forward. Revised the Summary of Engagement section to include engagement activities with Shoal Lake #40 First Nation, Iskatewizaagegan No. 39 Independent First Nation, Northwest Angle No. 33 (Treaty No. 3). Revised the Sagkeeng First Nation section to include a reflection on how engagement has progressed. Added a section on Sagkeeng's Alternative Means Assessment. Added subsections on Verification and Next Steps for each Indigenous Nation. Updated the Summary of Interests and Concerns Raised During Engagement Activities that Influenced the EA table to include new interests and concerns that influenced the EA. Added an appendix with the record of engagement and the interests and concerns tables. 	<ul style="list-style-type: none"> Added editorial updates (grammar, spelling, naming conventions). Extended end of engagement activities period from October 2021 to September 2022. Updated details in Table 4.2-1: Project Identified First Nations and the Red River Métis Engagement and Involvement. Updated details in Table 4.2.2-1 The Indigenous Nations Identified as Having Potential Interest in the Project. Added details regarding the Indigenous Advisory Committee. Updated Relationship Agreements with First Nations and Red River Métis. Added details about CNL, AECL, and Sagkeeng Technical Working Group. Added details about the identification of initiatives, including the Healing and Resiliency Action Plan. Added additional information on Sagkeeng's Community Environmental Monitoring Program. Added details about trauma-informed engagement training with Sagkeeng. Added details about Sagkeeng's Psychosocial Impact Assessment. Added details about CNL's development of an Indigenous Procurement Strategy. Added details about next steps of engagement. Added details about the future finalization of list of binding commitments. Added details about the incorporation of Traditional Land Use. Added details about First Nation and MMF verification of and engagement with EIS documentation. Added details to Table 4.4-1: Summary of Interests and Concerns Raised During Engagement Activities that Influenced the Environmental Assessment.
5.0	<ul style="list-style-type: none"> Added summary of Key Areas of Interest of Concern from engagements. Added Summary of Post-Draft Environmental Impact Statement Submission Activities. 	<ul style="list-style-type: none"> Significant restructuring of the entire Section 5.0, including its subsections, and the addition of new subsections on Engagement Methods and Activities, which include 'Implications of the COVID-19 Pandemic' and 'Feedback on Valued Components'. Reformatted to align with other Canadian Nuclear Laboratories Environmental Impact Statements for similar projects. Updated the description of engagement, and the engagement objectives. Added a new 'Evaluation' subsection to Engagement Objectives section to discuss the evaluation process that demonstrates the Project communications objectives have been met. 	<ul style="list-style-type: none"> Made editorial updates (grammar, spelling, naming conventions). Extended end of engagement activities period from October 2021 to September 2022. Added "waste management and transportation" to a list of Project-related topics at PLC meetings. Added details of combined bi-monthly webinars (e.g., notification and access). Updated details in Table 5.2.7-1: WR-1 Webinars. Added events to Table 5.2.9-1: Community Engagement Activities. Added details of weekly all-staff CNL meetings beginning in the summer of 2022.

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		<ul style="list-style-type: none"> Revised all sub-sections of 'Engagement Methods and Activities' section to update them with current engagement information. Updated 'Stakeholder Feedback and Response' section with revised interests and concerns, CNL responses and included the EIS sections where feedback was implemented. Update 'Planned Future Engagement' section to capture planned engagements through to the 2022/2023 fiscal year. Updated to include engagement activities up to October 2021. 	<ul style="list-style-type: none"> Added details of launch of WL-focused employee newsletter in October 2022. Updated plan and details for future engagement activities and extended end date from October 2021 to September 2023. Updated the fiscal quarter breakdown of future engagements.
6.1	<ul style="list-style-type: none"> Revised description of Assessment Methodology for clarity. Added table describing spatial boundaries for each Environmental Component. Revised description of Temporal Boundaries. 	<ul style="list-style-type: none"> Institutional control phase changed from 300 years to 100 years, and removed the passive Institutional control phase. Improved the description of how VCs were identified and how the traditional knowledge studies were considered in the VC selection. Added a section describing how Indigenous engagement feedback and traditional knowledge were incorporated into the assessment. Expanded the 'Human Health' and 'Ecological Health' categories in the Valued Components Table. Updated the description of spatial boundaries in 'Spatial Boundaries' Section. Added to the description of how uncertainty is mitigated through conservatism in the 'Prediction Confidence and Uncertainty' Section. Updated 'Monitoring and Follow-Up' section to include commitment to future collaboration with Indigenous Nations on monitoring activities. 	
6.2	<ul style="list-style-type: none"> Revised assumptions of unpaved roads during cap and cover construction. Revised assumptions on grout production and placement timeframe. Expanded Monitoring and Follow-up description 	<ul style="list-style-type: none"> Added new sub-sections to the Air Quality and Greenhouse Gases sections called 'Indigenous Engagement Feedback – Key Interests and Concerns' to document relevant feedback and to summarize key interests and concerns from engagement with Indigenous Nations. Added clarification on why indicator compounds (particulate matter and combustion gases) and hazardous radiological and non-radiological air emissions are assessed separately. Added clarification on why select substances (PAHs, metals, HB-40) are not considered indicator compounds. Updated the spatial boundaries with actual areas of the study areas. Institutional control phase changed from 300 years to 100 years, and removed the passive Institutional control phase. Revised project schedule. Added information on the radiological clearance for demolition process. Added rationale for excluding the removal of the Primary Heat Transport system from the Air Quality Assessment. Added clarification that Greenhouse Gas Emissions include temporary heating sources. Added further justification for using Winnipeg Ellen St Station for baseline air quality data. Updated the Air Quality 'Monitoring and Follow-Up' section to include commitments to future collaboration with Indigenous Nations on monitoring activities. Updated the Greenhouse Gas prediction confidence and uncertainty description. 	

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6.3	<ul style="list-style-type: none"> Added additional detail on geologic setting, summarized from Geosynthesis Report, including Soil Properties, Geomorphology, and Seismic (including Liquefaction). Expanded Monitoring and Follow-up description. Incorporates additional hydrogeological data collected post-submission. 	<ul style="list-style-type: none"> Added a new section on Indigenous feedback, summarizing key interests and concerns. Institutional control phase changed from 300 years to 100 years, and removed the passive Institutional control phase. Added text to provide a better description of bedrock fracture geology and age linkages between various fractures and faults. Added text on the potential for geomorphological changes to the Winnipeg River. Added clarification on the difference in hydraulic conductivity estimates for the basal sand unit at the Local Study Area in comparison to the Waste Management Area. Added results discussion of single well response (packer) testing completed in the upper portion of the bedrock. Clarified the discussion on differences between the Waste Management Area and Local Study Area basal sand hydraulic conductivities. Clarified the names of the overburden layers and coordinated with referenced studies. Updated the groundwater elevation monitoring data. Clarified the direction of hydraulic gradients. Added information on new groundwater quality monitoring data from the Waste Management Area. Revised the text on tritium detected in the dugouts near the landfill for accuracy. Added discussion on the cumulative effects of the Project combined with the Waste Management Area. Added information on the results of the Building Condition Assessment as relevant to releases to the geosphere. 	
6.4	<ul style="list-style-type: none"> Incorporates additional water quality data collected post-submission. Added justification of assessment of effects of air deposition using data from recent demolition work at WL. 	<ul style="list-style-type: none"> Added a new section on Indigenous feedback, summarizing key interests and concerns. Institutional control phase changed from 300 years to 100 years, and removed the passive Institutional control phase. Added discussion on the development of a stormwater management plan as a mitigation action for potentially altered drainage rates and flow patterns from decommissioning and reclamation of the Whiteshell Laboratories site. Added clarification on why changes to the drainage rates, flow patterns, and discharge volumes due to the concrete cap and engineered cover are expected to be within the natural range of variation. Added new Winnipeg River water quality data and sediment sample data. Added a Traditional Knowledge section summarizing observations and concerns shared by Indigenous Nations in their traditional land and occupancy studies. Added information on preventative and mitigation measures for work within 30 metres of a watercourse. Added information on the mitigation of fugitive dust emissions. Added clarification on why the assessment does not consider the wetlands on the east side of the Whiteshell Laboratories site as an exposure pathway. Provided updated modelling results. 	

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		<ul style="list-style-type: none"> Updated the Conclusions section to include commitment to future collaboration with Indigenous Nations on monitoring activities. 	
6.5	<ul style="list-style-type: none"> Revised to include additional environmental monitoring data up to 2018. Expanded Monitoring and Follow-up description. 	<ul style="list-style-type: none"> Added a new section on Indigenous feedback, summarizing key interests and concerns. Institutional control phase changed from 300 years to 100 years, and removed the passive Institutional control phase. Added new fish sample data and clarified the location where the fish is caught for sampling. Added a Traditional Knowledge section summarizing observations and concerns shared by Indigenous Nations in their traditional land and occupancy studies. Added additional detail on wastewater management at Whiteshell Laboratories. Added information on the mitigation of fugitive dust emissions. Provided updated modelling results. Updated the conclusions to confirm negligible effect on aquatic environment. Updated the Conclusions section to include commitment to future collaboration with Indigenous Nations on monitoring activities. 	
6.6	<ul style="list-style-type: none"> Added data and discussion regarding automated recording unit acoustic surveys for birds conducted in 2018 and 2019. Revised discussion of mitigations for Snapping Turtles. Expanded Monitoring and Follow-up description. 	<ul style="list-style-type: none"> Revised the Institutional control phase from 300 years (100 years Active and 200 years Passive) to 100 years of institutional control with active measures, and removed the passive Institutional control phase. Added a new section on Indigenous feedback, summarizing key interests and concerns. Added a new table reviewing Indigenous Valued Components. Added a new section on Traditional Knowledge incorporating observations and concerns identified in the traditional land use studies. Updated text on management of fugitive dust emissions and use of tarps. Added text on re-seeding the WRDF soil cover. Updated the Conclusions section to include commitment to future collaboration with Indigenous Nations on monitoring activities. 	
6.7	<ul style="list-style-type: none"> Revised to include Environmental Monitoring data up to 2018. Revised to include data from Food Intake Survey from MMF and SFN. Revised to incorporate revised ERA results. <ul style="list-style-type: none"> Changes in assumptions related to air quality. Added description of Normal Evolution Scenarios vs Disruptive Events vs Bounding Scenarios vs “What If” Scenarios vs Sensitivity Cases. Revised to move presentation of Disruptive Events including receptors, exposure pathways and dose results, from Section 7.0 to Section 6.7. Added Figure 6.7.1-8 showing Dose to Human Receptors for Normal Evolution Scenario. Added additional secondary pathway to ecological health assessment. Revised with updated results of assessment of Benthic Invertebrates from ERA. Expanded Monitoring and Follow-up description. 	<ul style="list-style-type: none"> Added a new section on Indigenous feedback, summarizing key interests and concerns. Institutional control phase changed from 300 years to 100 years, and removed the passive Institutional control phase. Provided updated WL operational radiation dose assessment results. Added information on the screening of non-radiological contaminants of potential concern in the closure phase. Clarified how the two types of on-site workers are assessed. Added information on why soil remediation was not considered in determining contaminants of potential concern. Added moose as a valued component for the post-closure phase. Added clarification on why atmospheric releases are not considered during the post-closure phase. Revised the list of radionuclides included in the post-closure phase to provide a more fulsome list. Provided updated radiological and non-radiological assessment results. Updated the discussion of disruptive events to align with the revisions in the DSAR, including updated disruptive event names. 	

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		<ul style="list-style-type: none"> Clarified that human habitation is part of normal evolution scenario and the disruptive event is the drinking of well water. Removed the discussion of “what-if cases” to align with the revisions in the DSAR. Updated the Monitoring and Follow-up section to include commitment to future collaboration with Indigenous Nations on monitoring activities. 	
6.8	<ul style="list-style-type: none"> Added figures to show Métis community Harvesting Areas. Revised to incorporate input from Traditional Knowledge studies from Indigenous Nations. Expanded Monitoring and Follow-up description. 	<ul style="list-style-type: none"> Institutional control phase changed from 300 years to 100 years, and removed the passive Institutional control phase. Split Section 6.8 into 6.8.1 Traditional Land and Resource Use and 6.8.2 Other Land and Resource Use. Added a new section on Indigenous feedback, summarizing key interests and concerns. Updated the ‘Description of the Environment’ section with more detail on the Indigenous Engagement activities and the Indigenous traditional land use and Traditional Knowledge Studies. Updated the ‘Traditional Land and Resource Use by Indigenous Peoples’ section. Added Indigenous engagement activities as Management Practices for project activities and effects pathways. Revised the Secondary Pathways conclusion section. Added an Environmental Monitoring Commitments for Indigenous Nations section. 	
6.9	<ul style="list-style-type: none"> Added figure showing full time employment at WL from 1962-2019. Revised to include most recent population data. Expanded Monitoring and Follow-up description. 	<ul style="list-style-type: none"> Updated the Scope of the Assessment description of steps 4, 5, and 6. Revised the Institutional control phase from 300 years (100 years Active and 200 years Passive) to 100 years of institutional control with active measures, and removed the passive Institutional control phase. Added a new section on Indigenous feedback, summarizing key interests and concerns. Revised the Valued Components section to include VCs identified by Indigenous Nations. Revised the Spatial Boundaries with input from Indigenous Nations. Updated the Limitations of Statistical Data section. Added a section on Indigenous Nations Perspectives on and Observations of the Whiteshell Laboratories Site. Significantly revised and updated the Employment and Income section to provide more up-to-date information for municipalities and Indigenous Nations. Revised the pathway analysis based on feedback from Indigenous Nations and more recent data; all pathways are now Secondary Pathways. Added further discussion of mitigations to reduce the impact on the local municipalities and Indigenous Nations from the presence of WRDF. Revised the Conclusions section. Added information gathered through Indigenous engagement throughout the section. Updated with the most recent census data. WL site employment numbers updated. 	

Section	March 2020 Submission	June 2022 Submission	December 2022 Submission
		<ul style="list-style-type: none"> Regional Health Overview section updated with more up-to-date data. Maintaining communications and Public Information Activities added to the Monitoring and Follow up program. 	
7.0	<ul style="list-style-type: none"> Added a Summary Table of FEPs. Revised with emphasis and justification for utilizing existing Accident and Malfunction assessments from the CSR that are applicable to WR-1 ISD. Added information on off-site emergency response related to transport of radioactive materials. Revised discussion of Fires and Explosions. Removed information related to Disruptive Events and moved to Section 6.7. Revised assessment and Table 7.4-1 to present Residual Risks after mitigations are applied. 	<ul style="list-style-type: none"> Significantly revised the section to focus only on discussion of Closure phase accidents and malfunctions. Removed the discussion of Features, Events, and Processes as those generally do not apply to Closure phase activities. Added a section on Indigenous feedback, summarizing key interests and concerns relevant to accidents and malfunctions. Clarified the methods by which accidents and scenarios were identified, measured and clarified. Expanded the discussion of non-radiological hazards present in WR-1. Clarified the risk measurement matrices (consequence and likelihood), and removed the dose criteria. Updated the risk likelihood categories. Provided a detailed risk measurement and evaluation discussion for each of the seven accident and malfunction scenarios. Updated Table 7.4-1 to indicate the revised risk priority level after additional mitigations are applied. 	
8.0	<ul style="list-style-type: none"> Revised with additional justification for determining no overlap between WR-1 and wider WL operations and decommissioning. 	<ul style="list-style-type: none"> Revised the Institutional control phase from 300 years (100 years Active and 200 years Passive) to 100 years of institutional control with active measures, and removed the passive Institutional control phase. Removed the Manitoba Minnesota Transmission Project from the list of Reasonably Foreseeable Developments (project completed). Added clarifications about contaminant release from the WMA and interactions between the WMA remediation and WR-1 projects. Updated the Section on Future Land Use to reflect the revisions to Section 6.8, update the responsibilities for the future use of the site. Revised the 'Summary of Cumulative Residual Effects for Valued Discipline Assessments summary' table with significant updates to the 'Proposed Mitigations' column. Revised the 'Summary of Cumulative Residual Effects for Valued Discipline Assessments summary' table to replace the 'cumulative effects' column with 'Cumulative Residual Effects' column and replaced the discussion for each discipline row with appropriate residual effects. 	
9.0	<ul style="list-style-type: none"> Added discussion of Disruptive Event results. Revised Summary to include discussion of EAFF. 	<ul style="list-style-type: none"> Included Indigenous feedback and concerns into each of the environmental effects sections. Added text on use of tarps for grout production under the Air Quality section. Revised the Institutional control phase from 300 years (100 years Active and 200 years Passive) to 100 years of institutional control with active measures, and removed the passive Institutional control phase. Updated the conclusions of Hydrogeology section to include a discussion of future monitoring and including Indigenous Nations in future monitoring. Updated the discussion and conclusion of Aquatic Environment section to explain the mitigations in place that make the risk to aquatic environment negligible. Provided additional justification of Hazard Quotients (HQs) for benthic invertebrates. Added a discussion of future monitoring and including Indigenous Nations in future monitoring. 	

Section	March 2020 Submission	June 2022 Submission	December 2022 Submission
		<ul style="list-style-type: none"> Updated the discussion of Terrestrial Environment section to explain the mitigations in place that make the risk to terrestrial environment negligible. Updated the discussion in Human Health section and added a discussion of measures in place to protect on-site workers. Clarified the non-radiological HQ exceedances (lead) for normal evolution scenario and disruptive events. Added a discussion of future monitoring and including Indigenous Nations in future monitoring. Updated the discussion in Ecological Health section and clarified the HQs for non- radiological exposures and added further justification of HQ exceedances for benthic invertebrates. Updated the Land and Resource use section with a further justification of low risk to traditional land use by Indigenous Nations. Added discussion of CNL engagement with Indigenous Nations to reconcile differences between CNL conclusions and Indigenous traditional knowledge studies and other expressed concerns. Significantly expanded the discussion of socio-economic effects discussion on municipal and Indigenous Nations in the Socio-economic Environment section. Added Human and Ecological Health disciplines to the Summary of Predicted Residual Effects table. 	
10.0	<ul style="list-style-type: none"> Revised discussion of Forest Fires. Revised discussion of Seismic to include Liquefaction Potential. Removed detailed results of Glaciation Assessment. <ul style="list-style-type: none"> Summary included, with reference to details in DSAR. 	<ul style="list-style-type: none"> Added an Indigenous Engagement Feedback – Key Interests and Concerns section in regards to effects of the environment on the Project. Revised the discussion of Flooding. Updated the Climate Change section with a climate change resiliency assessment. 	
11.0	<ul style="list-style-type: none"> Revised Summary of Follow-Up and Monitoring Program with additional detail. Revised Adaptive Management with expanded discussion. Revised Engagement and Communication with commitment to prepare annual report. 	<ul style="list-style-type: none"> Revised the Institutional control phase from 300 years (100 years Active and 200 years Passive) to 100 years of institutional control with active measures, and removed the passive Institutional control phase. Revised the section to better explain the relationship between WR-1 follow-up monitoring activities and existing Environmental Assessment Follow-Up activities already in place at WL site. Improved the description of Closure and Post-Closure phase activities. Updated the Adaptive Management section and added text on including input from Indigenous Nations on planning and carrying out monitoring activities. Added a section on Indigenous Engagement and Participation in Environmental Monitoring to describe the engagement activities with Indigenous Nations, their interest in the monitoring program, and how CNL plans to include the Nations in ongoing monitoring. Clarified list of foods to be monitored. 	<ul style="list-style-type: none"> Added editorial updates (grammar, spelling, naming conventions). Updated engagements with each First Nation and the Manitoba Métis Federation commitments. Added details about Relationship Agreements.
12.0	<ul style="list-style-type: none"> Revised to reflect additional information and changes throughout the EIS. Added summary of Disruptive Events to Human and Ecological Health, Section 12.6, and removed from Accidents and Malfunctions Section 12.9. 	<ul style="list-style-type: none"> Added a discussion of Indigenous concerns over the ISD alternative and their preference for the immediate dismantling and removal alternative. Added a section discussing Indigenous Engagement for the project. Added a section discussing how Traditional Knowledge and Indigenous Engagement Feedback was included and influenced the EA. Added a section discussing Public Engagement for the project. Added a section discussing the Scope of the EA and Approach. 	

Section	March 2020 Submission	June 2022 Submission	December 2022 Submission
13.0	<ul style="list-style-type: none"> Minor reorganization to place legislative references up front 	<ul style="list-style-type: none"> Revised the Institutional control phase from 300 years (100 years Active and 200 years Passive) to 100 years of institutional control with active measures, and removed the passive Institutional control phase. Updated list of references to add the new references and update revision numbers of existing references where required. 	

Document Title: Environmental Impact Statement for the In Situ Decommissioning of WR-1 at the Whiteshell Laboratories – Executive Summary

Document Number: WLDP-26000-ENA-002 Rev. 4

Changes from Last EA Submission: WLDP-26000-ENA-002 Rev. 4 supersedes WLDP-26000-ENA-002 Rev. 3

Revision History

March 2020 Submission	June 2022 Submission	December 2022 Submission
<ul style="list-style-type: none"> • Added a Document Interrelationship figure in the introduction. • Addition of treaty territory information in the introduction. • Added two alternatives as a result of Public and Indigenous feedback in the Alternatives section. • Reduction on the discussion on alternatives as a result of excessive detail in the executive summary. • Updated Indigenous Engagement section to include more detail about key issues raised and a timeline of engagement activities. • Updated the Public Engagement section to include more detail about issues raised. • Added a step to the Environmental Assessment Approach to summarize the outcomes of the assessment. • Addition of dose rate to human receptors from natural evolution scenarios. • Added a discussion on benthic invertebrates and HB-40 and cadmium exposure in Environmental Results section. • Accidents and malfunctions were updated. • Added references. 	<ul style="list-style-type: none"> • Revised the project timeline dates. • Revised the Indigenous Engagement section to reflect changes to Section 4.0 of the EIS. • Added an Inclusion of Indigenous Knowledge and Influence of Indigenous Engagement Feedback on the Environmental Assessment section. • Revised the Public Engagement section to reflect changes to Section 5.0 of the EIS. • Institutional control period changed from 300 years to 100 years, and removed the passive institutional control period. • Revised the Land and Resource Use Assessment section to reflect changes to Section 6.8 of the EIS. • Revised the Monitoring and Follow-up Programs section to provide more detail on how groundwater monitoring is the main component and will be used to guide adaptive management. • Revised the Monitoring and Follow-up Programs section to summarize commitments made for Indigenous engagement and participation in environmental monitoring. 	<ul style="list-style-type: none"> • Updated to include engagement activities from October 2021 to September 2022.

Document Title: WR-1 Hydrogeological Study Report

Document Number: WLDP-26000-REPT-004 Rev. 1

Changes from Last EA Submission: WLDP-26000-REPT-004 Rev. 1 supersedes WLDP-26000-REPT-004 Rev. 0

Revision History

Section	March 2020 Submission	June 2022 Submission
Overall Changes	<ul style="list-style-type: none"> • Additional ground water elevation data past November of 2016 out to September 2018. • Addition of data from overburden wells from the Building 505 (BH-B505-02a and BH-B505-01a) site location, these wells are south of the WL Main Campus well nests 1 through 8. • New data supports the analysis, conclusions and recommendation of the first revision of this document. 	<ul style="list-style-type: none"> • None
Updated Tables and Figures	<ul style="list-style-type: none"> • The following figures have been updated for the groundwater elevation data collected from November 2016 through September 2018 and data from groundwater elevation data from wells BH-B505-02a and BH-B505-01a south of the existing Whiteshell Main Campus wells. <ul style="list-style-type: none"> ○ Figure 2-4 WR-1 Area Monitoring Well Nests ○ Figure 3-7 Site-Wide Water Table Elevation Contours ○ Figure 3-7 Site-Wide Bedrock Groundwater Contours ○ Figure 3-9: WR-1 Well Nest Hydrograph 2018 Data ○ Figure 3-10: WR-1 Well Nest Hydrograph 2018 Data -Clay and Upper Complex Wells ○ Figure 3-11: WR-1 Well Nest Hydrograph 2018 Data - Clay Till Wells ○ Figure 3-12: WR-1 Well Nest Hydrograph 2018 Data - Basal Sand and Bedrock Wells ○ Figure 3-13: WR-1 Area Clay (and Upper Complex) Groundwater Elevation Contours (September 2018) ○ Figure 3-14: WR-1 Area Clay-Till Groundwater Elevation Contours (September 2018) ○ Figure 3-15: WR-1 Area Basal Sand Groundwater Elevation Contours (September 2018) ○ Figure 3-16: WR-1 Area Basal Sand Groundwater Elevation Contours (October 2016) ○ Figure 3-17: WR-1 Area Shallow Bedrock Groundwater Elevation Contours (September 2018) ○ Figure 3-19: WR-1 Area Basal Sand Groundwater Elevation Contours Mapped onto Interpolated Bedrock Topography 	
Appendix F	<ul style="list-style-type: none"> • Technical Memo: Summary of Geophysical Data Processing, Temporary Transducer Deployment Design and Implementation in Borehole 16 – 8D. This borehole was not developed as a monitoring well, but remained open for later development as required. Testing of the deep borehole with a liner and multi-level transducer system was also completed. 	

Document Title: WR-1 at the Whiteshell Laboratories Site Environmental Risk Assessment

Document Number: WLDP-26000-REPT-006 Rev. 5

Changes from Last EA Submission: WLDP-26000-REPT-006 Rev. 5 supersedes WLDP-26000-REPT-006 Rev. 1

Revision History

Section	March 2020 Submission	June 2022 Submission
Executive Summary	<ul style="list-style-type: none"> Updated to reflect changes in updated document referencing. Table ES-6 labelling corrected. 	
1.0	<ul style="list-style-type: none"> Closure Phase start and end date changed to Start 2022 end 2025. Table 1.1 updated accordingly. Detail added to Post-closure Phase including delineation of Institutional Control (Active), Institutional Control (Passive), Post-Institutional Control (Passive). 	<ul style="list-style-type: none"> Updated closure phase schedule dates.
2.0	<ul style="list-style-type: none"> References to EIS and supporting documents updated. 	<ul style="list-style-type: none"> Updated the discussion of climate projections and clarified use of current climatic data for conservatism. Surficial geology overburden layer names clarified to align with reference studies. Added compositions of overburden layers. Bedrock geology updated with Lac du Bonnet batholith information. Added references to the Geosynthesis Report for WR-1.
3.0	<ul style="list-style-type: none"> Table 3-1 Duration and Dates updated. Table 3-2 Daily Emission Rate updated. References to maximum and average grout used in tonne/day modified. Discussion of the distribution of radionuclides in the grout expanded. Values and layout of data in Table 3-8, 3-9, 3-10, and 3-11 Modified. Values and layout of data in Table 3-15 Modified. References to EIS and supporting documents updated. U-238 added to Table 3-16, values for other nuclides updated. Table 3.17 Values updated. 	<ul style="list-style-type: none"> Updated WR-1 radionuclide inventory information. Added Ag-108m, U-235, U-238 to Table 3-7, 3-8, 3-10, 3-11. Updated airborne release assumptions, grouting duration. Updated tritium release discussion, updated Table 3-12 with recent tritium release data. Updated radiological and non-radiological mass loadings and associated timeframes in Tables 3-16 and 3-17. Clarified the extent of building demolition.
4.0	<ul style="list-style-type: none"> Table 4-1: Screening of Non-Radiological COPCs against Relevant Air Quality Criteria, Values modified. Figure 4.2: Conceptual Model for Human Receptors during the Closure Period (Farm A/F) Path 23 added, Box 2 to Box 3. Table 4-6: Human Exposure Factors for Radiological Dose Calculations for Farm Receptor 3 Month Old Infant (nursing) and 3 Month Old Infant Formula) added. Table 4-7: Specific Human Exposure Factors for Harvester - CNL, 2018 (The child and infant intake rates were scaled down based on the ratios for adult, child and infant intake rates in CSA N288.1-14). Table 4.9 through Table 4.24 - updated values and 3 Month Old Infant (nursing) and 3 Month Old Infant Formula) added. Table 4.25: Summary of Total Dose for Closure Human Receptors and Comparison to Limits - Values updated. 	<ul style="list-style-type: none"> Added information on mould and asbestos controls. Updated exposure pathway discussion and included Indigenous food intake surveys. Clarified the on-site worker receptor profile. Updated the total dose summary during closure (Table 4-24).

Section	March 2020 Submission	June 2022 Submission
5.0	<ul style="list-style-type: none"> • Table 5-2: Human Health Screening of Non-Radiological Parameters in Surface Water - Updated Values. • Discussion of engagement with indigenous Nations added including Aboriginal Food Intake Survey. • Figure 5-4: Conceptual Model for Harvester during the Post-Closure Period <ul style="list-style-type: none"> - Compartment Plants (Box 4) added - Compartment Aquatic Plants (Box 7) added - Compartment Sediment (Box 8) added - Pathways P24, P27, and P24 from Surface water compartment (Box 2) to Compartments, Sediment (Box 8), Aquatic Plants (Box 7), Plants (Box 4) added - Pathway P85 From Sediment Compartment (Box 8) to Compartment Animal Produce (Box 5), Pathway P87 from Sediment Compartment (Box 8) to Aquatic Plants Compartment (Box 7) added - Ingestion Pathway P79 from Compartment Aquatic Plants (Box 7) to Dose Compartment (Box9) added - Ingestion Pathway P49 added from Compartment Plants (Box2) to Dose Compartment (Box9). • Table 5-5: Percentage of Food from Local Sources during the Post-Closure Period- Medicinal Plants added for Harvester. • Medicinal plant (Weekay) ingestion pathway added to relevant Post-Closure pathways for Harvester. • Table 5-10 through Table 5-14 updated values for added compartments and pathways presented in Figure 5-4, as well as updated nuclide inventory also the addition of U-238. • Table 5.15 through Table 5.18. • Updates to Table 5.20 Summary of Total Dose for Post-Closure Human Receptors and Comparison to Limits. • Updates to Table 5-21: Hazard Quotients for Harvester during Post-Closure (addition of Ingestion of Weekay) and Table 5-22 and 5-23. Total River Contribution and WRDF project Contribution presented for comparison. When the project contribution is considered instead of the total river contribution, the HQs are even lower since the project contribution. • Updates to the dominant contributor to the total dose is Cs-137 due to external exposure to sediment. The Cs-137 sediment concentrations are based on existing conditions and do not result from the source-term in the post-closure period. C-14 remains the dominate contributor to total dose from the source term (WRDF). • Figure 5.5, 5.6, 5.7 removed and replaced with Table 5-24: Sum of Dose Peaks for all Radionuclides in Each of Five Time Windows during Post-Closure. 	<ul style="list-style-type: none"> • Updated groundwater concentrations for non-radionuclides in Table 5-2. • Clarified the lack of on-site well in the Normal evolution scenario. • Updated the exposure pathways discussion with Indigenous food intake surveys. • Added moose to the exposure pathways. • Added sediment to Table 5-3. • Updated uncertainty discussion by including Indigenous harvester diet considerations. • Updated the radiological dose estimates in Tables 5-10, 5-11, 5-12, 5-13, 5-14. • Clarified routine water monitoring activities at WL. • Updated non-radiological concentrations and dose estimates in Tables 5-15, 5-16, 5-17, 5-18. • Clarified the role of atmospheric released during post-closure. • Updated total dose Table 5-20 and hazard quotients in Tables 5-21, 5-22, 5-23. • Updated discussion of radiological and non-radiological effects. • Updated Table 5-24 with revised loadings, concentrations and timeframes. • Clarified that for assessment purposes, all peak releases are assumed to happen at the same time.
6.0		<ul style="list-style-type: none"> • Updated Receptor Section and Characterization with references to Indigenous Traditional Knowledge and Land Use Studies. • Confirmed soil type as clay for the dispersion model with references to the Geosynthesis report. • Added Ag-108m, U-235, U-238 to Tables 6-6, 6-7, 6-8, 6-9 and updated the table with revised dose estimates. • Updated Table 6-10 with revised summary doses.

Section	March 2020 Submission	June 2022 Submission
7.0		<ul style="list-style-type: none"> • Updated Receptor Section and Characterization with references to Indigenous Traditional Knowledge and Land Use Studies. • Added moose to Tables 7-1, 7-2, 7-4, 7-5. • Added samarium and zirconium to Table 7-3 and revised groundwater concentrations of non-radionuclides. • Clarified the percentile used for existing sediment contamination in the dose calculations. • Updated concentrations in tables with Ag-108m, U-235, U-238 and revised concentrations in Tables 7-6, 7-7. • Updated doses in Table 7-8, 7-9, 7-10. Updated summary of total dose in Table 7-16, 7-18, 7-20. • Added a new Table 7-19 with HQ for benthic invertebrates exposed to groundwater.
8.0		<ul style="list-style-type: none"> • Added Section 8.1.3 on cumulative effects with the WL site.
Appendix D		<ul style="list-style-type: none"> • Revised Disruptive Event Scenario names. • Added Ag-108m, U-235, U-238 to Table D-1 and revised the concentrations. • Revised the concentrations in Table D-3. • Added Ag-108m, U-235, U-238 to Table D-5 and updated all doses. • Updated doses in Table D-7. • Updated description and results of Section 2.0 – Inadvertent Human Intrusion. • Updated description and results of Section 3.0 – Well in Plume. • Updated description and results of Section 4.0 – WRDF Barrier failure.

Document Title: In Situ Decommissioning of Whiteshell Reactor 1 Project - Decommissioning Safety Assessment Report

Document Number: WLDP-26000-SAR-001 Rev. 4

Changes from Last EA Submission: WLDP-26000-SAR-001 Rev. 4 supersedes WLDP-26000-SAR-001 Rev. 2

Revision History

Section	March 2020 Submission	June 2022 Submission
General	<ul style="list-style-type: none"> DSAR has been significantly restructured to improve readability and align with REGDOC 2.11.1 and SSR-5. 	<ul style="list-style-type: none"> Executive summary description of Indigenous Nations updated with proximities to WL site. Executive summary updated with clarification on the disruptive event doses and targets. Executive summary updated with revised Institutional control periods. Executive summary updated with more detail on the long-term monitoring.
1.0	<ul style="list-style-type: none"> Revised to clarify IAEA is guidance material not requirements under Canadian Law. Revised to show ISD compliance with IAEA GSR part 6. Revised figure of overall submission document hierarchy and document interrelationships. 	<ul style="list-style-type: none"> Future revisions of the DSAR clarified. Updated the list of CNSC radioactive waste management principles relied on in the DSAR. Clarified the relationship between CNSC-issued licence and supporting CNL programs and policies.
2.0	<ul style="list-style-type: none"> Revised description of Environmental Setting with additional details (e.g., from Geosynthesis, 2018 borehole data, etc.). 	<ul style="list-style-type: none"> Updated surficial geology layer unit descriptions to align with reference studies.
3.0	<ul style="list-style-type: none"> Revised Project Schedule to align with current target dates. Revised to include updated characterization information. 	<ul style="list-style-type: none"> Clarified the function of safety-related systems during closure.
4.0	<ul style="list-style-type: none"> Revised with information from Grout Formula Design and Building Condition Assessment. 	<ul style="list-style-type: none"> Revised the description of functions and assumptions about grout and internal walls.
5.0	<ul style="list-style-type: none"> Revised with updated Assessment Timeframe of 10,000 years. Revised to better describe Normal Evolution vs Disruptive Events vs Bounding Scenarios vs Sensitivity Cases. Glaciation Event revised to provide additional discussion for different potential glaciation timeframes (60K, 100k, 140K). 	<ul style="list-style-type: none"> Revised the description of various assessment timeframes. Revised the description of institutional control periods. Significantly revised section 5.4.1 to clarify the HAZOP process. Significantly revised section 5.4.2 to clarify the FEP development and evaluation process. Significantly revised section 5.4.3 to describe the process by which FEPs guided development of the modelling scenarios (normal evolution, disruptive events). Clarified that analysis of accidents and malfunctions during closure is evaluated in the EIS. Updated the titles of disruptive events to align with the ERA. Revised and clarified the details of each of the disruptive events. Revised Table 5.4.3-1.
6.0	<ul style="list-style-type: none"> Revised to add assessment of rapid grout and foundation degradation. Revised to expand discussion of sensitivity cases and impacts on the overall assessment uncertainty. 	<ul style="list-style-type: none"> Revised the defense-in-depth assessment of grout and internal walls to better define the role and assumptions on grout and cementitious barriers.
7.0	<ul style="list-style-type: none"> Revised to include results of updated source term inventory. Revised to include updated ERA results based on revised assumptions of air quality assessment. 	<ul style="list-style-type: none"> Updated the hazard and work description and dose estimates in Table 7.1.2-3.

Section	March 2020 Submission	June 2022 Submission
8.0	<ul style="list-style-type: none"> Revised to include results of updated source term inventory and updated information for Indigenous harvester receptor in the ERA. Revised to include updated results from changes to assumptions regarding benthic invertebrates in the ERA. Unplanned Human Habitation updated to reflect change in location of well and assumptions regarding institutional control effectively. 	<ul style="list-style-type: none"> Updated the forecasted radionuclide inventory in Table 8.2.3-1. Updated the peak mass loading in Table 8.2.3-2. Updated the non-radionuclide concentrations in Table 8.3.3-1. Updated the peak mass loading rates in Table 8.3.3-2. Updated the non-radionuclide concentrations in Table 8.5.3-1. Updated the radionuclide concentrations in Table 8.6.1-1. Updated the non-radionuclide concentrations in Table 8.6.1-2. Updated mass and activity loadings in Table 8.6.2-1. Updated loading rates and time of maximum in Table 8.6.2-2. Updated the non-radionuclides concentrations in Tables 8.6.2-3 and 8.6.2-4. Updated the release rates, concentrations and time of maximum in Table 8.6.3-1, 8.6.3-2.
9.0	<ul style="list-style-type: none"> Revised results as per above changes. 	
10.0	<ul style="list-style-type: none"> Expanded discussion of expectations for institutional control period. 	<ul style="list-style-type: none"> Significantly revised Section 10.0 to discuss the institutional control timeframes, controls and monitoring activities.
11.0	<ul style="list-style-type: none"> Expanded Discussion of Monitoring and Surveillance activities. 	
12.0	<ul style="list-style-type: none"> Expanded Discussion of Limits, Control and Conditions. 	
13.0	<ul style="list-style-type: none"> Expanded list of References. 	
Appendix A	<ul style="list-style-type: none"> Revised to Concord with REGDOC 2.11.1 and SSR-5. 	
Appendix B	<ul style="list-style-type: none"> No Changes. 	
Appendix C	<ul style="list-style-type: none"> No Changes. 	
Appendix D	<ul style="list-style-type: none"> Revised FEP Analysis to include Seismic FEPs. 	

Document Title: Whiteshell Laboratories WR-1 Reactor Decommissioning Indigenous Engagement Report

Document Number: WLDP-26000-REPT-002 Rev. 8

Changes from Last EA Submission: WLDP-26000-REPT-002 Rev. 8 supersedes WLDP-26000-REPT-002 Rev. 7

Revision History

March 2020 Submission	June 2022 Submission	December 2022 Submission
<ul style="list-style-type: none"> Updated to reflect engagement activities that had taken place up to the date of writing. 	<ul style="list-style-type: none"> Reformatted to align with other CNL Indigenous Engagement Reports for similar projects. Updated the goals of the Engagement Objectives section. Updated to include all new engagement activities that took place since the 2020 submission. Updated the CNL's Long-term Relationship with Indigenous Peoples section to reflect current progress and increased understanding of the path forward. Revised to include engagement activities with Shoal Lake #40 First Nation, Iskatewizaagegan No. 39 Independent First Nation, Northwest Angle No. 33 (Treaty No. 3). Revised the Sagkeeng First Nation section to include a reflection on how engagement with Sagkeeng has progressed. Added a section on Sagkeeng's Alternative Means Assessment. Added subsections on Verification and Next Steps for each Indigenous Nation. Added Full Tables of Indigenous Comments on the EIS and CNL's Responses as an appendix. Removed the Traditional Land and Resource Use section as it is already covered in the EIS. Moved the Contact Tracker to an earlier appendix. Added Background Information on Traditional Territories and Indigenous Nations and Organizations as an appendix. Significantly reduced the amount of examples of Indigenous engagement activities in the appendices. 	<ul style="list-style-type: none"> Updated the engagement information throughout all sections to include data up to September 2022. Updated the contact tracker in Appendix A. Made revisions to text throughout to align wording with the WR-1 EIS. Updated text for comments made by Indigenous Nations and the Manitoba Métis Federation on Section 4.0 of the EIS.

Document Title: In Situ Decommissioning of WR-1 at the Whiteshell Laboratories Site - WR-1 Groundwater Flow and Solute Transport Modelling

Document Number: WLDP-26000-REPT-005 Rev. 4

Changes from Last EA Submission: WLDP-26000-REPT-005 Rev. 4 supersedes WLDP-26000-REPT-005 Rev. 0

Revision History

Section	March 2020 Submission	June 2022 Submission
Overall Changes or Major Changes	<ul style="list-style-type: none"> Updated estimate of Lead solubility. Updated WR-1 Reactor Radiological Characterizations Includes U-238 in initial inventory. Updated Estimate of Residual Tritium Inventory of WR-1. Inclusion of additional sensitivity run to assess complete degradation of grout and foundation over 100 years. Inclusion of additional sensitivity run to assess the absence of the foundation Inclusion of addition of scenario #16 (shortened groundwater pathway 1/2 the normal evolution scenario). 	<ul style="list-style-type: none"> Added Ag-108m to the list of the assessed radionuclides.
List of Acronyms and Abbreviations	<ul style="list-style-type: none"> WRDF - Whiteshell Reactor Disposal Facility. 	
2.0	<ul style="list-style-type: none"> Figure 2-1 WHITESHELL LABORATORIES SITE - Updated. Figure 2-3 SURFICIAL GEOLOGY – Updated. 	<ul style="list-style-type: none"> Section 2.3 Geology was updated with clarification about how the stratigraphic borehole data was interpreted. Naming of the geologic overburden layers was clarified and aligned with reference studies. Description of the fracture pattern of Lac du Bonnet batholith was added. Surficial geology Section 2.3.4 updated to clarify how the hydrogeologic model was constructed and field data interpreted. Section 2.4.1 updated to include more recent field data. Principle hydraulic gradient and flow directions were clarified. Hydraulic conductivity distinctions between the WMA and WR-1 area were clarified.
4.0	<ul style="list-style-type: none"> 4.1.1.3 Radioactive Decay and Decay Products - Addition of U-238 initial inventory and decay products. Table 4-2: Mass Inventories at 50 Years Following WR-1 Shutdown - Inventories updated to values supplied in WR-1 Reactor Radiological Characterization Summary and Radionuclide Inventory Estimates (CNL 2019a). Table 4-7: Simulated Peak Mass Loadings from the Bedrock Pathway - Updated to reflect Inventory updates. Figure 4-5 PEAK SIMULATED MASS LOADINGS FOR SELECT SOLUTES (RADIONUCLIDES) Updated to reflect undated inventory estimates and the addition of U-238. 	<ul style="list-style-type: none"> Methods for establishing source inventory were clarified. Corrosion rates for reactor metals were validated with a reference to the Wasteform Synthesis Report. Radionuclide release assumptions were clarified. Assumptions on grout clarified that grout does not intend to fill every void in the building. Hydraulic conductivity for the building foundation was clarified with references to the Building Condition Assessment. Updated the five peak radionuclide loadings. Added the highest radionuclide activity loadings as tritium, C-14, Ni-59, Rn-222, and Po-210. Updated all simulated peak mass loading rates and times in Tables 4-7 and 4-8.

Section	March 2020 Submission	June 2022 Submission
5.0	<ul style="list-style-type: none"> • Scenario 7 – Upper-bound Source Term Estimate for Non-radiological Solutes and Tritium Table 5-2: Non-radiological Source Mass Inventory updated to be compliant with (CNL 2019a) Specifically Tritium. • Three additional scenarios: <ul style="list-style-type: none"> - Scenario 14 – Grout Degradation - Scenario 15 – Compromised Foundation - Scenario 16 – Half Pathway Length 	<ul style="list-style-type: none"> • Added a discussion of uncertainty to the introduction of Section 5.0. • Clarified the infiltration rate for Scenario 2. • Revised the name of Scenario 3 to match the ERA and DSAR. • Clarified diffusion versus advection transport mechanism in Scenario 4. • Added “Ag” to Table 5-1. • Revised the name of scenario 14 to match the DSAR. • Revised Scenario 15 to “Removal of Foundation” and clarified the purpose of this scenario. • Added 2 new scenarios: Scenario 17 – Radionuclide Source Inventory, Scenario 18 – Diffusivity Values. • Clarified in the introduction of Section 5.2 that radionuclides that peak at the end of the 500,000 year simulation time are assumed to not have peaked yet. • Scenario 1 results updated: clarified the results in mass loadings for ingrown solutes, instantly released solutes and corrosion-released solutes. • Scenario 2 results: clarified the solutes responsible for mass loadings increase and overall model sensitivity to this scenario. • Scenario 3 results: clarified the effect of scenario on local groundwater flow, and overall model sensitivity to this scenario. • Scenario 4 results: clarified which solutes are most and least affected by the scenario. • Scenario 8 results: removed the discussion of diffusion of mass. • Scenario 10 results: removed I-129 from the results and clarified that releases are controlled by reactor corrosion. • Scenario 11 results: clarified the reduction in transport time and resulting changes to solute mass loadings. • Scenario 12 results: clarified that the scenario confirms base case conservatism. • Scenario 13 results: clarified the reduction in transport time and resulting changes to solute mass loadings. • Scenario 14 results: removed I-129 from the results and clarified that releases are controlled by reactor corrosion. Clarified the effect on mass loadings from this scenario. • Scenario 15 results: removed I-129 from the results and clarified that releases are controlled by reactor corrosion. Clarified the effect on mass loadings from this scenario. • Added Scenario 17 and 18 results. • Updated all result values in Table 5-3.
6.0	<ul style="list-style-type: none"> • Minor additions to summary. 	

Document Title: WR-1 Reactor Radiological Characterization Summary and Radionuclide Inventory Estimates

Document Number: WLDP-26100-041-000-0001 Rev. 2

Changes from Last EA Submission: WLDP-26100-041-000-0001 Rev. 2 supersedes WLDP-26100-041-000-0001 Rev. 0

Revision History

Section	March 2020 Submission	June 2022 Submission
Tables	<ul style="list-style-type: none"> Added tables as a result of additional characterization during calendar years 2017 and 2018. 	
Section 4		<ul style="list-style-type: none"> Added data on Ag-108m due to its importance in the Nuclear Power Demonstration Reactor Decommissioning project and to demonstrate the negligible contributions of nuclides outside of the principal radionuclides. Removed the Comparison of Calculated Reactor Core Gamma and In-Field Dose Rate Measurements section as more recent and relevant characterization data collected has rendered this information obsolete.
Section 5	<ul style="list-style-type: none"> Revised to include Summary Information on the additional characterization survey and sampling CNL conducted during calendars years 2017 and 2018. 	
Section 6	<ul style="list-style-type: none"> Revised to include Summary Information on the additional characterization survey and sampling CNL conducted during calendars years 2017 and 2018. 	<ul style="list-style-type: none"> Added information on remaining water in the Thermal Shield and Concrete Cooling Systems containing detectable levels of tritium.
Section 7	<ul style="list-style-type: none"> Revised to include Summary Information on the additional characterization survey and sampling CNL conducted during calendars years 2017 and 2018. 	

Document Title: Whiteshell Laboratories Decommissioning Project Comprehensive Study Report Volume 1: Main Report/Volume 2: Appendices/Volume 3: Addendum

Document Number: WLDP-03702-041-000-0008/0009/0010

Change from First EA Submission: Original Document

Revision History

Scope of Change
Original Document Submitted in 2017

Document Title: Environmental Assessment Stakeholder Engagement Report – WR-1 In Situ Decommissioning

Document Number: WLDP-26000-REPT-010 Rev. 4

Changes from Last EA Submission: WLDP-26000-REPT-010 Rev. 4 supersedes WLDP-26000-REPT-002 Rev. 3

Revision History

March 2020 Submission	June 2022 Submission	December 2022 Submission
<ul style="list-style-type: none"> New Document. In the draft EIS, the stakeholder engagement activities were documented in appendixes. This is now a stand-alone document. 	<ul style="list-style-type: none"> Reformatted to align with other Canadian Nuclear Laboratories Stakeholder Engagement Reports for similar projects. Updated the goals of engagement objectives. Updated the Planned and Upcoming Engagement Activities section to capture planned engagements through to the 2022/2023 fiscal year. Updated to include engagement activities up to 18 October 2021. 	<ul style="list-style-type: none"> Updated events, statistics, and images in the appendix to include information up to September 2022.

Document Title: Geosynthesis for WR-1 Environmental Impact Statement

Document Number: WLDP-26400-041-000 Rev. 3

Changes from Last EA Submission:

Revision History

Section	March 2020 Submission	June 2022 Submission
General	Not Applicable - New Document	
1		<ul style="list-style-type: none"> Updated the scope of the report and its relationship with the EIS. Provided a summary of Regional, Local and Site-specific studies and characterization reports.
2		<ul style="list-style-type: none"> Added new Tables 2-1, 2-2, 2-3, 2-8, 2-9, 2-10, 2-11 summarizing sources of information. Clarified the relationship between Lake Agassiz beach-wash deposit and the basal sand layer under the local overburden layers. Added a new Table 2-6 summarizing key geologic observations and features with references to where they are described. Added a description of monadnocks associated with Lac Du Bonnet Batholith. Added Lac du Bonnet Batholith intrusion depth.
		<ul style="list-style-type: none"> Added an extensive discussion of local bedrock and batholith fracture geology (Section 2.5.2) including fracture alterations and infillings. Clarified the anomalous fracture filling materials. Provided a new figure mapping the economic geological features.
3		<ul style="list-style-type: none"> Added a new table 3-1 summarizing sources of information. Expanded the discussion of WR-1 site hydrological patterns to explain the local groundwater trends using more recent data. Clarified the overall WL site groundwater flow trends.
4		<ul style="list-style-type: none"> Added a new Table 4-1 summarizing sources of information. Updated the discussion of liquefaction potential to include results of a recent Cone Penetration Testing investigation.

Section	March 2020 Submission	June 2022 Submission
5		<ul style="list-style-type: none"> • Added a discussion of natural site evolution. • Provided a reference to the Comprehensive Study Report for short-term flooding assessment. • Provided a reference to the Climate Change Assessment for the long-term flooding assessment.
6		<ul style="list-style-type: none"> • Updated the hydrogeological elements summary to confirm the overall site groundwater flow direction is west towards the Winnipeg River. • Added a discussion of simulations carried out to model potential erosion rate of the Winnipeg River to the Geoscience Verification Plan table. • Updated Table 6-1 with revised locations of information required to satisfy CNSC REGDOC-2.9.1.

Document Title: Environmental Assessment Follow-Up Program for Whiteshell Laboratories

Document Number: WL-509246-STD-001 Rev. 0

Changes from Last EA Submission:

Revision History

Revision	Scope of Change
0	New Document

Document Title: CNL Whiteshell Reactor 1 - Phase 1000 Grout Formulation Testing Report

Document Number: WLDP-26000-REPT-012 Rev. 1

Changes from Last EA Submission: New Document

Revision History

Revision	Scope of Change
1	New Document

Document Title: Climate Change Assessment for WR-1 In Situ Decommissioning

Document Number: WLDP-26000-REPT-007 Rev. 0

Changes from Last EA Submission:

Revision History

Revision	Scope of Revisions
0	Original Document Submitted in 2017

Document Title: Estimate of Residual Tritium Inventory of WR-1

Document Number: WLDP-26400-036-000 Rev. 0

Changes from Last EA Submission:

Revision History

Revision	Scope of Change
0	New Document

Document Title: WR-1 Fuel Channel Survey Result

Document Number: WLDP-26000-021-000-0011 Rev. 0

Changes from Last EA Submission:

Revision History

Revision	Scope of Change
0	New Document

Document Title: Non-Radiological Inventory of WR-1

Document Number: WLDP-26000-021-000-0005 Rev. 0

Changes from Last EA Submission:

Revision History

Revision	Scope of Change
0	New Document

Document Title: WR-1 Lead Estimates

Document Number: WLDP-26000-021-000-0010 Rev. 0

Changes from Last EA Submission:

Revision History

Revision	Scope of Change
0	New Document

Document Title: Building Condition Assessment In-Situ Decommissioning of Whiteshell Reactor 1

Document Number: WLDP-26000-REPT-011 Rev. 1

Changes from Last EA Submission:

Revision History

Revision	Scope of Change
1	New Document

Document Title: Whiteshell Seismic Hazard

Document Number: WLDP-26000-021-000-0009 Rev. 0

Changes from Last EA Submission:

Revision History

Revision	Scope of Change
0	New Document

Document Title: Cone Penetration Testing Investigation for Whiteshell Main Campus

Document Number: WLDP-26000-041-000 Rev. 0

Changes from Last EA Submission:

Revision History

Revision	Scope of Change
0	New Document

Document Title: Analysis of Scrape Samples from Selected WR-1 Fuel Channels

Document Number: WLDP-26000-041-000-0006 Rev. 0

Changes from Last EA Submission:

Revision History

Revision	Scope of Change
0	New Document