

Waste Management Plan

Waste Management Plan

Contents

- Waste Management Plan..... 1
- Part 1: Introduction..... 2
 - Imperial's Approach to Environmental Management 2
 - Regulatory Framework..... 6
 - Waste Management and Monitoring Plan Objectives..... 7
 - Location of Waste Management Activities 7
- Part 2: Identification of Waste Types..... 8
- Part 3: Management of Each Waste Type 10
 - Hazardous and Non-Hazardous Waste 10
 - Sewage 10
- Part 4: Infrastructure Required for Waste Management 12

Part 1: Introduction

The Cdn-Sup KMG Jean Marie B48-6130-12030 Licence #448 (JMR B-48) is a relatively shallow (~784 m depth) exploration well that was drilled and abandoned in 1969 and which was never put into production. The well is located on an unmaintained lease in a boreal forest near the community of Jean Marie River, NWT.

In 2014 and 2015, the Office of the Regulator of Oil and Gas Operations (OROGO) completed gas migration testing events which resulted in learning the well was leaking at a low rate. On March 2, 2021, OROGO gave direction for re-abandonment of the well by March 31, 2022.

Company Name:	Imperial Oil Limited.
Site Name:	Cdn-Sup KMG Jean Marie B-48 Well
Site Location:	00/B48 61-30 120-30/0 [NT] Well Centre: NAD83, UTM Zone 10: 6815490m [Northing] 625799m [Easting]
Effective date of Plan:	December 2021
Project Description:	Well Re-abandonment
Site Description:	An exploration well was drilled by Canadian Superior in March of 1969. Once it was determined that the Hume Reef Formation (Horn River Platform) did not have commercially producible hydrocarbons, the well was abandoned. The proposed work is to re-abandon the well as directed by OROGO and complete cut, cap and reclamation activities in subsequent years.
Nearby Communities:	Jean-Marie River, NWT, located approximately 7km Northwest Fort Simpson, NWT, located approximately 55km Northwest

Imperial's Approach to Environmental Management

1.1 Operations Integrity Management System

Imperial's Operations Integrity Management System (OIMS) has been in effect since 1992 and forms the overall framework for Imperial's operations. OIMS includes systems designed to ensure the establishment of processes and procedures necessary to comply with the laws, regulations, and internal requirements related to Safety, Security, Health, and Environment (SSHE).

OIMS is embedded in day-to-day work processes to establish common expectations that every business unit must fulfill to proactively manage risk. OIMS is implemented over the complete life cycle of a project from exploration and development to production and reclamation. It provides a systematic, structured and disciplined approach to identify and manage risk, measure progress, and ensure management accountability.

1.1.1 Managing Operational Integrity

OIMS has been continuously improved to include behavior-based safety, security, environmental matters, and enhanced community involvement. Lloyd's Register Quality Assurance, Inc. (LRQA), an assessment and certification service, confirmed that OIMS meets the requirements of the ISO 14001 standard for environmental management systems. LRQA also recognized that OIMS meets all the requirements of the Occupational Health and Safety Assessment Series for health and safety management systems (OHSAS 18001).

1.1.2 Elements of OIMS and Governing Documentation

OIMS provides a systematic, structured, and disciplined approach that is used across Imperial's businesses and facilities, and enables Imperial to measure progress and manage accountability in these areas. It also ensures appropriate public engagement with the communities in which Imperial operates within. Figure A lists the 11 elements of the OIMS system (For more information on this refer to the Operations Integrity Management System).



Figure A: Operations Integrity Management System 11 Elements

1.2 Environmental Management System

The OIMS Framework contains principles and expectations that set the foundation for an Environmental Management System. OIMS, System 6-5, "Environmental Management", describes Imperial's Environmental Management System expectations. The purpose of the Environmental Management System is 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.

Under the umbrella of Imperial's Environmental Policy and regulatory standards, OIMS guides how Imperial manages environmental performance.

OIMS includes the Environmental Management System framework which requires operations and development projects to identify how operations interact with the environment ('environmental aspects') and how that interaction is managed through measurement, stewardship, risk assessment, and risk mitigation.

Expectations in the OIMS Framework related to the Environmental Management System include:

- 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.
- Proper long-term shutdown or abandonment of facilities is planned and managed.

1.3 Environmental Aspects Assessment and Review

Imperial maintains an Environmental Management Plan (EMP). The EMP is designed to identify environmental aspects and develop appropriate mitigations. The primary environmental aspects are air, land, vegetation, water, and wildlife. These aspects are managed through specific programs as identified through the EMP process.

The EMP is developed to meet internal OIMS requirements and is intended to outline the environmental aspects, propose protective measures and assess programs or plans currently in place.

The environmental advisor and operations personnel identify the environmental aspects and conclude on appropriate mitigations on an annual basis. Aspects relevant for this project are discussed in Section 3.

1.4 Environmental Business Plan

As part of OIMS element 6-5, Imperial utilizes an Environmental Business Plan (EBP) to systematically identify and deliver on environmental commitments. The EBP integrates environmental improvement into business plans and strategies.

Imperial uses the EBP process to identify key environmental priorities, set goals and focus areas, and establish multi-year plans to achieve those objectives at each business unit. Plans are reviewed annually, and progress is overseen by senior management through regular reviews.

Figure B outlines the relationships in the EBP process.



Figure B: How Environmental Business Planning Works

1.5 Environmental Stewardship and Reporting

Imperial maintains a Corporate Citizenship Report that highlights Imperial’s environmental performance. Since 2009, Imperial has made this report available online.

1.6 Responsible and Accountable Resources

All systems require responsible resources to ensure the continued success of the various systems in place. In addition to the systems and procedures mentioned above, the following resources are in place:

- system owner – higher level manager to oversee the system and attend committee meetings to ensure integration of the systems
- system administrator – a technical professional or specialist who coordinates updates to the system overall and committee meetings
- business line management – individuals responsible for periodic review or inspection of the workplace to ensure the business is proactively managing risks to the environment, identifying potential impacts and developing mitigation strategies

1.7 Waste

Imperial will manage any waste generated from this project in accordance with the Government of Northwest Territories “Guideline for Hazardous Waste Management” and other guidance documents as required. Environmental Aspects relating to waste are presented in Table A. Imperial will incorporate waste elimination and waste minimization measures into the project design. Imperial will reuse, recycle, treat and recover where possible and practical, and only dispose what cannot be managed otherwise, in an environmentally responsible manner that meets or exceeds regulatory requirements. Imperial has very stringent requirements in regards to where it allows waste generated by its operations to be managed or disposed of. As per internal policies, Imperial conducts rigorous assessments of third party

waste management facilities, and only facilities that pass those rigorous assessments are allowed to be used by Imperial or its affiliates. Imperial will ensure that waste is:

- characterized and classified properly.
- handled and stored in a manner that is protective of the environment.
- manifested (if required) accurately and completely.
- managed at facilities having the capabilities and approvals to do so.

Table A: Waste - Environmental Aspects, Protection and Mitigation

Environmental Aspect	Potential Impact	Protection and Mitigation Measures
<p>Waste</p> <p>Aspects: Improper disposal or segregation causing contamination or higher disposal costs.</p>	<ul style="list-style-type: none"> • Improper storage causing release and environmental impacts. • Incorrect/No segregation increasing costs and reducing recycle. • Sending waste to an unapproved waste receiver 	<ul style="list-style-type: none"> • Store waste on-site in appropriate containers • Ensure segregation of wastes based on treatment / recycle / disposal method • Use only approved waste disposal facilities and transfer stations (refer to list) • Waste receiver use tracked and stewarded (manifests)

Regulatory Framework

This Waste Management and Monitoring Plan (Waste MMP or ‘this Plan’ herein) has been developed to meet waste management plan guidelines provided by in the 2011 Guidelines for Developing a Waste Management Plan (Mackenzie Valley Land and Water Board, 2011). It summarizes the management and monitoring practices, actions, and contingencies, providing direction for additional management practices that will be required to manage upcoming remediation activities to continue to protect health, safety, and the environment. The Waste MMP provides an overview of the waste management strategy for the entire duration of active remediation and into post-closure.

Acts and regulations used to support this Waste Management and Monitoring Plan are:

- Waters Act (GNWT 2014)
- Transportation of Dangerous Goods Act (Government of Canada 1992)
- NWT Environmental Protection Act (GNWT 1988)
- Canadian Environmental Protection Act (Government of Canada 1999)
- Used Oil and Waste Fuel Management Regulations R-064-2003
- Canada Occupational Health and Safety Regulations (SOR/86-304)
- ECCC Environmental Emergencies Regulations (E2) (SOR/2019-51; Government of Canada 2019)
- Storage Tank Systems for Petroleum Products and Allied Petroleum Regulations (SOR/2008-197)

Waste Management and Monitoring Plan Objectives

The objectives of the Waste MMP are to outline:

- waste management practices at the Site to minimize the potential for impacts to the public, workers, and the receiving environment:
 - any waste generated will be segregated and disposed of appropriately so it does not pose a risk to the surrounding environment, public or workers.
- waste management practices at the Site that meet regulatory requirements and waste-related closure objectives and criteria:
 - these practices have been developed to satisfy applicable Water License conditions set forth in Type B Water License and Type A Land Use Permit (Mackenzie Land and Water Board).
- waste monitoring programs required to meet regulatory requirements and to verify waste-related closure objectives and criteria are met:
 - contaminated materials (i.e., soil sediment, waste from well abandonment) are remediated or removed for off-site disposal to reduce risk to humans and to aquatic and terrestrial systems.
 - site infrastructure with no future use (i.e., temporary camp) will be removed so it is not and will not become a safety hazard or source of contamination to the environment.

Reclamation work will endeavor to return the site and associated facilities to an equivalent land capability present at the Site prior to well construction inclusive of safe temporary waste on site storage, removal of waste to designated facilities, and monitoring of any waste storage areas established over the course of the Project.

These Waste MMP objectives are consistent with the C&R Plan.

Location of Waste Management Activities

Sewage and domestic waste will be generated at the camp location housing the workers and drilling waste and debris will be generated at the well site. Currently, Imperial has not received waste approval acceptance by local waste facilities and as a result waste will be taken back to Alberta for disposal at an Imperial approved waste site. Should a local waste facility provide approval for waste acceptance between now and execution, Imperial will submit the approval to the MVLWB. A map detailing locations of waste generation can be found in the Attachment A-2 of the application.

Part 2: Identification of Waste Types

Waste Characterization	Waste Type	Source	Estimated quantity	Potential Environmental Effects
Hazardous or Potentially Hazardous Wastes	Contaminated soils	Potentially contaminated soils from leaking well.	3m ³	Substances may be harmful to wildlife and aquatic life. The substances have the potential for bioaccumulation in the environment if the contaminant is not readily biodegradable. Runoff into water bodies must be avoided.
Non-Mineral Waste	Domestic refuse	Waste generated by project activities including recyclable and non-recyclable wastes (e.g. Organics, paper, plastics, cardboard and electronic waste), plastics, steel, packaging, containers, and waste building supplies, camp garbage.	As generated. Estimate is 580m ³ but project plans are to have one bin at the drilling site and one at the camp site and empty as required.	Plastics and packaging may be harmful to wildlife and aquatic life if not properly disposed of.
	Scrap metal	Waste metal from re-abandonment of wellhead.	2m ³	
	Construction waste	Barricades around the well. Waste cement from drilled out cement plug. Excess returns from cement job	10-15m ³	

	Sewage	Camp/Wellsite	450-500m ³	Substances may be harmful to human health if wastewater is not properly treated and/or disposed of.
Mineral Waste	Drill cuttings	Drilling fluid	90m ³	Substances may be harmful to wildlife and aquatic life.
		Drilling solids	10m ³	

Part 3: Management of Each Waste Type

Hazardous and Non-Hazardous Waste

Hazardous or potentially hazardous waste will be kept on site in their respective approved containers to be allotted for disposal at an Imperial Oil approved industrial waste disposal facility following completion of the re-abandonment portion of the program (drums for contaminated soil, bins for recyclable materials, and dumpsters for non-hazardous waste).

Additional non-mineral/non-hazardous waste stored on site will be evaluated for disposal at approved municipal waste centers and/or at Imperial Oil approved contaminated disposal facilities.

The following rules apply to all activities involving the temporary storage of hazardous materials on site for the Project:

- Materials are stored in a planned, orderly manner to avoid endangering the safety of personnel or release to the environment.
- Flammable waste products must be stored within designated flammable waste storage areas and must not be stored within 30 m of any other waste storage area or fuel storage area.
- Any soil that becomes contaminated because of hydrocarbon spills will be stored in an approved container for disposal at an approved facility.
- Employees must be trained in the techniques and materials that can be employed for spill containment
- All employees must be trained on how to report a spill and how to initiate the spill response system, including taking the necessary precautions when approaching a spill with the recognition that human health is the number one priority.
- In the event of a spill or release of stored waste in designated temporary on site waste storage areas, procedural containment and control will proceed as per the Spill Contingency Plan.

Minimizing Wildlife Attractants

Waste will be segregated and stored as described above. The different storage containers (drums, bins, dumpsters) will have lids and will remain covered when not in use to prevent attraction of wildlife to site. The non-hazardous waste dumpster and recyclables bin will be hauled to the landfill and recycling facility once full to prevent the accumulation of waste and debris on site. Hazardous material will be hauled away once the project is completed.

Waste management best practices and minimizing wildlife attractants to site will be discussed during tailgate meetings with field personnel.

Sewage

The camp is currently planned to be equipped with a sewage treatment system that will separate and treat greywater using filters and a UV sterilization pump. Treated water will then be discharged onsite and solids will be hauled to and disposed of at a municipal sewage lagoon/treatment plant. Volumes of sewage are included in Section 2. For further detail, of the estimated 450-500 m³ of sewage total volume.

Imperial will be using a “50-man membrane unit” treatment system that offers the ability for a dumping station for the sewage from the rig. The dumping station will use an insulated trailer with a pump to vacuum the bags and dispose of at the treatment plant. The rig site will use sewage bags on each outlet, reducing the chances of pump failure or pipe freeze up. Bags are used in conjunction with insulated tarps.

From the camp treatment system, the 50-man membrane unit relies on settling of solids on the initial tank, extended aeration with a biological filtration in the next then with the final step fluid goes through ultra membrane filtration with UV assist. The plant will produce clean water. The membrane unit is designed to meet level 4 treatment requirement in Alberta regarding cBOD5, TSS and fecal coliforms. The units are designed to meet the following discharge specs.

Parameter	Discharge Specification
Organic loading	3 grams cBOD5/m2/day
cBOD5	10 mg/L
TSS	10 mg/L
Fecal coliforms	50000 CFU/100mL
Total Chlorine	2 mg/L

The recognized wastewater production of an average person in a day is 50 gal/day which amounts to a total 1500 gal per day or 5.68 m³ at 30 people.

The treatment system discharge consists of a distribution field with ~20m long lateral system to distribute the effluent evenly over the ground. The lateral system will be comprised of 36-inch infiltrator chamber covering the 2” hose with 1/8 holes drilled to a predetermined spacing. Treated water will be discharged on the edge of the campsite location as proposed in the land use permit documentation. As the volume is expected to be under 5.7m³ and for less than six months, soil analysis is not required, and the distribution field will meet the requirements. The distribution field will be put on the edge of a ditch and clean effluent will be discharged into the ditch at the approved camp location.

Should the above plan not be accepted or able to be implemented, the alternative plan would be to haul and dispose of sewage at a municipal sewage lagoon/treatment plant.

Part 4: Infrastructure Required for Waste Management

All Project waste will be stored in established, labelled, and maintained waste storage areas as needed throughout the Project. Onsite waste storage areas will be regularly inspected and all handling and storage will be conducted according to each products' SDS. Temporary storage areas will be developed with consideration to the type of waste stored and be fully removed following completion and closure of the Project.

Infrastructure established and maintained for the temporary storage of waste onsite will be done so with the following factors in design:

- Storage area design must be modified such that it meets the safety requirements established in the Spill Contingency Plan.
- Sufficient area will be set aside such that the capacity of waste storage does not exceed the planned maximum of the established area.
- Flammable waste storage areas must be clearly labelled and established greater than 30m away from other storage areas.

If the campsite area is determined to be a well drained area, greywater will be treated via filters and a UV sterilization pump and released onsite. The anticipated camp site is approximately 500 meters setback from the nearest water course.

All other waste will be hauled away for disposal at the appropriate facilities.