Imperial Oil Resources N.W.T. Limited (Imperial)
Application for Variance of Operations Authorization 1210-001
and
Line 490 Replacement Activities (OH-001-2023)
Filed 6 May 2024
Imperial Response to K'ahsho Got'ine Committee
Information Request No. 1

1. Aquatic Effects Monitoring Program

1.1 K'ahsho Got'ine Engagement

Reference: OA Variance Application

Table 1-4: Environmental Evaluations completed at NOW

Appendix L: Environmental Protection Plan, Section 2.1 and 3.4

Preamble: The Aquatic Effects Monitoring Program (AEMP) for the Imperial Oil Resources Limited facility in Norman Wells monitors the Mackenzie River and Bosworth Creek, for potential aquatic effects from Imperial's operations. The AEMP is a condition of the Water Licence for Imperial's operations and is a component of the Environmental Protection Plan, which is required under its Operations Authorization. The Sahtu Land and Water Board has criticized the AEMP for not involving sufficient engagement of Indigenous peoples.

Request:

(a) How has Imperial reported the results of the AEMP to the K'ahsho Got'ine? What does Imperial do with the data from water sampling for the AEMP and how is that information shared with the K'ahsho Got'ine?

(b) How has Imperial engaged the K'ahsho Got'ine in respect of the AEMP and how frequently? How has Imperial incorporated Indigenous groups' feedback and input into the AEMP?

(c) What capacity funding, if any, has Imperial provided to Indigenous groups to engage with and review the AEMP?

(d) Does Imperial retain K'ahsho Got'ine technicians to support AEMP field sampling? If no, why not?

(e) The K'ahsho Got'ine have conducted independent water quality monitoring and have expressed interest in continuing to develop a comprehensive independent water quality monitoring program. How has Imperial supported independent K'ahsho Got'ine water quality monitoring?

Response:

a) Imperial's AEMP is regulated by the Sahtu Land and Water Board (SLWB). Imperial follows the regulatory process as set out in applicable legislation and the terms and conditions of Imperial's Type A Water Licence S13L1-007. The results of AEMP sampling are

submitted to the SLWB on an annual basis and are distributed publicly for review using the Online Review System (ORS)[1] and are available on the Public Registry[2].

b) In addition to answer to question 1.1a) above, in 2022, the SLWB formed the AEMP working group (WG). The purpose of the SLWB-led WG is to ensure a complete AEMP program is designed by braiding Traditional Knowledge (TK) and Western science (WS) together. Currently, the WG has met in November of 2022 and July of 2023. Imperial looks forward to additional meetings to finalize the AEMP program. To date, the K'ahsho Got'ine Foundation has been engaged to help Imperial's environmental consultant determine water sampling locations near Fort Good Hope and help refine water sampling methods. Additionally, Imperial welcomes comments from the communities when AEMP V5 is submitted to the SLWB. As Imperial develops the latest version of the AEMP, certain aspects of the program will be developed through community engagement, including target species, harvesting methods, sampling locations and data sharing methods.

c) Imperial has not provided capacity funding for the AEMP. However, community members who are involved through business or participation are compensated for services and/or compensated through honoraria. AEMP sampling, execution and reporting costs are paid by Imperial on an ongoing basis. The contractor utilized for the AEMP and operational sampling is a Sahtu joint venture with an industry-leading environmental consultant. More information on this is presented in the answer to IR 6.1 below.

d) In 2022, through Imperial's third-party environmental consultant, Imperial engaged the K'asho Got'ine Foundation for sampling around the Fort Good Hope area. This engagement is planned to continue. With the current format of the AEMP, sampling will be required in the winter, spring, summer, and fall. As of 2024, an additional sampling location will be added upstream of the Fort Good Hope area. Once the AEMP program is approved, Imperial understands that the large-bodied fish program will require the community to be involved in capturing fish and dissection, with TK and by providing a perspective of what community members see in the fish. Additionally, Imperial's environmental consultant has been working with K'ahsho Got'ine Foundation technicians to develop western science, technical water sampling skills and understanding.

e) Imperial's environmental consultant works with community members in training on techniques during AEMP sampling in the various communities. Please see the response to IR 6.1 below for more details.

[1] https://new.onlinereviewsystem.ca/
[2] https://slwb.com/registry/S13L1-007

1.2 Fish Studies

Reference OA Variance Application

Table 1-4: Environmental Evaluations completed at NWO

Appendix L: Environmental Protection Plan, Section 2.1 and 3.4

Preamble: In 2016, the Board conditionally approved AEMP version 1.0 so that Imperial could begin the water quality monitoring, which was the focus of this AEMP. Based on evidence and recommendations from the working groups and public review process, the Board directed Imperial to revise and resubmit the AEMP to include a fish monitoring component. Imperial insisted that the fish monitoring was unnecessary and would only be implemented if contaminants were detected in the water.

At that time, a third-party review was commissioned by Imperial and supported by the Board. The review advised that Imperial should include a fish monitoring program. Imperial submitted AEMP version 3.0 on December 24, 2019. It was posted for review on January 8, 2020, and closed on June 10, 2020.

The Board was troubled by the degree of outstanding public concerns relating to the AEMP and comments about the relationship that Imperial has with the communities who represent the people at the greatest risk from any effects from their Norman Wells Operation.

The need for the AEMP to include small and large fish studies has remained of particular concern and were required to be incorporated in the 2023 version of the AEMP. It is understood that a small fish study involving the sampling and testing of Slimy Sculpin in Bosworth Creek, which flows through the Norman Wells project footprint, was implemented in 2023 and will be reported in the 2023 AEMP to be submitted to the SLWB shortly.

It is also understood that the design and implementation of a large fish study was a further Board requirement that was to be implemented in 2023 but was not undertaken.

Request:

(a) What is the status of the large fish study component of the AEMP? Why has it not yet been completed?

(b) Why are the number and locations of small-bodied fish samples (Slimy Sculpin) in the AEMP low? Why hasn't Imperial conducted a Special Effects Study to establish additional sample locations to clearly test for effects?

Response:

a) In 2022, the SLWB formed the AEMP WG whose main task is to support development of a large fish study. At the July 2023 AEMP WG meeting, the group determined the best next step was to work together and determine the field component of the large fish sampling program. The initial plan was to do a test trial in September 2023. Imperial's third-party environmental consultant provided an outline of the WS part of the study which was distributed to the Renewable Resource Councils (RRC) in Fort Good Hope, Norman Wells and Tulita as well as the SLWB. No comments were received by the deadline provided and therefore, without alignment on this part of the study, the trial could not be undertaken in the 2023 field season.

Imperial continues to sample in accordance with the water and small fish portions of the AEMP on a quarterly basis in the Fort Good Hope, Norman Wells and Tulita area and is ready to execute the large fish components from a WS perspective. Imperial understands that an acceptable AEMP program is designed by braiding TK and WS together. Imperial remains committed to participating and understands the importance of community participation and hopes to get program alignment shortly. Imperial looks forward to the WG finalizing plans for the large fish program.

b) For version five of the AEMP, the aquatic scientists at Imperial's environmental consultant have consulted with one of Dr. Munkittrick's PhD students and have proposed an additional location in Bosworth Creek for a total of three locations. There are two upstream locations and one downstream location. Sampling ranges on the creek are selected to ensure sufficient catch to complete the required analysis. The WS data available at this time suggests that the potential for localized effects can be successfully monitored through the Bosworth Creek slimy sculpin program. The AEMP is used to determine sampling locations and these are evaluated on an ongoing basis.

Small-bodied fish sampling on the Mackenzie River continues to be assessed but recent attempts have not been successful. Details are provided within the 2023 AEMP Summary Report submitted to SLWB.

Regarding a Special Effects Study (SES), this was a specific study referred to in the Water Licence that was completed.

1.3 Water Sampling

Reference: OA Variance Application

Table 1-4: Environmental Evaluations completed at NOW

Appendix L: Environmental Protection Plan, Section 2.1 and 3.4

Preamble: The AEMP recognized the need for and tested passive sampling devices (PSDs) in 2022, which are deployed over several days to a few weeks to detect and characterize low-level petroleum contaminants in the aquatic environment and can differential Imperial effects from naturally occurring petroleum. Hutchinson Environmental Services Limited found that PSDs were not being used to their fullest potential, and methods to overcome common cross-contamination and sampler challenges were not included in the AEMP.

Request:

(a) Why doesn't the PSD program include sampling of heavy-end hydrocarbons and use the samplers to their fullest potential?

(b) Has Imperial developed a protocol for determining the optimal balance of sampler deployment vs. environmental interference, including methods for handling, deployment, preservation, and shipping PSDs to improve performance and reduce cross-contamination? If no, why not?

(c) How has Imperial updated its water quality data analysis to evaluate potential changes in response to Hutchinson Environmental Services Limited comment on the 2022 AEMP?

(d) Please provide additional detail on the exact locations and flow patterns that water quality samples will be collected from for the AEMP.

Response:

a) In 2022 and 2023, Imperial's environmental consultant worked with SGS AXYS (SGS), ALS Global Laboratories (ALS) and BV Laboratories (BV) to understand available analysis for semipermeable membrane devices (SPMDs) for Polycyclic Aromatic Hydrocarbons (PAH) and Hydrocarbons. ALS and BV labs discontinued analysis of SPMDs several years ago. Currently, the vendor of SPMDs is only aware of SGS laboratories (SGS) who will analyze SPMDs.

Imperial's environmental consultant worked with SGS in 2023 to analyze PAHs. As of 2023, there have been no accredited environmental labs in Canada identified (including by the vendor) that analyze SPMDs for petroleum hydrocarbons (BTEX or F1-F4).

In 2022, Imperial's environmental consultant started using Passive Diffusion Bags (PDBs) to test water samples for potential hydrocarbons, including heavier-end fractions. This technology continues to be utilized as the water samples can be analyzed using existing analytical procedures.

b) Imperial's environmental consultant has consulted the manufacturer and recommendations for protocol on sampler deployment and quality assurance and quality control. In addition to manufacturer

recommendations, Imperial's environmental consultant has worked with SGS labs, leveraging work done by Environment and Climate Change Canada (ECCC), to ensure deployment is aligned with work being done by other parties in similar conditions.

Quality assurance and quality control methods include the use of field duplicate samples, field blank samples, trip blank samples and degradation (time zero) samples and well as standardized storage and shipping protocols and data review requirements. Some of these methods are presented in the 2023 AEMP Summary Report with further detail to be provided in AEMP Version 5.

c) AEMP Version 5 (yet to be issued), addresses recommendations by Hutchinson and others. Imperial is working with the SLWB to have a technical meeting between Hutchinson, SRRB and Imperial's environmental consultant to ensure alignment on WS recommendations for AEMP V5. Imperial is committed to participating actively in the group for a successful program design. The 2023 AEMP sampling activities and upcoming 2024 AEMP sampling activities are intended to reflect direction provided by the SLWB through Hutchinson Environmental while full alignment on the overall program is pending.

d) The 2023 AEMP Summary report, which was submitted to the SLWB on April 30, 2024, provides maps of sampling locations for water, and fish programs, as executed. Additional locations are planned for 2024 and will be incorporated into AEMP Version 5 and subsequent annual reports. The water quality sampling locations are as follows:

Upstream

- AEMP-US-01 (Tulita/Midway Island) nearshore river flow
- AEMP-US-02 (10 Mile Island), nearshore river flow
- AEMP-US-03 (6 Mile Island), nearshore river flow
- AEMP-US-04 (Bosworth Creek) main creek flow in a deep cut bank
- AEMP-US-05 (Bosworth Creek) natural seep in the creek
- AEMP-US-06 (Bosworth Creek) upstream from winter road

Downstream

- AEMP-DS-01 (Bosworth Creek) main creek flows in a deep cut bank
- AEMP-DS-02 (Marine Dock) nearshore flow
- AEMP-DS-03 (Islands 3) mid-channel flow
- AEMP-DS-04 (Refinery mid-channel flow
- AEMP-DS-05 (Radar North) mid-channel flow as it splits around an island
- AEMP-DS-06 (Fort Good Hope-Blue Fish) deep pool area near natural islands – identified by community members as a high-value

- AEMP-DS-07 (Fort Good Hope – Ramparts location to be identified by FGH) mid-channel flow
- AEMP-DS-08 (Radar South) mid-channel flow as it splits around an island

2. Flowline Failure and Prevention

2.1 Cause of Line 490 Failure

Reference: Line 490 Replacement Activities Application

Section 1.7 – Operational Improvements and 2022 Annual Production Report

OA Variance Application

Section 1.0 – Introduction and Purpose

Section 4.3 – Completed Engagement Activities

Preamble: On July 27, 2022, Imperial identified a breach in Line 490 flowline corridor between Goose Island Terminal to Bear Island Terminal 4 which released produced water into the Mackenzie River. The exact cause of the spill has not been described in any public document, and it is unclear if the cause is yet known by Imperial. Erosion of riverbed sediment in the area of the Line 490 leak appears to have been a contributing factor, but an analysis and conclusion(s) of how erosion contributed to the spill haves not been provided. Understanding the factors that caused the spill will allow Imperial to assess how to better protect/repair the other pipelines and prevent a spill from similar failure in the future.

Request:

(a) Please provide a complete analysis of the causes of the Line 490 failure.

(b) Please provide copies of all studies, reports and investigations completed in respect of the Line 490 failure.

(c) Has Imperial implemented plans to prevent future failures of the pipelines under the Mackenzie River? If yes, how?

Response: The causes, analysis and preventive measures related to the Line 490 failure are contained in the final incident investigation report which is included as Attachment 1.

Imperial has engaged third-party river-crossing pipeline specialists Arcadis and implemented plans to prevent future failures. Imperial is completing the following:

- Continuation of annual riverbed surveys to monitor flowline depth of cover to confirm each crossing possesses sufficient cover to remain protected.
- Hydrodynamic modeling has been completed to simulate the Mackenzie River flow through the NWO to assess the potential scour that could occur at different river flow rates.
- Response plans have been implemented to shut down and purge

flowlines if river flow rates exceed specified critical values.

- Armoring as needed to remediate areas of low depth of cover and mitigate the potential for scour.

2.2 Riverbed Erosion

Reference: Line 490 Replacement Activities Application

Section 1.7 – Flowline Work

Attachment D-1 – Flowline Integrity Management Plan

Preamble: An abnormal amount of riverbed erosion occurred at Line 490 in 2021/2022. Peak flows in the Mackenzie River at Norman Wells increased over the last 20 years from 2000 to > 5000 m3/sec in the spring of 2022 (Environment Canada hydrometric data[3]), and higher-than-historic erosional events that may jeopardize pipelines below the river bottom are likely to occur in the future and should be planned for.

Request:

(a) What caused unprecedented scouring of the riverbed in 2021/2022?

(b) Has Imperial undertaken a fluvial assessment of the riverbed under the Mackenzie River to determine the maximum erosion depth and pipeline susceptibility damage from exposure or decreased structural support?

(c) Has Imperial considered options to mitigate erosion (e.g., pipeline armor cover) and/or secondary support or controls (e.g., non-erosive structural bedding and/or secondary pipeline containment)?

Response: Imperial reviewed the data noted in the preamble provided (Station 10KA001; Mackenzie River at Norman Wells). In the spring of 2022, peak flows were greater than 30,000 m^3 per second, not on the order of 5,000 m^3/sec as indicated in the preamble.

The final incident investigation report is included as Attachment 1.

a) Imperial engaged an external consultant to complete a hydrodynamic study of the Mackenzie River to assess the potential for future erosion/ scour that could expose or suspend the buried flow lines.

b) Yes. Imperial has installed armoring over various flowline corridors at the NWO over its history, including in 2024 when armoring was installed along two corridors.

[3] <https://wateroffice.ec.gc.ca/report/historical_e.html?stn=10KA001&dataType=Monthly&parameter>

2.3 Spill Response

Reference: Line 490 Replacement Activities Application

Section 1.7 – Operational Improvements and 2022 Annual Production Report

OA Variance Application

Section 10.3 – NWO Spill Contingency and Response Plan and

Attachment N-3 – Norman Wells Operations – Spill Contingency and Response Plan

Preamble: Line 490 failed on July 27, 2022. Imperial did not contact the K'ahsho Got'ine to provide notice of the spill until July 29, 2022. During the two-day period in which leadership was not informed of the spill, the K'ahsho Got'ine fished, boated, and swam in the Mackenzie River.

Request:

(a) Why were the K'ahsho Got'ine notified of the Line 490 spill two days after the incident?

(b) How has Imperial modified its spill contingency and response plan to improve communications with and notifications to the K'ahsho Got'ine regarding the same?

(c) The K'ahsho Got'ine have requested compensation for the loss of fish caused by community members pulling their nets out of the Mackenzie River. Why has Imperial not responded to this request?

Response:

a) Imperial met its regulatory notification requirements and quickly shut down flow on Line 490 following discovery of the incident. In addition, Imperial immediately informed multiple Sahtu community leaders of the produced water release directly via telephone calls. K'asho Got'ine were notified on a timeline consistent with a broader group of Indigenous community leaders.

b) While Imperial is committed to mitigating the risk of releases, it has also updated its workflow to provide prompt notification to a broader group of Indigenous community leaders. Imperial demonstrated its commitment to increased communications by providing a significant number of recurring status updates regarding this release.

c) Imperial is aware of the request for compensation[4] and Imperial is reviewing this request.

[4] Imperial Response to CER IR 1 (C28800-25) at PDF 1.

2.4 Flowline Integrity Management Plan

Reference: Line 490 Replacement Activities Application

Section 1.7 – Operational Improvements and 2022 Annual Production Report

Attachment D-1 – Flowline Integrity Management Plan

Preamble: It is understood that Imperial is required by its Water Licence S13L1-007 (Schedule 5, Item 1) and Operations Authorization OA1210-001 to submit an annual Flowline Integrity and Break-Up Report no later than October 31st of the year of that report.

As reported in the 2023 Flowline Integrity and Break-up Report, and similar to the results of the 2022 survey, suspended flowlines were documented on the bundle of pipelines (including Line 490) between Bear to Goose Island. Based on these findings, it is apparent that the current approach to conducting the annual flowline integrity investigations is not adequately documenting scour conditions prevailing during spring freshet.

These existing pipelines are typically buried at a depth of between 2 m and 5 m below the riverbed. In 2022, the annual Flowline Integrity and Break-Up Report identified a 50 m and a 20 m stretch where the pipelines were exposed due to approximately 2 m of scour beneath the pipelines. This report was published in the fall of 2022, after the breach of Line 490 had already occurred.

Given that both the 2022 and 2023 Flowline Integrity and Break-Up Report noted that 50 m and 20 m stretches of suspended flowlines were observed between Bear to Goose Island, it is clear that the current approach to conducting the annual flowline integrity and break-up investigations later in the summer is inadequate. A new approach is required to produce more timely flowline integrity scour data during the critical freshet period.

Request: (a) How has Imperial updated its flowline integrity management plan and other safety mechanisms to monitor and prevent the erosion and suspension of the other flowlines under the Mackenzie River?

Response: a) In addition to the annual riverbed surveys completed to assess flowline depth of cover and undertaking armoring measures where required, Imperial has updated its flowline integrity management plan to monitor for and mitigate future riverbed scour by:

- developing a hydrodynamic model to simulate the Mackenzie River flow through the NWO to assess the potential scour that could occur at different river flow rates; and
- implementing of response plans to shut down and purge the flowlines if river flow rates exceed specified critical values.

2.5 Environmental Impacts

Reference: OA Variance Application

Section 1.7 – Flowline Work

Section 10.3 – NWO Spill Contingency and Response Plan

Attachment N-3 – Norman Wells Operations – Spill Contingency and Response Plan

Line 490 Replacement Activities Application

Section 1.0 – Introduction and Purpose

Section 4.3 – Completed Engagement Activities

Preamble: Imperial advised that the spill from Line 490 contained minimal concentrations of chloride and hydrocarbons but did not provide the analytical results of the quality of the produced water associated with Line 490 spill. This makes it difficult to fully understand the impacts of the release on the environment downstream in the Mackenzie River.

The spill (55 m3) occurred from a point source, and the entire volume of the Mackenzie River (15,300 m3/sec on the day of the spill) was not available to dilute spilled process water at the point of release and downstream in the mixing area as alluded to by Advisian in their Spill Response Report.[5] While it is unlikely that effects to on the Mackenzie River occurred overall, local effects to water quality and benthic invertebrates in and around the area of the spill may have occurred.

The monitoring that was conducted (surface water grab samples, collected 14 to 16 days after the initial spill occurred) would not have been able to detect environmental effects due to the timing and methods used, and it is erroneous to use the results of the Advisian sampling to indicate there was no environmental effect. Water collected by grab samples does not provide a sufficient spatial-temporal representation of flowing river water, and the spilled saline process water would be present at and near the river bottom, which was not sampled by surface water grabs. Further, the laboratory detection limits associated with hydrocarbons (including BTEX and PAHs) in surface water grab samples, are too high to measure trace levels of the contaminants of potential concern, which are a concern to downstream communities.[6]

Request:

(a) Please provide the analytical results of the quality of the produced water associated with Line 490.

(b) Please provide the flowrate of produced water pipelines, the pressure of the produced water pipeline and information about how long the pipeline was left open for during the breach (and why?).

(c) Has Imperial conducted a study of the effects of the spill within an estimated mixing zone from the point-source discharge? If so,

[5] Advisian, "2022 Spill Response to Line 490 Process Water Release, Norman Wells, NT", August 19, 2022

[6] *Hutchinson Environmental Sciences Ltd. (2021). Technical Review of AEMP for Imperial Oil Norman Wells Operation. August 16, 2021. Hutchinson Environmental Sciences Ltd. (2023). Imperial Oil Resources Ltd. Norman Wells Aquatic Effects Monitoring Program (AEMP) 4.0 Review. April 20, 2023.*

please provide.

(d) Does Imperial's spill response plan or other emergency response plan address the following:

(i) Quickly deploying a qualified environmental professional to assess the effects (mixing) zone of a spill and conduct predictive modelling and monitoring of the impacts. Ideally, the responder would be at Imperial's facility or able to be on-site within 24 hours;

(ii) Descriptions of measures to mitigate environmental impacts within the predicted mixing zone as quickly as possible; and

(iii) Quickly notifying the K'ahsho Got'ine and other downstream communities of the spill and its potential impacts to allow these parties to respond and conduct their own mixing zone modelling and/or monitoring to safeguard aquatic resources that they use or have interest in.

Response:

a) At the time of the release, Line 490 was carrying a co-mingled product of produced water and freshwater for wellbore injection purposes. On July 27, 2022, the co-mingled split was 77% produced water and 23% fresh water. The produced water contained trace amounts of a corrosion inhibitor (CORR11514A) which is added to the produced water stream before re-injection into the reservoir at a concentration of 15 ppm. During a site inspection completed by an ECCC officer on July 28, 2022, representative samples of the co-mingled produced water released were collected from the Bear Island Terminal 4 (B.I.T. 4) by both Imperial representatives and the ECCC officer for further lab analysis. Imperial submitted the collected samples to an accredited third-party laboratory (Bureau Veritas) to complete a full suite analysis to determine the concentration of the contaminants of potential concern (COPCs). Within produced water, the primary COPC's include dissolved chloride and trace hydrocarbons (BTEX, F1-F4).

The full analytical report (Attachment 2) was received from the lab on August 3, 2022 and shared with regulators.

b) This information is included in the attached Final Incident Investigation Report (Attachment 1).

c) The release of co-mingled produced water resulting from the Line 490 failure, lasted from 5:14AM to 6:07AM on July 27, 2022 (53 minutes in total) before the entire flowline was safely shut-in. In total, approximately 55 m^3 was released to the Mackenzie River, which equates to a release rate of 0.0173 m^3/s. Per ECCC water survey data stationed near Norman Wells on the Mackenzie River, the flow rate at the time of the release was approximately 15,300 m^3/s. Due to the significant dilution effects which took place during the release, there were no studies conducted on the estimated mixing zone downstream of the release location. A water quality sampling program was conducted on the Mackenzie River at 13 different locations beginning 15 km upstream of the release location and extending downstream

near Fort Good Hope. These results were shared with regulators and communities on August 20, 2022. The results were compared to Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines for the Protection of Aquatic Life. Chloride levels were below CCME guidelines and consistent across all samples including the location upstream of the release. All hydrocarbon concentrations were below laboratory detection limits across all sampling locations.

d) See the response to CER IR 1.2 a)[7] which is reproduced below:

Updates to the Imperial Core ERP, NWO ERP, SCARP and the Mackenzie River Tactical Response Plan have been underway since early 2023, and support work to facilitate these updates began in 2021, supported by a third party, and has been a focus area for NWO. This exercise has included integration of the SCARP with the NWO ERP. Updating the Mackenzie River Tactical Response Plan included fieldwork and site surveillance work. Due to the inter-relation of these plans, updating them in a coordinated manner helps to ensure they can be used in an integrated manner and address potential management of change issues.

i) To increase the on-site capacity for initial assessment, the updated SCARP includes expanded spill assessment information and personnel on site will be receiving shoreline clean up and assessment technique training in fall of 2024. A contract for spill response support is in place with 3rd party consultants as well their contact information is included as oil spill response resources in the NWO ERP. These 3rd party consultants facilitated the updates to the SCARP and MRTRP, are familiar with the asset, and are able to respond to an event. Internally there is expertise and resources available from ExxonMobil to generate any spill modelling required.

ii) Measures to mitigate are outlined in the NWO ERP, SCARP and MRTRP.

iii) NWO ERP includes direction regarding guidance that notification of indigenous communities will be considered depending on the nature and location of the incident.

[7] Imperial Response to CER IR 1 (C28800-27) at PDF 4.

3. Horizontal Directional Drilling for Line 490 Replacement Activities

3.1 Planning for Riverbed Erosion

Reference: Line 490 Replacement Activities Application, Section 3.1 – Depth of Cover

Preamble: The directional bore pipeline to replace Line 490 should be installed below the maximum predicted erosion depth and/or include secondary support or controls.

Request:

(a) Has Imperial assessed the maximum erosion depth of the Mackenzie River? Is the proposed horizontal directional drilling for the replacement of Line 490 below the maximum erosion depth?

Response:

a) Based on the current riverbed morphology between Bear and Goose Islands, the 2023 hydrodynamic survey estimated the maximum possible future erosion depth to be approximately 2 meters. The horizontal direction drill is expected to be completed 15 meters below the riverbed and therefore is not considered to be at risk of future exposure. The riverbed over top of the replacement pipelines will continue to be monitored annually.

3.2 Frac Out Contingencies

Reference: Line 490 Replacement Activities Application

Preamble: Horizontal directional drilling bore operations have a potential to release drilling fluids into the surface environment through frac-outs. A frac-out is the condition where drilling mud is released through fractured bedrock into the surrounding rock and sand and travels towards the surface.

Request:

(a) What is Imperial's Frac-out Contingency Plan to minimize the potential for a frac-out associated with the proposed horizontal directional drilling activities and provide for the timely detection of frac-outs?

Response:

a) Updates to these documents are now substantially complete and are setup to provide alignment as future updates are made. Upon finalization, which is expected in the first half of 2024, these plans will be submitted to the CER in accordance with the existing OA and processes that have been underway with the CER since early 2023. More details are provided in the answer to CER IR 3.4 b).[8]

[8] Imperial Response to CER IR 3 (C29304-2) at PDF 7-8.

3.3 K'ahsho Got'ine Monitoring

Reference: Line 490 Replacement Activities Application, Appendix C Environmental Interactions Table, Rights of Indigenous Peoples, para 13

Preamble: In describing the Indigenous and Treaty rights of the potentially affected Indigenous Peoples in the Replacement Activities area, the reference states that Imperial plans to "engage Indigenous personnel as appropriate for field activities associated with the Replacement Activities." The CER asked Imperial to provide additional details on how Indigenous Peoples would be engaged for the field activities. In its response to the CER Information Request No. 3, Imperial stated that, on approval of the Replacement Activities, it "plans to reach out to the communities' RRCs to determine if they are interested in providing oversight of the drilling activities."

Request:

(a) How has Imperial engaged the K'ahsho Got'ine to monitor the horizontal directional drilling for the Line 490 Replacement Project?

(b) How will Imperial ensure that the monitors have full access to the facilities to monitor and oversee the construction and operations?

(c) What financial support will Imperial provide to Indigenous groups for monitoring the horizontal directional drilling for the Line 490 Replacement Project?

(d) What mechanisms has Imperial established to respond to feedback from K'ahsho Got'ine monitors? What resolution mechanisms has Imperial adopted in the event of a disagreement?

Response: a) to d) See the response to CER IR 3.3[9], a portion of which is reproduced below:

> *Upon approval of the Replacement Activities, Imperial plans to reach out to the communities' Renewable Resource Councils (RRCs) to determine if they are interested in providing oversight of the drilling activities. The scope of the Environmental Monitor role will be developed jointly with Imperial and the participating RRCs based on their capabilities and interests.*
>
> *Additionally, Imperial will leverage existing relationships with environmental consultants that have formed joint ventures in the Sahtu, as appropriate.*

[9] Imperial Response to CER IR 3 (C29304-2) at PDF 6.

4. Progressive Reclamation of the Operations

4.1 Reclamation of Line 490

Reference: OA Variance Application

Section 1.7 – Flowline Work

Section 12.2 – Progressive Reclamation

Attachment P-1b – Norman Wells Interim Closure and Reclamation Plan

Preamble: Imperial has indicated that it has abandoned Line 490 in place.

Request: (a) What options is Imperial currently considering for reclamation of Line 490?

Response: a) The Replacement Project is planned to replace existing NWO infrastructure. The lines installed will become part of Imperial NWO infrastructure and will be incorporated into the NWO's closure and reclamation plans.

No long-term disturbance to the land is anticipated to result from the HDD operations. Clean-up and restoration will be managed in accordance with the project EPP, and reclamation activities will be planned to align with the Norman Wells Operations Interim Closure and Reclamation Plan. Following completion of the HDD activities any debris, matting and geotextile used during HDD activities will be removed. Drilling waste will be removed, and the entry and exit pits of the HDD will be backfilled and recontoured to restore pre-construction grade and drainage. Topsoil will be replaced and the site will be prepared in a manner facilitating re-establishment of natural vegetation.

4.2 Progressive Reclamation Activities

Reference: OA Variance Application

Section 12.2 – Progressive Reclamation

Attachment P-1b – Norman Wells Interim Closure and Reclamation Plan

Preamble: Imperial has authority to carry out progressive reclamation pursuant to its interim closure and reclamation plan under its Operations Authorization and Water Licence. The interim closure and reclamation plan adopts the following definition of progressive reclamation:

> Progressive reclamation takes place prior to permanent closure to reclaim components and/or decommission facilities that no longer serve a purpose. These activities can be completed during operations with the available resources to reduce future reclamation costs, minimize the duration of environmental exposure and enhance environmental protection. Progressive reclamation may shorten the time for achieving closure objectives and may provide valuable experience on the effectiveness of certain measures that might be implemented during permanent closure.

The interim closure and reclamation plan also canvasses the options for final closure and reclamation and proposes the development of a long-term waste management facility to store waste product and soil indefinitely in the Norman Wells area. Imperial also anticipates that the long-term management facility will be required to support remediation and reclamation activities prior to closure and therefore, must be developed prior to closure. The K'ahsho Got'ine have consistently expressed their opposition to this proposal for closure and reclamation.

Request:

(a) What components or activities are being considered for progressive reclamation?

(b) What components or activities does Imperial intend to progressively reclaim prior to finalizing a plan for closure and reclamation?

(c) How are Imperial's progressive reclamation activities monitored?

(d) How has Imperial engaged with the K'ahsho Got'ine on progressive reclamation activities?

(e) How has Imperial engaged with the K'ahsho Got'ine on planning for closure and reclamation?

(f) How does Imperial intend to address K'ahsho Got'ine opposition to the proposed waste management facility?

Response: a) to f) As discussed in the Interim Closure Plan, Imperial undertakes progressive reclamation work at NWO. Progressive reclamation work occurs during facility operations (prior to final closure) to reclaim components or decommission facilities that no longer serve a purpose to minimize the duration of environmental exposure, enhance environmental protection and reduce future reclamation costs. It also

provides valuable experience for testing the effectiveness of different measures and is anticipated to shorten the time required for achieving final closure activities.

Imperial submits an Annual Closure and Reclamation Report, which includes summaries of all environmental assessment/monitoring activities conducted at NWO in the previous year and the expected work in the following year. These are submitted to SLWB and CER and are available on the Public Registry.

Currently no parts of the site are planning to be closed in the near future. Imperial is assessing the site by completing Phase I and Phase II environmental site assessments. These assessments are in part gathering data which supports an understanding of the environmental site conditions across the NWO to assist with making plans for closure. These assessments are common on operating sites, especially larger ones and are part of being a responsible operator.

Progressive Reclamation is an approved element of Imperial's Interim Closure and Reclamation Plan as a condition of the Type A Water License granted by to Imperial by the SLWB. Each year, the scope of planned Progressive Work is submitted to SLWB for review. A part of the SLWB's approval process for the Water License is to post the proposed License Terms for public review and comment during which the K'ahsho Got'ine would have been entitled to be a part of. As part of the generation of the ICRP, Working Groups were convened to address elements of the ICRP with community and government participants.

As previously outlined, ICRP Working Groups, were conducted related to plans for Closure and Reclamation. Closure and Reclamation topics have also been reviewed during previous Neighbor Week visits, community meetings & during portions of Chapter 9 meetings.

Imperial anticipates that an Environmental Assessment ("EA") is an appropriate forum for review of the NWO final Closure and Reclamation Plan. The EA process will allow communities, stakeholders, regulators and governments to study and review aspects of the final closure plan. Regulatory agencies have been diligently working to understand how the existing MVEIRB EA process can meet the requirements of each regulator and facilitate meaningful engagement with communities in the Sahtu.

Waste Management will be a key component of the Environmental Assessment ("EA") review of the NWO final Closure and Reclamation Plan.

5. Environmental Impact of Operations

5.1 Flaring and Venting

Reference: OA Variance Application, Section 7.0 Gas Flaring and Venting Information

Preamble: The OA Variance Application indicates that Imperial engages in routine flaring and non-routine flaring and provides information on flaring in its annual reports to the Chief Conservation Officer.

Request:

(a) Please produce the annual reports provided to the CCO for the past ten years, particularly the portions of the reports in respect of gas flares and venting. What are the daily rates, during and flow of flaring?

(b) Are there any imperfections in the operating system or flowlines that cause increased flaring? If yes, what are those imperfections?

Response: Gas Flaring and Venting information is summarized in Section 7 of the OA Variance Application[10].

a) The past 10 Annual Environmental Reports that were submitted to the CCO are attached for reference (Attachment 3). Per OA-1210-001 Condition 11, Imperial is required to report all flaring volumes on an annual basis. Please reference section 4.5 (2015 annual report) and sections 3.4 (2016-2023 annual reports) for the relevant flaring information.

b) As noted in the 2023 Annual Environmental Report, annual flaring volumes have declined over recent years due to several factors including reduced reservoir gas production due to the Line 490 production shut-ins. Under the existing OA-1210-001, Imperial has not exceeded the routine and non-routine daily flare gas discharge limits.

[10] Application for Variance of Operations Authorization 1210-001 (C27037-2) at PDF 37-39.

5.2 Natural Seeps

Reference: OA Variance Application, Table 1-4: Environmental Evaluations completed at NWO

Preamble: Imperial has stated that there are a number of natural seeps located along the Mackenzie River near the NWO. Imperial has indicated that it is possible to differentiate between naturally occurring seepage zones and releases from industrial activities.

Request:

(a) What impact, if any, does the Norman Wells Operations have on natural seeps? Does the pressure caused by the Norman Wells Operations on the natural reservoirs increase the prevalence of natural seeps?

Response:

a) A summary document about Natural Seeps is in Section 5 of the 2013 Renewal Application for Water Licence S03L1-001.[11]

[11] Renewal Application for Water Licence S03L1-001. Natural Seeps (Section 5 of 20).

6. K'ahsho Got'ine Engagement

6.1 K'ahsho Got'ine Monitoring

Reference: OA Variance Application

Section 3.2 – Community Engagement Plan

Appendix I – Engagement Plan

Line 490 Replacement Activities Application

Appendix C Environmental Interactions Table, Rights of Indigenous Peoples, para 13

Preamble: The K'ahsho Got'ine have engaged and have expressed interest in continuing to engage in independent monitoring of the Norman Wells Operations, including water quality sampling, fish sampling, operations monitoring and closure and reclamation monitoring.

Request:

(a) How has Imperial supported independent monitoring of the Norman Wells Operations by the K'ahsho Got'ine?

(b) Has Imperial considered funding Indigenous-led independent environmental monitoring and mitigation advisory programs to facilitate Indigenous guardianship and stewardship over the Norman Wells Operations? If yes, what initiatives are planned? If not, why not?

Response: a) and b) Currently, Imperial uses two, third-party environmental companies that support the AEMP and other environmental and reclamation activities associated with the NWO permits. The contractor utilized for the AEMP and operational sampling is owned by a Sahtu land corporation and the other contractor is co-owned by four Sahtu land corporations. Both contractors are joint ventures with industry-leading environmental consultants.

Imperial's environmental consultants work with community members in training on proper sampling techniques during AEMP sampling in the various communities. Similar to 2023, TRSA will be AEMP sampling in Fort Good Hope and Norman Wells in the winter, spring summer and fall for AEMP V5. During these sampling events, Imperial's consultant can demonstrate proper surface water sampling techniques, sample preservation, laboratory paperwork and shipping to labs. Imperial encourages K'ahsho Got'ine through the K'ahsho Got'ine Foundation and RRC to participate in water sampling. There are ongoing meetings with K'asho Got'ine to develop the 5 Year Work Plan. Imperial continues to focus on facilitating Sahtu involvement in the AEMP field work to support the NWO.

6.2 Transparency and Communications

Reference: OA Variance Application

Section 3.2 – Community Engagement Plan

Appendix I – Engagement Plan

Preamble: The K'ahsho Got'ine have repeatedly expressed concern about the lack of transparency of the existing 2014 Operations Authorization and associated approvals, regulatory documents, and proceedings. In 2023, the Commission of the Canada Energy Regulator informed the K'ahsho Got'ine that the 2014 Operations Authorization was a private document and would not share the Authorization with the K'ahsho Got'ine prior to the commencement of this regulatory proceeding. In addition, reporting under the Operations Authorization is not public, including the annual production report, environmental report, safety report, well history report and well operations report. Imperial also does not provide the communities with detailed information about operational activities or maintenance approved by the Chief Conservation Officer. This lack of transparency impairs the K'ahsho Got'ine's ability to monitor the operations and protect its community and rights.

Request:

(a) Imperial conducted significant flowline maintenance in the winter of 2023/24. Why didn't Imperial notify the K'ahsho Got'ine of these maintenance activities?

(b) In 2023, the K'ahsho Got'ine requested a copy of the Line 490 investigation report. Imperial employees verbally agreed to provide the report but the K'ahsho Got'ine did not receive a copy of the report. Why was a copy of the report not provided to the K'ahsho Got'ine?

(c) Does Imperial plan to share its annual production report, environmental report, safety report, well history report and well operations report with the K'ahsho Got'ine under its new Operations Authorization? Does Imperial plan to share all applications to the Chief Conservation Officer with the K'ahsho Got'ine under its new Operations Authorization? If yes, how? If not, why not?

Response:

a) Imperial completes routine flowline maintenance and integrity inspections on an annual basis per our Flowline Integrity Management Plan. Imperial follows regulatory requirements and provides the proper regulatory notifications and approvals are obtained prior to beginning work, including for the scope of work mentioned in this information request. In addition, an email update to community leaders including K'ahsho Got'ine from Imperial on February 2, 2024, shared that there would be upcoming work to place additional cover to protect two lines from potential riverbed scouring during future high water flow events.

b) This report was provided to Yamoga Land Corporation by Imperial on June 27, 2023. The same report was provided again on October 19, 2023, following the Community Engagement Session which was held in FGH on October 12, 2023. It is also included as Attachment 1 of this

submission.

c) Imperial follows the regulatory process for submissions and the regulator maintains a record of these documents.

6.3 Business Opportunities

Reference: OA Variance Application, Section 3.1 – Economic and Social Benefits of NWO

Preamble: Imperial stated that over the past five years an average of 32% of Imperial's total goods and services purchased, have been procured from Indigenous businesses, the vast majority of whom are local to the Sahtu. However, the exact proportion of business opportunities provided by the Norman Wells Operations to Indigenous-owned Sahtu and K'ahsho Got'ine businesses is not clear.

Request:

(a) How many and which K'ahsho Got'ine businesses has Imperial engaged or contracted with for goods and/or services? How many and what Sahtu businesses has Imperial engaged or contracted with for goods or services?

(b) What is the exact percentage of Imperial's total goods and services procured from Indigenous owned Sahtu businesses? And K'ahsho Got'ine businesses?

(c) How many Sahtu Dene and Métis employees and K'ahsho Got'ine employees does Imperial currently have working at the Norman Wells Operations?

Response: a) to c) Imperial's submission of Additional Written Evidence on March 7, 2024 (AWE), provided additional details on the continued social and economic benefits of the OA Variance in Section 2.3.[12]

Section 2.3.3 of the AWE discusses Local Contractors. Sahtu Indigenous Companies that have provided services at NWO include:

- Sahtu Canadian Helicopters
- CANOL Oilfield
- HSE Integrated
- Mackey Expediting & Logistics
- North Wright Airways
- SRP
- TRS Advisian
- Trumpeter
- Tlegohti
- HCI Leasing
- HRN Contracting
- K'ashe Gotine District Land Corp
- McCoy

[12] Imperial Additional Written Evidence to CER (C28710-2) at PDF 6-8.

- Norman Wells Claimant Corp
- Sahtu Geomatics

In 2023, the total percentage spend of Imperial's total goods and services procured from Indigenous owned Sahtu businesses was 29.4%.

In Imperial's AWE Submission, further information on the Sahtu beneficiaries employed at NWO was provided in section 2.3.2 Employment.[13]

[13] Additional Written Evidence of Imperial (C28710-2) at PDF 6.

6.4 Support for Engagement

Reference: OA Variance Application

Section 3.2 – Community Engagement Plan

Appendix I – Engagement Plan

Preamble: The K'ahsho Got'ine have spent a significant amount of time and financial resources to participate in the regulatory processes for the Operations Authorization Variance and the Line 490 Replacement Activities. However, due to the lack of funds available, we have also been limited in our ability to engage knowledge holders, elders and land users and technical and legal experts to support our analysis of the impact of the Norman Wells Operations on our rights. We have communicated our concerns about the minimal financial support available to us for our meaningful engagement to the Government of Canada, the Commission of the Canada Energy Regulator and Imperial. In particular, we have made submissions on the inadequacy of funding in this regulatory process in our statement of concern and in our letter to the Commission dated March 12, 2024. Despite this, no additional funding has been made available to the K'ahsho Got'ine for our involvement in the proceedings.

Request: (a) Has Imperial provided financial support, not including financial support for meeting costs with Imperial, to Sahtu communities, including the K'ahsho Got'ine, to support their engagement in regulatory proceedings over the past five years? If no, why not?

Response: Imperial has not provided funding for regulatory processes over the last five years. During that timeframe, the only regulatory proceeding outside of the current processes was regarding the WMF, which was withdrawn.

Imperial and Yamoga worked together to execute a Capacity Funding Agreement for K'asho Gotin'e for the engagement scheduled for October 12, 2023, in Fort Good Hope (ROC 860, 872)[14]. For the current proceedings, the CER administers a Participant Funding Program (PFP) to facilitate participation.

Imperial remains in active dialogue with the Fort Good Hope community (Yamoga Lands Corporation, Fort Metis Land Hope Corporation and others) to seek ways of working together which includes the evaluation of potential funding agreements. In the broader Sahtu, Imperial has reached out to SSI and other communities as well.

[14] Imperial Response to CER IR 1 (C28800-24) at PDF 40, 42.

Attachment 1: Line 490 Incident Investigation Report

Attachment 2: Lab Analysis Report (Representative samples of the co-mingled produced water released were collected from the Bear Island Terminal 4 (B.I.T. 4))

Attachment 3: Annual Environmental Reports submitted under OA-1210-001