Type A Water Licence S13L1-007 Renewal Application

Norman Wells Operations

Provided by:

Imperial Oil Resources N.W.T. Limited

Submitted to:

Sahtu Land and Water Board
June 2024

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Acronyms, Abbreviations, and Units

Acronym	Definition
AEMP	Aquatic Effects Monitoring Program
AES	Accumulated Environmental State
BIT	Bear Island Terminal
CEP	Community Engagement Plan
CER	Canada Energy Regulator
CIRNAC	Crown-Indigenous Relations and Northern Affairs Canada
Core ERP	Imperial Upstream Core Emergency Response Plan
CPF	Central Processing Facility
DFO	Department of Fisheries and Oceans
DPE	Dual Phase Extraction
e.g.	Example
EIRB	Environmental Impact Review Board
EIS	Environmental Impact Statement
EPP	Environmental Protection Plan
ESA	Environmental Site Assessment
FIMP	Flowline Integrity Management Plan
GIT	Goose Island Terminal
GMP	Groundwater Management Plan
GNWT	Government of the Northwest Territories
ICRP	Interim Closure and Reclamation Plan
Imperial	Imperial Oil Resources N.W.T. Limited
INAC	Indigenous and Northern Affairs Canada
LWBs	Land and Water Boards
LT	Land Terminal
MPE	Multiphase Extraction System
MVLWB	Mackenzie Valley Land and Water Board

Acronym	Definition
MVRMA	Mackenzie Valley Resource Management Act
NDP	Northern Development Program
NEB	National Energy Board
NGLs	Natural Gas Liquids
NTPC	Northwest Territories Power Corporation
NWO	Norman Wells Operations
NWO ERP	NWO Emergency Response Plan
NWO SCARP	NWO Spill Contingency and Response Plan
NWT	Northwest Territories
OA	Operations Authorization
QA/QC	Quality Assurance/Quality Control
SLWB	Sahtu Land and Water Board
SNP	Surveillance Network Program
SSA	Sahtu Settlement Area
SSERP	Site-Specific Emergency Response Plan
SSI	Sahtu Secretariat Incorporated
TK	Traditional Knowledge
WMF	Waste Management Facility
WMP	Waste Management Plan

Units	Definition
km	kilometre
m^3	cubic metre
m	metre
km^2	kilometres squared
km^3/d	cubic kilometres per day
%	percentage
°	degree
m^3/s	cubic metres per second
m^3/day	cubic metres per calendar day
mg/kg	millgram per kilogram
kg	kilogram
mg/L	milligram per litre
V	volts

Application Package Checklist

Included	Information Name (Docs, Records, Certificates)	Location in Application
Yes	Application Form	Appendix A
Yes	Proof of Registration/Incorporation	Appendix B
Yes	Maps	Section 11.0
Yes	Geospatial Data	Included as shape files with digital submission
No	Municipal Licence Questionnaire	Not Applicable
Yes	Project Specific Information Requirements (PSIR)	Details provided throughout the submission
Yes	Water and Wastewater Management Plan	Section 5.0
Yes	Waste Management Plan	Section 5.5
No	Rock (Waste Rock and Ore) Management Plan	Not Applicable
No	Tailings Management Plan	Not Applicable
No	Landfill Management Plan	Not Applicable
Yes	Hydrocarbon-Contaminated Soils Treatment Facility Management Plan	Section 7.4
Yes	Operations and Maintenance Plans	See Section 1.9 and Appendix D
Yes	Effluent Quality Criteria Report	Section 5.2 and Appendix D (Section D-1.1.3.7)
No	Mixing Zone Information	Not Applicable
Yes	Off-site Disposal Agreement: Waste Acceptance Confirmation	Section 5.6
Yes	Aquatic Effects Monitoring Program Design Plan	Section 5.4
No	Erosion and Sediment Control Plan	Not Applicable
No	Dust Monitoring and Management Plan	Not Applicable
No	Geochemical Characterization and Management Plan	Not Applicable
No	Explosives Management Plan	Not Applicable
Yes	Emergency Response/Preparedness Plan	Section 6.0
Yes	Spill Contingency Plan	Section 6.3

Included	Information Name (Docs, Records, Certificates)	Location in Application
Yes	Studies Undertaken to Date	Section 0
Yes	Engagement Record and Plan	Section 2.0
Yes	Authorization from Landowner	Section 1.5
Yes	Other Authorizations	Section 1.4
No	Land Use Plan Conformity Table or Statement	Section 1.6
Yes	Traditional (Environmental Knowledge)	Section 2.5
Yes	Closure and Reclamation Plan	Section 7.0
Yes	Financial Capacity	Section 1.8
Yes	Application Fees	Fees have been requested and will follow submission of this application.
Yes	Water Use Fees Calculation	Appendix C. Fees submitted separately via electronic payment
Yes	Closure Cost Estimate	Section 7.6 and Appendix L

Note: This concordance table is developed from Table 2 of the *Guide to the Water Licensing Process Checklist* (Land and Water Board of the Mackenzie Valley, 2021).

Plain Language Summary

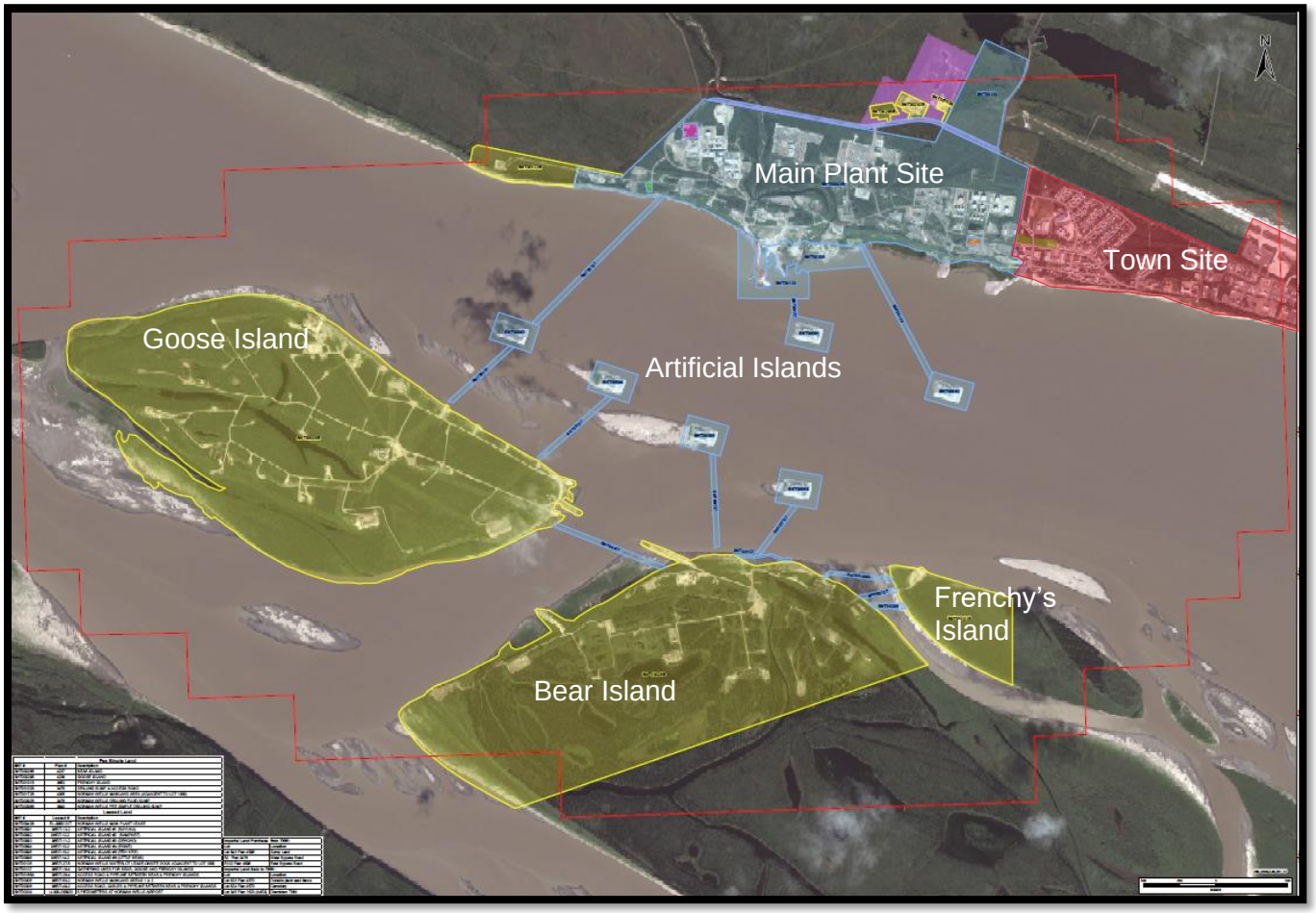
This application has been submitted to the Sahtu Land and Water Board (SLWB) to renew Water Licence S13L1-007. The Water Licence covers the operation of Imperial's facilities at Norman Wells. Imperial plans to continue operating the Norman Wells Operation (NWO) for the next 5 to 10 years and is pursuing 10-year extensions on its permits with the SLWB and Canada Energy Regulator (CER). The extensions are intended to cover the remaining operating life of the field and allow for sufficient time for engagement and permitting a transition to closure of the facility. Imperial is not requesting any major changes to licences that cover continued operation of the field.

What's Included in the Norman Wells Operations?

The scope of NWO activities covered under our approvals includes the operation of the Central Processing Facility (CPF), mainland field, operations on the natural and artificial islands, potential drilling (although no drilling is planned at this time), well and facility maintenance, integrity, project work and progressive reclamation.

Currently Imperial's NWO produces 4,000 to 7,000 barrels of oil per day. There are approximately 300 active wells-- half are used for water injection and half are used for oil and gas production. Imperial uses gas to generate electricity for our facility and for the Northwest Territories Power Corporation (NTPC) to supply the Town of Norman Wells.

- Imperial's NWO covers all of Goose Island, most of Bear Island and a portion of Frenchy's Island, the six Artificial Islands and the CPF located on the mainland.
- The actual size of the NWO is approximately 11 km^2.



History in Norman Wells

- Imperial has been producing oil and gas at Norman Wells since the 1920s when the first well on the banks of the Mackenzie River was drilled.

- In addition to producing oil, Imperial has also produced gas and electricity for the Town of Norman Wells for many years.

Water Licence S13L1-007

Imperial's water licence defines:

- Allowable water withdrawals and sources;
- The required quality of water returned to the environment;
- Conditions applying to operations, maintenance, waste management, contingency planning, and aquatic effects monitoring; and
- Requirements for facility closure and remediation (further discussed below).

The existing approval application content is detailed, but at a high level summarizes the NWO, shows how Imperial monitors the operation and the environment and reports regularly to the regulator, and describes various aspects of the operation in detail.

A great deal of this content has been submitted to the regulator and is available to the public as a part of our regular reporting and ongoing regulation of the NWO.

The NWO has not undertaken significant operational changes since the last approvals were issued. No new wells have been drilled and there is not a plan to drill more oil wells at this time.

Imperial's Operating Plans

Imperial has many operating plans and policies in place to cover health, safety, the environment, and community. Some of these plans under Imperial's current licence include:

- Environmental monitoring plans
    - Aquatic Effects Monitoring Plan (AEMP)
    - Environmental Protection Plan (EPP)
    - Groundwater Management Plan (GMP)
    - Quality Assurance & Quality Control (QA/QC) Manual
    - Waste Management Plan (WMP)
    - Interim Closure and Reclamation Plan (ICRP) and Addendum
- Spill and emergency response plans and,
    - Flowline Integrity Management Plan (FIMP)
    - Imperial Upstream Core Emergency Response Plan (Core ERP)

- Mackenzie River Tactical Response Plan (MRTRP)
- Spill Contingency and Response Plan (SCARP)
- Norman Wells Operations Emergency Response Plan (NWO ERP)

- Community Engagement Plan (CEP).

The plans and policies applicable to the SLWB's licensing requirements are provide to the SLWB.

Imperial reports testing and monitoring results collected under these plans to the SLWB and these are posted on the SLWB's online registry for Water Licence. Monitoring is done by a third party.

Topics of Interest and Community Engagement

During Neighbour Week in 2023, Imperial prepared and engaged with the community on a variety of topics captured in posters. Further engagements were held in Norman Wells and Tulita in August 2023, and in Fort Good Hope in October 2023, and Norman Wells in February 2024 to provide regulatory clarity on upcoming applications. We look forward to our upcoming neighbour week in 2025 as well as all of the continued engagement in 2024.

On top of Neighbour Week, regular engagements between Imperial and the communities have occurred throughout the term of the current Water License. These include, but are not limited to:

- annual Chapter 9 meetings (scheduled by CIRNAC);
- communications from Imperial about specific topics related to NWO;
- meetings with community leadership;
- regulatory submissions and review;
- working group meetings;
- facility tours; and
- sponsorships and career programs to support Sahtu workers.

Imperial's Community Engagement Plan follows the *Mackenzie Valley Land and Water Board Engagement Guidelines for Applicants and Holders of Water Licenses and Land Use Permits 2018.* If community members have any suggestions, questions or concerns, they can reach out to the socioeconomic team at normanwellscommunity@esso.ca.

Preparing for Reclamation and Closure

Imperial's NWO are anticipated to produce for the next 5 to 10 years, and Imperial is currently preparing for closure. Imperial anticipates over 20 years of remediation and reclamation work after the end of production. There is an existing Interim Closure and Reclamation Plan for the asset under our current water licence.

To give closure the focus and attention it requires Imperial is pursuing the path to continue operations while developing clarity on the regulatory process for closure.

1.0 Introduction

The Norman Wells Operations (NWO) is an upstream oil and gas facility located in the Town of Norman Wells approximately 700 km northwest of Yellowknife, Northwest Territories (NWT) (Figure 1). The NWO includes infrastructure and operations on the mainland adjacent to the Mackenzie River, on three natural islands (Bear, Goose and Frenchy's) and six artificial islands (1-Rayuka, 2-Rampart, 3-Decho, 4-Ekwe, 5-Iteh K'ee, 6-Little Bear) within the Mackenzie River (Figure 2).

The main operational areas of Imperial's NWO include the Central Processing Facility (CPF) on the mainland, a tank farm on the mainland, field operations on the mainland and field operations on the natural and artificial islands. Each area has remained substantially unchanged since the 2013 application and a full description of each operational area is found in Appendix D.

The product from NWO, is a mid-sweet blended oil, shipped via the Enbridge Line 21 Pipeline (also called the Norman Wells Pipeline or the Enbridge Pipeline in this application) to Zama in northern Alberta, where it connects with the Alberta oil pipeline network. In 2022, total oil (only) production from the NWO was 321,196 cubic metres (m^3), with an annual average of 880 cubic metres per calendar day (m^3/day). The oil including natural gas liquids (NGLs) produced was 1,044 m3/day (Imperial Oil Resource N.W.T. Limited, 2023a).

The NWO also supplies electricity to the Northwest Territories Power Corporation (NTPC), which, in turn, supplies electricity to the Town of Norman Wells. Electrical production for supply to NTPC is anticipated to continue while the NWO is operational.

Imperial has been conducting operations at Norman Wells since the early 1900s. The Norman Wells Expansion Project was approved in early 1980s and began production in 1985. NWO is expected to continue production for the next 5 to 10 years. The operations are not anticipated to commercially produce beyond 2035.

Imperial is applying to the SLWB for renewal of the Type A Water Licence S13L1-007 (the Licence or WL) for another ten-year term to align with the variance request application for its existing Operations Authorization (OA) from the Canada Energy Regulator (CER).

1.1 Project Location

The NWO is located at Latitude +65°17' and Longitude -126°51' and within the limits of the Town of Norman Wells, NWT. The Town of Norman Wells is located within the Tulita district, one of three districts in the Sahtu Settlement Area (SSA) (Figure 1). An estimated 2,669 people or 0.6% of the total population

of the NWT live in the SSA based on census data collected in 2022 (Government of Northwest Territories, 2022).

The NWO is located within an area known as the Proven Area, which covers all of Goose Island, most of Bear Island and portion of Frenchy's Island, the six artificial islands and the mainland (including the CPF). The Proven Area covers an area of 32 km^2 and the actual size of the NWO geographical footprint is approximately 11 km^2 (Figure 1). The Proven Area is the area described in Schedule "A" to the Proven Area Agreement dated July 21, 1944, between Imperial Oil Limited and His Majesty in Right of Canada and was excluded from the *Northwest Territories Lands and Resources Devolution Agreement*. Imperial's NWO includes field and CPF infrastructure and operations. The field infrastructure and operations is generally comprised of the production equipment outside of the CPF, but is within the Proven Area, and thus includes the equipment, facilities, and operations on the mainland and on the natural and artificial islands (Figure 2).

The mainland portion of NWO is bounded by the following land uses:

- The Enbridge Facility is located to the northwest of the CPF,
- A bulk fuel storage/loading facility and the Town of Norman Wells is located to the east,
- Commercial, residential, industrial, and recreational land uses to the east of NWO,
- Seepage Lake, the Town of Norman Wells sewage lagoons and the airport are located to the north-northeast, and
- The Mackenzie River is located to the south of the mainland.

In addition, a recreational/parkland area is located to the west and south of Bear Island, west and north of the mainland.

1.2 Approval Requested

Imperial is applying to the SLWB for a renewal of Type A Water Licence (S13L1-007) for a ten-year term to align with the proposed renewal period for its existing OA from the CER. Imperial's requested decision date with respect to this application is on or before March 4, 2025, to align with the expiration date of the existing Licence.

1.3 Regulatory Instruments

1.3.1 Current Water Licence

The current Water Licence S13L1-007 (Type A) issued by the SLWB under the *Mackenzie Valley Resource Management Act* (MVRMA) is one of the primary instruments regulating the NWO activities. The Licence was issued on January 2, 2015 (effective date March 5, 2015) and expires on March 4, 2025.

The licence defines:

- allowable water withdrawals and sources,
- the required quality of water returned to the environment,
- conditions applying to operations, maintenance, waste management, contingency planning, and aquatic effects monitoring, and
- requirements for facility closure and reclamation.

Since being issued, the current licence includes eight modifications approved by the SLWB. The modifications are shown in Table 1-1.

Table 1-1: Modifications Made Within Existing Licence

Date	Water Licence Modification
March 2024	Depth of Cover Repairs
March 2023	Bosworth Creek Erosion Repair
December 2020	Operation and Maintenance Dredging at the Mainland Dock
June 2020	Water withdrawal from the Mackenzie River at an alternate location (Bulk Fuels unloading dock)
July 2019	Water withdrawal from the Mackenzie River at an alternate location (Bear Island)
May 2018	Water withdrawal from the Mackenzie River at an alternate location (flush flowline 65/77)
January 2016	Depth of Cover Repairs
July 2015	Construct Soil Washing Facility

1.3.2 Operating Authorization

On December 19, 2014, Chief Conservation Officer of the National Energy Board (NEB), now the CER, issued OA-1210-001 (NEB, 2014) pursuant to an application under Section 5(1)(b) of *Canada Oil and Gas Operations Act* and the *Canada Oil and Gas Drilling and Production Regulations* dated July 31,

2014, and expiring December 31, 2024. There is currently an ongoing CER proceeding to consider the application submitted by Imperial to vary the existing OA to extend the term of operation.

1.4 Other Approvals and Authorizations

Other significant approvals and authorizations are outlined in Table 1-2 below.

Table 1-2: Other Approvals and Authorizations

Year Enacted	Permit or Approval	Use	Regulator
1996	2620-D-2-16	Install injection facilities at their F-31 wellsite and one-time approval for the Injection of tank bottoms	CER
1999	NTR000018	Manage a Hazardous Waste Storage facility (NTR000018)	GNWT
2004	File SC00170	Annual maintenance of the mainland dock and approach for road repairs	DFO
2011	S11L8-001	Excavation along the shoreline to repair a freshwater pipe	SLWB
2012	S11L8-006	Placement of riprap around infrastructure	SLWB
2012	S11L1-004	Excavation for installation of a freshwater pipeline between Bear Island and Frenchy's Island	SLWB
2012	File 12-HCAA-CA6-00061	Sand removal from sandbars downstream of Artificial Islands 4 and 6	DFO
2018	S17L8-005	Dredging in the Mackenzie River to facilitate access	SLWB
2021	S20L8-005 & S20Q-007	Quarrying of sand from Artificial islands 4,5 and 6	SLWB

In April of 2024, applications for a Type B Water Licence and two Land Use Permits were submitted to the SLWB to cover a geotechnical investigation and horizontal directional drilling related to replacement activities for a section of Line 490 between Bear Island and Goose Island. Those files are currently before the SLWB.

1.5 Land Ownership and Agreements

The following Norman Wells Leases were issued to Imperial:

- 00043 Mainland Plant Site issued on August 13, 2009; Expires August 13, 2039; issued by the Commission of the NWT
- 00135 West Marina Dock issued on December 16, 2009; Expires December 19, 2039; Issued by West Lot Dock

The following Certificates of Title were purchased from the GNWT:

- 67879 for Lot 510 Plan 3640 Norman Wells on March 31, 2009
- 67876 for Lot 496 Plan 3476 Norman Wells on March 31, 2009
- 67877 for Lot 497 Plan 3476 Norman Wells on March 31, 2009
- 67878 Frenchy's Island for Lot 503 Plan 3653 Norman Wells on March 31, 2009
- 73065 Bear Island for Lot 502 Plan 4237 Norman Wells on November 9, 2012
- 73066 Goose Island for Lot 501 Plan 4238 Norman Wells on November 9, 2012
- 81659 for Lot 643 Plan 4598 Norman Wells on April 15, 2019
- 81660 for Road R2 Plan 3476 Norman Wells on April 15, 2019
- 81661 for Road R102 Plan 4598 Norman Wells on April 15, 2019

Imperial currently has access for the land that is required for the operation. No changes to land access are needed for continued operation.

1.6 Land Use Conformity

Imperial's NWO is within the Norman Wells Proven Area Agreement. As per the Sahtu Land Use Plan, the Norman Wells Proven Area Agreement is defined as a legacy land use within the Norman Wells community boundary where the Plan does not apply pursuant to MVRMA S. 34 (Sahtu Land Use Planning Board, 2023).

1.7 Justification for Screening Exemption

Under the Land and Water Boards of the Mackenzie Valley (LWB) *Guide to the Water Licensing Process* Section 4.2, a project must meet requirements of Part 5 of the MVRMA (Land and Water Board of the Mackenzie Valley, 2021). Imperial is not proposing any alternations to the operational footprint or industrial processes that would trigger a formal preliminary screening or environmental assessment. During the review of the 2014 Water Licence application, the SLWB determined that the existing Water Licence preliminary screening and environmental assessment provisions under Part 5 of the MVRMA were not triggered for the following reasons:

- The definition of "development" under subsection 111(1) of the MVRMA is defined as “any undertaking, or any part or extension of an undertaking, that is carried out on land or water.” This application does not propose any extension of an undertaking be "carried out" as NWO will continue to operate in its present state.

- The definition of "preliminary screening " under subsection 111(1) of the MVRMA is defined as “[an examination of a proposal for a development undertaken pursuant to section 124].

- In 2014, the SLWB had previously determined Imperial's application for the current Water Licence (issued in 2015, applied for in 2013) was exempt from the preliminary screening requirements of the MVRMA because the scope of activities at NWO had not changed since the results of the 1999 preliminary screening process pursuant to Schedule 1: Part 1 subpart 2 of the *Exemption List Regulations* and section 143 (1)(c) of the MVRMA.

- In March 2014, during the previous ten-year renewal of Imperial's Water Licence, the SLWB determined that because there had not been any significant alterations to the operational footprint or industrial processes noted in that Water Licence Renewal Application, a new preliminary screening was not required pursuant to Schedule 1: Part 1 subpart 2 of the *Exemption List Regulations* and Section 143(1)(c) of the MVRMA.

- Section 2, Schedule 1, Part 1, 2.1(b) of the *Exemption List Regulations* states a “development, or a part thereof, for which renewal of a permit, licence or authorization is requested that has not been modified and has fulfilled the requirements of the environmental assessment process established by the MVRMA “does not require a preliminary screening”. Therefore, this application to renew the Water Licence is similarly exempt where no material modifications to NWO have occurred since the 1999 preliminary screening process was completed.

- Section 114 of the MVRMA states the purposes of Part 5 is “to ensure that the impacts on the environment of proposed developments receive careful consideration before actions are taken in connection with them”. The fundamental purpose of the environmental assessment process is to assess the impacts of proposed developments before they are approached, constructed and operational. NWO is constructed and in operation; the exclusion of existing projects from environmental assessment processes is a concept that is well recognized and applied under other environmental assessment legislation.

- Section 157.1 of the MVRMA states Part 5 [does not apply in respect of an authorization related to an undertaking that is the subject of a licence or permit issued before June 22, 1984]. Approved in 1980, NWO is thus not subject to Part 5 of the MVRMA unless abandonment,

decommissioning, or significant alterations occur, none of which are contemplated in this renewal application.

The items noted above were summarized in Imperial's response to the CER's Renewal of OA 1210-001 information letter dated July 28, 2023, which was also sent as a copy to the SLWB.

In 1979, the NWO Expansion Project and the Norman Wells Pipeline Project were both referred by the Department of Indian Affairs and Northern Development (DIAND) (now Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC)) to the Federal Environmental Assessment and Review Office for a Regional Socio-economic Impact Assessment.

In March 1980, Esso Resources Canada Limited submitted Environmental Impact Statements (EIS) and a Regional Socio-economic Impact Assessments to DIAND/Environmental Assessment and Review Office for the Norman Wells Oilfield Expansion and Norman Wells Pipeline Projects. The EIS outlines the proposed development activities, rationale for the project, potential environmental impacts and concluded the mitigation measures proposed were adequate to safeguard the environment. From a socio-economic perspective, it concluded that there would be several significant positive impacts related to employment and business opportunities to produce a net positive socio-economic impact.

In April 1999, the SLWB completed a preliminary Environmental Screening during the Water Licence renewal (EIRB Reference # P99-003), which screens potential environmental impacts from the water intake, operation, abandonment and reclamation to groundwater, surface water, noise levels, land non-renewable natural resources, air/climate/atmosphere, vegetation, wildlife, and fish. It also screened potential socio-economic impacts as well as potential impacts to culture and heritage. Mitigations associated with each of the potential impacts listed above were also identified. The preliminary screening decision was that Imperial's "facility at Norman Wells does not pose a significant adverse impact on the environment or have significant public concern" and that it could proceed with the Water Licence renewal regulatory process and/or implementation without referring it to the Environmental Impact Review Board (EIRB). A copy of the 1999 preliminary screening assessment is provided in Appendix D.

NWO routinely completes environmental assessment work as part of its ongoing operations and commitments to the CER and SLWB for the S13L1-007 Water Licence (SLWB, 2015). Sections 4.0 to 7.0 and Section 9.0 highlight studies and environmental assessments completed to date.

1.8 Financial Information

Imperial maintains a security deposit in the amount of $180,883,606 security for the NWO, in accordance with Section 72.11 of the MVRMA and Part C Condition 1 of the Licence. A copy of the approval of the

Irrevocable Standby Letter of Credit is included in Appendix F. This Letter of Credit is automatically renewed each November; Imperial confirms it was last renewed in November 2023.

In addition to the security provided under the MVRMA, Imperial has provided financial security to His Majesty the King in the right of Canada, as formally represented by the Minister of Indian Affairs and Northern Development, now the CIRNAC, in respect of operations in the Norman Wells Proven Area pursuant to Section 27 of the COGOA. The security consists of a $26,000,000 Imperial Oil Limited promissory note. Imperial confirms this Agreement remains in force.

Further, Imperial has also provided a Continuing Guarantee and Undertaking to the extent of an additional $75,000,000 guaranteeing the obligations of Imperial at Norman Wells pursuant to the COGOA. Imperial confirms this Agreement remains in force.

Together, these financial securities total $281,883,606 for the existing operation.

1.9 Summary of Operations Plans and Annual Reports

Table 1-3 below lists the SLWB regulated operational plans that support the NWO.

Table 1-3 Operations Plans

Operations Plan *(link to Public Registry provided when available)*	Most Recent Date and Version	Notes
Aquatic Effects Monitoring Plan (AEMP)	December 2022 (Version 4)	See Application Section 5.4 for details about history of versions and workplan. December 2023 (Draft Version 5 substantially complete; large fish component being developed through Working Group)
Community Engagement Plan for Sahtu Settlement Area Communities Norman Wells Operations	May 2024 (Version 4)	Submitted with this application.
Environmental Protection Plan (EPP)	March 2024 (Version 1, Revision 5)	
Flowline Integrity Management Plan	December 2021 (Version 1, Revision 9)	

Operations Plan *(link to Public Registry provided when available)*	Most Recent Date and Version	Notes
Groundwater Management Plan (GMP)	March 2024 (Revision 0)	
Imperial Upstream Core Emergency Response Plan	December 2023	
Interim Closure and Reclamation Plan (Part 1, Part 2, Part 3, Part 4, Part 5) and Addendum	March 2016 and March 2023	
Mackenzie River Tactical Response Plan (MRTRP)	April 2024 (Version 1)	
Norman Wells Operations Emergency Response Plan (ERP)	May 2024	
Quality Assurance & Quality Control (QA/QC) Manual	June 2021 (Version 1, Revision 5)	
Spill Contingency and Response Plan (SCARP)	May 2024 (Version 3)	This document contains the Fuel Management Plan (FMP).
Waste Management Plan (WMP)	June 2021 (Version 6)	

Table 1-4 below outlines the reports submitted to support the NWO that are regulated by the SLWB.

Table 1-4 Summary of Reports

Report *(link to Public Registry provided when available)*	Most Recent Submission Date
Annual Flowline Integrity and Mackenzie River Breakup Report	January 31, 2024
AEMP Annual Report	April 30, 2024
Annual Closure and Reclamation Report	May 23, 2024
Monthly Water Use Report	May 24, 2024 (April 2024 data)
Annual Water Use Report	March 28, 2024

Further detail about these Plans and Reports is included in Sections 4.0 to 7.0.

2.0 Engagement

2.1 Community Engagement Plan

The Community Engagement Plan (CEP) submitted and accepted as part of Water License S13L1-001 remains the guiding document for Imperial's community engagement activities in the Sahtu region.

Some minor updates to that document are submitted with this renewal application as part of Version 4 of the CEP.

2.2 Engagement Methods

Imperial has been operating NWO for many years. Regular engagements between Imperial and the communities associated with NWO have occurred throughout the term of the current Water Licence. These include, but are not limited to:

- Neighbour Week open houses;
- annual Chapter 9 meetings (scheduled by CIRNAC);
- communications from Imperial about specific topics related to NWO;
- Neighbour News newsletters;
- meetings with community leadership;
- regulatory submissions and review;
- working group meetings;
- facility tours; and
- sponsorships and career programs to support Sahtu workers.

Imperial will continue with its routine community engagement, collaborative work with stakeholder groups and will engage in additional Water Licence-specific community and stakeholder events through closure and reclamation.

2.3 Engagement History

2.3.1 Waste Management Facility

Prior to engagement relating to a renewal of the water licence, Imperial had focused engagement centred on a proposal to construct a Waste Management Facility (WMF) in Norman Wells. On September 26,

2022, Imperial submitted Notification of Withdrawal of Application to the CER and the SLWB for the proposed WMF at NWO.

During the WMF Application review process, it became clear that members of communities and other stakeholders in proximity to NWO wanted to engage on closure holistically and waste management within the context of broader closure. Imperial is working to define and establish a fulsome review process for closure that will include the review of waste management. Further details about this work are in Section 7.2 of this Application.

2.3.2 Waste Management Facility Pre-Submission Engagement Summary - Update

In May 2021, a Community Engagement summary was submitted as part of the Amendment Application-Waste Management Facility Norman Wells. Concerns related to ongoing operations were captured in the summary. Appendix G provides a summary of the items from that application where the status was listed as “ongoing or open” as of May 2021. This Appendix has been updated with the current status.

As the WMF application was withdrawn, the summary does not include any items specific to that topic. Items resulting from the Closure and Reclamation working group remain open.

2.4 Record of Engagement

Since the start of 2023, Imperial has communicated with SSA communities and stakeholders its intention to carry on operations beyond the term of the current CER OA and continue the Water Licence in this renewal application. The renewal application includes the following documents that collectively form the Record of Engagement. These documents are intended to be read together to demonstrate the meaningful engagement conducted relevant to the ongoing operations at NWO.

2.4.1 Engagement Matrix

Initially prepared for concerns related to the WMF, the Engagement Matrix was prepared to guide planning and alignment in the approach to engagement, and provided a summary of the stakeholders, tactics and potential issues of concern.

The Engagement Matrix has been expanded to encompass ongoing operations and is shown in Appendix H.

2.4.2 Engagement Log

A detailed account of all engagement occurrences, the Engagement Log forms the chronological record of engagements related to the ongoing operations of NWO. The timeframe for this submission is April 2023 - March 2024. The Engagement log can be found in Appendix I.

A summary of Open House events that were scheduled and completed in 2023 and 2024 is shown as part of the Engagement Matrix in Appendix H. Imperial continues to reach out to Deline and Colville Lake communities to schedule a visit. At the time of this submission, a meeting time had not yet been confirmed.

Key messages shared during meetings for the renewal application are as follows:

- Imperial plans to continue operations at Norman Wells past 2025.
- Imperial is pursuing the standard 10-year term extension on our permits with the SLWB and the CER.
- Imperial expects to file submissions in the Fall of 2023 to seek continuation of current operations.
- These submissions are not intended to address the closure of the facility.
- Imperial is not requesting any major changes.
- No changes to regulatory limits including water approved for use from the Mackenzie River.

2.4.3 Engagement Summary

A results-based report of engagement related to the ongoing operations for each affected party, organized by Sahtu community and other interested parties (e.g. regulators) is shown in the Engagement Summary in Appendix J.

A summary of issues raised by communities is summarized in Table 2-1; organized by issues and noting which communities brought up the topic in engagement sessions noted above.

Table 2-1: Summary of Issues Raised During Engagement

Issue(s) Raised	Status	Community
Water quality of Mackenzie River a) Natural seeps b) Overall water quality	a) Concerns related to natural seeps were addressed directly in engagement. Imperial is in the process of developing a Frequently Asked Questions (FAQ) internet page share information about this topic. b) Has been addressed directly in engagements and captured for continued and future discussion.	Fort Good Hope Norman Wells
Line 490 incident a) Impacts to water b) How is a future incident prevented c) Prompt notifications to communities d) Compensation for fish harvesting potentially affected by the release (Fort Good Hope)	a) Addressed directly in engagements or captured for continued and future discussion. b) Addressed directly in engagements or captured for continued and future discussion. Ongoing sharing of studies completed. c) Addressed directly in engagements or captured for continued and future discussion. Imperial acknowledged lessons learned to immediately call a broader group of leadership within communities. d) Acknowledged and captured for continued and future discussions	Fort Good Hope Norman Wells Tulita
Line 490 replacement activities a) Ongoing engagement b) Regulatory process c) what happens if equipment becomes stuck during drilling (HDD), and contingency plans d) Town's lower-cost electricity supply is at risk with one-third of production currently shut in. (Norman Wells)	a) to c) Addressed directly in engagements or captured for continued and future discussion. d) Having the lines down is economically challenging for the Norman Wells operations. If approvals for Line 490 are not provided, Imperial may consider temporarily shutting down operations.	Fort Good Hope Norman Wells Tulita
Closure related activities a) Progressive reclamation b) Environmental liability for closure c) Artificial islands d) Waste management	All items addressed directly in engagements or captured for continued and future discussion.	Fort Good Hope Norman Wells Sahtu Renewable Resource Board
Water License a) Use of fracking and chemicals b) Low water level concerns	a) And b) Addressed directly in engagements (no change to water usage, no fracking is conducted)	Fort Good Hope

Issue(s) Raised	Status	Community
Participation in employment and business opportunities	Imperial has active and ongoing discussions and engagement related to business and employment opportunities.	Norman Wells
Engagement of youth/elders	Captured for continued and future discussions.	Fort Good Hope Norman Wells Tulita
Imperial Charter flights	Addressed directly in engagements	Norman Wells

2.5 Traditional Knowledge

As part of Imperial's Water License Renewal in 2013, Imperial, with the support of AMEC, conducted a Traditional Knowledge Study. As part of the Consent Form, Imperial acknowledged that people and communities own their traditional knowledge (TK) and information about their traditional use of the land and the Mackenzie River. Imperial requested permission to use the collected information in its water license renewal application and in its Emergency Response Plan. This work was summarized in the Norman Wells Mackenzie River Environmental Map and is incorporated into the Norman Wells Operations Emergency Response Plan as Map A.7.

Since 2013, there have been two working groups: a Closure and Reclamation working group (meetings took place in 2014-2018) and an Aquatics Effects Monitoring Program (AEMP) working group re-established in 2022 (there is more detail on the AEMP history and working groups included in Section 5.4). Both groups involved obtaining and consideration of TK. Most recently, through the AEMP working group led by the SLWB, TK holders and Imperial have been working together to design a large fish study and Imperial will continue to work together with the communities to ensure that TK is implemented into the AEMP program.

On an annual basis, Imperial completes Emergency Response drills. Community leadership and regulators are invited to provide input to the planning sessions and attend the drills. Imperial also offers opportunities to provide feedback through scheduled community engagements, such as Neighbour Nights or project specific engagements. For the Line 490 Replacement Activities, there were two community engagement sessions held in Norman Wells (August 16, 2023 and February 6, 2024) with the opportunity for community members to provide written or verbal feedback. Resolved and outstanding issues raised through engagement are tracked through the Engagement Record. Through the regulatory process for closure, Imperial anticipates that TK will be part of the process.

2.6 Local Benefits

By investing in communities where we live and work, Imperial is committed to making a positive and lasting contribution to Canadians and as such, NWO continues to support programming, events and education initiatives throughout the Sahtu region. In 2023, this included $100,000 to support community programs and initiatives throughout five Sahtu communities and over $36,000 donated to support education related sponsorships including Sahtu Indigenous scholarships, graduation events and high school achievement awards. Additionally, Imperial is a proud sponsor of the Sahtu Cup, an annual hockey tournament in Norman Wells.

In 2023, donations were made by both employees and the company in support of NWT wildfire relief: $5,000 to the Red Cross and $10,000 to the United Way of NWT. Imperial donated 11 homes to the Sahtu Land Corporations in the five communities, worth over $1 million. Ten of the 11 houses have been accepted and one house donation is pending.

Imperial supports recruitment and development programs that enable Indigenous people to meet the company's employment requirements and business needs. The Northern Development Program (NDP) supports the increase of Sahtu Indigenous employees at Imperial. NDP candidates participate in a two-year term assignment providing the training required to potentially qualify for career hire at Imperial. In 2023, this program sent out offers for 7 opportunities.

Finally, from a local business perspective, over the past 5 years (2018 to 2022), an average of 32% of Imperial's total goods and services purchases have been procured from Indigenous businesses, the vast majority of whom are local to the Sahtu. there was year over year growth in this metric to the point that in 2022, 43% of all goods and services purchases met this criteria. This totals almost $100M of revenues paid to companies that directly benefit local Indigenous individuals and communities.

3.0 Water Source and Usage

3.1 Water Source

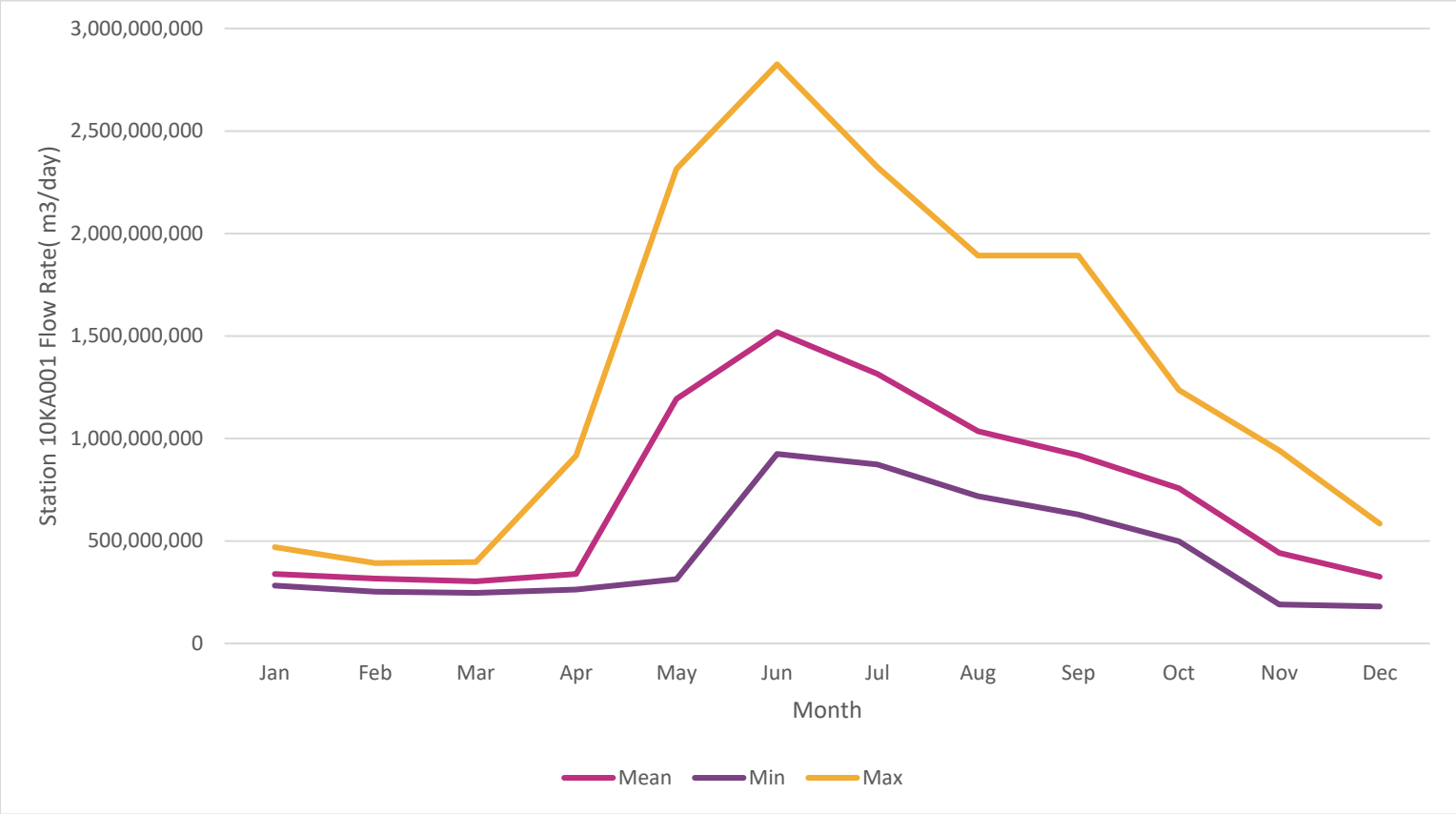
All waters are sourced from the Mackenzie River as per Part D of the Water Licence except for water managed within surface water runoff facilities (SWROF). For context, the volume of water released from the SWROF in 2023 was 4.3% of the volume withdrawn by NWO from the Mackenzie River.

The flow rate of the Mackenzie River was used to assess the maximum available water at NWO. Using historical hydrometric data from Station 10KA001, mean, minimum and maximum monthly flow rates were developed from data collected between 2000 to 2022 (Government of Canada, 2023).

As illustrated in Figure 3-1 below, from January to April the average flow rates are below 4,000 m^3 per second (m^3/s) or 345,600,000 m^3/day. Due to spring thawing (freshet), average flow rates begin increasing in May and peak in July. Through July, August and September, average flow rates remain above 10,000 m^3/s or 864,000,000 m^3/day. Flow rates decline to 8,768 m^3/s in October and reduce below 4,000 m^3/s by December. Collectively, the annual average flow rate for the dataset is 8,672 m^3/s.

Under the existing water licence, the maximum daily withdrawal limit is 16,000 m^3/day. The lowest daily flow rate of the Mackenzie River at Norman Wells was recorded on June 8, 1990 (1,680 m^3/second or 145,152,000m^3/day). Using this hypothetical extreme example as perspective, the daily maximum withdrawal would be 0.011% of the flow. Daily average withdrawals are closer to 6,000 m3/day with an average discharge volume of 4,000 m^3/day, a net withdrawal rate of 2,000 m^3/day or 0.0014% of the lowest flow recorded.

Figure 3-1: Mackenzie River Average Flow Rates (m^3/day) at NWO (Station 10KA001)



3.2 Water Use

3.2.1 Volume

Imperial does not require changes to daily or yearly water allocation limits.

A summary of water use for withdrawal, discharge and injection is presented in Table 3-1 below from 2014 to 2023. Over this time period,

- a total of 17,820,947 m^3 of fresh water has been withdrawn from the Mackenzie River and used within the fresh water cooling loop as part of CPF processes
- approximately 4,529,872 m^3 of the withdrawn water was injected across NWO's field injector wells to maintain reservoir pressure

- approximately 13,230,523 m^3 (74%) of the withdrawn water has been discharged back to the Mackenzie River.

Table 3-1: Summary of Yearly Water Use for NWO from 2014-2023

Year	Freshwater Withdrawal (m^3)	Freshwater Discharge (m^3)	Freshwater Injection (m^3)
2014	2,595,958	1,622,144	973,813
2015	2,297,247	1,492,540	767,734
2016	2,328,913	1,645,291	683,621
2017*	215,030	177,083	37,947
2018*	462,928	462,928	0
2019	2,221,010	1,751,970	469,040
2020	1,621,138	1,186,859	410,406
2021	1,795,790	1,271,990	523,796
2022	2,198,103	1,820,850	377,253
2023	2,084,830	1,798,568	286,262
TOTAL	17,820,947	13,230,523	4,529,872

Figure 3-2 below shows a summary of water use in relation to the licenced limit from 2024 to 2023.

Figure 3-2: Summary of Water Use at NWO from 2004 to 2023

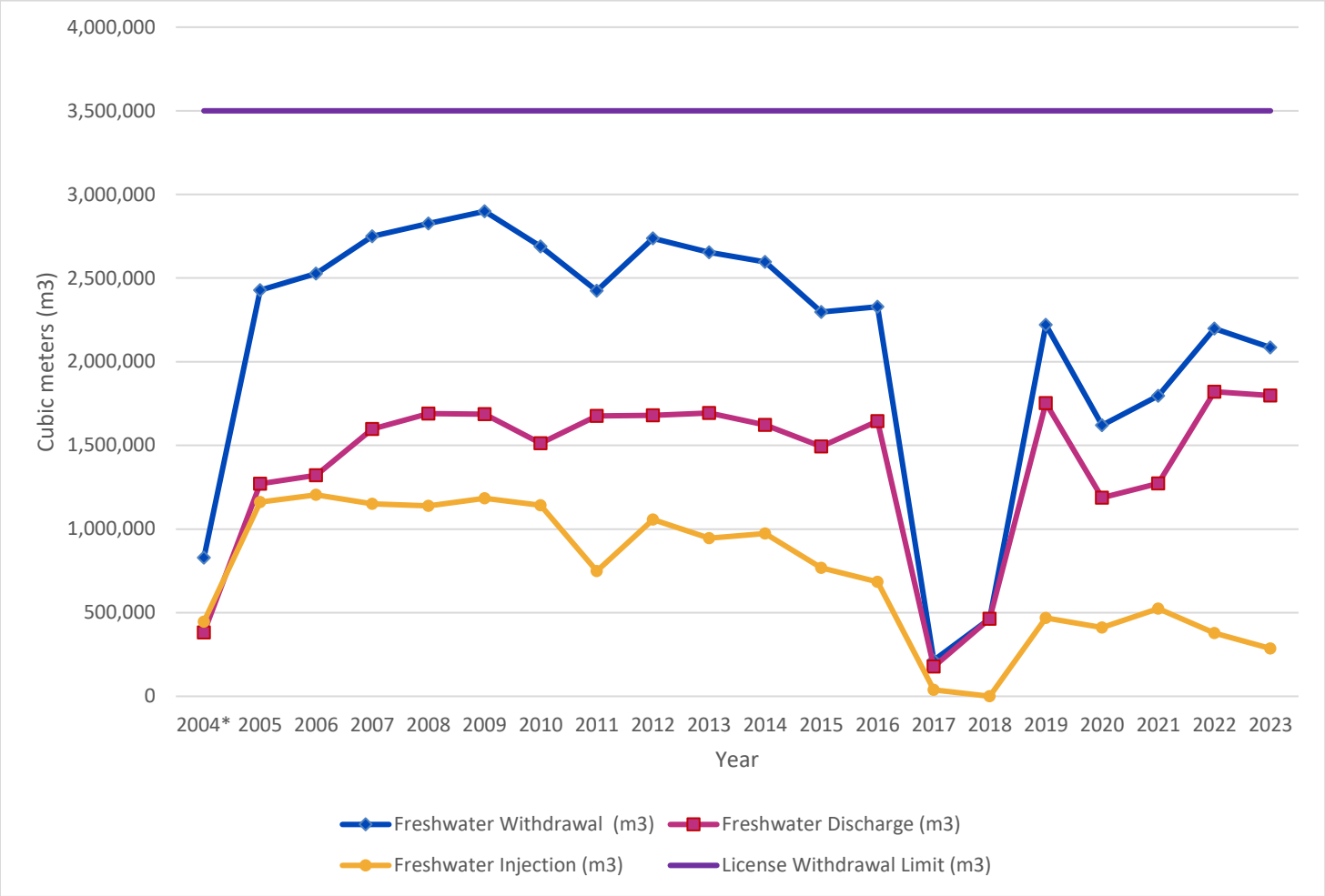


Figure 3-2 illustrates that lower withdrawal volumes were recorded in 2017 and 2018. In November 2016, Enbridge shut down the Line 21 Norman Wells Pipeline as a preventative measure to conduct ground stability investigations, and later shut down the pipeline from late 2017 to late 2018 to complete the Line 21 Segment replacement project (Canada Energy Regulator, 2021). Throughout the beginning of 2018, Imperial worked with regulators and local stakeholders to keep them informed of the start-up progress. On October 13, 2018, Enbridge's Line 21 was re-opened, and Imperial safely restarted the CPF. NWO was once again at limited capacity while production was ramped up for the remainder of 2018 (Imperial Oil Resources NWT Limited, 2018) (Imperial Oil Resources NWT Limited, 2019).

From 2014 to 2023, the average volume of fresh water withdrawn from the Mackenzie River was 2,142,874 m^3/year. 2017 and 2018 have been excluded from the average due to CPF shut down and lower than normal withdrawal. Water usage from the Mackenzie River is not expected to exceed

2,595,958 m^3/year (peak 2014) over the next ten years and remains within the current Licence allocation of 3,500,000 m^3/year.

3.2.2 Points of Withdrawal

The majority of water withdrawn from the Mackenzie River is via River dock pumps (three submerged water pumps that are housed in a closed bunker on the Imperial dock) from where it is pumped to the CPF. Water from the Mackenzie is also intermittently withdrawn from points and along the edges of winter ice bridges between islands, ice bridges between the islands and mainland, and from points along the shore of islands.

To update the list of withdrawal locations with those authorized over the course of the existing licence, as well as for locations that could be used to reduce transportation of water from the Mainland (similar in nature to previous modification approval for Bear Island), Imperial requests that the withdrawal points shown in Table 3-2 be incorporated into a renewed licence for the NWO.

Table 3-2: Water Points of Withdrawal

Point of Withdrawal	New POW	Frequency	Estimated Volume (m3/year)
CPF Intake Water from the Mackenzie River	No	Daily	2,500,000
Various along ice roads/bridges	No	Winter	200,000
Bulk Fuels unloading dock	No	Intermittently	<10,000
Bear Island	No	Intermittently	<10,000
Goose Island	Yes	Intermittently	<10,000
Frenchy's Island	Yes	Intermittently	<10,000
Artificial Islands	Yes	Intermittently	<10,000
Bunkers, ditches, excavations, drainage sumps	No	Intermittently	100,000

Water usage indicated as intermittent would vary in point of withdrawal based on the scope of operations work and would be temporary in nature to support work authorized already under the current licence. Notification could be provided as needed to the inspector prior to any of these work activities as required. To re-iterate, this does not constitute an additional request, is within the existing allocation, and is submitted in the spirit of modifications previously approved. Table 3-2 above is included to reflect potential operating scenarios so they can be captured in a renewed licence.

3.2.3 Points of Use

There are no changes proposed to the activities conducted for the NWO in this application. The anticipated water use under a renewed licence for the CPF cooling and injection process equipment, drilling and any other industrial or maintenance uses associated with the operation remain unchanged from existing uses and are summarized in Table 3-3. In addition, water is used to support maintenance, integrity and project work (described in Appendix D) on an as-needed basis.

Table 3-3: Intended Water Use

Water Use	Primary Source	Estimated Volume (m^3/year)
Cooling	River dock pumps	2,500,000
Injection	CPF	500,000-1,000,000
Winter road construction and maintenance	Mackenzie River along typical routes identified in Figure 2	200,000
Ice road or ice pad construction	Mackenzie River, nearest access point on bank of river	50,000
Drilling	CPF	0
Well abandonment	CPF	400-600
Vehicle washing	CPF	25
Dust suppression	CPF, Mackenzie River, bunkers, ditches, excavations, drainage sumps	5,000
Environmental work (e.g. borehole drilling and installation of monitoring wells)	CPF	10

3.2.3.1 Freshwater Cooling and Injection Process

Freshwater cooling, injection and discharge are described in detail in Appendix D Sections D-1.1.3.5 through D-1.1.3.7.

3.2.3.2 Water Use for Winter Roads

Imperial uses part of its current water allotment to construct winter ice roads. The estimated fresh water volume used to build winter ice roads in 2022 was 171,250 m^3. The volume of water used for winter ice roads will vary year-to-year based on scope and conditions.

3.2.3.3 Drilling

The last production-related wells drilled at NWO were three production wells in 2009. There are no plans for drilling new wells at NWO and Imperial does not anticipate any new drilling programs at this time.

3.2.3.4 Well Abandonment

Fresh water may be required for well abandonment activities which will continue as a part of normal operations as the field nears the end of production. Approximately 20 m^3 of fresh water is estimated to be required for each well abandoned and approximately 0 to 20 wells per year are abandoned.

3.3 Existing Water Users Affected by NWO

The nearest licenced water user is the Town of Norman Wells and the nearest downstream water user is the Charter Community of K'asho Got'ine (approximately 180 km). Each community holds a licence for the withdrawal of water from the Mackenzie River for municipal use. Under Licence S18L3-003, the Town of Norman Wells withdraws water 24 hours/day from the Mackenzie River directly to its water treatment facility and does not store water before treatment (Stantec Consulting Ltd., 2018). Under Licence S20L3-003, the Charter Community of K'asho Got'ine withdraws water from the Mackenzie River over a period of 3 days each April and October to fill a storage reservoir that supplies the water treatment plant (Charter Community of K'asho Got'ine, 2020).

Water users are not limited to people or organizations holding a water licence and could include anyone using the river for water supply, transport, or fishing. Any water user, licenced or not, in the vicinity of the NWO has the potential to be affected by the project in a case where there was a spill or discharge of contaminated material to the river. Any spill to the River would be managed to limit potential adverse affects according to an updated SCARP that includes improvements in notification procedures (as approved by the SLWB). Potential contaminants or wastes will be managed according to the Environmental Protection Plan and Waste Management Plan (as approved by the SLWB).

Following the conditions of the existing water licence, water discharged to the Mackenzie River from the NWO, is sampled prior to release and must meet the water quality criteria established by the SLWB.

4.0 Environmental Management System

Imperial's Environmental Management System is designed to enable Imperial to conduct its business in a manner that is compatible with the balanced environmental and economic needs of the communities in which it operates. The Environmental Management System expectations are as follows:

- Environmental aspects are addressed and controlled, consistent with policy, regulatory requirements, and business plans. Environmental business planning is conducted and integrated into business plans,
- Applicable laws, regulations, permits and other governmental requirements are anticipated and met, and the resulting operating requirements are documented and communicated to those affected. Compliance is periodically verified,
- Environmental performance, including emissions, discharges, and wastes is tracked and stewarded to meet performance goals, and
- Proper long-term shutdown or abandonment of facilities is planned and managed.

Imperial's Environmental Management System is further described in the NWO EPP which was most recently updated March 14, 2024 and sent to the SLWB to be filed on the public registry.

4.1 Environmental Protection Plan

As required by Part E, Condition 5 of the Licence, the EPP sets out the procedures, practices, resources and monitoring necessary to manage hazards to and protect the environment from proposed work and activity. The EPP was developed in accordance with Imperial's Environmental Standards and the MVLWB's guiding document titled*, Land and Water Boards Standard Outline for Management Plans* (Land and Water Board of the Mackenzie Valley, 2021). Per Part E Condition 6 of the Licence, Imperial reviews the NWO EPP annually and submits revisions to the EPP to the SLWB for review and approval when updates are necessary. An updated version (2024) of the EPP was submitted to the SLWB in May 2024.

5.0 Water and Waste Management

The following sections summarize Imperial's Waste and Water Management strategy to satisfy Part E of the Licence. Several plans are outlined below that cover different conditions of waste and water management at NWO. The following plans were developed in accordance with the MVLWB guiding document titled, *Land and Water Boards Standard Outline for Management Plans* (Land and Water Boards of the Mackenzie Valley, 2021).

- Quality Assurance/Quality Control Manual (QA/QC Manual, per Annex A, Condition A3, submitted to the SLWB in June 2021 and approved in July 2021; outlines surface water SNP, including sampling, quality control and assurance, monitoring, inlet and effluent sampling.
- Groundwater Management Plan (GMP), per Part E Conditions 2 to 4 and Schedule 4, submitted to the SLWB on December 22, 2022; outlines groundwater-SNP quality control and assurance, monitoring and sampling.
- Waste Management Plan (WMP), per Part E Conditions 7 to 9, submitted to the SLWB in July 2021; describes effluent management, as well as other wastes produced as part of Imperial's routine and non-routine operations.
- Aquatic Effects Monitoring Program (AEMP), per Part I Condition 2, submitted to the SLWB on December 19, 2022; the AEMP seeks to answer if routine or historic activities at Imperial's NWO introduce substances into the environment that could cause acute or chronic effects by altering the Accumulated Environmental State (AES) of the aquatic environment. Version 4 of the AEMP was rejected by the SLWB on June 9, 2023. Imperial has addressed conditions outlined in the reasons for decision document issued June 12, 2023, and will continue working with the AEMP Working Group in 2024 to finalize the Large Fish Study component to be included in the upcoming Version 5 submission.

The following reports are submitted with regards to water use, monitoring and closure and reclamation:

- Annual Water Use Reports, as per Part E Conditions 2 to 4 and Schedule 4, submitted to the SLWB March 31st annually; summarizes water usage, effluent monitoring, reportable releases, groundwater and surface water monitoring and waste generated. The 2023 Annual Water Use Report was submitted to the SLWB March 28, 2024 (Imperial Oil Resources NWT Limited, 2024).
- Annual AEMP summary reports, per Part I Condition 3, submitted to the SLWB March 31st annually; provides updates on water quality and/or quantity, aquatic habitats, and aquatic life The

2024 AEMP summary report was submitted to the SLWB on April 30, 2024 (Tłegǫ̀hłı̨ Reclamation Services Advisian, 2024).

- Annual Closure and Reclamation Program Reports, as per Part J, Condition 4, submitted to the SLWB annually on May 31st; provides updates of closure and reclamation activities at the NWO. The 2023 Annual Closure and Reclamation Progress Report was submitted to the SLWB on May 23, 2024 (Tłegǫ̀hłı̨ Joint Venture, 2024). This report provides a summary of work completed by Imperial in 2022.

5.1 Surveillance Network Program

As required under Part B of the Licence, Imperial maintains a Surveillance Network Program (SNP). The SNP consists of the following components:

- Surface water sampling of the intake and discharge water used in the CPF cooling system;
- Sampling, during and prior to discharge, of impounded or collected water from impound basins, collection sumps, excavations, ditches, bunkers and/or bermed areas; and
- Groundwater sampling of the SNP network groundwater monitoring wells.

Collectively, the SNP components are intended to monitor for potential facility-related impacts entering or migrating to the environment. All sampling completed under the SNP is summarized in an Annual Water Use report and submitted to both SLWB and the CIRNAC inspector (Imperial Oil Resources NWT Limited, 2023b).

The SNP is detailed in Annex A of the Licence and sets out the requirements for the three branches of the SNP program including but not limited to sampling expectations, water quality release limits, and reporting. The three branches of the SNP are listed below.

- Fresh Water – Mackenzie River water
- Surface Water – snow and rainwater
- Groundwater – below surface water

The NWO Laboratory QA/QC Manual, outlines steps and procedures for the surface water SNP and has been approved by the SLWB. QA/QC information for groundwater is in the NWO GMP which was updated and sent to the SLWB for approval in April 2024.

5.2 Effluent Management

As required by Part E Conditions 12 to 16 of the Licence, Imperial samples and manages surface water discharge and run-off at the NWO. Yearly discharge volumes are summarized in Table 3-1 above. The following plans govern effluent management at the NWO, detailing the sampling locations, parameters, and methodologies:

- The QA/QC manual outlines procedures for sampling frequency, type, and water quality criteria for discharge to the Mackenzie River.
- The WMP outlines waste acceptance and fluids handled through the injection process.
- the EPP outlines mitigations to prevent erosion near waterbodies.

Water with results below the Licence guidelines is discharged back to the Mackenzie River. All surface water that has been tested and discharged to the Mackenzie River is reported in the Annual Water Use Reports.

5.3 Groundwater Management Plan

As required by Part E, Conditions 2 to 4 of the Licence, Imperial has developed a Groundwater Management Plan (GMP). Details of parameters sampled and sampling frequencies can be found in the most recent GMP.

The GWP was developed to:

- Monitor select existing groundwater wells, believed to have had no impact, in and around on-going operations across the site.
- Use the monitoring results to serve as early detection of change in groundwater.
- Use monitoring results to determine if there is a need for remediation or a remedial action plan.
- Provide a description of the groundwater information in the Annual Water Use Report.
- Provide an update on remedial efforts in the Closure and Reclamation Program Annual Report.
- Assist stakeholders in understanding the scope of the groundwater monitoring, the evaluation process, and the response plan.

An ongoing site-wide groundwater monitoring program has been implemented at NWO since 1997. In 2012, a site-wide groundwater well background study was completed to develop statistical ranges for each hydrogeologic zone at the NWO. The results of the background groundwater chemistry analysis aided in the selection of groundwater-SNP wells. Groundwater-SNP wells are installed in the uppermost

groundwater bearing zone and are intended for early identification of change in and near active work sites (Category 1 monitoring wells). Wells installed for the purpose of monitoring and remediation are intended to delineate areas of historical impacts and track remediation progress (Category 2 monitoring wells); these wells are further explained in Section 7.5.

Groundwater monitoring wells deeper than 15 m below ground surface were not considered part of the Groundwater-SNP as historic data has shown that natural occurrences of hydrocarbons and/or saline groundwater tend to dominate in the deeper groundwater bearing zones.

Results for Category 1 monitoring wells are reported in the Annual Water Use Report and results from Category 2 monitoring wells are reported in the Annual Closure and Reclamation Program Report as described in Section 7.5.

5.4 Aquatic Effects Monitoring Program

5.4.1 AEMP Working Group

Imperial has been monitoring the aquatic environment in and around the NWO for decades. In 2014, the SLWB developed terms of reference to establish a Working Group (WG) to develop an AEMP as part of the conditions within Water License S13L1-007. The stated goal within the Terms of Reference is:

"…to develop a new Aquatic Effects Monitoring Program for the Norman Wells operation, which outlines goals, standards, timelines, consultation requirements, methodologies, and QA/QC."

Significant progress has been made since the WG began its work. Since 2013, four versions of the AEMP have been prepared and submitted for SLWB and community review. Each version of the AEMP has been revised in response to feedback provided within the WG and from environmental data collected as part of the various versions of the program. Within the WG, there is now general agreement regarding the water quality sampling and small fish study components of the program.

In November 2022, the WG was re-established by the SLWB with a renewed focus on developing a meaningful large fish study. The WG has made progress over the past two years in developing a large fish study to be included in the upcoming AEMP Version 5 submission to the SLWB.

5.4.2 AEMP Development and Annual Summary Report

The 2015 Water Licence requires Imperial to develop and maintain a variety of monitoring plans and other initiatives related to managing the operation, including the execution of an AEMP. As required by Part I Condition 2 of the Licence, Imperial has developed an AEMP in collaboration with a working group from communities and established by the SLWB.

Version 4 of the AEMP is currently available on the public registry. In November 2023, the SLWB directed Imperial to postpone the submission of AEMP Version 5 until the SLWB schedules a WG meeting in the first half of 2024. Imperial will address comments from that meeting of the WG into AEMP Version 5 and submit the document to the SLWB three to six months after the WG.

During the development of the AEMP versions, Imperial has continued to monitor for potential aquatic effects. Water quality sampling for the AEMP has been conducted annually since 2017. Version 2 of the AEMP was followed from 2017 to 2022 with some amendments incorporated in 2019 from Version 3 (Imperial Oil Resources NWT Limited, 2019). Version 4 sampling procedures were followed for the 2023 reporting period (Tłegǫ̀hłı̨ Reclamation Services Advisian, 2024). In 2024, Imperial will continue conducting the water quality and small fish study components described the current AEMP Version 4 as part of its ongoing annual field programs.

Imperial expects that Version 5 of the AEMP will be posted on the registry following submission.

Program results are reported in an annual AEMP summary report submitted to SLWB. The 2023 AEMP Summary Report was submitted to the SLWB in March 2024 and will be available on the public registry.

5.5 Waste Management Plan

As required by Part E of the Licence, Imperial has developed a WMP which was submitted to the SLWB in June 2021 for approval. The WMP addresses the management of the following categories:

- solid waste
- liquid waste
- semi-solid waste and miscellaneous

Drilling waste disposal terms and conditions are set out in the Licence. A summary of historic drilling activity and disposal of drilling waste is provided in the Annual Water Use Report (Imperial Oil Resources NWT Limited, 2023b).

Handling, storage and disposal of petroleum products and hazardous wastes are outlined in from the WMP. Hydrocarbon impacted soils from accidental releases on-site are treated in the biocells if soil parameter concentrations are within acceptable limits for biotreatability. This management of impacted soils is used to further closure and reclamation activities as outlined in Section 7.4 and in accordance with the Biocell Operations Guidance Manual.

5.6 Waste Acceptance

Imperial audits all waste receiver facilities to confirm their safety, environment, regulatory, and financial systems meet Imperial standards. There is no industrial landfill in Norman Wells; all oilfield waste generated by Imperial that cannot be managed on-site within the capacity of existing facilities is shipped to facilities in Alberta, British Columbia, or Northwest Territories for treatment and/or disposal.

Waste generated on-site is collected and disposed of at appropriate waste facilities both on and off-site in accordance with the operating authorization conditions for Imperial's On-site Hazardous Waste Storage Yard, Generator Number NTG339, Receiver Number NTR019. In 2023, approximately 21 tonnes of hazardous waste and 280 tonnes of non-hazardous waste were transported to approved facilities outside of Norman Wells including Yellowknife and Northern Alberta (High Level and Edmonton). Copies of Off-Site Disposal Agreements for the NWT are provided in Appendix K.

As of the end of 2023, the biocells contained approximately 6,100 m^3 of impacted soil (see Section 7.4). Historically, Imperial completed bioremediation, however, due to soil volumes and treatability of recently excavated material on-site, treatment has been inactive over past couple years. Annual maintenance continues to maintain structural integrity of the Biocells.

Waste generated at NWO is listed in Appendix B of the WMP.

5.7 Waste Management Facility Application Summary

In September 2021, Imperial submitted an amendment application for S13L1-007 for the construction and operation of a WMF at NWO. In September 2022, Imperial withdrew the amendment application with the reasons outlined in a letter submitted to the CER and SLWB at that time.

There are no plans to apply for a WMF outside of the closure process. While waste management remains an important component of the closure plan for Norman Wells, during the WMF Application review process, it became clear that members of communities and other stakeholders in proximity to NWO wanted to engage on closure holistically and waste management within the context of broader closure. Imperial is working to define and establish a fulsome review process for closure that will include the review of waste management.

For clarity, Imperial is not applying to construct or operate a WMF as part of this renewal application.

6.0 Contingency Plans

Per Imperial's environment policy, incidents resulting from its operations are responded to quickly and effectively, in cooperation with industry organizations and authorized government agencies. NWO conducts regular tabletop drills and full-scale emergency response exercises to practice emergency response and evaluate preparedness.

Imperial reviews the primary contingency plans on an annual basis. On May 30, 2024, Imperial sent the SLWB updated versions of the:

- Imperial Upstream Core Emergency Response Plan,
- Norman Wells Operations Emergency Response Plan (previously called 'Site specific ERP'),
- Norman Wells Operations Spill Contingency and Response Plan (SCARP), and
- Norman Wells Operations Mackenzie River Tactical Response Plan (MRTRP).

A summary of each plan is in the following sections and Imperial anticipates that the updated versions of each plan will be posted on the public registry.

6.1 Core Emergency Response Plan

Imperial's Core ERP establishes a structured and systematic process for responding to events or situations that pose, or could pose, a threat to the people, environment, assets, or corporate reputation, impacted by operations. The Core ERP provides guidelines and information to assist Imperial management in effectively responding to an emergency that has the potential to impact any of the following: activities, operations, facilities, resources, environment, and personnel.

The Core ERP relates to emergency preparedness and response associated with the operations and activities being conducted. It is designed to serve as a high-level and overarching plan into which respective, functional, tactical-level operational emergency response plans can bridge to ensure that emergency response activity and the management of incidents is consistent across all business activities. This plan does not remove the requirement or supersede any subordinate applicable, project or site-specific emergency response plans.

6.2 NWO Emergency Response Plan

The NWO ERP is a site-specific emergency response plan (SSERP) that covers tactical actions at NWO and is to be used in conjunction with the Core ERP. The NWO ERP is a planning and preparedness document to demonstrate the potential response capability available to respond to emergencies that impact:

- activities,
- operations,
- facilities,
- resources,
- environment, or
- personnel.

The 2024 update to the plan incorporates updated internal and external contacts that may need to be notified in an emergency, including communities. An external regulatory notification process and emergency response equipment locations were added to the updated version. The updated version also includes tank fire responses, merged spill responses, and incorporated references to the MRTRP and SCARP.

6.3 NWO Spill Contingency and Response Plan

The NWO SCARP outlines response actions and mitigation procedures for spills of any size at NWO. The plan details spill response processes that are designed to minimize potential health and safety hazards, environmental damage and guide cleanup efforts that are effective and efficient. The NWO SCARP is to act as a supplemental plan to the NWO ERP. The 2024 update of the plan was essentially a revision of all sections and information to include integration of information collected in 2023 through community engagement (contact and information flow improvements) and from a third-party review of the Plan by Triox Environmental Emergencies Ltd.

6.4 Mackenzie River Tactical Response Plan

The purpose of the Mackenzie River Tactical Response Plan is to provide the necessary information to respond safely and effectively to an incident that may occur at or near Imperial's NWO. This plan has

been developed to promote the protection of the public's health and safety, and environmentally sensitive areas that could be impacted.

7.0 Remediation, Reclamation and Closure

This section provides a summary of NWO's closure and reclamation planning efforts and associated progressive reclamation work completed to date.

7.1 Interim Closure and Reclamation Plan

The NWO ICRP (Imperial Oil Resources N.W.T. Limited, 2016) was completed in 2016. It was submitted to the SLWB in March 2016 and approved with conditions in January 2017.

An update to the ICRP was completed in 2022 as an addendum. This update was submitted to the SLWB on March 3, 2022, with SLWB Acceptance dated September 26, 2022. This update included a summary of work completed to date and clarifications to existing ICRP content.

The ICRP describes the coordinated actions planned to return the site and affected areas to established settings that are compatible with a healthy environment and with safe human activities. This plan was developed in collaboration with a working group consisting of regulators, local community representatives, Indigenous governments and organizations, and other interested parties.

7.2 Final Closure and Reclamation Plan

Per Part J Condition 5 of the Licence, Imperial is required to submit a Final Closure and Reclamation Plan to the SLWB for approval a minimum of 24 months prior to the end of commercial operations at NWO.

Imperial's operations at NWO are anticipated to produce for the next five to ten years, and Imperial is currently preparing for the transition to reclamation. Imperial anticipates over 20 years of remediation and reclamation work will follow the end of commercial production.

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 for 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.

7.3 Progressive Reclamation

As discussed in the ICRP, 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.

NWO progressive reclamation work is described in the annual closure and reclamation report provided to the SLWB. Details of historical progressive reclamation activities prior to 2024 were reported in the 2023 Annual Closure and Reclamation Progress Report (Tłegǫ̀hłı̨ Joint Venture, 2024) which was provided to the SLWB in 2024.

The following activities may occur in any given year, on an ongoing basis in support of progressive reclamation:

- Downhole abandonment activities for production/injection wellbores,
- Abandonment of groundwater wells that are not needed for monitoring programs,
- Site assessments (e.g., Phase I/II/III assessments and investigations) to identify and define impacted source areas,
- Soil remediation (e.g., excavation & treatment on-site, in-situ vapour extraction, ex-situ bioremediation, or interim containment and capping in place),
- Groundwater remediation in high priority areas,
- Monitoring activities (e.g., groundwater, surface water and vegetation monitoring),
- Surface reclamation activities such as soil contouring or re-vegetation in select areas, and
- Decommissioning, dismantling and demolition.

7.4 Hydrocarbon-Contaminated Soils Treatment (Biocell)

There are two biocells on-site, which are engineered for batch treatment of hydrocarbon-affected soils. Fluids that are periodically removed from the sumps to avoid potential for overflow and are transported to the F-31X ("Grizzly Tank") injection well for disposal. Biocell 1 currently stores treatable, PHC impacted soil that is awaiting biotreatment. Biocell 2 temporarily stores untreatable impacted soil awaiting disposal options as outlined in the Annual Closure and Reclamation Progress Report (Tłegǫ̀hłı̨ Joint Venture, 2023).

Biocell operation and management is discussed in the Biocell Operations Guidance. An update to the Biocell Operations Guidance Manual is anticipated in 2024/2025.

7.5 Groundwater Management

An extensive network of groundwater monitoring wells (Category 2 monitoring wells) has been installed to delineate areas of historical impacts and track remediation progress.

A site-wide monitoring well inventory was conducted in 2023. The results of the monitoring well inventory are presented in Table 1 of the 2023 C&R report. Given the number of monitoring wells in this program (the 2023 monitoring well inventory identified 601 in total), the data collection will be executed over two years in 2023 and 2024. The purpose of establishing this data set is to further the overall hydrogeologic characterization of the site and support the ongoing development of site-specific guideline and the overall conceptual site models (CSMs) for the Mainland and islands. A revised groundwater sampling rationale will be developed after the site-wide baseline groundwater sampling is assessed. The results of the 2023 groundwater and surface water monitoring and sampling program are summarized in the following in Table 2 through Table 8 of the 2023 C&R Report (Tłegǫ̀hłı̨ Joint Venture, 2024).

Three groundwater treatment systems were installed in 2003 as follows:

- A dual phase (groundwater and free-phase hydrocarbon) extraction (DPE) system operating seasonally in the B-38X and former Fire Training area,
- A hydraulic containment and groundwater extraction system at the former Refinery Bank area, and
- A multiphase (groundwater, free-phase hydrocarbon and hydrocarbon vapour) extraction (MPE) system operating at the former Refinery Bank area.

The purpose of the DPE and MPE systems is to remediate groundwater and reduce the overall hydrocarbon mass in soil and groundwater to a point where remedial excavation and on-site soil treatment can be safely conducted to complete remediation of their respective areas.

The purpose of the containment and extraction system is to prevent impacted groundwater from leaching into the Mackenzie River.

7.6 RECLAIM Closure Cost Estimate

An updated closure and reclamation cost estimate is provided in Appendix L.

8.0 Contractors

A list of contractors and subcontractors currently involved in NWO is provided below.

Table 8-1 Contractors and Subcontractors Currently Involved in NWO

Company Name	Responsibilities	Mailing Address	Community	Prov/Terr	Postal Code
HSE Integrated Ltd.	On-site Medic Services e.g. On-site First Aid Attendants	7739 Edgar Industrial Way	Red Deer	AB	T4P3R2
Bluewater Group	Inbound Materials / Freight Forwarding & Customs - Warehousing, shipping and receiving	Production Warehouse, 750 Mackenzie Dr, Bag 5000	Norman Wells	NT	X0E0V0
Trumpeter Camp Company Partnership	Camp (Accommodations and meals)	PO Box 370, 16 Fox Crescent Wells	Norman Wells	NT	X0E0V0
Yamouri Inn Ltd- Subcontractor to Trumpeter Camp	Catering Services	PO Box 268, 1 Town Square	Norman Wells	NT	X0E0V0
F.M. Electronics Ltd.	Telecommunications Services	F.M. Electronics Ltd. Box 240	Onoway	AB	T0E1V0
North-Wright Airways Ltd	Air Freight & Passengers to Islands	Bag Service 2200	Norman Wells	NT	X0E0V0
Boiler Controls & Installations (2019) Inc.	HVAC and Housing/Office Maintenance	509 Canol Drive	Norman Wells	NT	X0E0V0
Ditchers Landscaping	Landscaping	281 Mackenzie Drive	Norman Wells	NT	X0E0V0
Graham Maintenance Services LP	Pipeline Integrity Services	10840 27th Street SE	Calgary	AB	T2Z3R6
McCoy Enterprises Ltd.		PO Box 11, 12 Canol Drive	Norman Wells	NT	X0E0V0
Canol Oilfield Services	Fluid Hauling Services	PO Box 178	Norman Wells	NT	X0E0VO
Fluor Driver	General Mech Maintenance, Projects & Turnaround Services	Corp - 1003 Ellwood Road SW Suite 101	Edmonton	AB	T6X0B3
HRN Contracting - Subcontractor to several on-site Contractors like Fluor Driver, Boiler Controls, Graham, etc.	Heavy equipment and operators	65 Mackenzie Drive, Box 329	Norman Wells	NT	X0E0V0
Ranger Inspection - Subcontractor to Fluor Driver	Inspection services	#130, 11051-50 Street SE	Calgary	AB	T2C3E5
Team Industrial Services inc. - Subcontractor to Fluor Driver	NDE/NDT services	2507-84 Avenue	Edmonton	AB	T6P1K1
Ace vegetation control services ltd- Subcontractor to Fluor Driver	Vegetation Control services	2001 - 8 Street	Nisku	AB	T9E7Z1
Green Enterprises - Subcontractor to Fluor Driver	Sustainability services	Box 234	Norman Wells	NT	X0E0V0
Ed's Valve servicing - Subcontractor to Fluor Driver	Valves servicing	#103, 4012 Landry Avenue	Red Deer	AB	T4S2B3
Norman Wells Claimant Corporation ltd.- Subcontractor to Fluor Driver	Marine Services	9 Woodland Drive, Box 69	Norman Wells	NT	X0E0V0
Integra Technologies Limited- Subcontractor to Fluor Driver	specialized services, rentals, and products to the Energy industry	3456 - 78 Avenue	Edmonton	AB	T6B2X9
Summit inspections Services Ltd.	Inspections	7935 8 Street NE	Calgary	AB	T2E8A2
Lifting Equipment Ltd. - Subcontractor to Fluor Driver	Crane and Hoist Inspection services	#5, 711-48 Avenue	Calgary	AB	T2G4X2
Overhead Door Company of Edmonton - Subcontractor to Fluor Driver	Door Maintenance services	11706-160 Street NW	Edmonton	AB	T5M3Z3
Robert Allan Ltd-Subcontractor to Fluor Driver	Ship Designs & Marine Services	230-1639 West 2nd Avenue	Vancouver	BC	V6J1H3
New Age Oilfield Services Inc. - Subcontractor to Fluor Driver	Oilfield Services	7403 36 Street	Leduc	AB	T9E0Z5
Vallen Canada - Subcontractor to Fluor Driver	Supply of industrial MRO and safety products	#100, 7606-42 Street	Leduc	AB	T9E0B5
Acuren Group Inc. - Subcontractor to Fluor Driver	NDE/NDT services	7450 18 Street	Edmonton	AB	T6P1N8
Northridge contracting limited- Subcontractor to several on-site Contractors like Fluor Driver, Boiler Controls, Graham, etc.	Hydrovac, steam and water trucks	BOX 351, 12 Mackenzie Drive	Norman Wells	NT	X0E0V0

Company Name	Responsibilities	Mailing Address	Community	Prov/Terr	Postal Code
Altex Industries inc. Subcontractor to Fluor Driver	Heat Exchangers manufacturing and maintenance	6831 42nd Street NW	Edmonton	AB	T6B2X1
Sterling Crane Subcontractor to Fluor Driver		2440-76 Avenue	Edmonton	AB	T6P1J5
Royal Canadian Legion	Water delivery and sewage and quarry materials	PO Box 5	Norman Wells	NT	X0E0V0
PTW Canada Energy	I&E - Instrumentation, Electrical Work and Meter Proving	PO Box 37			
KBL Environmental Ltd	Waste Disposal - Green Bin Disposal	PO 1895	Yellowknife	NT	X1A2P4
Lochend Energy Services	Well servicing	PO Box 280	Crossfield	AB	T0M0S0
RPM Specialty Services Ltd.	Well servicing	38316 Range Road 281	Red Deer	AB	T4E1X8
Precision Well Servicing	Well servicing	Eighth Avenue Place Suite 800, 525 - 8 Avenue S.W.	Calgary	AB	T2P1G1
Solar Turbines Canada Ltd.	Turbine Services	4108 78 Ave NW	Edmonton	AB	T6B3M8
Canadian Helicopters	Helicopter services	4500, 1000 Airport Road Edmonton International Airport	Edmonton		T9E0V3
Ventus Geospatial	Drone surveillance – ROW flyovers and Natural Seeps	562 39th Street N	Lethbridge	AB	T1H6Y2
Arcadis	Bathymetric survey / hydrodynamic support	830 NE Holladay Street	Portland, USA	OR	97232
SanJel	Well Servicing (Cement)	530 8 Avenue SW #1600	Calgary	AB	T2P3S8
Halliburton	Well Servicing (Tool hands, Kill Mud Specialists	10202 70 Avenue	Clairmont	AB	T8X5A7
GeoVerra	Bathymetric survey and general surveying	Unit 202 - 1475 Ellis Street	Kelowna	BC	V1Y2A3
Tłegǫ̀hłı̨ Reclamation Services Advisian (TRSA)	Environmental consulting support to NW Ops	49 Quarry Park Blvd SE	Calgary	AB	T2C3E7
Tlegothi (Parsons/507244 NWT JV)	Environmental consultant supporting E&PS – progressive reclamation programs on-site	214 11 Avenue SW	Calgary	AB	T2R0K1

9.0 Other Studies

Imperial completed several studies or modifications to satisfy conditions under the Current Licence; Table 9-1 highlights studies completed to date. Study reports have been submitted to the SLWB and are on the public registry.

Table 9-1: Other Studies completed at NWO

Study	Description	Submitted to the SLWB	Approved by the SLWB
Traditional Knowledge Study	Section19 of Renewal Application submitted in 2013.	August 27, 2013	March 5, 2015
Differentiation of Natural Seeps vs Spills	Section 5 of the Renewal Application for Water Licence S03L1-001. Since 1998, Imperial has commissioned a number of field and laboratory investigations of the oil and gas seepage zones around the mainland portion of NWO. Results to date indicate that it is possible to differentiate between naturally occurring hydrocarbon seepage zones and hydrocarbon release areas attributable to industrial activities.	August 2013	March 5, 2015
Artificial Islands	Post Closure Studies – Section 2.2 of the ICRP Appendix R. A preliminary, quantitative post closure reclamation options study was completed as part of the ongoing examination of various alternatives related to the six artificial islands to support ongoing closure and reclamation at the NWO.	March 3, 2022	September 26, 2022
	Habitat Assessment – Section 2.3 of the ICRP Appendix R A fish and fish habitat study were completed to evaluate nearshore habitat that has established around the islands since their construction in the mid-1980's and to assess suitability for resident and migratory fish species.	March 3, 2022	September 26, 2022
Waste Facility Modification	New Soil Washing Facility – pilot project to determine efficacy of technology to treat salt-impacted soils at NWO.	August 5, 2015	July 28, 2015

Study	Description	Submitted to the SLWB	Approved by the SLWB
Withdrawal of Mackenzie River water from Alternative Location	For withdrawal of water from the Mackenzie River at a location not currently listed within the Licence, through a water pump strictly for the purposes of the flushing of flowline 65/77.	April 18, 2018	SLWB approval May 30, 2018
	Withdrawal of water from the Mackenzie River at an Alternative Location (Bear Island)	July 2, 2019	SLWB approval July 30, 2019 CIRNAC approval July 11, 2019
Operation and Maintenance Dredging	Dredging at the Mainland Dock	November 4, 2020	December 23, 2020
Waste Management Facility	Amend the Type A Water Licence S13L1-007 to include a Waste Management Facility	September 30, 2021	Application was withdrawn from CER and SLWB on September 26, 2022.
Special Effects Study (SES) as part of AEMP; Schedule 6	Proposed changes to Water Licence S13L1-007 with addition of visible sheen and modification of metals and ions parameters.	June 2, 2015	GNWT recommendations issued June 17, 2015. SLWB approval January 4, 2016
	Evaluation of visible sheen method and evaluating metals and ions in groundwater and surface water.	April 29, 2022	SLWB requested additional modifications on March 27, 2023; Imperial completed field trials in 2023 to validate effectiveness of visible sheen method for Cat A SWRO locations and continues to work with SLWB to address recommendations.
Modification Bosworth Creek Erosion Repair	The proposed scope includes required bank armouring work to mitigate an area of erosion along a 21 m section of the Bosworth Creek bank near flowline infrastructure on the mainland of Norman Wells Operations.	February 22, 2023	SLWB Approval March 28, 2023 DFO approval March 14, 2023.

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11.0 Figures

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MACKENZIE RIVER

Site Location

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Kilometers

- Proven Area Boundary
- Norman Wells Municipal Boundary
- Sahtu Settlement Area
- Sahtu Settlement Land

NOTES:
- Imagery last updated: December 20, 2022.

Imperial

IMPERIAL OIL RESOURCES

NORMAN WELLS ALL AREAS
REGIONAL OVERVIEW MAP
OVERVIEW MAP

PROJECTION	DATUM	CONTRACTOR NAME	CONTRACTOR MAP NUMBER
UTM 9N	NAD83	--	Figure 1

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7,242,000

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Typical Ice Road Configuration

Bosworth Creek

Central Processing Facility

MAINLAND

Bosworth Creek

Artificial Island #3 (Dehcho)

Artificial Island #4 (Ekwe)

Artificial Island #1 (Rayuka)

Artificial Island #2 (Rampart)

Artificial Island #5 (Iteh K'ee)

Artificial Island #6 (Little Bear)

GOOSE ISLAND

FRENCHY'S ISLAND

MACKENZIE RIVER

BEAR ISLAND

MACKENZIE RIVER

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Metres

- Utilized during Goat Trail and Ice Road
- Utilized ONLY during Goat Trail
- Utilized ONLY for Ice Road
- Imperial Flowlines
- Roads
- Island Extent
- Central Processing Facility
- Proven Area Boundary
- Norman Wells Municipal Boundary

NOTES:
- Imagery last updated: July 06, 2022.

Imperial

IMPERIAL OIL RESOURCES

NORMAN WELLS ALL AREAS
NWO GENERAL ARRANGEMENT
OVERVIEW MAP

PROJECTION	DATUM	CONTRACTOR NAME	CONTRACTOR MAP NUMBER
UTM 9N	NAD83	--	Figure 2

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