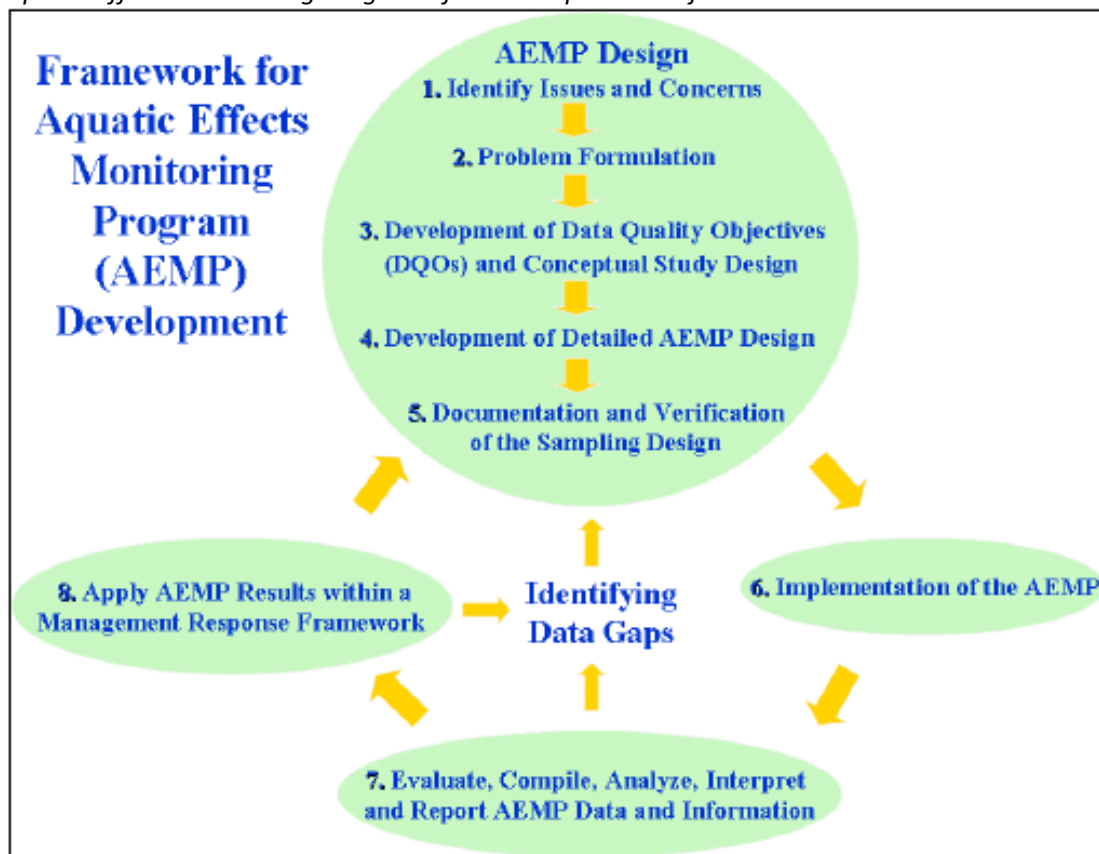


**Imperial Oil AEMP**  
**Technical Sessions Discussion Template**  
**January 2014**

The purpose of this part of the Agenda for the technical sessions is to have a high level discussion on what should be part of Imperial Oil's new Aquatic Effects Monitoring Program. From 2002 – 2006 Imperial Oil did complete an AEMP which ended in 2007. The approach now is to develop a new Aquatic Effects Monitoring Program for the operation, which outlines goals, standards, timelines, consultation requirements, methodologies, and QA/QC. As part of the technical sessions, the SLWB is seeking input on components to include in the future Program as well as questions to be answered to guide Imperial Oil in developing the Program.

Program should be based on the AANDC (formerly INAC) Guidelines for Designing and Implementing Aquatic Effects Monitoring Programs for Development Projects in the Northwest Territories.



**Identify Issues and Concerns**

What are the issues and concerns regarding the aquatic environment that interested parties may have about the development? A preliminary list of stressors that may be of concern should be documented (a stressor is a substance, such as a chemical or change that can have a negative effect on the water environment).

- Status of water quality downstream of Imperial Oil operations.
- Health of fish populations due to Imperial Oil operations.

### **Problem Formulation**

In this step you should complete a final of possible stressors and then look at each one to see if it could have an effect on the water environment or human health. The way stressors can affect the water environment need to be determined (such as elevated levels of a chemical changing the quality of the water).

*What are possible water quality stressors?*

### **Development of Data Quality Objectives (DQOs) and Conceptual Study Design**

This step of the process identifies the important parts of an AEMP and helps determine what the monitoring program will look like. It determines what types of information and how much data are needed to evaluate the effects. What levels of stressors would harm the water environment. The data quality objects also describe how the AEMP results will be used to determine if the development project has caused negative effects on the water environment.

#### ***Possible Goals for Imperial Oils AEMP***

- *To determine if water quality in the a vicinity of IOR's operation is being adequately protected;*
- *To determine if there is any short-term or long-term effects on the water quality in the vicinity of IOR's operation;*
- *Identify if additional impact mitigation measures are needed to reduce or eliminate potential effects IOR's facility may be having on the aquatic ecosystems; and*
- *AEMP could also help support/evaluate the cumulative effects on water quality with the region.*

#### ***Possible Objectives (What do we aim to achieve?) for Imperial Oil's AEMP***

- *Assess water quality upstream, mid-stream, and downstream of the Norman Wells Operation to demonstrate to stakeholders that the water is safe for human users and environmental receptors*
- *Determine if the Norman Wells Operation is having an impact on the water quality within its operational area*
- *Identify if additional impact mitigation measures are needed to reduce or eliminate potential effects IOR's facility may be having on the aquatic ecosystem;*

**Component Specific Objectives** – *What sampling and monitoring is being done to support the goals and objectives and how is it going to be measured? How many sample locations will there be? What parameters will be assessed? What methodologies will be used for sampling (i.e. grab samples, passive samplers)? How many samples will be taken and at what time of year? How would the occurrence of natural seeps be addressed through the program? Should the program include in river, effluent, run-off water, and groundwater sampling?*

**Levels of Stressors** - *Results of in river water quality monitoring should be compared to CCME standards for Freshwater Aquatic Life.*

*Data collection should also align with other water sampling that is going on in the region such as the ERN-GNWT Community Water Monitoring Program so data can be shared.*

**Communication and Engagement** – *How has the Program been developed in consideration of stakeholder comments and concerns? How will affected communities be involved and communicated*

*with? IOR did a pilot project with ENR-GNWT Community-Based Water Monitoring Program after a member of the public in Fort Good Hope suggested that working with ENR-GNWT would be better than Imperial Oil completely the pilot project on their own (still waiting for results), if Imperial Oil chose to continue to support the ENR-GNWT program would this meet the intent of the AEMP or should Imperial Oil do a separate program?*

### **Development of Detailed AEMP Design**

Study design is chosen in this step. For example, a water body located near an effluent discharge can be compared to a non-exposed (or reference) water body upstream or in a different location than the project. Another example could be several measurements taken a certain distance apart, downstream of a project area. Choosing the most appropriate sampling locations and timing for sampling is critical.

*Where should Imperial Oil be sampling (Hutchinson suggested upstream, mid-stream, and downstream)? How many sampling locations are considered reasonable? How often should they be sampled (Hutchinson suggested 3 different times of the year)?*

### **Documentation and Verification of the Sample Design**

Plans will be prepared to describe the procedures to be followed by people conducting field sampling since it is important that the data is collected properly. Specific guidance for all field work (to collect high quality data and information), and a plan to make sure people collecting samples or visiting the site take all safety precautions necessary.

### **Implementation of the AEMP**

This step begins following the approval of the AEMP by the regulatory board.

*Is this requirement of the 10 year licence or multi-year program with the ability to re-evaluate after each year of data is collected?*

*What is the implementation timeline for an AEMP (i.e. plan should be submitted within one year of issue of the new water licence)? Will this timeline be different based on project component (i.e. groundwater monitoring, in river sampling, surface water run-off)?*

### **Evaluate, Compile, Analyze, Interpret and Report AEMP Data and Information**

Once data and information has been collected under the AEMP, it needs to be evaluated, compiled, analyzed, interpreted and reported by the developer.

*How should the data be reported (i.e. technical report, plain language, data tables, presentations?) Where should the data be stored so it can be easily shared?*

### **Apply AEMP Results within a Management Response Framework**

Management response is also known as adaptive management; it is a way to continually improve the management of the project by learning from the information collected year after year by the AEMP. Results could lead to changes if results show that a certain parameter is having a negative effect on the environment.

*Review of project should occur annually to re-evaluate if the program is achieving its goals and objectives and if there is any gaps.*

**Imperial Oil SNP Part D**  
**Technical Sessions Discussion**

**SNP Part D: Sampling and Analysis Requirements for Surface Water Run-off Facilities**

1. A Representative Grab Sample and Analysis of all water collected in the Surface Water Run-Off Facilities (listed in Schedule 1) discharged to lands and/or waters, and/or to be used for dust suppressant on roads, shall be obtained prior to release.

- a. Water to be released from Surface Water Run-Off Facilities listed as Category A in Schedule 1 shall be analyzed for the following prior to discharge

Parameter	Guideline
Visible oil sheen on the water	N/A
Chlorides (Field Test)	< 500 mg/L
pH (Field Test)	6.0 – 9.0

- b. Water to be released from Surface Water Run-Off Facilities listed as Category B in Schedule 1 shall be analyzed for the following prior to discharge:

Parameter	Guideline
Total Petroleum Hydrocarbons	10.00 mg/L
Phenols	0.14 mg/L
pH	6.0 – 9.0
Chlorides	< 500 mg/L
Total Suspended Solids	N/A
Total Dissolved Solids	N/A
Specific Conductivity	N/A

- c. Water will not be released for any Surface Water Run-Off Facilities if there is an exceedance(s) in the above criteria without consulting the Board and an Inspector. The Licensee shall make every effort to investigate any exceedance(s) and treat the water prior to discharge.

- d. A Microtox Test shall be performed for any discharge to Water(s) from Surface Water Run-Off Facilities:

Microtox EC50(15) Toxicity Testing*	Pass = EC50(15) > 90%
Microtox EC50(15) With Charcoal Filtration	Pass with Charcoal Filtration = EC50(15) > 90%

\*If original Microtox test fails, the Licensee may perform the Microtox test with Charcoal Filtration

- e. While discharging water volumes greater than 10 m<sup>3</sup>, the discharge shall be monitored by obtaining a Representative Grab Sample(s) and conducting subsequent analyses as outlined in SNP Part D, Items 1 (a) or (b), from before, the middle, and the end of the discharge. For water volumes less than 10 m<sup>3</sup>, a single Representative Grab Sample shall be collected and analyzed.

- f. Water(s) collected in any area associated with Imperial Oil's Norman Wells operations and facilities not listed in Schedule 1 shall be sampled and analyzed as per SNP Part D, Items 1 (a – e), as required.

## Schedule 1

This Schedule is intended to outline any area associated with Imperial Oil's Norman Wells operations and facilities that may be used to collect surface water, which will ultimately require discharge to land(s) and/or Water(s).

Surface Water Run-Off Facilities include Impound Basins and Areas, excavations, bunkers, bermed areas, and associated ditches provided for the collection, storage, and discharge of Surface Water Run-off from Imperial Oil's Norman Wells operations and facilities.

Category A – includes excavations (in areas where there are no known historical impacts), bunkers, bermed areas, and associated ditches.

Category B – includes;

- Refinery Impound Basin
- LT 11 Impound Basin (historically Battery 3 Impound Basin)
- Refinery Water Flood Basin
- CPF Impound Area (also referred to LT 2 Impound Basin)
- Biocell
- Capped sumps
- Excavations, bermed areas, or ditches (in areas where there is known historical impacts)
- Or any area where the Surface Water Run-Off from Category A does not meet the requirements outlined in SNP Part D: 1(a).

**Contaminated Soil Management**  
**Imperial Oil Technical Sessions**  
**January 2014**

*Several reviewers had comments in regards to Imperial Oil's contaminated soil management procedures and requested the submission of an Operation and Maintenance Manual for Contaminated Soil Management.*

Under Imperial Oil's current Water Licence S03L1-001, they have two separate reporting requirements for waste disposal (in this case contaminated soil) based on whether it is from operations or the A&R group. Part H of Water Licence S03L1-001, outlines requirements for A&R. Part B:3 outlines Annual Operations reporting requirements. Currently, large spills require reporting to the NEB and the SLWB, who both receive Remedial Action Plans and Closure Plans for site remediation on operational facilities as required.

*Reviewer Comment from AANDC # 7: treatment criteria should be added to the Licence for contaminated soil management. Imperial's response identifies CCME as the standard based on NEB requirements.*

*Reviewer Comment from AANDC #8: O&M Manual and ENR Comment #4: Biocell Procedures.*

**SLWB Proposal for Discussion:**

Possible future Licence requirements;

Part D: Conditions Applying to Waste Disposal

- The Licensee shall adhere to the approved Waste Management Plan and shall annually review the Plan and make any necessary revisions to reflect changes in operations, technology, chemicals or fuels, or as directed by the Sahtu Land and Water Board. Revisions to the Plan shall be submitted to the Sahtu Land and Water Board for approval.

The Waste Management Plan submitted with the renewal application identified temporary soil containment cells and the Biocell as locations for contaminated soil management. As part of the review process, Imperial provided an updated map of waste management locations. The SLWB will request that Imperial Oil revise the Waste Management Plan to identify exact locations of contaminated soil management, even possible temporary sites. Reporting will address whether or not these sites are used year to year.

Part E: Conditions Applying to Operation and Maintenance

- The Licensee shall submit to the Sahtu Land and Water Board a Contaminated Soil Operation and Maintenance Manual for operational sites. Once approved, the Licensee shall annually review the Plan and make any necessary revisions to reflect changes in operations, technology, or as directed by the Sahtu Land and Water Board. Revisions to the Plan shall be submitted to the Sahtu Land and Water Board for approval.

This would address AANDC Comment #8. The scope of this Plan would be limited to the criteria to be assessed as per AANDC Comment #7 and the applicable regulatory guidelines to be utilized (i.e. CCME).

The question to be answered with this Manual would be, what is the process Imperial Oil uses to determine whether contaminated soil is treated onsite at the Biocell or shipped south for disposal at a Licensed facility? The intention is not to duplicate what would already be in a Closure and Reclamation Plan (which would include the operating procedures for the Biocell, thus addressing ENR Comment #4), but address the gap in contaminated soil management for operations. Imperial Oil would be required to ensure that the sampling procedures and parameters they assess to determine the extent of contamination is the same between operations and A&R (or now Closure and Reclamation). *It is understood that remediation sampling procedures and parameters to be assessed would be different from simply determining the level of contamination, which is what is necessary here.*



**Imperial Oil Closure and Reclamation Plan**  
**Technical Sessions Discussion Template**  
**January 2014**

*The purpose of this part of the Agenda for the technical sessions is to have a high level discussion on what should be part of Imperial Oil's revised Closure and Reclamation Plan for any subsequent Water Licence. Over the years Imperial Oil has submitted to the SLWB Conceptual (in the past Abandonment and Restoration Plans) for overall operations as well as certain facilities as they are abandoned. The approach now is to develop a Conceptual Closure and Reclamation Plan for the whole operation, which outlines goals, standards, timelines, consultation requirements, methodologies, and QA/QC. As part of the technical sessions, the SLWB is seeking input on components to include in any future Plan as well as questions to be answered to guide Imperial Oil in developing the Plan.*

*Based on the Land and Water Boards Standard Outline for Management Plans, any future Closure and Reclamation Plan shall be structured as follows;*

**Plain Language Summary**

Consider this section an executive summary using non-technical language.

**Revision History and Conformity Table**

For Imperial Oil, identify dates of previous Plans, how any Plan addresses Licence conditions, and any directives from the Board on revisions. If this Plan has been developed to meet the requirements of another agency as well (ex. National Energy Board), this information shall be included as well.

**Table of Contents**

**Glossary and Acronyms**

**Introduction and Background**

What are the objectives of the Plan? What reports and/or other Plans are directly linked to this Plan? Who are the individuals or departments responsible for updating and implementing the Plan.

*So for Imperial Oil, possible goals and objectives of a Closure and Reclamation Plan;*

**Closure Goal – to restore the site to a sustainable functioning ecosystem compatible with a healthy environment and healthy human activity.** *As a starting point based on the Land and Water Boards Closure and Reclamation Guidelines for Mining. Imperial Oil can add to this in discussion with relevant stakeholders.*

**Closure Principles**

1. **Physical Stability** – physical structures must not pose a threat to human, wildlife, aquatic life, or environmental health and safety
2. **Chemical Stability** – chemical constituents released from project components must be safe for human, wildlife, aquatic life and environmental health and safety.
3. **No long-term active care and maintenance** – Post-closure monitoring should be finite

4. **Future Use compatibility (including aesthetics and values)** – future land use should be compatible with surrounding lands and water bodies.

*Who should Imperial Oil be consulting with to determine future use compatibility based on the varied land ownership within the Proven Area Agreement? Should there be one regulatory standard for all the operations regardless of land ownership (i.e. CCME, which standard)? What timeline should be followed for post-closure monitoring of the different project components? Will this timeline be different based on project component (i.e. well sites, pipelines, bunkers, etc.)*

### **Main Body of the Management Plan**

This section should outline the bulk of the Plan and how the proponent will achieve component specific objectives. It should also include assumptions, decision, scheduling, and any uncertainties and how they are being addressed. This section should answer the question of what is the research methodology?

*For Imperial Oil's operations, the component specific objectives include but are not limited to;*

**Component Specific Objectives** – *What level of reclamation is being required for each of these components and how is it going to be measured?*

1. Water intake facilities and distribution system
2. Waste disposal sites and facilities
3. Petroleum, chemical and hazardous waste storage areas
4. Stream restoration (Bosworth Creek)
5. Soil and Groundwater impacts and proposed remediation
6. Oil collection system, including above-ground or near surface flowlines
7. Waterflood facilities and sediment settling lagoons
8. Sumps and diked storage areas for waste (Miscellaneous Mainland Impound Areas; excavations; bunkers; bermed areas; associated ditches provided for the collection, storage and discharge of surface run-off waters)
9. Central processing facility (CPF Impound Basin)
10. Artificial and natural islands (Miscellaneous Bear Island Impound Areas; Miscellaneous Goose Island Impound areas)
11. Former refinery area and associated facilities (Refinery Impound Basin; Battery 3 Impound Basin; Refinery Water Flood Basin)
12. Abandoned well heads
13. Buildings and other infrastructure (e.g. roads)

**Closure Options** – best option to achieve the objectives,

**Selected Closure Activity** – what is the best way to achieve the selected closure activity?

**Closure Criteria** - what is the best way to measure the closure activity to meet the closure objective?

*Questions to consider for these overlapping sections: what length of time for post-closure monitoring, is active or passive revegetation going to occur, will all equipment and in ground infrastructure be removed from site, how is it determined if groundwater monitoring will be conducted or simply soil*

*contamination delineation, what are the triggers for different levels of sampling, what parameters will be assessed, how many samples taken to determine accuracy, Etc?*

**Financial Security Requirements** – *what level of financial security is being held to support the cost of reclamation from various regulatory agencies? Is this security adequate to cover the full cost of site reclamation?*

**Communication and Engagement** – *How has the Plan been developed in consideration of stakeholder comments and concerns? Who has been consulted? How will affected communities be involved and communicated with?*

### **Monitoring and Evaluation**

How will the effectiveness of this Plan be assessed? What is the frequency for revisions?

*Essentially for Imperial Oil, this is the QA/QC section.*

### **Contingencies**

What contingencies have been identified to address non-compliance, unforeseen circumstances, or natural events.

*For Imperial Oil, a big component of this would be the occurrence of natural hydrocarbon seeps and natural elevated metals.*

### **References**

**Flowline Integrity Management**  
**Imperial Oil Technical Sessions**  
**January 2014**

*Imperial Oil originally submitted to the SLWB a Flowline Integrity Management Plan in December 1999. The purpose of the Plan is to describe the strategies and corrosion control programs for managing the integrity of the Norman Wells flowline systems. For the purposes of these technical sessions, the SLWB is interested in discussing the current Licence requirements, the need for a new Plan, and clarifying the shared jurisdiction on this matter with the NEB.*

**Relevant Sections of Water Licence S03L1-001**

**A: Scope and Definitions, (2)**

- **“Flowline”** – means a line that is used to transport fluids from a well to a production facility or vice versa, and includes intrafield export and all gathering lines;

*Is this an accurate and all encompassing definition?*

**Part B: 3 Annual Report; subpart (i)**

- the physical condition of each Artificial Island and Natural Island, including inspections of each Island and vicinity for channel erosion, island scour and erosion, at the Flowline landfalls and condition of rip rap;

*This should be moved to Part E: Conditions Applying to Operation and Maintenance as this is included in a separate annual report referred to as the “Breakup Report”. The Breakup Report does annual bathymetric surveys to assess depth of coverage on flowlines under the Mackenzie River post-breakup, as well as the condition of each island.*

**Part B: 3 Annual Report; subpart (n)**

- the dates and results of Flowline and storage tank integrity tests;

*This can remain as it applies to all flowlines and storage tanks, not just those under the river and on the islands, and more so refers to the integrity tests as identified in the Flowline Integrity Management Plan.*

**Part E: Conditions Applying to Operation and Maintenance, (3)**

- The Licensee shall inspect the riverbeds, channels and banks of the Mackenzie River in the vicinity of the Flowline(s) as required by the National Energy Board (NEB); and shall immediately notify the Inspector of any significant erosion and take appropriate remedial action as required.

*The results of these inspections are included in the Breakup Report.*

**Part E: Conditions Applying to Operation and Maintenance, (4)**

- The Licensee shall submit to the Board any NEB approved Modification(s) or changes to the Flowline Integrity Management Plan for information purposes only.

**SNP Part F: Other Requirements, (1)**

- The Licensee shall conduct annual inspections of the Artificial Islands and Natural Islands to determine:
  - a) location, depth, and volume of channel scour in the vicinity of the oil and water distribution Flowline(s);
  - b) location and magnitude of Artificial Island slope erosion;
  - c) location and severity of Artificial Island rip rap disturbance;
  - d) structural integrity of the Artificial Islands, and other related structures; and
  - e) structural integrity of Natural Islands where it is applicable to oil field operations.

*Should not be part of the SNP but instead included in Part E of the Licence and consolidated with other requirements for clarity.*

**SNP Part G: Reports, (2)**

- The Licensee shall submit to the Board, results of the Artificial Islands and Natural Islands inspections as required in Part F of the SNP no later than October 31<sup>st</sup> of each year, together with evaluations of repair and maintenance work required, and a schedule for completing such work prior to the following spring River Ice Breakup period.

*Should not be part of the SNP but instead included in Part E of the Licence and consolidated with other requirements for clarity.*