Assessment of Oil Sands Mine Water (OSMW) Management Options in the Athabasca Region

Request for Proposal

Request for Proposal: Assessment of OSMW Management Options in the Athabasca Region

Disclaimer

The members of the Crown-Indigenous Working Group (CIWG) for the Potential Oil Sands Mining Effluent Regulations participate in good faith in support of the Government of Canada's commitment to renewed Nation-to-Nation and government-to-government relationships that are based on recognition of rights, respect, collaboration, and partnership as the foundation for transformative change. Participation by the First Nations, Métis Nations, and Métis communities in the CIWG will not be interpreted as tacit support or acceptance of oil sands mine water release or as an abrogation or derogation of their rights. This request for proposal was developed collaboratively by CIWG members. While CIWG members support this document in principle, some statements may not fully represent the position of each member.

Request for Proposal: Assessment of OSMW Management Options in the Athabasca Region

Posting date: June 17, 2025
Proposal submission deadline: July 18, 2025
Project completion date: March 6, 2026

1 Project Overview

In recognition of the importance of the Athabasca River to Indigenous communities, ECCC and nine Indigenous communities established a Crown-Indigenous Working Group (CIWG) in response to concerns raised by Indigenous communities regarding potential releases of treated oil sands mining effluent to the Athabasca River watershed. The CIWG is meant to serve as a mechanism for collaboration to assess whether regulations authorizing releases of treated oil sands mining effluent are needed, and if necessary, on the development of potential regulations for oil sands mining effluent.

The CIWG is working to understand the potential impacts and risks of all Oil Sand Mine Water (OSMW) management options to ensure that any impacts to treaty and Aboriginal rights resulting from the potential release of treated oil sands mining effluent are thoroughly assessed, understood, and avoided. In support of its mandate, the CIWG has completed several studies aimed to characterize the OSMW management options, understand the capabilities and limitations of the options, and to gather preliminary information for the CIWG decision process.

The CIWG developed a multi-phased plan to assess alternatives to discharge of treated OSMW to the Athabasca River and its tributaries. The first two phases of this work were completed in 2023 and are presented in the Assessment of Alternatives to Discharge of Oil Sands Mine Water Crown-Indigenous Working Group (CIWG). The Alternatives Report identified and explored a wide range of potential alternatives that could achieve reduction of stored volumes of OSMW, including recycle and reuse options. The report indicated that there was no one alternative that could deal with stored volumes and that many identified alternatives lend themselves to being part of a portfolio of options.

In 2024, the CIWG began a working relationship with oil sands operators under the Pathways Alliance, and the Mining Association of Canada, to further define potential alternatives and OSMW management options, and assess the feasibility of implementing any of these options either separately or together.

Leveraging the work completed to date, the CIWG is seeking to advance the understanding of and further refine both the list of alternatives and the treat and release options to support subsequent phases of their mandate. The next phase involves conducting a comprehensive characterization of various OSMW management options that can effectively manage, either partially or fully, the excess OSMW volumes from oil sands mining operations. The CIWG will then compare the potential impacts, risks, and uncertainties of the alternatives to those of the treatment and release options. The comparison will help CIWG evaluate different policy options, ensuring that the options are assessed by balancing technical, operational, environmental, health, and societal needs with costs, risks, and benefits.

Once the evaluation and comparison of the scenarios is complete, the CIWG will make recommendations to the Minister of Environment and Climate Change Canada. The recommendations to the Minister will focus on whether a potential regulation that may authorize releases of treated oil sands mining effluent is the preferred approach.

2 Project objectives

This project involves leveraging previous studies completed for the CIWG, and from the ongoing engagement between CIWG, Pathways Alliance and Mining Association of Canada, to conduct a detailed characterization and validation of different OSMW management options that would be capable of managing, either partially or fully, the quality and the excess OSMW volumes from oil sands mining operations in the Athabasca region. In this RFP, "excess OSMW volumes" refers to the volume of OSWM that industry has identified for removal from their sites from now until 2070. These projected volumes were provided to the CIWG's Assessment of Alternatives Subgroup (AASG) on an annual basis and categorized by mine OSMW type, including the associated range of OSMW quality characteristics and treatment technologies available.

The CIWG's AASG has identified three (3) categories of OSMW management options that require further characterization or validation as part of this RFP.

2.1 Alternatives to treatment and release

This category includes options other than release of treated OSMW into the Athabasca River and its tributaries, such as permanent subsurface storage or the transfer of treated OSMW to other uses. The objectives for this category of OSMW management options are:

- Refine the conceptual-level characterization of the alternatives to treat and release, close information/data gaps, and validate the technical data collected by the CIWG's AASG to date.
- Evaluate the potential for integration of alternatives or other OSMW management options to maximize the volume of OSMW that can be managed (without treatment and release to the Athabasca River or its tributaries).

2.2 Treatment for reuse and inter-operator reuse

This category includes OSMW management options that could be implemented today to improve water efficiency of operations thereby reducing future inventories of OSMW over the long term thereby reducing withdrawals from the Athabasca River and its tributaries. This category includes measures such as increased segregation of non-contact surface runoff, treatment of recycled OSMW for reuse, and inter-operator OSWM reuse for OSMW management. The objectives for this category include:

- Review treatment for reuse and inter-operator reuse practices in the oil sands industry and identify any opportunities and barriers for larger-scale implementation and potential for any of these practices to be combined with options from 2.1 to maximize OSMW volumes management.

- Quantify potential reductions to future inventories of OSMW assuming treatment for reuse and inter-operator reuse opportunities and emerging technologies are implemented.

2.3 Treatment and release options

In December 2022, the CIWG completed the Best Available Technology (BAT) Report. The study included characterizing Oil Sands Process Water (OSPW), identifying contaminants of potential concern (COPCs), the development of preliminary tiers of treatment objectives, and identification of established and emerging technologies relevant to OSMW. A key result of the BAT Report was that no single treatment technology can meet the treatment objectives specified by the CIWG, and that treatment trains would be required. The study did not consider economics. The CIWG is interested in building upon the outcomes of the first BAT Report to close identified gaps and further evaluate the most viable OSMW treatment options and their ability to meet CIWG's preliminary effluent limits.

Leveraging from the work in the BAT study, and the information gathered by the CIWG from Pathways, this category includes all the OSMW management options in which OSMW is treated and released to the Athabasca River and its tributaries through active or passive treatment processes. They serve as a reference option for comparison with alternatives (It should be noted that numerous participants in CIWG do not support treatment and release of OSWM to the Athabasca River and its tributaries as per the disclaimer at the beginning of this document). The objectives for this category include:

- Refine the conceptual level characterization of treatment and release options, close data gaps, and validate the technical data gathered by CIWG AASG and BAT SG to date.
- Characterize the treatment trains leveraging the work previously completed in the initial BAT study as a starting point to avoid duplication of effort. The objective is to identify treatment configurations that could be used to efficiently treat OSMW and meet preliminary effluent limits ranges on 2-3 targeted substances of concern (SOC) provided by CIWG. Preliminary effluent limits provided will be a range of concentrations to represent varying degrees of treatment. Treatment trains short-listed should be unique to reflect the potential variability in treatment approaches and should assume characterization for an idealized site-level treatment facility and a regional facility.
- Produce predicted effluent profiles based on the short-listed treatment trains containing predicted effluent concentrations on all substances present in the oil sands mine water profiles.

- Conduct a high-level evaluation of capital and operating costs associated with each treatment train, sufficient to support comparative assessment and inform future planning.

3 Scope of Work (SOW)

This section outlines the scope of work and key deliverables for the study. The consultant will be expected to develop a detailed proposal of how they will meet the SOW. Additional background materials will be provided to the successful consultant for further consideration.

3.1 Work Package 1: OSMW management options characterization and validation

The CIWG AASG is currently developing a conceptual-level characterization of OSMW management options, including, alternatives to treat and release, treatment for reuse and inter-operator sharing, and treatment and release options with input from oil sands operators. The complete list of alternatives under review are presented in Appendix 1 of this RFP. The list is divided into two subgroups:

- OSMW management options considered suitable for further consideration
- OSMW management options that are not being advanced at this time due to no known drivers

The tasks outlined in this section refer to the OSMW management options considered suitable for further consideration. The tasks for OSWM management OSMW management options that are not being advanced at this time due to no known drivers are outlined in section 3.2 of this RFP - Work Package 2: Drivers and barriers to OSMW management options implementation.

The consultant shall advance the characterization of all OSMW management considered suitable for further consideration by the CIWG AASG, and validate the technical information gathered to date. For proposal purposes, the consultant shall assume that a total of 9 OSMW options will be carried forward: four (4) alternatives to treat and release, two (2) recycle and reuse/inter-operator sharing option, and three (3) reference treatment and release options. It is important to note that these numbers may change as the CIWG AASG screening of alternatives progresses. An increase in the number of alternatives proposed to be carried forward should be managed as a Potential Additional Work upon discussion/agreement with the CIWG AASG.

The consultant shall expand upon and/or enhance scope of work outlined herein to ensure the completeness of the work packages, including all tasks and deliverables necessary and relevant to the successful execution of the project. The consultant will be responsible for preparing and facilitating discussions/meetings/ workshops for work package1 and for different project stakeholders (as needed); the scheduling proposed in agreement with the draft dates presented in this RFP.

3.1.1 Tasks for OSMW management options considered suitable for further consideration

- Using the descriptors listed in Appendix 2 of this RFP, refine the characterization of all OSMW management options considered suitable for further evaluation by addressing data gaps and validating the technical information gathered by CIWG in collaboration with oil sands operators. Appendix 2 presents the criteria or descriptors developed by CIWG to characterize the OSMW management options outlined in Appendix 1. These descriptors were created through a collaborative effort between the CIWG AASG and the Pathways Alliance as part of their ongoing partnership. The consultant shall:

- Review the list of descriptors provided in Appendix 2 for completeness.
- Identify other descriptors that would be relevant and useful to characterize the options selected and make a recommendation on adding additional descriptors to the CIWG AASG, as needed.
- Provide input for each descriptor by either closing identified data gaps or validating existing information, enabling the CIWG AASG to use this refined data as input for the next phase of the study plan (e.g., feasibility-level assessment).
- For each OSMW management option, indicate viability for immediate-term implementation and long-term implementation. Provide recommendations to help convert the OSMW management options for long-term implementation into options that could be implemented in the medium or short term.
- Identify the alternatives or combinations of alternatives, which could maximize the volume of OSMW that can be managed through alternatives to treatment and release (excludes treatment and release options).
- Review treatment for reuse and inter-operator reuse practices in the oil sand mining industry presented in Appendix 1 of this RFP.
- Estimate potential reduction in freshwater intake and future OSMW inventories based on treatment for reuse and inter-operator reuse practices and on drivers and barriers identified for this category.
- Review and validate the mine water profiles, and preliminary effluent quality profiles established by the CIWG. Building upon the BAT report and treatment options proposed by industry, shortlist potential treatment technologies/treatment trains based on:
    - their capacity to treat the quality and volumes of OSMW that need to be removed from oil sands mines in the Athabasca Region.
    - their ability to meet preliminary effluent limits on targeted substances of concern (SOC) provided by CIWG, including salts, naphthenic acids, and total suspended solids (TSS).
- Develop high level mass balance and treatment Block Flow Diagrams for the identified treatment trains, including effluent profiles for all substances included in the mine water profiles
- Identify the most viable OSPW treatment options and their ability to meet CIWG's preliminary effluent limits.

- Prepare order of magnitude cost estimates (including both capital and operating costs) for the OSWM treatment trains identified.

3.2 Work Package 2: Drivers and barriers to OSMW management options implementation

The consultant shall identify and describe potential drivers and barriers to implement OSWM management options, including OSMW management options that are not being advanced at this time due to no known drivers (as presented in Appendix 1 of this RFP). The consultant shall provide recommendations for removing barriers and increasing drivers for each of those options. The drivers and barriers to be considered are limited to:

- Technological readiness
- Technical viability
- Operational complexity
- Regulatory factors
- Economics
- Industry demand
- Potential liability and legal requirements

Please note that the environmental, human, and social impacts of the OSMW management options will be assessed and compared separately by the CIWG and are not within the scope of this RFP. However, the results of this RFP will inform and support that separate assessment. The consultant is expected to provide input as outlined in Section 3.1.1 and Appendix 2 of this RFP. The consultant. the consultant would be responsible for summarizing the variables and input that will help CIWG conduct the next phase of the study.

- Collect and analyze information from a range of sources to validate assumptions and enhance the understanding of barriers and drivers associated with OSMW management options currently deemed non-viable. Where appropriate, the CIWG may offer suggestions or reference materials based on insights and knowledge previously acquired on the subject.

- Provide recommendations to reduce or eliminate barriers and to enhance or leverage on key drivers. This should include identifying opportunities for collaboration among oil sands operators and key project stakeholders, such as provincial and federal governments, Rights holders, other industries. Such collaboration could help advance the project more efficiently and support environmental and economic objectives for stakeholders.

- The consultant shall also provide a conclusion on whether each option should remain categorized as “non-viable” or whether it warrants reconsideration and potential reclassification into the alternative category for further characterization.

- The consultant shall prepare and facilitate discussions/meetings/ workshops for Work Package 2 for different project stakeholders (as needed); scheduling to be proposed by the consultant in agreement with the draft project dates provided in this RFP.

3.3 Work Package 3: Reporting and stakeholders' engagement

The third work package consist of the report preparation and engagement with different stakeholders to present the outcomes of the mandate.

- The successful consultant shall prepare a comprehensive Assessment of OSMW Management Options Report that presents the results of each work package and recommendations. The CIWG's disclaimer will be included in all deliverables prepared by the selected consultant. A copy of the disclaimer is included on the first page of this RFP. The consultant shall add or elaborate on the proposed tasks herein to ensure that the work package is complete and includes all necessary/relevant tasks and deliverables.
- Upon approval from the CIWG, share one draft of the report with industry for feedback. Organize a workshop with CIWG and Industry to discuss industry comments and prepare additional presentations as needed for external stakeholders.
- In consultation with the CIWG, and as needed, prepare materials tailored to community engagement, ensuring that communicated technical information to different Indigenous communities is informative, accessible, and promotes community participation.

4 Deliverables

The project deliverables will be a combination of meetings, meeting materials (including documents, handouts and presentations as required) and a final report prepared by the consultant and presented/submitted to the CIWG, the CIWG Project Manager, and other CIWG members identified during the kick-off meeting. A list of the minimum deliverables for each work package is presented below.

The meetings proposed are intended to be collaborative opportunities for feedback and input, rather than simply presentations. The consultant should be prepared to receive the feedback provided and use it to adjust the materials and the path forward accordingly. This objective should be formalized/operationalized in a post-meeting review process that demonstrates how feedback has been incorporated into different deliverables. Also, before the meeting, there shall be preparatory meetings with the CIWG Project Manager (PM) to discuss the approach, review objectives, and assess materials, ensuring alignment and preparedness for the upcoming meeting. This list is not exhaustive, and the consultant will optimize this list based on their expertise project needs.

All presentation materials, meeting notes, action trackers, maps, calculation notes, references, and data—whether analyzed in Excel or other file types—must be organized in a format that enables future analysis by CIWG and uploaded to the CIWG SharePoint.

Additionally, the contractor is required to provide all data and analysis in accessible formats, including but not limited to Excel, Word documents, and any spatial data collected and compiled.

Deliverables: OSMW management options characterization and validation			
Section	**Activity**	**Deliverables**	**Support documents and files**
Work Package 1: Characterization and validation of OSMW management options deemed suitable for further consideration	Summary of refined and optimized OSMW management options characterization	**Meeting 1:** Meeting with Pathways to discuss approach and technical data sharing for cost estimates **Audience**: CIWG AASG. CIWG BAT SG, Pathways	Power Point Presentations Handouts (i.e., excel tables, as needed) Minutes of meetings Geospatial/GIS data where applicable Comments Tracker
		Meeting 2 OSMW management options summary matrix, including: - Updated summary table in excel - Updated Block flow diagrams - Summary of Benefits, risks, and uncertainties summary **Audience**: CIWG AASG. CIWG BAT SG	
		Meeting 3: - Cost estimates (e.g., order-of-magnitude estimates for fixed costs, operating costs, etc.) - Summary of inputs for the Environmental, human health, and social impacts assessment (section 3.1.1, App. 2) **Note**: Plan for an additional meeting with CIWG AASG/CIWG BAT SG and Pathways to discuss approach to cost estimates. **Audience**: CIWG AASG/ Pathways, CIWG BAT SG	
		Meeting 4: - Overview of treatment for reuse, inter-operator sharing approach, and emerging technologies, etc. - Forecast of reduced freshwater OSMW intake and OSMW inventory - Recommendations for optimal alternatives or combinations (excluding treatment and release options) **Audience**: CIWG AASG	
	Treatment technologies assessment	**Meeting 5:** - Overview of effluent quality limits for the identified substances of concern (SOC) - Summary of mass balance per treatment option. - Recommendations for optimal technologies/treatment trains (for alternatives and treatment and release options) able to meet CIWG' s preliminary effluent limits **Audience**: CIWG AASG, CIWG BAT SG	

Work Package 2: Barries and Drivers	Overview of Barries and Drivers	**Meeting 6** - Summary of drivers and barriers assessment and recommendations **Audience**: CIWG AASG, CIWG BAT SG	Power Point Presentation Minutes of meetings Comments Tracker
Work Package 3: Reporting and stakeholder engagement	Assessment of OSMW Management Options Report	**Draft Table of Content (TOC): due 12 weeks before the end of the project**. Assume two weeks review by the CIWG. • **Draft Reports**: The consultant shall assume preparation of three draft reports, each followed by a meeting to discuss feedback ▫ **Revision A:** due 8 weeks before the end of the project. Assume three (3) weeks review by the CIWG. **Meeting 7:** Consultant presents the comments received by CIWG and provides feedback on how the comments were integrated into the report and to gather any additional feedback. **Audience**: CIWG AASG/ ECCC ▫ **Revision B:** due 3 weeks after Meeting 7. **Meeting 8:** Engagement with project stakeholders (i.e., industry) for gathering industry's feedback. **Audience**: CIWG AASG/ ECCC/ Pathways ▫ **Revision C:** due 3 weeks after Meeting 8. **Meeting 9:** Consultant presents to CIWG and provides feedback on how industry's comments were integrated into the report and to gather final feedback for the final report. **Audience**: CIWG AASG/ ECCC • **Final Report**: submitted to CIWG AASG 4 weeks after meeting 9, addressing all comments received by stakeholders during the drafting period	Meeting Agenda Presentation deck Minutes of meetings Comments Tracker Word Documents and all supporting documents in all formats (pdf, GIS, excel, ppt, etc.)
	Prepare community engagement materials	**Meeting 10** - Presentation to discuss and select examples of visuals and materials include plain language summaries, infographics, maps, diagrams or flowcharts, handouts, etc. **Meeting 11** - Presentation of draft visuals and materials selected by the CIWG and to gather feedback. **Meeting 12** - Presentation of final visuals and materials selected by the CIWG **Audience**: CIWG AASG/ Indigenous communities	Power Point Presentations Handouts (i.e., excel tables, as needed) Minutes of meetings Geospatial/GIS data where applicable Comments Tracker

5 Project Management

Project management for this mandate requires a collaborative and structured approach to ensure the timely completion of tasks and deliverables. Close coordination between the consultant Project Manager and the CIWG Project Manager will be critical for keeping records and tracking the proposed schedule and budget. Details of the expectations for consultant project management include:

- **Pre-Meeting Coordination**:
  in consultation with the CIWG Project Manager, ensure meeting objectives and agenda are clear and pertinent.
- **Organizing and Facilitating Meetings**: in consultation with the CIWG Project Manager, the consultant Project Manager will prepare bi-weekly, minimum 2-hour meetings with the CIWG subgroup to build consensus on work methods and provide project feedback.
- **Ensuring project stakeholders input is addressed:** The consultant Project Manager will be prepared to highlight how feedback from subgroup meetings, project stakeholders and project deliverables is incorporated into the meeting materials, and the overall project deliverables, including:
  - **Project meetings**: The consultant is responsible for taking meeting minutes that capture key takeaways, action items, and sub-group feedback. The CIWG and consultant Project Manager will review these notes to ensure accuracy.
  - The consultant is responsible for distributing meeting minutes to the CIWG Project Manager and uploading them to the CIWG's SharePoint.
  - The consultant will keep organized records of the minutes and presentations in the CIWG SharePoint.
  - **CIWG's feedback on deliverables:** The consultant is responsible for tracking comments on project deliverables (i.e., materials presented in each meeting or workshop, draft reports, etc.), compiling all comments into a spreadsheet and providing the table back to the CIWG Project Manager. The CIWG Project Manager will be responsible for resolving conflicting comments/feedback in the table. Once clarifications are complete, the consultant Project Manager will track the consultant's responses to comments in the same table.
  - The consultant will keep organized records of the draft and final reports in the CIWG SharePoint

- **Project Tracking**: The consultant Project Manager is responsible for tracking the project schedule and budget.
  - A one-page monthly project progress and budget report will be prepared and submitted to the CIWG Project Manager.
  - The consultant Project Manager will organize a monthly tracking meeting between the CIWG Project Manager and the Consultant Manager to review project progress.

  - The consultant Project Manager will notify in advance the CIWG Project Manager if project deliverables or milestones will not be accomplished within the agreed upon time and budget and get approval on how to address these potential delays.
- **Project Change Notice (PCN):** the consultant Project Manager will notify the CIWG manager of any new /additional tasks or changes in previously approved tasks that would result in a budget and schedule change in the form of a *Project Change Notice* (PCN). The consultant will not execute any tasks under a PCN until it is approved by the CIWG Project Manager.

6 Evaluation metrics and criteria:

Proposals will be evaluated on the following topics:

- Project team expertise (including descriptions of previous experience) and proposed organizational structure (include a table with roles and responsibilities) (**30 points)**

  Includes consideration of experience in:

  - the Oil Sands Sector,
  - Industrial wastewater management and treatment
  - Hydrology, hydrogeology and water resources management and other relevant engineering disciplines
  - Environmental and human impact assessment
  - expertise in cost estimating frameworks for the feasibility assessments
  - conducting options analyses (e.g. MAA, life cycle analyses, etc.)
- Understanding of scope of work **(25 points)**
- Previous experience with multi-stakeholder projects (skills and management). **(25 points)**
- References **(10 points)**
- Proposed budget (**10 points)**

7 Submission and project requirements

7.1 Proposal (maximum 12 pages) describing:

- How will project goals be achieved
- Methods to complete the identified scope of work
- Project schedule including meetings, deliverables, responsibilities
- Research team biographies
- Project highlights from three previous projects
- Proposed budget
- Disclosure of any potential conflicts of interest

7.2 Acceptable appendices:

- Project team resumes
- Supplemental information
- Project organization chart
- Project schedule

7.3 Proposal submission instructions

Proposals must be submitted electronically by **July 11, 2025,** to Fort McKay First Nation, attention Ryan Abel at rabel@fortmckay.com

7.4 Anticipated contracting and draft project timelines (subject to change)

- RFP published: June 17, 2025
- Proposal submission deadline: July 18, 2025
- Contract awarded: By August 15, 2025
- Project kick off meeting: TBD, followed by bi-weekly project updates
- Work Package 1 deliverables: TBD, 2025
- Work Package 2 deliverables: TBD, 2025
- Work Package 3 deliverables: December 19, 2025
- Final Report for Assessment of OSMW Management Options and presentation to the CIWG subgroup last week of February 2026)
- Presentation of project results to external stakeholders (First week of March 2026).

7.5 Contact information:

Ryan Abel, Fort McKay First Nation. Email: rabel@fortmckay.com Phone: 780-370-6689

Appendix 1 :

List of OSMW management options under review (note that this list is currently evolving, and it is subject to change)

OSWM Options Suitable for Further Consideration

Category 2: Permanent subsurface storage (Deep Well Injection)		
Total number of alternatives under this category: 6		
New #	**Note**	**Alternative name**
6		Injection of treated saline OSMW into regional deep wells
7		Segregation and reinjection untreated depressurization water into deep wells
8		Treat OSWM and transfer for fracking operations
Category 3: Treatment of OSMW and transfer for reuse in other industrial processes (surface management)		
Total number of alternatives under this category: 5		
New #	**Note**	**Alternative name**
12		Treat OSWM and transfer for irrigation food based crops in the closest irrigation district
13		Treat OSMW and transfer for irrigation of animal grazing crops in the closest irrigation district
14		Treat OSMW and transfer for irrigation of non-food-based crops (canola for biofuels) in the closest irrigation district
16		Use treated OSMW in SAGD makeup water
Category 4: Increased implementation of good industrial practices on lease and between oil sands mining operators (former Alternative 6)		
Total number of alternatives under this category: 7		
New #	**Note**	**Alternative name**
17	(new)	Increased implementation of OSMW recycling
18	(new)	Increased implementation of OSMW treatment and reuse (includes resuse in-insitu operations)
19	(new)	Increased implementation of OMSW separation / segregation
21		Increased segregation of non-contact runoff
22		Direct contact water generation/direct contact steam generation
23	**(See Category 6)**	Increased use of evaporators to reduce volumes of untreated OSMW
Category 5: Reference Options		
Total number of alternatives under this category: 3		
New #	**Note**	**Alternative name**
24		Continued storage of OSMW in ponds on site.
25	Active	Release OSMW to the Athabasca River with medium levels of OSMW Treatment (little to no reduction of salinity)
26	Active	Release OSMW to the Athabasca River with High Level of OSMW Treatment
Category 6: Additional alternatives industry has explored - Untreated OSMW evaporation		
Total number of alternatives under this category: 3		
New #	**Note**	**Alternative name**
27	(new)	Use of spray evaporators - See alternative 23, Category 4
28	(new)	Use of thermal evaporators - See alternative 23, Category 4
29	(new)	Use of drying Fields- See alternative 23, Category 4

OSMW management options that are not being advanced at this time due to no known drivers

Category 1: Treatment of OSMW and release to receiving environment with eventual release to the Athabasca River or its tributaries		
Total number of alternatives under this category: 5		
New #	**Note**	**Alternative name**
1		Treat OSMW and release to natural existing wetlands.
2		Treat OSMW and release to created/constructed wetlands.
3	(new)	Treat OSMW and release to pit lakes (on lease) with no tailings.
4	(new)	Treat OSMW and release to artificial lakes (on/off-lease), with no tailings.
5	(new)	Release untreated OSMW to artificial lakes (on lease), with no tailings.
Category 2: Permanent subsurface storage (Deep Well Injection)		
9		Use of untreated OSMW for salt cavern washing/creation
10	(new)	Treat OSMW and transfer to geothermal wells for energy generation
11	(new)	Injection of treated OSMW into suitable (depleted) SAGD wells
Category 3: Treatment of OSMW and transfer for reuse in other industrial processes (surface management)		
15		Treat OSMW and transfer to data centers (cooling towers)
Category 4: Increased implementation of good industrial practices on lease and between oil sands mining operators (former Alternative 6)		
20		Reuse OSMW for metals and mineral recovery

Appendix 2:

Examples of descriptors for OSMW management options characterization

Request for Proposal: Assessment of OSMW Management Options in the Athabasca Region

These descriptors are provided as examples for consideration purposes; the consultant can improve, add, or remove descriptors, as necessary. They were developed in collaboration between the CIWG and Pathways Alliance as part of the working relationship between the parties.

1. Alternative definition
Description of the alternative (what is it?)
Has this alternative been implemented or considered by industry?
OSMW Quality and Volumes
OSMW types that could be managed by this alternative (influent)
Demand Quality
Demand volume (Mm3/yr)
Storage requirements
Quality for transport and distribution
Block Flow Design (BFD)
What is the OSMW short-term destination?
What is the OSMW long-term destination?
Treatment Regional vs site-specific
Reference for OSMW quality requirements
Is it contemplated in the regulatory framework?
Is it allowed in the existing regulatory framework
Treatment technology choice
Distance for conveyance to short-term destination (Km)
Distance for conveyance to long-term destination (Km)
Expected off-site waste streams
Operational considerations
Phase(s) of the LOM when the alternative can be implemented
Technology implementation readiness
Alternative implementation readiness
Annual operational period (seasonality)
Alternative implementation scale
Potential for scalability
Sensitivity to variable climate conditions
Major maintenance and operational requirements
Air Quality
Potential to generate odors and dust during operations
Potential to generate reportable emissions (PM10; PM2.5, PM1.0, NOx, SOx, VOC, etc.) during operations
Land
Estimated land disturbance (Ha or m^2) - Provide assumptions for construction + operations

1. **Characterization of the alternatives**

2. Inputs for Environmental and Human Health Assessment

Biodiversity
Type of habitats within the alternative footprint (i.e., wetlands, forests, grasslands, etc.)
Potential for protected and/or endangered species to live in or frequent the alternative footprint
Potential for protected areas to be within the alternative's footprint
Potential for migration corridors to be within the alternative's footprint
Waste
Expected waste streams (liquid, gas, solids, heavy metals, other)
Estimated construction wastes (i.e., Mt)
Annual operating waste generation (i.e., Mt/yr, Mm3/yr)
Energy
Energy source (Alberta grid, natural gas, other)
Energy demand (i.e., Gal gasoline, KW/h, m^3 natural gas, etc.)
Water
Freshwater/extraction needs (Mm^3) - construction
Freshwater/extraction needs (Mm^3) – operations
Social
Is the alternative/option footprint close to urban centers
What is the perceived public perception and/or acceptance of this alternative
What are downstream drinking water sources (i.e., wells, freshwater intakes).
Are there recreational fisheries in the footprint of this alternative?
Indigenous Community Concern Areas
Does the alternative have potential to impact traditional land use?
Does the alternative potential impact on the exercise of Indigenous rights and/or traditional activities, if yes which ones?

3. Material Balance

Stream Number		**1**	**2**	**3**	**4**
Description	**Units**	**Influent**	**Effluent**	**Non-Saline Waste**	**Saline Waste**
Annual OSMW Volume	20				
Flow	gpm				
Flow	m3/h				
TSS	mg/L				
TDS	mg/L				
MASS BASIS					
Water	kg/hr.				
TSS	mg/L				
TOC	mg/L				
TDS	mg/L				

4. Order of Magnitude Unclassified Costs

Description	Years of Operation	Key Parameters		Total Installed Cost	Total Sustaining Capital and year	Treated OSMW Generated	Annual Operating Cost
		Treatment Capacity	Pipe Length				
Units	**(years)**	**m^3/d**	**Km**	**M$**	**M$**	**Mm^3**	**M$/yr**
TOTALS							
TOTALS							
Assume comparable time periods for all options							
Discounted cash flow from each alternative to be able to compare them.							

5. Benefits, risks, uncertainties to all stakeholders

Description	Environmental	Social	Human Health	Financial	Indigenous Way of Life
ID benefits/risks, uncertainties of this alternative during **operations** - assume construction benefits are similar across alternatives					