

Water Licence Submissions for Board Approval	
File Number	S13L1-007
Company	Imperial Oil Resources N.W.T. Ltd.
Project	Norman Wells Operations Aquatic Effects Monitoring Program version 4.0 (19 December 2022, Advisian)
Location	Proven Area, Norman Wells, NT
Activity	Industrial Oil and Gas Production
Date of Decision	June 9, 2023

On June 9, 2023, the Sahtu Land and Water Board (SLWB or Board) met and considered the Submission made on December 23, 2022, for approval:

- Norman Wells Aquatic Effects Monitoring Program Report (Advisian, 19 Dec 2022) version 4.0¹ as required by Water Licence S13L1-007, Part I, Condition 1.

AEMP v. 4.0 has been designed to answer the following question:

Are the routine **or historic** activities at the Imperial site at Norman Wells introducing **substances** into the receiving environment that **could cause** acute or chronic effects **by altering the Accumulated Environmental State (AES)** of the aquatic environment? (purple text was added by Imperial)

Imperial described the key components included in this program are:

1. Water quality monitoring of the Mackenzie River and Bosworth Creek

This incorporates sampling locations and techniques intended to characterize the Environmental State of the water bodies regionally and locally (around Norman Wells Operations) both upstream and downstream of the facility.

2. Small-bodied fish monitoring program

Designed to be executable with available fish species in environmentally relevant locations (one site-influenced stream and one non-influenced stream) that have small

¹ See SLWB Online Registry www.slwb.com for S13L1-007 – [Imperial NWO AEMP V4](#) – Dec. 23, 2023

home ranges allowing data to be more reliably attributable to Norman Wells Operation (NWO) stressors if indicated.

Reviewers noted some improvements from previous versions by the inclusion of:

- winter under-ice sampling,
- an expansion of sites upstream and downstream for water sampling,
- the use of SPMDs [passive sampling devices – PSDs] to help understand hydrocarbon (and PAH) concentrations in the river,
- focus on Accumulated Environmental State (AES) monitoring,
- the identification of key contaminants of potential concern (COPC) [turbidity, total suspended solids, petroleum hydrocarbons (PHCs) and polycyclic aromatic hydrocarbons (PAHs),
- a description of the small-bodied fish study,
- mention of the large-bodied fish study that will provide data to the communities that they want.
- Inclusion of Guardians to assist with field sampling program.
- Imperial’s commitment to early and meaningful engagement and communication to build confidence and trust in the final program. “Imperial recognizes that while Version 4 has not received board approval currently, there is a significant benefit to commence field programs in 2023 under this revised plan. The Board agrees with this approach and has directed Imperial to carry on with the field portion of the program in 2023 with participation of local communities as occurred in 2022 and to continue to work on revisions to the Plan to address these concerns and issues”.
- There has been insufficient time for Imperial to implement agreed upon recommendations from the review of the 2021 AEMP Annual Report into the AEMP Design.

additional field work to be conducted in 2023, including, but not limited to:

- i) conduct the Special Effects Study for small-bodied fish species as proposed by HESL,
- ii) investigate and rationalize the inclusion of additional sampling locations for water quality recommended by ECCC,
- iii) identify other small-bodied fish sampling locations on the Mackenzie River to be able to demonstrate facility effects on aquatic life, and
- iv) consider and rationalize the other parameters recommended to be monitored in water and fish by ECCC, SRRB, ECC.

The Board provided some additional direction for the AEMP Design at their meeting:

- a. To expand the sample area to look for effects on large fish all the way to the delta because large fish travel far.
- b. To remove Bosworth Creek for sampling, as there are no fish that people eat in the entire creek.
- c. To look at other species of fish and aquatic life in the river along the food chain because everything is connected.
- d. To gather TK to understand how the fish have changed from big impacts (like right after the expansion) to natural changes (whitefish arrive in good condition in July and then get skinny).
- e. To include the **Large Fish Study in the final AEMP Design Plan version** to be submitted for their approval. The Board considers the large fish study component of the AEMP, that uses Traditional Knowledge to know how fish have changed, to be as important to the whole AEMP as the Western Science component.

The following are the four areas of concern and what is necessary to resolve community concerns:

A. Fish:

- Fish health including appearance and liver enlargement.
- Contaminant accumulation in fish bodies and the tissues that are typically eaten.
- Fish that are typically eaten or are of high value to the communities or have been the subject of community concern in the past (e.g., burbot, grayling).

B. Water:

- Demonstrate water has not been adversely affected by IORL operations, especially for the contaminants that are primarily related to the operation [turbidity, total suspended solids, petroleum hydrocarbons and polycyclic aromatic hydrocarbons (PAHs)].
- Provide confidence that upstream references represent the river's natural environment and are appropriate for comparison to downstream changes.

C. Whole aquatic ecosystem:

- Consider how the combined effects of IORL affect the life of organisms that depend on the Mackenzie River, based on recent data collected within the context of the historical record, and holistic consideration of the same [stressors include industrial discharges, impacted groundwater and surface water, water takings, effects from the artificial islands, accidental spills, etc.].
- Focus monitoring on metrics that are sensitive and are likely to identify change early (e.g., sentinel and sensitive media/species).

D. Communication:

- Communicate the monitoring design and results in a meaningful way to community members and speaks to their concerns.

GENERAL REPORT

- a. The plan is too general to know if it will accomplish the objectives expected by the SLWB and the communities (SRRB ID1).
- b. The plan includes too much rationalization, general explanations and needless theoretical chatter that just confuses the reader and is unnecessary to include. The more this document discusses the reasons for doing something and theory behind the monitoring, the less clear the reasons become (SRRB ID15).
- c. The front page indicates that the authors also review and approve the report – maybe a separate reviewer would help to smooth out some of the more difficult sections (SRRB ID1).

METHODS AND DETAILS FOR ASSESSING ACCUMULATED ENVIRONMENTAL STATE

- d. The plan still lacks pertinent details or specific targets for things like sample sizes, performance standards for QA and chemical analysis, statistical power or how Imperial will be determining potential impacts to the aquatic environment, including the biotic community, in the Mackenzie River (SRRB ID1).
- e. GNWT-ECC identified ongoing concerns with methods, statistical analyses and data interpretation and presentation of data. Imperial did not address many of the comments made on the statistical design, methods, and analysis of the 2021 AEMP Annual Report.
- f. HESL noted a focus of AEMP v 4.0 on the small fish monitoring program and noted that “care must be taken to include the metrics that the communities are concerned with including Shoreline and Natural and Artificial Islands erosion and its effects on water quality and aquatic habitat and Metrics that are needed to assess the Accumulated Environmental State.
- g. SRRB ID1 commented and HESL agreed that there is a False expectation that the Accumulated Environmental State will be monitored to capture the overall effects of the entire operation – but there is no evidence in the document that this will happen.

ADAPTIVE MANAGEMENT AND RESPONSE FRAMEWORK

- h. Definitions in the Plan are not consistent with those established by the Land and Water Boards. For example, the definition of “Adaptive Management” refers to making changes to Operations if monitoring shows an impact [if a trigger is exceeded]. Whereas Imperial is proposing to change the monitoring program if impacts are detected (SRRB ID6).

- i. All reviewers made comments and recommendations on the Response Framework and the need to define Thresholds and Action Levels.

FISH STUDY

- j. All the reviewers noted that there were no small-bodied fish sample locations on the Mackenzie River and that the “fish studies” described in the AEMP might just confirm hydrocarbon response in sculpins below a natural seep while providing no clarity or test of the possible impacts from operations in the Mackenzie, where people in the communities’ fish (SRRB ID1). The Board also noted that there are NO fish that people eat in Bosworth Creek.
- k. The Board members were unanimous in stating that the Large Fish Study is needed.

ENGAGEMENT AND COMMUNICATION

- l. There are no consultation or engagement records or reporting on how TK has been considered and accommodated in the AEMP Design.
- m. There is no detail on how will the results be meaningfully shared and communicated and feedback considered for future AEMP updates? HESL recommended that a schedule of engagement for AEMP results sharing with communities be developed and included in the AEMP to promote confidence that results will be shared and allow communities to plan for these sessions.