Attachment 5: Environmental Protection Plan

NORMAN WELLS GOOSE TO BEAR ISLAND FLOWLINE REPLACEMENT ENVIRONMENTAL PROTECTION PLAN

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Prepared for:
Imperial Oil Resources N.W.T. Limited
505 Quarry Park Boulevard
Calgary, AB T2C 5N1

Prepared by:
Stantec Consulting Ltd.
200, 325 25 St. SE
Calgary, AB T2A 7H8

Project Number:
110905370

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Acronyms / Abbreviations

CER	Canada Energy Regulator
EPP	Environmental Protection Plan
ESC	Erosion and Sediment Control
GNWT	Government of the Northwest Territories
Imperial	Imperial Oil Resources N.W.T. Limited
HDD	Horizontal Directional Drill
MBCA	Migratory Birds Convention Act
NPS	Nominal Pipe Size
NTU	Nephelometric Turbidity Unit
NWO	Norman Wells Operations
SAR	Species at Risk
SDS	Safety Data Sheet
SLWB	Sahtu Land and Water Board
TSS	Total suspended solids

1 Introduction

This construction Environmental Protection Plan (EPP) has been developed to complement the Norman Wells Operations (NWO) EPP for the purpose of executing the Line 490 Replacement Activities, as described in Section 1.1.

This EPP provides guidance for Imperial, contractors, subcontractors and monitors to use in planning the activities and to help identify what environmental protection measures will be implemented, where these measures will be implemented and when the measures can or cannot be implemented.

1.1 Activity Summary

Imperial is proposing to replace an approximately 1,050 meter (m) long section of piping associated with the Line 490 corridor under a channel of the Mackenzie River (Replacement Activities). The Replacement Activities will replace the following lines in the existing Line 490 corridor:

- NPS 10 emulsion line pipe
- NPS 6 emulsion line pipe
- NPS 6 water line pipe
- NPS 4 natural gas line pipe
- NPS 4 cable conduit

The flowlines and cable conduit will be bundled to be installed within an existing right-of-way by horizontal directional drilling (HDD).

Figure 1 of the CER Submission shows the location of the proposed Replacement Activities.

1.2 Schedule

Mobilization of construction equipment is scheduled to begin in Winter 2024/2025 (as soon as ice road is available). Subject to acquisition of required permits and approvals (Appendix C), clearing and site preparation and construction activities including HDD execution is planned for Spring/Summer 2025. Commissioning and start-up is planned for Fall/Winter 2025.

2 Scope of Environmental Protection Plan

This EPP addresses mitigation measures to be implemented during construction of the Replacement Activities including reclamation. Key environmental contacts that may need to be engaged during construction are provided in Appendix A. Contingency Plans (Appendix B) are provided to be implemented in the event of unplanned or upset conditions as described in the relevant plan.

2.1 Organization

This EPP is structured as follows:

- **Section 1 and 2**, “Introduction and Scope of the EPP” address the purpose, scope and organization of the EPP.
- **Section 3**, “Environmental Compliance” provides guidance on the implementation of the EPP and measures to ensure compliance with the EPP and other required permits.
- **Section 4**, “General Environmental Protection Measures” includes measures to be implemented during all phases of the Replacement Activities.
- **Section 5**, “Activity Specific Environmental Protection Measures” outlines environmental protection measures that will be implemented by phase of the Replacement Activities.

2.2 Extent and Limits

This EPP has been developed for the proposed Replacement Activities. Unforeseen conditions or circumstances during construction may warrant revision of specific mitigation measures noted in the EPP or additional mitigation measures to appropriately mitigate the effects of the Replacement Activities. If an unforeseen environmental issue arises for which no mitigation measures have been approved or if alternative mitigation measures are identified, Imperial’s Environment and Regulatory Advisor, Construction Manager and Environmental Inspector will formulate a plan of action. The plan will include measures to assess and mitigate effects associated with the issue.

This EPP addresses mitigation measures to be implemented during construction of the Replacement Activities. The NWO EPP addresses measures to be implemented during operation of the Replacement Activities.

3 Environmental Compliance

Environmental compliance is facilitated through sharing of information, providing environmental orientations/training, hiring qualified staff, and providing onsite inspection of activities through a proactive and adaptive inspection program. It is a critical component of project success through adherence to regulatory approvals, permits, commitments and specific requirements of this EPP. Imperial expects full compliance by staff and all contractors and consultants.

The objectives of these measures are:

- relevant environmental regulatory requirements and approved environmental protection measures are known and consistently applied
- processes are in place that allow access to environmental information to support field-based decision-making
- Environmental Inspectors supporting the Replacement Activities are qualified and properly trained

3.1 Environmental Monitoring Program

Specific Measures	Preparation Measures
Approvals and Licenses	1. All necessary licenses/approvals/permits should be acquired prior to the commencement of construction. Conditions as presented on permits, approvals, licences, certificates, and activity-specific management plans will be adhered to. Any inconsistencies between permit conditions and contract documents shall be addressed prior to the commencement of construction. If there are conflicting mitigation measures identified, the most stringent will be followed.
Environment and Regulatory Advisor and Environmental Inspector	2. Imperial will designate an Environment and Regulatory Advisor for the Replacement Activities with an Environmental Inspector made available to assist with maintaining environmental compliance during work around sensitive areas. 3. The Imperial Environment and Regulatory Advisor and the Environmental Inspector are responsible for overseeing that environmental commitments, undertakings, and conditions of authorizations are met. In addition, the Imperial Environment and Regulatory Advisor and the Environmental Inspector will monitor that work is completed in compliance with applicable environmental regulations and Imperial's policies, procedures and specifications in the most efficient and effective way possible. 4. Other responsibilities for the Environmental Inspector include: • providing expert advice and guidance on major decisions or courses of action to deal with issues that affect environmental features • reporting any spills in accordance with federal and territorial reporting and notification protocols and advising Imperial management on the clean-up and disposal of the material and any affected soils or vegetation • preparing daily reports for submission to Imperial as required
Environment and Regulatory Advisor and Environmental Inspector (cont'd)	5. review Replacement Activities-related information prior to the commencement of construction

Specific Measures	Preparation Measures
	6. liaise with appropriate government agencies in co-operation with the Imperial Environment and Regulatory Advisor 7. supervising and supporting any environmental resource specialists that may be required to support the Replacement Activities 8. reviewing construction methodologies with the Construction Manager 9. collecting environmental information throughout construction for documentation and reporting
Pre-Construction Training	10. All persons entering the site should be provided site-specific orientation.
EPP and Distribution	11. The EPP will be distributed to Imperial inspection staff and responsible construction personnel prior to construction. Should updates be required, the Imperial Environment and Regulatory Advisor will distribute as necessary.
Information Sharing	12. The Imperial Environment and Regulatory Advisor and Environmental Inspector will facilitate the transfer of environmental information to Imperial field staff and the Contractor in a timely manner.

3.2 Issue Resolution

During construction, potential non-compliances may be identified and construction techniques may need to be altered due to unforeseen circumstances. Should it be necessary to report non-compliances or modify mitigation to address site conditions not anticipated in the EPP, the following processes will be used.

Issue or Concern	Issue Resolution Measures
Non-Compliances and Resolution	13. The Imperial Environment and Regulatory Advisor or Environmental Inspector will be notified by the responsible person onsite when a non-compliance is identified, and it will be their responsibility to contact the Construction Manager. If the Construction Manager is not available during a non-compliance situation, the Imperial Project Manager is to be notified. If the Imperial Project Manager is not available during a non-compliance situation, the Environment and Regulatory Advisor or the Environmental Inspector has the authority to modify work procedures or initiate work stoppage. 14. The Construction Manager will either modify the work practice or shut the activity down until corrective actions are determined and implemented. The Imperial Environment and Regulatory Advisor or the Environmental Inspector will assist in this decision-making process. 15. If the work is shut down, it will resume only when corrective actions have been developed and approved by Imperial. Once approved by Imperial, the Contractor will inform the work crew and work will proceed following the corrective action plan. 16. The Imperial Environment and Regulatory Advisor or Environmental Inspector will be responsible for daily documentation of environmental non-compliances and providing notification of non-compliances to appropriate regulatory agencies.
Revised Construction Procedure	17. Contact the Construction Superintendent if site conditions warrant a revision in construction procedures that may have environmental implications or material changes in mitigation measures as identified in this EPP.

Issue or Concern	Issue Resolution Measures
	18. The Contractor should develop the revised construction procedure to the environmental protection measures in co-operation with the Project Manager, the Construction Manager, the Environmental Inspector, and the Imperial Environment and Regulatory Advisor. 19. Revised construction procedures should include the following: a. documentation to which EPP measure(s) requires the variance b. proposed change to specific procedure c. location d. rationale for modifications e. environmental criteria reviewed as part of modification request f. consideration of environmental objectives g. equivalent or approved standard of environmental protection h. additional environmental protection measures required i. site sketch or photo documentation j. sign-off by the Construction Superintendent and the Imperial Environment and Regulatory Advisor 20. Discuss changes to an existing procedure with the appropriate regulatory authorities, as necessary, and seek the appropriate authorization should the revised procedures require further regulatory approval. If the modification meets the environmental objectives, and there is no specific regulatory approval required for the change, no additional discussions with regulatory authorities are necessary. 21. Document the resolution and/or revision and communicate it to the appropriate parties.

3.3 Notifications

Notification associated with the Replacement Activities will be provided to concerned parties and regulatory stakeholders. This allows regulatory agencies and concerned parties to plan as appropriate for construction activities in their area.

Contacts or Concerns	Notification Measures
Federal and Territorial Agencies	22. The Environmental and Regulatory Advisor or designate will inform appropriate federal and territorial resource agencies of the Replacement Activities in accordance with regulatory requirements.
Indigenous Engagement Log	23. Additional engagement with Indigenous communities will be held in advance of construction commencement. Contact information for a designated Imperial representative should be available to address questions and concerns during construction.

4 General Environmental Protection Measures

This section of the EPP describes general environmental protection measures that will be used to protect sensitive biophysical, historical or cultural resource feature and the response procedure in the event such features are discovered during construction.

Feature	Environmental Protection Measures
Pre-Disturbance Assessments	24. Conduct pre-disturbance assessments to identify environmental features in and adjacent to the disturbance footprint prior to commencement of construction.
Migratory Birds	25. Tree and vegetation removal (including brushing) should be completed outside the primary nesting period for migratory birds (May 7 – August 10) to avoid disturbance to nesting birds protected under the *Migratory Birds Convention Act* (*MBCA*). 26. Complete migratory bird nest sweeps as necessary prior to vegetation removal if vegetation removal is planned during the migratory bird nesting period. 27. In the event an active bird nest is identified, the nest will be subject to site-specific mitigation measures. Appropriate mitigation measures will be selected by the Environmental Inspector or Wildlife Resource Specialist.
Exclusion Fencing	28. Silt fencing is recommended along the perimeter of the entry and exit pads to exclude amphibians from the work area.
Wildlife Encounters	29. No construction personnel shall harass, threaten or injure wildlife. 30. Construction personnel are not permitted to hunt or fish on the work site. 31. Firearms are not permitted in vehicles, on worksites or at any associated facilities. 32. If wildlife is discovered within a construction work area, report to the Imperial Environmental Inspector or Environment and Regulatory Advisor who will contact applicable regulatory authorities as required. 33. If wildlife is encountered during construction, personnel are required to move away from the animal and wait for the animal to move off the construction site. 34. Report any incidents with nuisance wildlife or collisions with wildlife to the Environmental Inspector, who will notify applicable regulatory authorities as appropriate.
Weed and Vegetation Management	35. Equipment will arrive at site clean and free of soil and vegetative debris. Any equipment which arrives in a dirty condition will not be allowed on site until it has been cleaned. 36. Flag areas identified as having invasive or noxious weed infestations prior to the start of construction. 37. Conduct basic shovel and sweep cleaning before moving equipment from any locations identified as having an invasive weed infestation. 38. Consider placing mats over infested areas to reduce the potential transport of weeds. Where mats are used ensure they are free of soil, vegetation and debris prior to removal from the site.
Historical Resources Discovery	39. Should previously unknown archaeological resources be uncovered or suspected of being uncovered during construction, ground disturbance in the find location should cease immediately. A site-specific response plan should then be employed following further investigation of the specific find.

Feature	Environmental Protection Measures
	The response plan would indicate under which conditions the ground disturbance activity in the find location may resume.
	40. The following is the site-specific response plan should any archaeological resource be found: • immediately cease any construction around the found resource • notify the Imperial Environment and Regulatory Advisor or the Environmental Inspector • notify the Construction Manager • notify a Licensed Archaeologist to assess the found resource and which actions may be required • work shall not resume until the Construction Manager provides approval • the Environment Inspector will mark areas that are required to be avoided if applicable
Equipment Refueling and Maintenance	41. Store deleterious substances (including fuel and oil) at least 30 m from watercourses and wetlands. 42. Ensure all containers, hoses and nozzles are free of leaks. 43. Use secondary containment when storing deleterious substances within 30 m of watercourses and wetlands.
	44. Equipment or machinery shall not be washed within 30 m of watercourses or wetlands. 45. Refuelling should be undertaken a minimum of 30 m from wetlands and watercourses to reduce potential impacts to surface water quality if a spill occurs. If maintaining a 30 m refuelling distance is not possible, special refueling procedures for sensitive areas should be undertaken subject to approval by the Environmental Inspector.
Waste Management	46. Construction debris and other waste materials will be collected by the Contractor and disposed of at an approved facility.
Waste Management (cont'd)	47. The Contractor should implement a site-specific waste collection and disposal plan, which may include: • waste materials, sanitary waste and recycling transported off-site by licensed waste contractors • guidelines for labelling and storage of hazardous and liquid wastes in a secure area that would contain material in the event of a spill 48. Implementation of a waste management program consisting of reduction, reuse and recycling of materials.
Spill Response	49. Maintain an emergency spill response kit at the worksite wherever equipment is staged or fuel is stored. 50. In the event of a spill implement the Spill Release Contingency Plan (Appendix B).
Spill Reporting	51. Notify the Construction Manager and Environmental Inspector as soon as possible following the discovery of any spill. 52. The Environmental Inspector will immediately report any spill exceeding reportable quantities as detailed to the Government of the Northwest Territories (GNWT) spill report line as detailed in the Spill Release Contingency Plan (Appendix B).
Noise	53. During construction, motorized construction equipment should be equipped with appropriate mufflers and silencers as available.

Feature	Environmental Protection Measures
Air Quality / Greenhouse Gas Emissions	54. During construction, motorized construction equipment should be equipped with functioning mufflers and silencers. Company and construction personnel should avoid excessive idling of vehicles; vehicles and equipment should be turned off when not in use unless required for operation. 55. Use barges to transport crews to and from the worksite. 56. Equipment must be well-maintained during construction and maintenance activities to reduce emissions.
Fire Prevention	57. Personnel must be made aware of proper disposal methods for welding rods, cigarette butts and other hot or burning material. 58. Smoke only in designated areas. 59. Maintain appropriate emergency fire suppressant equipment onsite.
Potential Contamination	60. If potentially contaminated soils are encountered during construction, the Contractor should suspend work in the vicinity of the potentially contaminated soil and immediately notify the Imperial Environment and Regulatory Advisor and Environmental Inspector to determine an appropriate plan of action. Work should not resume until a plan to manage the potentially contaminated soil has been developed.

5 Activity Specific Environmental Protection Measures

5.1 Survey and Locates

Activity	Activity-Specific Measures
TWS Staking	61. Survey and stake the limits of clearing in the field to ensure that construction is conducted within approved boundaries and to allow for the protection of off-site areas. 62. Maintain any staking, fencing, flagging or signage during construction. 63. The Construction Manager and Environmental Inspector should verify the final alignment to confirm that areas of environmental concern have been properly flagged, staked and fenced.
Utility Lines	64. The Contractor will be responsible for locating and exposing existing underground infrastructure including pipelines and utilities.
Hydrovac	65. Empty hydrovac trucks at approved locations in adherence to local regulations. Hydrovac material should be contained within the designated release area. If hydrovac material is planned to be released onsite release areas should be planned and monitored to ensure sediment does not migrate into a waterbody or onto topsoil.

5.2 Vegetation Clearing

Activity	Activity-Specific Measures
Breeding Birds	66. Tree and vegetation removal (including brushing) should be completed outside the primary nesting period for migratory birds (May 7 – August 10) to avoid disturbance to nesting birds protected under the Migratory Birds Convention Act (MBCA). 67. Complete migratory bird nest sweeps as necessary prior to vegetation removal if vegetation removal is planned during the migratory bird nesting period. 68. In the event an active bird nest is identified, the nest will be subject to site-specific mitigation measures. Appropriate mitigation measures will be selected by the Environmental Inspector or Wildlife Resource Specialist.
Work Area Conditions	69. Clearing should be done during dry conditions to the extent practicable to limit disturbance to soil and vegetation.
Work Area Limits	70. Clearing activities should be monitored by the Environmental Inspector to ensure clearing is limited to approved limits of clearing. 71. Do not allow clearing or grubbing beyond the staked or flagged workspace boundaries.

5.3 Topsoil Salvage and Grading

Activity	Activity-Specific Measures
Soil Handling and Storage	72. Soil disturbance including grubbing will occur only within the approved clearing limits. 73. Minimize soil stripping and grading to the extent possible.

Activity	Activity-Specific Measures
	74. Stockpile topsoil and subsoil separately with adequate spacing between piles. If space is limited, maintain separation between soil piles using appropriate barriers. 75. Where contamination is known or suspected to occur, stockpile those materials separately. 76. Do not push or store graded or stripped material in treed areas. 77. Topsoil may be stockpiled on undisturbed topsoil within approved clearing limits. 78. Subsoil must be stockpiled on areas where topsoil has been removed. 79. Clearly label soil stockpiles as “topsoil” and “subsoil” as appropriate to prevent inadvertent admixing or improper backfilling.
Topsoil Stripping	80. Salvage topsoil to the colour change (transition layer), bottom of the duff layer or 15 cm, whichever is deepest. Where there is little or no topsoil, salvage all available root zone material to the colour change or 15 cm, whichever is greater. 81. Where topsoil depth is not distinguishable by colour, consult the Environmental Inspector for guidance on topsoil stripping.
Erosion and Sediment Control	82. Prior to construction, where there is potential for soil erosion, the need for and location of erosion and sediment control (ESC) measures should be determined by the Environmental Inspector and installed prior to the commencement of work in the area. 83. Conduct ground disturbance activities in a manner to avoid or reduce erosion and the discharge of sediment-laden runoff from directly entering natural drainage systems. 84. Manage the potential for off-site migration of sediment through the installation of ESC measures (e.g., coir logs, erosion control matting, sediment fence) as identified by the Environmental Inspector. 85. The Environmental Inspector will monitor soil stockpiles for erosion by wind. In the event of wind erosion, implement the following mitigation measures as warranted: • suspend construction activities until high winds subside • apply water to the topsoil pile • lightly compact sandy or pulverized soils • install wind fences 86. ESC and stabilization measures should be maintained and monitored during and following the Replacement Activities until vegetative cover is established. Where evidence of erosion is identified, corrective control measures should be implemented as soon as conditions permit.
Wet Soil Conditions	87. Where construction during adverse weather conditions have the potential to result in wind/water erosion, excessive rutting, decreased soil capability or the potential for serious harm to fish and fish habitat, temporary shutdowns may be necessary. Temporary shutdowns will be based upon discussions between the Construction Manager, Contractor and Imperial Environment and Regulatory Advisor or Environmental Inspector. The Construction Manager must authorize resumption of work in consultation with the Imperial Environment and Regulatory Advisor or the Environmental Inspector prior to restart.

5.4 Horizontal Directional Drill Preparation Activities

Activity	Activity-Specific Measures
Water Licence Required	88. Conditions of applicable water licenses will be followed while diverting water or conducting dewatering activities (if required).
Dewatering	89. Use secondary containment for equipment (pumps, generators) to reduce the likelihood of spills. 90. Direct water to a well-vegetated low-lying upland area through a filtration device and flow dissipators as required to ensure discharge does not result in release of sediment, scouring or erosion. 91. Size geotextile filter bags appropriately for the planned discharge and suspended sediment size. 92. Do not allow sediment-laden water from pumping activities to directly enter a watercourse or wetland. 93. The Environmental Inspector or designated alternate will inspect discharge piping to ensure it is free of leaks and properly anchored. 94. The discharge location shall be inspected daily to verify: • no substantial erosion or sedimentation is occurring • water being discharged does not contain any oil or other substances in amounts sufficient to create a visible film, sheen or foam in the discharge water • discharge water is not reaching a watercourse or wetland 95. If dewatering discharge reaches a watercourse, discharge water must not exceed the least stringent criteria of 8 nephelometric turbidity units (NTUs) above background levels or 10% above background levels of the watercourse.
Pipe Stringing	96. Cap pipe ends to limit the potential for wildlife to become trapped or confined. If pipe caps are not installed, check for confined or trapped animals prior to pipe movement/installation.
Waste Management	97. Do not leave spent welding rods, filings/shavings from end preparation or cut off pipe rings on the ground. During bevelling operations, collect pipe bevel shaving debris to limit potential for wildlife to ingest shavings. Contain and collect debris from sandblasting operations. 98. Where spray or paint-on coatings are applied, place impermeable containment (e.g., tarpaulin) of appropriate size to contain any overspray or drips.

5.5 Horizontal Directional Drilling

Activity	Activity-Specific Measures
Water Licence Required	99. Conditions of applicable water licenses will be followed while withdrawing water for drilling activities.
Water Withdrawals	100. Equip and maintain any water intakes with a screen designed to prevent impingement or entrainment of fish. Screen intakes in accordance with the Interim Code of Practice: End-of-Pipe Fish Protection Screens for Small Water Intakes in Freshwater (DFO 2020).
Drilling Fluids	101. Drilling fluid additives will be selected to comply with applicable regulatory approvals. 102. The Contractor will keep a record or log of the drilling fluid additives used during the course of drilling activities and submit it to the Environmental Inspector prior to removing the drilling rig from site. 103. Any drilling additives not included in the original scope of the Replacement Activities will be assessed and approved prior to use. 104. Contain all drilling water and drilling waste for reuse or disposal. 105. Water will be withdrawn from the Mackenzie River to mix drilling fluid. The mud mix should be bentonite-based with no unapproved additives. 106. Water withdrawals must not exceed the limits in applicable water licenses.
Turbidity Monitoring	107. A Turbidity Monitoring Plan (TMP) will be developed prior to construction. A qualified environmental professional will conduct turbidity monitoring during construction to detect an inadvertent return of drilling fluid into a watercourse. The TMP will include the following measures: • Complete turbidity monitoring during horizontal directional drilling. • Immediately notify the Lead Driller of any changes in turbidity levels. • Notify the Environmental Inspector and Construction Manager as soon as possible following an exceedance of specified turbidity levels.
Inadvertent Fluid Releases	108. Follow the Inadvertent Fluid Release Contingency Plan (Appendix B) in the event of an observed or suspected return of drilling fluid to surface or to a waterbody. 109. The Drilling Contractor shall monitor the volume, pressure and parameters of drilling fluid to detect any losses during drilling operations. 110. If an inadvertent return of drilling fluid is identified offsite, cleanup procedures will be developed in consultation with the Imperial Environment and Regulatory Advisor and Environmental Inspector.

5.6 Hydrostatic Testing

Activity	Activity-Specific Measures
Water Licence Required	111. Conditions of applicable water licenses will be followed while withdrawing water for hydrostatic testing.
Water Withdrawals	112. Equip and maintain all water intakes with a screen designed to prevent impingement or entrainment of fish. Screen intakes in accordance with Interim Code of Practice: End-of-Pipe Fish Protection Screens for Small Water Intakes in Freshwater (DFO 2020)
Additives	113. Seek approval from the Imperial Environment and Regulatory Advisor and Environmental Inspector prior to the use of any additives in hydrostatic test water.
Release of Hydrostatic Test Water	114. Following the completion of hydrostatic tests, hydrostatic test water will be sampled in accordance with Canadian Council of Ministers of the Environment (CCME) Canadian Water Quality Guidelines and either discharged over land if guidelines are met or disposed of.

5.7 Clean-up and Restoration

Activity	Activity-Specific Measures
Reclamation Objectives	115. Reclamation activities should be planned to align with the Norman Wells Interim Closure and Reclamation Plan (AMEC Foster Wheeler 2016).
Waste Management	116. Remove all debris and bins from the work area.
Grade Restoration	117. Remove matting, geotextiles and ramps, if used, except where access may be required for cleanup activities. 118. Recontour graded areas to restore preconstruction grade and drainage. Where restoration of preconstruction grade is not feasible, recontour to grades not exceeding 1:3 or as directed by a geotechnical engineer.
Topsoil Replacement	119. Replace topsoil as evenly as possible over areas where topsoil was salvaged. Postpone topsoil replacement during wet weather or high winds to limit potential damage to soil structure or erosion of topsoil.
Revegetation	120. Prepare the site in such a manner as to facilitate reestablishment of natural vegetation. Revegetate the site through seeding or by natural recovery where this is expected to be more effective. This will be evaluated during post-construction environmental monitoring.
Post-Construction Environmental Monitoring	121. Conduct post-construction environmental monitoring following completion of construction activities. Undertake site visits in the spring and late summer and document any of the following: • Erosion, subsidence or soil slumping • Ponding water • Vegetation conditions • Debris or waste materials 122. Document any deficiencies identified during post-construction environmental monitoring activities and develop and implement corrective action plans to address any noted deficiencies.

6 References

Amec Foster Wheeler. 2016. Norman Wells Operations Interim Closure and Reclamation Plan. Submitted to the CER November 2023 (Filing IDs C27037-20, C27037-21, C27037-22, C27037-23). Accessed January 24, 2023.

Fisheries and Oceans Canada. 2020. *Interim Code of Practice: End-of-Pipe Fish Protection Screens for Small Water Intakes in Freshwater.* Available online at: https://www.dfo-mpo.gc.ca/pnw-ppe/codes/screen-ecran-eng.html. Accessed January 24, 2023.

Imperial Oil Resources N.W.T. Limited. 2022. Norman Wells Operations Emergency Response Plan. Submitted to the CER November 2023. (Filing ID C27037-16). Accessed January 26, 2024.

APPENDICES

Appendix A Environmental Contacts

Contact	Contact Information
Internal Contacts	
Imperial Norman Wells Operations Control Centre	867-587-8000
Imperial Norman Wells Operations 24 Hour Emergency Line	867-587-2862
External Contacts	
Government of Northwest Territories Spill Report Line	867-920-8130
Norman Wells Emergency Services	911
Norman Wells RCMP	867-587-1111

Appendix B Environmental Management and Contingency Plans

B.1 Spill Release Contingency Plan

B.1.1 Introduction

The Contractor will report any spills to the Environmental Inspector and Construction Manager. The Environmental Inspector or Construction Manager will immediately notify Imperial via the processes outlined in the Imperial Norman Wells Operations Emergency Response Plan (December 2022 edition, or as amended). The Environmental Inspector will notify appropriate regulatory authorities as required.

If there is any ambiguity as to whether a spill exceeds reportable thresholds, the spill will be reported to the Environmental Inspector and Norman Wells Operations Centre. The Environmental Inspector will determine if the spill should be reported to regulatory authorities. Information that should be communicated in initial spill reporting includes: name and contact information of caller, date and time, material(s) spilled, location of spill, estimated quantity of material spilled, cause of spill, actions taken to date, assistance required, any injuries and weather conditions.

Table B-1 outlines the thresholds for reportable spills as defined by Northwest Territories Environment and Climate Change.

Table B-1 Spill Reporting Thresholds

Substance	Reportable Quantity
Explosives • Compressed gas (toxic/corrosive) • Infectious substances • Sewage and wastewater • Radioactive materials • Unknown substance	Any amount
Compressed Gas (Flammable) • Compressed gas (non-corrosive, non-flammable)	Any amount of gas from containers with a capacity greater than 100 L
Flammable liquid	≥100 L
Flammable solid • Substances liable to spontaneous combustion • Water reactant substances	≥ 25 kg
Oxidizing substances	≥ 50 L or 50 kg
Organic peroxides • Environmentally hazardous substances intended for disposal	≥1 L or 1 kg
Toxic substances	≥ 5 L or 5 kg
Corrosive substances Miscellaneous products, substances or organisms	≥ 5 L or 5 kg
PCB mixtures of 5 or more ppm	≥ 0.5 L or 0.5 kg

Table B-1 Spill Reporting Thresholds

Substance	Reportable Quantity
Other contaminants – for instance, crude oil, drilling fluid, produced water, waste or spent chemicals, used or waste oil, vehicle fluids, wastewater.	≥ 100 L or 100 kg
Sour natural gas (i.e., contains H_2S) Sweet natural gas	Uncontrolled release or sustained flow of 10 minutes or more
Flammable liquid Vehicle fluid	≥ 20 L When released on a frozen water body that is being used as a working surface
Reported releases or potential releases of any size that: are near or in an open water body; are near or in a designated sensitive environment or habitat; pose an imminent treat to human health or safety; or pose an imminent threat to a listed species at risk or its critical habitat	Any amount

B.1.2 General Measures

The following measures are to be adhered to during all construction activities:

1. Maintain appropriate spill equipment at all work sites based on risk. Risk potential for site-specific spills will be used to determine the appropriate type of response equipment to be stored on-site and a suitable location for storage.

2. Post specific instructions regarding applicable contacts and appropriate response actions to be taken in the event of a spill in the field construction offices.

B.1.3 Initial Response

The following actions will be taken upon discovery of a construction spill:

1. Ensure personal safety and the safety of others on site. Don appropriate personal protective equipment.

2. Assess the safety hazards associated with the situation. Identify the composition of the spilled material.

3. If feasible and safe to do so, remove any sources of ignition, isolate the source of the spill and initiate initial response (control, contain, clean up).

4. While efforts to contain the spill are initiated, immediately notify the Environmental Inspector and Construction Manager.

5. Once the source has been isolated, attempt to contain the spilled material. Seek additional resources in coordination with the Construction Manager, Environmental Inspector and Imperial Norman Wells Operations as necessary.

6. Take note of relevant details including time, location, material, volume and immediate corrective actions implemented.

In the event of a spill associated with existing Imperial Norman Wells Operations infrastructure, immediately contact the Norman Wells Operations 24 Hour Emergency Response Line (867-587-2862).

B.1.4 Containment Procedures

The successful containment of a spill on land or water depends on a variety of factors including ground cover and topography; soil permeability; hydrogeology; physical characteristics of the spilled material; water currents and weather conditions. The following general guidelines should be followed:

1. Identify the product, stop the source and physically contain the spill as soon as safe to do so.

2. Avoid the use of water or fire extinguishing chemicals on non-petroleum product spills since many chemicals react violently with water and chemical extinguishing agents may release toxic fumes. In addition, chemicals may be soluble in water and dispersal makes containment and clean-up more difficult.

3. Minimize traffic on contaminated soils.

4. Use berms constructed with materials and equipment in proximity to the site to physically contain a spill on land. Deployment of booms will be necessary to contain a spill and prevent contamination spread on water.

5. Consult the Environmental Inspector in the development of specific containment measures.

B.2 Inadvertent Fluid Release Contingency Plan

Accidental release of bentonite fluid adjacent to or into a watercourse during Horizontal Directional Drilling (HDD) activities could result in adverse effects on the environment. The following Inadvertent Fluid Release Contingency Plan has been developed to provide guidance to reduce the environmental effects of a release during the planned HDD crossing of a channel of the Mackenzie River.

B.2.1 Planning

Prior to the start of HDD activities, the Contractor, Environmental Inspector and Construction Manager will meet to review the HDD workplan and site-specific measures prepared to respond to a potential inadvertent fluid release. The Contractor, Environmental Inspector and Construction Manager will review potential release scenarios and confirm how specific scenarios (e.g., fluid returns on land within clearing limits at entry/exit point; fluid returns within riparian habitat; evidence of fluid release to watercourse) will be mitigated, considering the feasibility of recovery and potential environmental effects associated with cleanup activities.

B.2.2 General Measures

Ensure that supervisory personnel are aware of and implement the following measures prior to the commencement of crossing activities:

- The Contractor will develop a site-specific cleanup plan for approval by the Environmental Inspector and Construction Manager prior to the commencement of crossing construction.
- Implement the measures in the EPP related to drilling fluid additives to ensure that bentonite fluid composition is limited to bentonite mud, freshwater and other inert additives if required. Maintain copies of Safety Data Sheets (SDS) on site.
- Coordinate access along the trenchless crossing path to monitor, contain and clean up potential fluid releases.
- Construct a temporary subsoil berm downslope of the entry point with a capacity adequate to capture anticipated volumes of bentonite fluid at the bellhole that could be released during pullback and other crossing operations. Construct a bellhole with the above-noted capacity at the exit point after the pilot hole has been completed.
- Install casing where warranted to limit the potential for loss of containment in coarse-textured near-surface deposits which may interfere with bentonite fluid circulation.
- Close entry and exit bellholes that will contain bentonite fluid immediately following completion of crossing construction and remediate them to meet regulatory guidelines.
- Ensure that the following equipment is maintained onsite to respond to an inadvertent fluid release:

spill kits	excavators	appropriate shoring materials (e.g., steel plates) for terrestrial or near-shore containment
3-inch (minimum) submersible pumps with sufficient lengths of leak-free hose and suction heads and priming buckets	6-inch pumps with sufficient lengths of leak-free hose and suction heads	meshed intake covers for any pumps to be used instream meeting the *Interim Code of Practice: End-of-Pipe Fish Protection Screens for Small Water Intakes in Freshwater* (DFO 2020).
portable generators for providing heat and power	sandbags	geotextile filter fabric, steel wire and T-posts
6 mm (minimum) polyethylene sheeting	booms	silt curtains
straw bales	light towers	shovels
personal flotation devices for response crew working near water		vacuum trucks on-site during pullback operations

B.2.3 Monitoring

A Turbidity Monitoring Plan (TMP) will be developed prior to construction. A qualified environmental professional will conduct turbidity monitoring during construction to detect an inadvertent return of drilling fluid into a watercourse. The TMP will include the following measures:

- Complete turbidity monitoring during horizontal directional drilling.
- Immediately notify the Lead Driller of any changes in turbidity levels.
- Notify the Environmental Inspector and Construction Manager as soon as possible following an exceedance of specified turbidity levels.

B.2.4 Emergency Response

The loss of bentonite fluid into coarse-grained or poorly consolidated material may occur during construction. As bentonite fluid does not always flow to the surface, a fluid loss does not necessarily indicate that bentonite fluid has been released to surface or into a waterbody. Nevertheless, a release of bentonite fluid can adversely affect aquatic or terrestrial environments and any indication of fluid loss should trigger monitoring to determine if a release to a sensitive environment has occurred.

In the event of fluid loss or unanticipated change in annulus pressure, immediately suspend crossing construction and conduct a detailed examination of the crossing path and surrounding area for evidence of a release to the surface.

Immediately notify the Environmental Inspector and Imperial Environment and Regulatory Advisor if a bentonite fluid release is observed.

If a bentonite fluid release either (i) enters or threatens to enter a watercourse or wetland or (ii) is causing adverse environmental effects, the Imperial Environment and Regulatory Advisor will notify Imperial Norman Wells Operations, the Canada Energy Regulator and the Government of the Northwest Territories spill report line.

Following suspension of crossing construction, the following steps should be taken:

- Contractor will contain and prevent additional bentonite fluid from entering the aquatic or terrestrial environment by installing an appropriate containment berm if feasible and as approved by the Environmental Inspector.
- Implement water quality monitoring in any affected watercourse as approved by the Environmental Inspector.
- The Imperial Environment and Regulatory Advisor or Environmental Inspector will notify relevant regulatory authorities within required time limits of the fluid release and the response plan being implemented. A report summarizing the events leading to the release as well as measures taken following the release to reduce effects on the environment will be completed by the Environmental Inspector within seven days.

The following measures should be considered where appropriate:

- If accessible by heavy equipment, construct berms for containment.
- If a terrestrial release cannot be contained with a berm, evaluate the feasibility of constructing bale and filter cloth weirs and a containment area.
- Before allowing filtered water to enter a watercourse or wetland, ensure that TSS are within 10 mg/L of background TSS levels.

B.2.4.1 Instream Response

The following considerations should be incorporated into emergency response planning in the event of an instream release of bentonite drilling fluid:

- Stop forward progress of the drill.
- Isolate and contain the site to prevent downstream movement of the drilling fluid. Specific method(s) and materials used for containment will be determined based on site conditions and material availability.
- Drilling fluid will be recovered to the extent practical and returned to the drilling operations; or, cleaned up and disposed of by a qualified third-party waste management party.
- Relevant regulatory authorities will be notified within 24 hours of the instream inadvertent return.

- Forward progress of the HDD will resume once sediment has been removed to the extent practical, measures to prevent another inadvertent return have been implemented, and turbidity values are below the threshold.

B.2.5 Resumption/Continuation of Drilling

Crossing construction will be allowed to resume only if the potential for adverse effects on the aquatic environment is low as approved by the Imperial Environment and Regulatory Advisor or Environmental Inspector, in consultation with a qualified environmental professional, if warranted. Planning and procedures for continuance of crossing construction are as follows:

- Implement measures to prevent the further release of bentonite fluid. Appropriate measures will vary depending upon information learned during the previous steps taken during crossing construction.
- Construction may resume when corrective actions have been approved by the Environmental Inspector. Consider the following measures to prevent further release:
    - Ensure that appropriate structures, materials, equipment and personnel are in place, and available in the event of a subsequent release of bentonite fluid.
    - Reduce bentonite fluid pressures, if practical.
    - Plug fissures and/or fractures with non-toxic sealers or plugging agents pumped into the bore hole and left undisturbed for an appropriate period of time, whereupon crossing will be resumed. If the sealing agents are not successful, crossing will be suspended, and the plan will be reviewed and revised.
    - Employ downhole cementing to either seal off the problem zone for re-excavating or seal off a large portion of the existing hole to a point where a new trenchless path (generally at a lower elevation) can be attempted. If these measures are unsuccessful, crossing will be suspended, and the plan will be reviewed and revised.
    - Move the crossing starting site and attempt to drill from a new location employing the same protection measures implemented on the initial crossing if conditions indicate that a second attempt will be successful. Prior to commencing the re-attempt, the crossing path and methodology will be reviewed and revised accordingly.

Appendix C Environmental Permits

Environmental permits required for the Replacement Activities will be updated prior to construction.

Regulator	Environmental Permit