2022-2023 OSM WORK PLAN APPLICATION

This form will be used to assess the merits of the proposed work plan and its fit with the Oil Sands Monitoring (OSM) Program mandate and strategic priorities. Applicants must complete the form in its entirety. Applicants that fail to use this form and complete all sections in the timeframe will not be considered.

OSM Work Plan Submission Deadline: The deadline for submission of proposed work plans is ***October 5, 2021 at 4:30 PM Mountain Standard time.***	***October 5, 2021*** *4:30 PM MST*
Decision Notification	*Mid to Late January 2022*

The OSM Program is governed by the Freedom of Information and Protection of Privacy Act (FOIP) and may be required to disclose information received under this Application, or other information delivered to the OSM Program in relation to a Project, when an access request is made by anyone in the public. Applicants are encouraged to familiarize themselves with FOIP. All work plans are public documents.

Work Plan Completion

Please ***Enable Macros*** *on the form when prompted.*

The applicant is required to provide information in sufficient detail to allow the evaluation team to assess the work plan. Please follow the requirements/instructions carefully while at the same time being concise in substantiating the project's merits. *The OSM Program is not responsible for the costs incurred by the applicant in the preparation and submission of any proposed work plan.*

When working on this form, please maintain Macros compatibility by always saving your draft and your final submission as a **Microsoft Word Macro-Enabled Document**, failure to do so will result in loss of form functionality**.** This form was created using Microsoft word 2016 on a PC and may not have functionality on other versions of Microsoft on PC or MACS.

All work plans under the OSM Program require either a government lead or a government coordinator. This will ensure that the financial tables (for Alberta Environment and Parks & Environment and Climate Change Canada) are completed accurately for work plan consideration. ***However,*** *if an* ***Indigenous community, environmental nongovernmental organization*** *or any other* ***external partner*** *is completing a work plan proposal, they would* ***only*** *complete the* ***grant or contract budget component*** *of the* ***Human Resources & Financials Section*** *for their project. The government coordinator within Alberta Environment & Parks would be responsible for completing the remaining components of the Human Resources and Financial Section of this Work Plan Application, as they are responsible for contract and grant facilitation of successful submissions. All other sections outside of* ***Human Resources & Financials Section*** *of this work plan proposal are to be completed in full by all applicants.*

The OSM Program recognizes that majority of work planning submissions are a result of joint effort and monitoring expertise. Should the applicant wish to submit supplemental materials in addition to their application additional resources are available in the Work Planning Form and Distribution Package, accessible here: **Work Planning Form and Distribution Package**

Should you have any ***questions*** *about completing this work planning form or uploading your final submission documents, please send all inquiries by email to:* **OSM.Info@gov.ab.ca**.

Work Plan Submission

*Upon completion of this application, please submit the appropriately named work plan (**Microsoft Word Macro-Enabled Document**) and all supporting documents to the link provided below. Failure to follow the naming convention provided may result in oversight of your application.*

*Please upload (by drag and dropping) the **WORK PLAN SUBMISSION & ALL SUPPORTING DOCUMENTS** here:*

WORK PLAN SUBMISSION LINK (CTRL+CLICK HERE)

Please use the following file naming convention when submitting your WORK PLAN:

202223_wkpln_WorkPlanTitle_ ProjectLeadLastNameFirstName

Example:

202223_wkpln_OilSandsResiduesinFishTissue_SmithJoe

If applicable, **please use the following file naming convention when submitting your supplementary or supporting files.** Please number them according to the guidance and examples provided:

202223_sup##_WorkPlanTitle_ ProjectLeadLastNameFirstName

Examples:

202223_sup01_OilSandsResiduesinFishTissue_SmithJoe

202223_sup02_OilSandsResiduesinFishTissue_SmithJoe

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202223_sup10_OilSandsResiduesinFishTissue_SmithJoe

Do not resave your work plan or documents under any other naming conventions. *If you need to make revisions and resubmit before the work planning deadline of October 5, 2021, **DO NOT** rename your submission. When resubmitting, simply resubmit with the exact naming convention so that it replaces the original submission. **DO NOT** add any additional components such as versioning or dates to the file naming convention. Please direct any questions regarding the submission or naming of submissions to **OSM.Info@gov.ab.ca**.*

WORK PLAN APPLICATION

PROJECT INFORMATION	
Project Title:	Atmospheric Pollutant Active Monitoring Network
Lead Applicant, Organization, or Community:	Alberta Environment and Parks
Work Plan Identifier Number: *If this is an on-going project please fill the identifier number for 20/21 fiscal by adjusting the last four digits:* ***Example:*** *D-1-2020 would become D-1-****2022***	A-LTM-S-1-2223
Project Region(s):	Oil Sands Region
Project Start Year: *First year funding under the OSM program was received for this project (if applicable)*	Pre 1998
Project End Year: *Last year funding under the OSM program is requested* ***Example: 2022***	N/A
Total 2022/23 Project Budget: *For the 2022/23 fiscal year*	$13,940,563.00
Requested OSM Program Funding: *For the 2022/23 fiscal year*	$13,606,788.33
Project Type:	Longterm Monitoring
Project Theme:	Air & Deposition
Anticipated Total Duration of Projects (Core and Focused Study (3 years))	Choose an item.
Current Year	**Focused Study:** Choose an item.
	Core Monitoring: Choose an item.

CONTACT INFORMATION	
Lead Applicant/ Principal Investigator: Every work plan application requires one lead applicant. This lead is accountable for the entire work plan and all deliverables.	Bob Myrick
Job Title:	Director, Airshed Sciences
Organization:	AEP
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PROJECT SUMMARY

Should your application be successful, The OSM Program reserves the right to publish this work plan application. Please check the box below to acknowledge you have read and understand:

☒ *I acknowledge and understand*

In the space below please provide a summary (300 words max) of the proposed project that includes a brief overview of the project drivers and objectives, the proposed approach/methodology, project deliverables, and how the project will deliver to the OSM Program objectives. The summary should be written in plain language.

Ambient air quality monitored through active methods is essential to link stressors to potential impacts on humans and the environment. The data collected continuously by this program allows an assessment between air quality and possible receptor responses to be undertaken for any period of interest (e.g. hourly, daily, seasonal, long-term). Assessments can be conducted on real-time or historical data collected as far back as 1998.

The overall objectives of the active air quality monitoring network in the oil sands region are:

- Provide ambient data that will allow assessment of: (i) current state of air quality, (ii) changes in measured concentrations (relative to baseline), and (iii) hot-spots and emerging issues (based on changes from baseline and/or elevated levels relative to established criteria/objectives/thresholds).
- Provide representative ambient concentrations in populated areas to inform human health risk assessments and provide the public with air quality indicators through the Air Quality Health Index (AQHI) or Fort McKay Air Quality Index (FMAQI).
- Provide ambient concentrations to help understand the impact of multiple sources on air quality in the Oil Sands region, including the ability to distinguish between oil sands specific sources of emissions from other natural and anthropogenic sources.

Specific objectives of the active monitoring network in the OSM region are provided in Section 2.0 Objectives of the Work Plan.

The Active Ambient Air Monitoring Program has five components described below:

(1) The long-term core ambient air monitoring network includes continuous and time-integrated air monitoring. The Wood Buffalo Environmental Association (WBEA) operates 29 ambient air monitoring stations (AMSs) in the Athabasca Oil Sands Region (including the acute air monitoring station in Fort McKay - Waskōw ohci Pimâtisiwin). The Lakeland Industrial and Community Association (LICA) operates 4 AMSs in the Cold Lake Oil Sands Region, and the Peace River Area Monitoring Program (PRAMP) operates 5 AMSs in the Peace River Oil Sands Region. All three airsheds collect time-integrated samples for the National Air Pollution Surveillance (NAPS) program and other parameters that cannot be collected through continuous monitoring. The long-term core air monitoring network was developed to fulfill EPEA Approval compliance monitoring requirements and satisfy community and scientific interests.

In addition, funding for the operation of the Namur Lake AMS was approved by OSM in 2021-22. This station, implemented in 2016, is owned and operated by Fort McKay First Nation (FMFN) and is referenced in Section 5.4 of the Moose Lake Access Management Plan released by the Government of Alberta in February 2021

(https://open.alberta.ca/publications/moose-lake-access-management-plan).

(2) Air monitoring activities related to Recommendations 14/15 in the report "Recurrent Human Health Complaints Technical Information Synthesis – Fort McKay Area" (Alberta Energy Regulatory and Alberta Health, 2016) continue to be implemented. Implementation of these recommendations will improve air monitoring consistency within 30 km of Fort McKay and allow improved characterization of air pollutants that cause air quality and odour concerns in the community. Some aspects of this monitoring are intended to be short-term or focused, as described in Section 10.0 Work Plan Approach/Methods.

(3) Measurements previously collected at the Oski-ôtin research monitoring station operated by ECCC have been transitioned to the Waskōw ohci Pimâtisiwin and Bertha Ganter AMSs located in Fort McKay. A side-by-side comparison for specific air quality parameters monitored by WBEA and ECCC is being considered for 2022-23. Analysis of the completed 2013-2020 Oski-otin data set, including a comprehensive statistical analysis, refinement of source apportionment and model evaluations, will be completed in 2022-23.

(4) The WBEA created an odour monitoring app (COMP) that allows the public to provide anonymous information on the odours they experience. The app collects information such as odour type, intensity, duration, timing and location. The collected information is compared to data at WBEA ambient air monitoring stations to determine if or how ambient air trends are related to odours.

(5) The transition to an adaptive monitoring approach as directed by the OSM Program will continue in 2022-23. This will involve a structured approach to: (a) review the existing monitoring network and document the purpose or objective for each station and for each parameter monitored at each station; (b) develop a shared understanding of regulatory and community expectations that will guide any OSM adaptive monitoring framework based adjustments required to the current long-term surveillance program; (c) determining which air quality parameters are applicable for the EEM approach; (d) establish baselines for selected parameters; and (e) establish limits of change for selected parameters.

In addition, the Atmospheric Pollutant Active Monitoring Network work plan includes collaboration with two community-based monitoring work plans being submitted by FMFN and Fort McKay Metis Nation (FMMN) in 2022-23 for dust and odour monitoring.

The COVID-19 pandemic has led to access restrictions to air monitoring stations located on industry site leases and in communities. Much of the monitoring outlined in the Atmospheric Pollutant Active Monitoring Network is completed using automated systems and therefore, frequent access to monitoring sites is not necessary. Periodic site access is required to: (1) maintain, repair and replace equipment; (2) conduct routine calibrations; and (3) change time-integrated samples. All organizations will follow COVID-19 health and safety protocols recommended by industries, communities and Alberta Health Services when conducting field work.

1.0 Merits of the Work Plan

All work plans under the OSM Program must serve the mandate of the program by determining (1) if changes in indicators are occurring in the oil sands region and (2) if the changes are caused by oil sands development activities and (3) the contribution in the context of cumulative effects. In the space below please provide information on the following:

- *Describe the key drivers for the project identifying linkages to the EEM framework particularly as it relates to surveillance, confirmation and limits of change (as per OC approved Key Questions).*
- *Explain the knowledge gap as it relates to the EEM framework that is being addressed along with the context and scope of the problem as well as the Source – pathway – Receptor Conceptual Models .*
- *Describe how the project meets the mandate of the OSM Program*
- *Discuss results of previous monitoring/studies/development and* what has been achieved to date.

KEY DRIVERS and LINKAGES TO EEM FRAMEWORK:

Active air monitoring in the Athabasca oil sands region started concurrently with oil sands development which began in the 1970s. The original driver of this monitoring was regulatory approval requirements and human exposure community monitoring. Airshed organizations began monitoring air quality in the Athabasca, Cold Lake and Peace oil sands regions in 1998, 2000 and 2016, respectively. In recent years, air monitoring networks were broadened to address specific concerns ranging from emergency response to understanding the impact of oil sands development in the context of other cumulative impacts (e.g. domestic sources, wildfire smoke, climate change).

The proposed work builds on an already well-developed framework for surveillance monitoring, mechanisms for confirming change, and modelling to support understanding of airborne contaminants' transport and fate. This network collects data on ambient air pollutant concentrations that will be used to: (1) establish appropriate baseline conditions for selected parameters at relevant receptor locations, (2) assess changes from these baseline conditions and comparison to limits of change established by the OSM Program; and (3) confirmation of the nature and extent of events that may have impacts on humans and/or the environment.

In the 2022-23 work plan, we will: (1) continue surveillance (including ambient compliance) monitoring, (2) develop limits of change and criteria for investigation of cause at specific receptor locations, (3) develop an understanding of what baseline or baselines of air quality are appropriate for determining change, (4) improve effects-based surveillance and air quality linkages, (5) improve our understanding of regional emission sources, and (6) use an air quality model (GEM-MACH) to determine linkages between emission sources and odour/air pollutant events in the region, hence addressing an EEM framework element. Please refer to the diagram called "Monitoring Activities in an EEM Framework (within existing linkages)" in Supplemental Attachment #07 for a visual explanation of how the active air monitoring network fits into the adaptive monitoring approach.

KNOWLEDGE GAP WITHIN SOURCE-PATHWAY-RECEPTOR MODEL:

The active ambient air quality monitoring network is directly included in the conceptual model and is linked to odours, contaminant exposure, abiotic chemical change and human health. Data collected by this network is used to understand the impact of air emission sources on ambient air quality. This understanding allows the potential odour, health, and environmental impacts of the air quality parameters associated with emissions from oil sands operations and other sources (in a cumulative effects context) to be assessed. Understanding the impacts of air pollutants on the environment and humans can be assessed using the EEM framework approach. A major focus of the Air and Deposition TAC will be to develop a shared understanding of regulatory and community expectations that will guide any required OSM adaptive monitoring framework based adjustments to the current long-term surveillance program and to determine which elements of the adaptive monitoring approach of the EEM framework need to be incorporated into the active ambient air monitoring network.

Data collected by the active long-term air monitoring network is used to address the following knowledge gaps:

- Does air quality exceed the benchmarks such as AAAQOs, AAAQGs, LARP triggers/limits, CAAQS or Fort McKay's Permissible Air Quality Limits?
- What is the Air Quality Health Index (AQHI) in communities and in Fort McKay what is Fort McKay Air Quality Index?
- What are the long-term trends of monitored parameters in relation to human health, ecosystem, and environmental effects thresholds and to community concerns?
- What are the patterns of change of monitored parameters in communities and at key receptor locations and what is contributing to these patterns?
- What are the effects of energy resources and commercial developments on the air quality in communities?
- Are anthropogenic air emissions and/or associated atmospheric deposition related to oil sands activities affecting ecological systems in the oil sands region?
- What changes to environmental indicators are occurring in the oil sands region? Are they due to oil sands development?
- What are the background concentrations of measured ambient air parameters?
- What is the relationship between odour complaints and ambient air monitoring data?
- Do ambient air concentrations of H2S and/or SO2 in Fort McKay meet Trigger Levels determined by the FMAQO Advisory Committee?
- How are air emissions from industry within 30 km of Fort McKay affecting air quality and odour in the community?

Additional knowledge gaps may exist in relation to the EEM framework in terms of source emissions, transformation and fate and effects. The Air TAC will be looking at aspects of the active monitoring network in the context of the EEM framework Question #3 (Should I be concerned, is it getting better or worse, is it worth investigating), Question #4 (where is it coming from) and Question #5 (does it need to be fixed).

FULFILLMENT OF OSM PROGRAM MANDATE:

The Air TAC will continue to develop a shared understanding of objectives, tiers of monitoring activity, baselines, limiting factors, triggers, pathways and contributing factors to, as appropriate, implement elements of an adaptive monitoring framework. This will allow further assessment of the impact of air quality on environmental receptors and human health.

The active air monitoring network in the oil sands region has been in place for over 20 years and provides a wealth of data to assess changes in air quality indicators. The active air monitoring data provides confirmation of expected and observed influence of stressor – response pathways (Hemsley et al., 2019, Landis et al., 2019).

As discussed in the next section, many studies have been conducted to evaluate the impacts of air emissions from oil sands operations on air quality and human and environmental receptors. In 2021-22, an adaptive monitoring approach will be developed for specific air quality parameters, which will allow further assessment of the impact of air quality on environmental receptors and human health. Different parameters may require different baselines after which they will be assessed for potential "change" within the available time period.

RESULTS OF PREVIOUS MONITORING STUDIES:

Emissions from oil sands operations are impacting ambient air quality. The assessment of the nature and magnitude of these changes in air quality depends on the methodology used to assess change, and the baseline from which changes are assessed. Monitoring is a direct measure of ambient air quality in the oil sands region. Complementary tools, such as dispersion modelling, satellite data, and intensive focused studies, provide the necessary information (i.e. calculated and predictive scenarios) to address monitoring gaps and inform decision-making.

The following are some of the air quality changes and source attribution relations that have been observed in the oil sands region:

- Net SO2 from the main sources as inferred from surface monitoring stations and satellite data shows a slight overall increasing change in SO2 in the oil sands mining region between Fort McMurray and Fort McKay (McLinden et al., 2020).
- Sulphur concentrations in lichen, as a marker of S-in-air, shows no significant changes (Wieder et al., 2020 – paper under review).
- Secondary organic aerosol (SOA) as a major component of PM2.5 from oil sands activities has increased between an early industrial expansion period (1998–2001) and more recent times (2011–2014) (Liggio et al., 2016).
- SO2 concentrations are low and remain stable at the Maskwa monitoring station (Cold Lake Airshed) despite new facility construction and the commissioning of oil sands expansions projects. The stable SO2 observations are likely due to the de-grandfathering of older facilities with higher SO2 release limits.
- Although the Reno monitoring station continues to show elevated hydrocarbon concentrations (CH4, NMHC) relative to current measurements at the other PRAMP sites overall, there has been a decrease in the magnitude and frequency of elevated concentration hydrocarbon events.
- Edgerton et al. (2020) showed a decrease in concentrations of reactive gases from the center of surface mining oil sands production operations towards the edges of the monitoring domain by factors of 8 for SO2, 20 for NO2, 4 for HNO3 and 3 for NH3, with 18 out of 30 sites showing a ~40% SO2 decrease since 2000 and only 2 out of 30 sites showing statistically significant temporal changes for NO2.
- Landis et al., 2017 applied a PMF receptor model to ambient air data from AMS Fort McKay, which resolved five sources explaining 96% of PM2.5, and six sources explaining 99% of PM10 and based on the study results concluded that “Abatement strategies targeting the three major types of fugitive dust would likely result in significant reductions in ambient PM10–2.5 concentrations in the Fort McKay community.”.
- Overall, ambient NO2 increased from 2000-2008 in the Athabasca Oil Sands Region (AOSR) and plateaued with little change since. Small data sets prevented examining PM2.5 and NH3 changes; however, wildfires are known as a large NH3 source during summer months. McLinden et al. (2015) showed regional annual increases in NO2 through to 2014 and NOx emission data shows a general continuing increase in NOx emissions North of Fort McMurray. It should be noted that NO2 levels at stationary air monitoring stations will be influenced by their proximity to mining operations (e.g. levels will increase when the mine expands closer to the station and decrease when the mine expands away from the station). Therefore general ambient NO2 level trends may be better predicted by trends in NOx emissions.
- Strong seasonality is also observed for PM10, where ambient monitoring near community and industry operations detected high alkalinity and strong spatial gradients, with higher deposition of base cations during snow-free periods.

Air quality levels are dynamic in the oil sands region. They may change depending on several factors such as emission rates, meteorological conditions, topography, and the location of emission sources relative to the receptor (community). Alternate approaches have been used to assess the impacts of oil sands operations on nearby communities. The use of these methodologies show a "clear and generally increasing influence of industry on air quality" in the community of Fort McKay (Davidson and Spink, 2018). Based on this work, concentrations of NO2, SO2, THC, TRS, and PM2.5 between an early industrial expansion period (1998–2001) and more recent times (2011–2014) have significantly increased and that this change can be attributed to industrial development. Furthermore, pollution "episodes" continue to impact Fort McKay's community (Wren et al., 2020). Due to the dynamic nature of air pollution in the oil sands region, traditional time-series trend analysis of air quality data may not be appropriate for assessing the effectiveness of emission management programs and therefore previous trending findings need to be interpreted and used with caution.

SO2 emissions inferred from satellite data reported SO2 emissions, and surface monitoring network SO2 concentrations all agree prior to 2013. Post-2013, SO2 emissions inferred from satellite data and surface monitoring network SO2 concentrations remain in agreement (showing little change to a slight increase in SO2),

while reported SO2 emissions decreased by a factor of 2. No clear explanation for this discrepancy currently exists (McLinden et al., 2020) and it highlights the monitoring station-source location challenges noted above for NO2.

Results based on data collected by the active air monitoring network are available at:
https://open.alberta.ca/publications/9781460140925
https://open.alberta.ca/publications/9781460145692
https://www.tandfonline.com/doi/full/10.1080/10962247.2017.1377648
https://wbea.org/resources/reports-publications/air-monitoring-reports/
https://comp.wbea.org/
https://wbea.org/resources/reports-publications/publications/
https://www.sciencedirect.com/journal/science-of-the-total-environment/special-issue/10LW6CG6CPT
https://wbea.org/air/air-quality-events/
https://lica.ca/resources/
https://prampairshed.ca/resources/other-resources/

2.0 Objectives of the Work Plan

List in point form the Objectives of the 2022/23 work plan below

The active air monitoring network functions to address multiple objectives, science questions and policies including:

- Environmental Protection and Enhancement Act (EPEA) approvals;
- National Air Pollution Surveillance (NAPS) system;
- Acid Deposition Management Framework (ADMF);
- 2009 Ambient Air Monitoring Strategy for Alberta;
- 2019-2024 science strategy (Knowledge for a changing environment);
- OSM Monitoring Objectives;
- Alberta's Ambient Air Quality Objectives (AAAQOs) and Guidelines (AAAQGs);
- Air Quality Health Index (AQHI);
- Fort McKay Response Trigger Protocol;
- Lower Athabasca Regional Plan (LARP);
- Canadian Ambient Air Quality Standards (CAAQS); and
- Indigenous air quality concerns and monitoring requests.

Specific objectives of the 2022/23 work plan are:

(1) To measure impacts from Oil Sands development on ambient air quality.
(2) To provide ambient air data that citizens, industrial members, and regulatory bodies can use to make informed decisions on health, facility compliance, and environmental management policy.
(3) To provide ambient air data for community needs, including the Air Quality Health Index (AQHI), the Fort McKay Air Quality Index (FMAQI), and measuring representative ambient concentrations in populated areas.
(4) Implement ambient air monitoring approved by the Fort McKay Air Quality and Odour (FMAQO) Advisory Committee (specific to Recommendations 1, 14 and 15).
(5) To measure air parameters in Fort McKay that will assist in odour identification and source characterization/attribution during air quality and odour events.
(6) To understand the impacts of Oil Sands development on the odours experienced in communities in the AOSR.
(7) To understand the relationship between the odours experienced by community members and the ambient air data collected at active air monitoring stations.
(8) To measure air parameters in Fort McKay that will assist in dustfall identification and source characterization during dustfall and low visibility events.
(9) To understand the impacts of Oil Sands development on the dustfall experienced in Fort McKay.
(10) To understand the relationship between the dustfall experienced by community members in Fort McKay and the ambient air data collected at active air monitoring stations.
(11) To ensure that monitoring carried out in the region is relevant to the concerns of community

members.
(12) To implement the adaptive monitoring approach, as directed by the OSM Program Oversight Committee, where appropriate in the Atmospheric Pollutant Active Monitoring Network.
(13) Create an Indigenous-led air monitoring program in the Peace Athabasca Delta and at reserve locations in partnership with WBEA.
(14) Expand the Fort Chipewyan air monitoring capabilities to fill the air quality data gap with time integrated sampling.
(15) Build community capacity through training of ACFN and MCFN Personnel for sampling program operations and maintenance.

3.0 Scope

Evaluation of Scope Criteria (Information Box Only- No action required)
Your workplan will be evaluated against the criteria below. A successful workplan would:

- be in scope of the OSM Program (e.g., regional boundaries, specific to oil sands development, within boundaries of the Oil Sands Environmental Monitoring Program Regulation)
- integrate western science with Indigenous Community-Based Monitoring
- addresses the EEM framework particularly as it relates to surveillance, confirmation and limits of change as per approved Key Questions.

have an experimental design that addresses the Pressure/Stressor, Pathway/Exposure, Response continuum

- produce data/knowledge aligned with OSM Program requirements and is working with Service Alberta
- uses Standard Operating Procedures/ Best Management Practices/ Standard Methods including for Indigenous Community-Based Monitoring

3.1 Sub Theme

Please select from the dropdown menu below the theme(s) your monitoring work plan relates to:

Air

3.2 Core Monitoring or Focused study

Please select from the dropdown menu below if the monitoring in the work plan is "core monitoring" and/or a "focused study". Core monitoring are long term monitoring programs that have been in operation for at least 3 years, have been previously designated by the OSM program as core, and will continue to operate into the future. Focused studies are short term projects 1-2 years that address a specific emerging issue. For the purposes of 2022/23 work planning all Community Based Monitoring Projects are Focused Studies.

Core Monitoring

3.3 Sub Theme Key Questions

Please select from the dropdown menus below the sub-theme(s) your monitoring work plan relates to and address the Key Questions:

3.3.1 Surface Water Theme

3.3.1.1. Sub Themes:

Choose an item.

3.4.1.2 Surface Water Key Questions

Explain how your surface water monitoring program addresses the key questions below.

1. Are changes occurring in water quality, biological health (e.g., benthos, fish) and/or water quantity/flows, to what degree are changes attributable to oil sands activities, and what is the contribution in the context of cumulative effects?

Click or tap here to enter text.

2. Are changes in water quality and/or water quantity and/or biological health informing Indigenous key questions and concerns?

Click or tap here to enter text.

3. Are data produced following OSM Program requirements and provided into the OSM Program data management system?

Click or tap here to enter text.

4. Do methodologies use relevant Standard Operating Procedures/ Best Management Practices/ Standard Methods?

Click or tap here to enter text.

5. How does the monitoring identify integration amongst projects, themes or with communities?

Click or tap here to enter text.

6. 7.6. Where does the monitoring fit on the conceptual model within the EEM framework for the theme area and relative to the conceptual model for the OSM Program theme area? How will this work advance understanding transition towards of the conceptual model EEM framework?

Click or tap here to enter text.

7. Is the work plan contributing to Programmatic State of Environment Reporting?

Click or tap here to enter text.

3.3.2 Groundwater Theme

3.3.2.1 Sub Themes:

Choose an item.

3.3.2.2 Groundwater Key Questions

Explain how your groundwater monitoring program addresses the key questions below.

1.Are changes occurring in groundwater quality and/or quantity, to what degree are changes attributable to oil sands activities, are changes affecting other ecosystems, and what is the contribution in the context of cumulative effects?

Click or tap here to enter text.

2. 2. Are changes in groundwater quality and/or quantity informing Indigenous key questions and concerns Indigenous concerns and health?

Click or tap here to enter text.

3. Are data produced following OSM Program requirements and provided into the OSM Program data management system?

Click or tap here to enter text.

4. Do methodologies use relevant Standard Operating Procedures/ Best Management Practices/ Standard Methods?

Click or tap here to enter text.

5. How does the monitoring identify integration amongst projects, themes or with communities?

Click or tap here to enter text.

6. Where does the monitoring fit within the EEM framework and relative to the theme area? How will this work advance transition towards the EEM framework?

Click or tap here to enter text.

7. Where does the monitoring fit on the conceptual model for the theme area and relative to the conceptual model for the OSM Program? How will this work advance understanding of the conceptual model?

Click or tap here to enter text.

8. Is the work plan contributing to Programmatic State of Environment Reporting?

Click or tap here to enter text.

3.3.3 Wetlands Theme

3.3.3.1 Sub Themes:

Choose an item.

3.3.3.2 Wetland - Key Questions

Explain how your wetland monitoring program addresses the key questions below.

1. Are changes occurring in wetlands due to contaminants and hydrological processes, to what degree are changes attributable to oil sands activities, and what is the contribution in the context of cumulative effects?

Click or tap here to enter text.

2. Are changes in wetlands informing Indigenous key questions and concerns?

Click or tap here to enter text.

3. Are data produced following OSM Program requirements and provided into the OSM Program data management system?

Click or tap here to enter text.

4. Do methodologies use relevant Standard Operating Procedures/ Best Management Practices/ Standard Methods?

Click or tap here to enter text.

5. How does the monitoring identify integration amongst projects, themes or with communities?

Click or tap here to enter text.

6. Where does the monitoring fit within the EEM framework and relative to the theme area? How will this work advance transition towards the EEM framework?

Click or tap here to enter text.

7. Where does the monitoring fit on the conceptual model for the theme area and relative to the conceptual model for the OSM Program? How will this work advance understanding of the conceptual model?

Click or tap here to enter text.

8. Is the work plan contributing to Programmatic State of Environment Reporting?

Click or tap here to enter text.

3.3.4 Air Theme

3.3.4.1 Sub Themes:

Quality

3.3.4.2 Air & Deposition - Key Questions

Explain how your air & deposition monitoring program addresses the key questions below.

1. Are changes are occurring in air quality, to what degree are changes attributable to oil sands emissions, and what is the contribution in the context of cumulative effects?

There are multiple ways to define 'change', which relies on how 'baseline' or 'background' is defined. Developing a shared understanding between all stakeholders and partners will be crucial for the success of this framework. These terms have not been explicitly defined for air monitoring by the OSM Program. In 2022-23, the TAC will continue to define 'baseline' for specific air quality parameters. Existing data will be leveraged to help define 'baseline', which considers different time periods and geographical locations. It is likely that each contaminant will require a distinct baseline.

Recent advancements in technology for real time measurements have enhanced the understanding of complex atmospheric cycles and the ability to verify and validate changes observed in the region. Instruments with better detection limits and improved speciation of compounds will help verify and validate historical monitoring methods and results.

The assessment of change depends on the statistical method used to evaluate the data. Based on annual average concentration data over ten years, statistically significant improvements in ambient air quality have been measured for SO2, H2S/TRS and NO2 at several air monitoring stations in the Athabasca oil sands region. A statistically significant increase (worsening) in SO2 levels was measured at the Lower Camp AMS based on ten years of data. However, air quality levels are dynamic in the oil sands region and may change depending on factors such as emission rates, meteorological conditions, topography and the location emission sources relative to the receptor(s) of interest e.g. community, sensitive ecosystem, etc.

As an example, Davidson and Spink (2018) found that concentrations of NO2, SO2, THC, TRS, and PM2.5 between an early industrial expansion period (1998–2001) and current day (2011–2014) have significantly increased in Fort McKay and that this change can be attributed to industrial development. A study by Edgerton et al. (2020) showed a decrease in concentrations of reactive gases from the center of oil sands production operations towards the edges of the monitoring domain by factors of 8 for SO2, 20 for NO2, 4 for HNO3 and 3 for NH3, with 18 out of 30 sites indicating ~40% SO2 decrease since 2000 and only 2 out of 30 sites statistically significant temporal trends for NO2. Due to the dynamic nature of air pollution in the oil sands region, traditional monotonic time-series trend analysis of air quality data may not be appropriate for assessing temporal changes in air quality and/or the effectiveness of emission management programs.

Odours and air quality concerns are a recurrent issue in communities in the oil sands region, especially in Fort McKay. Intensive air monitoring in and near the community will help to identify air pollutants that are causing air quality and odour issues and the sources responsible for these issues. Air quality trigger levels have been established for SO2 and H2S in Fort McKay that will compared to, and actioned based on, data from the Waskōw ohci Pimâtisiwin station. The lowest trigger level for SO2 has been exceeded a few times (in 2019 and 2020) since the draft Fort McKay Acute Response Triggers Process was established.

The enhanced air quality monitoring station in Fort McKay (Oski-ôtin) was established to monitor a wide range of air pollutants in near-real-time so that a detailed diagnosis of pollutants associated with odour events and other air quality episodes could be determined. On-going analysis of data from this site has led to new methods for source attribution for specific air quality or odour events in Fort McKay (Wren et. al. 2020).

2. Are changes informing Indigenous key questions and concerns?

Based on recurrent odour and poor air quality issues and general concerns regarding air quality impacts on health, air quality monitoring is conducted in or near several Indigenous communities in the oil sands region due to, including Fort Chipewyan, Fort McKay, Anzac, Janvier, Conklin and Cadotte Lake. Air quality data from these monitoring stations is used to calculate the Air Quality Health Index (AQHI), which provides community members with a short-term health based indicator of current air quality conditions. Additionally, community members in the Athabasca Oil Sands Region can submit odour concerns through the Community Odour Monitoring Program (COMP) app. The WBEA, LICA and PRAMP currently monitor in communities that would otherwise have been excluded from provincial and federal monitoring strategies or plans, filling a monitoring gap that helps address Indigenous community concerns.

Additional air monitoring is conducted in Fort McKay as, due to its location relative to oil sands mining and upgrading operation, it is the community most impacted by oil sands emissions and there are recurrent air quality issues in the community and related health and quality of life concerns by community members. In addition to traditional air monitoring, an acute air quality station (Waskōw ohci Pimâtisiwin station) provides information to the community on acute levels for SO2 and H2S.

The report “Recurrent Human Health Complaints Technical Information Synthesis – Fort McKay Area” (Alberta Energy Regulatory and Alberta Health, 2016) contains recommendations directed at addressing many of Fort McKay’s air quality and odour concerns. Pollution “episodes” that continue to impact the community of Fort McKay were evaluated by Wren et al., 2020 and Landis et al. 2017 where source attribution was undertaken. Landis et al. 2017 concluded that “Abatement strategies targeting the three major types of fugitive dust would likely result in significant reductions in ambient PM10–2.5 concentrations in the Fort McKay community.” which is information the community can use to understand the sources impacting one element of air quality in the community and the mitigation actions it needs to pursue with industry and regulators.

The Oski-ôtin air monitoring station in Fort McKay also provided additional information on air quality parameters that allows the community to determine the potential source or sources that may be causing air quality or odour concerns. With the decommissioning of this AMS, some of the monitoring conducted at this station will be conducted by WBEA at either the Waskōw ohci Pimâtisiwin or Bertha Ganter stations.

The project is linked to GEM-MACH modeling activities under the Atmospheric Deposition Monitoring work plan (A-PD-6-2223), which will include an examination and further development of the model’s predictive capabilities for odour events.

The Recommendation 14/15 committee requested the additional air monitoring in Fort McKay explicitly to address the concerns the community has regarding air quality. Implementation of these recommendations will allow improved characterization of air pollutants that may cause air quality concerns.

3. Are data produced following OSM Program requirements and provided into the OSM Program data management system?

All data produced by the active air monitoring program are publicly available and accessible. For the 39 active air monitoring stations, data are available at:

WBEA - https://wbea.org/historical-monitoring-data/ (continuous data)
WBEA - https://wbea.org/network-and-data/integrated-data-search/ (time-integrated data)
WBEA - https://annualtrends.wbea.org/ (annual trends)
WBEA - https://wbea.org/air/air-quality-events/ (air quality events)
LICA - https://lica.ca/airshed/
PRAMP - https://prampairshed.ca/live-air-quality-data/
All Airsheds - http://airquality.alberta.ca/map (real time data)

All Airsheds - https://www.alberta.ca/access-air-quality-and-deposition-data.aspx (quality assured data)

In the future, quality assured data from the new Air Data Management System will be linked to the OSM Program data portal.

Data from the COMP are available at https://comp.wbea.org/.

Data on the ECCC measurements at Oski-ôtin are accessible at https://www.canada.ca/en/environment-climate-change/services/oil-sands-monitoring/monitoring-air-quality-alberta-oil-sands.html.

4. Do methodologies use relevant Standard Operating Procedures/ Best Management Practices/ Standard Methods?

Quality assurance and quality control are conducted in accordance with the Air Monitoring Directive, the Air Monitoring Quality Assurance Plan and SOPs for data QA/QC developed by AEP and each airshed.

The Namur Lake AMS operated by FMFN follows the AMD to the extent possible. Because this is an off-grid AMS, year-round operation is not practical. Typically, the station is operated from March through November. The TAC will discuss the need for and value of having this station operate year-round operation and the appropriate changes and requirements to facilitate its year-round operation if this is considered desirable.

The WBEA's field procedures manual and site documentation Volume III are publicly available, and specific SOPs and QAP are available upon request.
https://wbea.org/wp-content/uploads/2020/03/Volume-III-Site-Documentation-2019_reduced.pdf

The AEP SOPs and Air Monitoring Directive are available here:
http://environmentalmonitoring.alberta.ca/resources/standards-and-protocols
http://aep.alberta.ca/air/legislation/air-monitoring-directive/default.aspx

Available SOPs for the Oski-ôtin station are posted at:
http://environmentalmonitoring.alberta.ca/resources/standards-and-protocols/
AEP and ECCC will work together to improve the SOP inventory. These will be updated and reviewed as required.

5. How does the monitoring identify integration amongst projects, themes or with communities?

Supplemental Attachment #07 provides a visual description of how this work plan is integrated with other Air and Deposition work plans and with other monitoring themes.

This work plan integrates all of the active air monitoring funded under OSM. It includes active monitoring previously identified in separate work plans for the Athabasca, Cold Lake and Peace River oil sands regions, the acute air quality station in Fort McKay, additional monitoring for Recommendations 14/15 from the "Recurrent Human Health Complaints Technical Information Synthesis – Fort McKay Area" report, the Oski-ôtin monitoring station, and the Community Odour Monitoring Program.

This work plan is also integrated with a Community-Based Monitoring (CBM) work plan being submitted from the community of Fort Chipewyan. The CBM work plan involves training two community members to calibrate and maintain the WBEA's Fort Chipewyan air monitoring station that operates in their community. The purpose is to develop community-specific resources and understanding of the air monitoring being conducted in the community. Two community members from the Athabasca Chipewyan First Nation and Mikisew Cree First Nation completed their training at the WBEA and are now providing operational support for the Fort Chipewyan AMS year-round with the support of the WBEA. This year, time-integrated samples will be added to the Fort

Chipewyan AMS. These individuals will be responsible for the weekly sample deployments and collections, as per the National Air Pollution Surveillance schedule.

This work plan is also integrated with Community-Based Monitoring (CBM) work plans being submitted by the Fort McKay First Nation (FMFN) and the Fort McKay Metis Nation (FMMN). One work plan related to dust monitoring is being led by the FMFN and the other related to odour is being lead by the FMMN but both work plans are collaborative FMFN and FMMN initiatives and are therefore total Fort McKay Community in scope. The WBEA association has a strong role in both work plans which involve community monitoring of both dust and odours and coordinating and integrating this monitoring with current WBEA monitoring and associated data management and analyses. For the community odour monitoring the community odour monitors will input their observations into the COMP program using the COMP app which will require some modifications to this app and some training by WBEA to the community odour observers on the use of app. For the dust monitoring, WBEA will locate some of the dust monitors at current WBEA stations and manage the collection, sample analysis and data management at these sites and will assist Fort McKay with the sample analysis and data management for the dust sample it collects in the Community, on its Reserve Lands e.g. at the Namur Lake AMS, and on its traditional territory e.g. certain traplines and community gathering areas. The analyses of the collected dust data will be done by both WBEA and Fort McKay air quality scientists and include all relevant and related air quality data currently being collected under the OSM Atmospheric Pollutant Active Monitoring Network program e.g. continuous PM2.5 and PM10 monitor, the NAPS integrated PM mass, ion and element data, and the regional meteorological data.

Data generated by this work plan are used to support atmospheric deposition calculations, conduct model validation exercises, and provide data relative to established regulatory benchmarks. The deposition calculations and model validation are done through the Integrated Atmospheric Deposition Monitoring work plan (A-PD-6-2223).

6. Where does the monitoring fit within the EEM framework and relative to the theme area? How will this work advance transition towards the EEM framework?

Work proposed for 2022-23 intends to apply the EEM framework to the active air monitoring network where appropriate. The first step will be to develop a shared understanding of regulatory and community expectations which in turn will guide any OSM adaptive monitoring framework adjustments required to the current long-term surveillance program.

This will involve developing a clear understanding of: (1) regulatory and community expectations for monitoring which will be used to determine if and where adjustment of the current long-term surveillance program based on the OSM adaptive monitoring framework are needed or appropriate; (2) the purposes for monitoring at each monitoring station; (3) air quality parameters (and locations) where the adaptive monitoring approach is adequate; and (4) a method for identifying baselines and identifying limits of change that will inform future monitoring activities.

The Air and Deposition TAC recognizes that implementing the EEM Approach will be a process and will require collaboration with other OSM TACs. The WBEA has initiated identification of monitoring objectives and scientific questions for the Ambient Air monitoring network (Section 2. Objectives of the workplan). Please see Supplemental Attachment #07 for a visual representation of how active air monitoring fits within the EEM framework.

7. Where does the monitoring fit on the conceptual model for the theme area and relative to the conceptual model for the OSM Program? How will this work advance understanding of the conceptual model?

The active ambient air quality monitoring network is directly included in the conceptual model and is linked to odours, contaminant exposure, abiotic chemical change and human health. Data collected by this network is used to understand the impact of air emission sources on ambient air quality. This understanding allows the potential odour, health, environmental impacts of the air quality parameters

associated with emissions from oil sands operations and other sources (in a cumulative effects context) to be assessed. The data is used to support atmospheric deposition calculations and provide data relative to established regulatory benchmarks. Please refer to Supplemental Attachment #07 for a visual description of how this work plan fits into the conceptual model.

8. Is the work plan contributing to Programmatic State of Environment Reporting? (Answer Box)

Yes, monitoring from previous iterations of this work plan are being used in the Programmatic State of Environment reporting. Project team members from this work plan contributed data, analyses, figures, and text to the OSM SoE report, and will continue to do as required.

3.3.5 Terrestrial Biology Theme

3.3.5.1 Sub Themes:

Choose an item.

3.3.5.2 Terrestrial Biology - Key Questions

Explain how your terrestrial biological monitoring program addresses the key questions below.

1. Are changes occurring in terrestrial ecosystems due to contaminants and landscape alteration, to what degree are changes attributable to oil sands activities, and what is the contribution in the context of cumulative effects?

Click or tap here to enter text.

2. Are changes in terrestrial ecosystems informing Indigenous key questions and concerns?

Click or tap here to enter text.

3. Are data produced following OSM Program requirements and provided into the OSM Program data management system?

Click or tap here to enter text.

4. Do methodologies use relevant Standard Operating Procedures/ Best Management Practices/ Standard Methods?

Click or tap here to enter text.

5. How does the monitoring identify integration amongst projects, themes or with communities?

Click or tap here to enter text.

6. Where does the monitoring fit within the EEM framework and relative to the theme area? How will this work advance transition towards the EEM framework?

Click or tap here to enter text.

7. Where does the monitoring fit on the conceptual model for the theme area and relative to the conceptual model for the OSM Program? How will this work advance understanding of the conceptual model?

Click or tap here to enter text.

8. Is the work plan contributing to Programmatic State of Environment Reporting?

Click or tap here to enter text.

3.3.6 Cross-Cutting Across Theme Areas

3.3.6.1 Sub Themes:

Choose an item.

If "Other" was selected from the drop down list above please describe below:

Click or tap here to enter text.

3.3.6.2 Cross-Cutting - Key Questions

Explain how your cross-cutting monitoring program addresses the key questions below.

1. Is data produced following OSM Program requirements and provided into the OSM Program data management system?

Click or tap here to enter text.

2. Do methodologies use relevant Standard Operating Procedures/ Best Management Practices/ Standard Methods?

Click or tap here to enter text.

3. How does the monitoring identify integration amongst projects, themes or with communities?

Click or tap here to enter text.

4. Where does the monitoring fit within the EEM framework and relative to the theme area? How will this work advance transition towards the EEM framework?

Click or tap here to enter text.

5. Where does the monitoring fit on the conceptual model for the theme area and relative to the conceptual model for the OSM Program? How will this work advance understanding of the conceptual model?

Click or tap here to enter text.

6. Is the work plan contributing to Programmatic State of Environment Reporting?

Click or tap here to enter text.

4.0 Mitigation

Evaluation of Mitigation Criteria (Information Box Only- No action required)
Your workplan will be evaluated against the criteria below. A successful workplan would potentially inform:

- efficacy of an existing regulation or policy
- an EPEA approval condition
- a regional framework (i.e., LARP)
- an emerging issue

Explain how your monitoring program informs management, policy and regulatory compliance. As relevant give consideration for the EEM framework and the approved Key Questions.

The pollutant monitoring program functions to address multiple objectives and scientific questions as identified in the EPEA approvals, NAPS, ADMF, 2009 Alberta Monitoring Strategy, 2019-2024 Alberta Science Strategy, OSM Monitoring Objectives, AAAQO, AAAQG, AQHI, FMRKT, FMAQI, LARP, and CAAQS.

Many of the active monitoring stations that are part of the long-term core air monitoring network (operated by WBEA, LICA and PRAMP) are required directly or indirectly by an EPEA approval condition. Approvals may include the requirement for a specific monitoring activity (specific station and parameters) or the requirement for an industrial operator to participate in an Airshed organization. In many cases, the industry meets their EPEA approval requirements through the monitoring and reporting conducted by the Airshed organizations. Airshed organizations will report non-compliance of approval conditions related to ambient air monitoring to the regulator on behalf of the industry. Consistent exceedances of AAAQOs can lead to regulatory action. In some cases existing monitoring stations and the parameters being monitored at these stations are the result of commitments made by an operator to an Indigenous community as part project mitigation.

The Namur Lake AMS is required to assess air quality pollutant levels in the Moose (Namur) Lake area relative to the Moose Lake Ambient Air Quality Targets as identified in the Moose Lake Access Management Plan (MLAMP). Fort McKay has also established Moose Lake ambient air quality targets for air quality on the Moose Lake Reserves (Gardiner Lake Reserve #174A and Namur Lake Reserve #174B) which are more stringent than the MLAMP Ambient Air Quality Targets. The station is therefore also required to assess air quality pollutant levels on the Moose Lake Reserves relative to these community-based air quality targets. The MLAMP specifically requests that financial support through the OSM Program be provided to operate this station and this funding was provided for the 2021/22 fiscal year.

Data collected at the active air monitoring stations are included in the annual reporting against limits/triggers for air quality under LARP and CAAQS. If air quality levels are above the benchmarks outlined by LARP or CAAQS, then management actions may need to be developed. The nature of the management action will depend on the trigger level exceeded.

The PRAMP air monitoring network was originally established to address the AER report "Decision 2014 ABAER 005: Report of Recommendations on Odours and Emissions in the Peace River Area (March 31, 2014)" available through the Peace River Performance Dashboard at https://www.aer.ca/protecting-what-matters/reporting-on-our-progress/taking-action-in-peace-river/peace-river-performance-dashboard. This report was generated based on public concerns associated with oil sands development in the Peace River region.

Ambient air data supports several population centre (community) monitoring needs, including the Air Quality Health Index (AQHI), and measuring representative ambient concentrations in populated areas.

Odours and air quality are important issues in the oil sands region, and much of the monitoring and evaluation in this work plan is focused on addressing these issues (FMAQO Advisory Committee). Specifically, new monitoring is needed in Fort McKay to improve the consistency of air and

meteorological monitoring within 30 km of Fort McKay to assist the regulator, industry, community and the OSM Program in identifying priority air quality management issues and the emission sources that need to be the focus for additional management. The new monitoring will improve our understanding of air quality and odour issues in the community and identify sources that may be causing these issues. The Oski-ôtin air monitoring station allowed a more comprehensive understanding of air pollutants that are impacting odour and air quality in Fort McKay and with the decommissioning of this facility WBEA added a total sulphur analyzer, a continuous gas-phase VOC analyzer, and a particle counter (to be added in 2022-23) to its Waskōw ohci Pimâtisiwin AMS. The WBEA Community Odour Monitoring Program is available throughout the AOSR and allows community members to be engaged in identifying odour issues.

The relevance of the active air monitoring network and its connection to other monitoring themes and tools for investigation of cause are visually portrayed in Supplemental Attachment #07.

5.0 Indigenous Issues

Evaluation of Indigenous Issues Criteria (Information Box Only- No action required)
Your workplan will be evaluated against the criteria below. A successful workplan would potentially:

- Investigate Indigenous communities key questions and concerns
- Includes culturally relevant receptor(s) and indicator(s)
- Include or be driven by Indigenous communities (participatory or collaborative)
- Develop capacity in Indigenous communities
- Include a Council Resolution or Letter of Support from one or more Indigenous communities
- Describe how ethics protocols and best practices regarding involvement of Indigenous peoples will be adhered to
- Provide information on how Indigenous Knowledge will be collected, interpreted, validated, and used in a way that meets community Indigenous Knowledge protocols

Explain how your monitoring activities are inclusive and respond to Indigenous key questions and concerns and inform the ability to understand impacts on concerns and inform Section 35 Rights

Active (continuous and time-integrated) monitoring occurs in most Indigenous communities in the oil sands region (including Fort Chipewyan, Fort McKay, Anzac, Janvier, Conklin and Cadotte Lake). Information from this monitoring provides communities with ambient air monitoring concentrations and the AQHI in real time. Because of Fort McKay's location relative to mining operations, and concerns repeated by community members regarding air quality and odour, more comprehensive air monitoring and reporting are conducted. Most First Nation and Métis organizations belong to Airshed organizations in the oil sands region. An agreement between Fort McKay and ECCC is in place regarding data sharing from the Oski-ôtin research station. In addition, the Namur Lake AMS operated by Fort McKay First Nation was included as part of the OSM Program starting in 2021-22.

The WBEA's long-term environmental monitoring program was initiated due to concerns expressed by local Indigenous community members about the potential impacts of industrial development on ambient air quality. Indigenous community members continue to be key participants in the technical and general membership that oversees this surveillance program.

Current Indigenous key questions and concerns, and regulatory agency recommendations, need to be understood by the Air and Deposition TAC to align the program monitoring objectives and scientific questions of Indigenous communities, and ensure inclusivity and responsiveness.

Project team members also participate in all TAC meetings with ICBMAC and the Athabasca University Facilitation Centre, and support a consistent approach and implementation of engagement and/or integration of Indigenous Community-Based Monitoring, where appropriate.

The Atmospheric Pollutant Active Monitoring Network program co-operates with, supports, and, as requested, participates in ICBM monitoring programs e.g. the FMFN dust monitoring work plan and the FMMN odour monitoring program.

Does this project include an Integrated Community Based Monitoring Component?

No

6.0 Measuring Change

Evaluation of Measuring Change Criteria (Information Box Only- No action required)
Your workplan will be evaluated against the criteria below. A successful workplan would potentially:

- assess changes in environmental conditions compared to baseline (e.g., validation of EIA predictions)
- report uncertainty in estimates and monitoring is of sufficient power to detect change due to oil sands development on reasonable temporal or spatial scales
- include indicators along the spectrum of response (e.g., individual, population, community)
- focus on areas of highest risk (where change is detected, where change is greater than expected, where development is expected to expand (collection of baseline)
- measure change along a stressor gradient or a stressor/reference comparison

Explain how your monitoring identifies environmental changes and can be assessed against a baseline condition. As relevant give consideration for the EEM framework and the approved Key Questions.

A major outcome of long-term ambient air quality monitoring is to measure trends and changes in air quality over time so that the impacts of oil sands activities and other non-oil sands activities on human and environmental indicators can be determined. Long-term, continuous air monitoring at consistent monitoring locations in the oil sands regions allows such assessments.

Measuring change in air quality parameters needs to consider the dynamic nature of air quality in the oil sands region. While conventional statistical methods for assessing air quality trends, have application in certain circumstances, alternative methods that consider all the temporal and spatial variability in oil sands emissions, need to be used to adequately measure short and long term change and the factors contributing to any measured changes. (see response to question 1. under 3.4.4.2 above).

The Air and Deposition TAC will work to establish baselines for selected air parameters and develop or adopt methodologies to determine both short and long-term deviations from the established baselines. This will allow future comparisons to limits of change.

7.0 Accounting for Scale

Evaluation of Accounting for Scale Criteria (Information Box Only- No action required)
Your workplan will be evaluated against the criteria below. A successful workplan would potentially be:

- appropriate to the key question and indicator of interest
- relevant to sub-regional and regional questions
- relevant to organism, population and/or community levels of biological organization
- where modelled results are validated with monitored data
- where monitoring informs on environmental processes that occur at a regional scale. e.g. Characterizing individual sources to gain a regional estimate of acid deposition and understand signal from individual contributing sources.

Explain how your monitoring tracks regional and sub-regional state of the environment, including cumulative effects. As relevant give consideration for the EEM framework and the approved Key Questions.

Active air monitoring is concentrated in the minable oil sands region (north of Fort McMurray) where the greatest air emissions are occurring. Data from the active monitoring network are being used to support evaluation of the GEM-MACH model (part of project A-PD-6-2223 - Integrated Atmospheric Deposition Monitoring). GEM-MACH simulations include regional to sub-regional sources for the OS and other pollutants; the relative impact of these towards odour events will be examined in collaboration with A-PD-6-2223. Active monitoring also takes place in communities and in the vicinity of industrial sources allowing for subregional assessment for the state of the environment. The existing monitoring network has limitations in terms of accounting for regional changes outside of the minable oil sands region because of the vast areal expanse and the cost/practicality of active monitoring. However, once evaluated with active monitoring data, air modelling information and satellite data can be used to fill existing gaps in the regional monitoring network. A numerical forecast model, fully evaluated against long-term surface monitoring data, is highly useful for supporting cumulative effects assessments.

8.0 Transparency

Evaluation of Transparency Criteria (Information Box Only- No action required)
Your workplan will be evaluated against the criteria below. A successful workplan would potentially include:

- a plan for dissemination of monitoring data, including appropriate timing, format, and aligns with OSM program data management plan
- demonstrated transparency in past performance
- identified an annual progress report as a deliverable
- reporting of monitoring results occurs at timing and format that is appropriate for recipient audience.

Explain how your monitoring generates data and reporting that is accessible, credible and useful. As relevant give consideration for the EEM framework and the approved Key Questions.

There is a vast amount of active air quality information available from airshed organization websites and provincial reports. Near real-time and quality assured data are available from airshed and AEP websites indicated below:

WBEA - https://wbea.org/historical-monitoring-data/ (continuous data)
WBEA - https://wbea.org/network-and-data/integrated-data-search/ (time-integrated data)
WBEA - https://annualtrends.wbea.org/ (annual trends)
WBEA - https://wbea.org/air/air-quality-events/ (air quality events)
LICA - https://lica.ca/airshed/
PRAMP - https://prampairshed.ca/live-air-quality-data/
All Airsheds - http://airquality.alberta.ca/map (real time data)
All Airsheds - https://www.alberta.ca/access-air-quality-and-deposition-data.aspx (quality assured data)
COMP data - https://comp.wbea.org/
Oski-ôtin data - https://www.canada.ca/en/environment-climate-change/services/oil-sands-monitoring/monitoring-air-quality-alberta-oil-sands.html

AEP and Airshed organizations are working with OSM to assure that data are also available from the active monitoring network on the OSM portal current in development.

Multiple data summaries and reporting products for communicating information from the active monitoring network have been produced by AEP and airsheds. Some examples include:
• A COMP web site that reports odour observations through a map driven interface in real time, as well as an annual report that compares 'Odour Event Days' to the data collected at ambient air monitoring stations;
• Community AQHI displays (e.g. AQHI lanterns, WBEA screens that display hourly AQHI data for the RMWB region, as well as local air monitoring data)
• Map driven websites showing air quality results
• The AQE (Air Quality Events) app developed by the WBEA informing subscribers of pollutant concentrations that exceed the AAQO/Gs, and the Fort McKay Response Triggers
• The COMP app
• Community presentations
• Reports against triggers, limits and standards defined by frameworks including the Lower Athabasca Regional Plan and the Canadian Ambient Air Quality Standards

9.0 Efficiency

Evaluation of Efficiency Criteria (Information Box Only- No action required)
Your workplan will be evaluated against the criteria below. A successful workplan would include:

- appropriately addressed a risk-informed allocation of resources
- identified the role and justification for each staff member on the proposed work plan
- identified in-kind and leveraged resources (e.g., resources and approaches are appropriately shared with other OSM projects where possible)
- established partnerships (value-added) and demonstrated examples of coordinated efficiencies (e.g., field, analytical)
- identified co-location of monitoring effort
- demonstrated monitoring activities and information collected are not duplicative
- considered sampling/measurement/methods compatibility to other data sources (e.g., AER)

Explain how your monitoring is integrated with other OSM projects and incorporates community-based participation and/or engagement in proposed monitoring activities. As relevant give consideration for the EEM framework and the approved Key Questions.

The primary allocation of resources for this work plan is the on-going operation of 39 active air monitoring stations in the oil sands region. The cost of purchasing, implementing, operating, and maintaining active monitoring stations is significant and, in many cases, more expensive in the oil sands region because of challenges with power and road access. The air monitoring stations have multiple monitoring objectives and support the implementation of many air quality related management frameworks (LARP, AAAQOs/AAAQGs, CAAQS, ADMF, and FMKRT). Addressing these objective and framework needs have led to higher then anticipated cost. These costs are compounded by remote site access, power availability, and overall higher cost of services.

Airshed organizations are looking at opportunities to partner with communities to operate air monitoring stations to help build relationships and capacity. The cost associated with the Oski-ôtin research station has been minimized since that station has been discontinued and certain measurements have been transitioned to the WBEA.

The PRAMP airshed has completed its capital purchase plan. As a result of this capital purchase plan, PRAMP now owns previously rented air monitoring stations. A significant cost reduction is realized now that the capital purchase plan is fully implemented.

The WBEA is a multi-stakeholder organization that has community-participation on its Governance Committee, General Members board, and all its Technical Committees. The Technical Committees develop and approve the WBEA annual work plans, which are then provided to OSM, so the communities have a voice at multiple tables. The LICA and PRAMP Committee have similar multi-stakeholder structures and processes.

The Community Odour Monitoring Program is dependent on citizen/community member participation. The app allows citizens throughout the Regional Municipality of Wood Buffalo to submit information about the odours they experience. Since the release of the COMP app in September 2017, there have been 1027 odour observations in the Regional Municipality of Wood Buffalo. Eighty percent of the odour observations were long (>60 min) and intermediate (15-60 min) in duration. The highest number of observations occurred in the May through September periods. In 2017-2018 there were 377 odour observations, while in 2019 and 2020, there

were 416 and 234 odours observations submissions, respectively. The odour observations include submissions from the communities of Fort Chipewyan, Fort McKay, Fort McMurray, Anzac, and Conklin, as well as odour observations in industrial areas and on highways throughout the region.

The WBEA has also incorporated community-based participation in the operation and maintenance of Fort Chipewyan station by training community members to perform monthly calibrations and instrument repairs (Air Quality Monitoring in the Peace Athabasca Delta).

The WBEA is supporting the OSM groundwater team by collecting and deploying precipitation samples at Bertha Ganter-Fort McKay AMS.

This work plan is also integrated with the Integrated Atmospheric Deposition Monitoring (A-PD-6-2223) work plan by providing data to calculate deposition and conduct model validation exercises, respectively.

10.0 Work Plan Approach/Methods

10.1 List the Key Project Phases and Provide Bullets for Each Major Task under Each Project Phase *

Note: these phases occur concurrently

PHASE 1: Operation of existing ambient air monitoring stations in the WBEA, LICA, and PRAMP airsheds

a) WBEA:

- Operate 29 ambient air monitoring stations including the acute air monitoring station (Waskōw ohci Pimâtisiwin AMS) in Fort McKay. These stations fulfill EPEA Approval compliance monitoring requirements and satisfy community and scientific interests.
- Time-integrated sampling: PM2.5 metals and ions, PM2.5 EC/OC, PM10 metals and ions, PAHs, precipitation, VOC.
  - There are additions of time-integrated sampling in the network due to changes in Industry EPEA Approval requirements.
  - The WBEA is supporting the OSM groundwater team by collecting and deploying monthly (summer) and weekly (winter) precipitation samples at Bertha Ganter-Fort McKay AMS.
- Continue to operate the WBEA Air Quality Events app to streamline notification of events (AAAQOs, AAAQG, Fort McKay response triggers – app was implemented in 2020-21).
- Implement the following improvements to the ambient air monitoring network:
  - Complete site commissioning of the new Mildred Lake AMS location; and
  - Modify reporting to meet new requirements in the Air Monitoring Directive (AMD) and the new AAAQG for TRS.
- Provide support to the Air Quality Monitoring in the Peace Athabasca Delta ICBM work plan:
  - Procure and install a PM2.5 ECOC sampler; and
  - Report data in routine monthly and annual reports to be consistent with current ambient air monitoring program.
- Design and implement a local and regional Dustfall Monitoring Program due to concerns from the community of Fort McKay, as well as the addition of a Dustfall Monitoring clause in industrial EPEA approvals. This program will be developed in conjunction with the community and industry.
- Continue the WBEA's Continuous Hydrocarbon Instrument Evaluation (Phase 2) - A comparison of the Thermo 51i vs. Thermo 55i vs. API N901 vs. Mocon 9000NMHC.
- Continue the WBEA's Continuous Particulate Instrument Evaluation (Phase 2) - A comparison of the API T640 vs. T640x (FEM for PM10 & PM2.5) vs. T640 + BGI mini PM10 head) vs. SHARP vs. Partisols (PM 2.5 & 10).

b) LICA:

- Operate three permanent and one portable continuous and semi-continuous (or triggered semi-continuous) stations in the Cold Lake oil sands.
- Operate portable monitoring station at location(s) to be determined in the Town of Lac La Biche.

c) PRAMP:

- Operate five continuous and three triggered semi-continuous monitoring stations in the Peace River oil sands.
- Operate portable monitoring station at location(s) to be determined in the Town of Grimshaw.

d) Fort McKay First Nation (FMFN) Namur Lake AMS:

The Namur Lake AMS was commissioned in late 2016 by the Fort McKay First Nation (FMFN) to help obtain baseline air quality information in the Moose Lake area where the FMFN has two Reserves. Since the spring of 2017 the station has operated continuously except during the colder winter months. Shutting the station down in the cold weather period has been necessary in order to:

- avoid significant generator operational time and thus minimize fuel consumption and associated generator emissions in this clean area, and
- ensure that should the generator fail to start in the coldest part of the year, that the lead-acid battery system (worth $35,000) does not become damaged due to the freezing of battery electrolyte.

These considerations mean that station operation generally commences in February or March of each year, and ceases in October or November. Since the station is off grid it is almost completely operated on energy from 36 solar panels during the operational part of the year with operation during nighttime and cloudy weather periods possible because of the station's large battery power storage system. During its operational period the standby generator is seldom required.

Further investigation is being done to assess options to allow for more reliable winter operations of the Namur Lake AMS. The Namur Lake AMS uses an Airpointer® to monitor NO, NOx, NO2, SO2, H2S, PM2.5 (nephelometer), O3, temperature, wind speed, wind direction, relative humidity, and precipitation (rain/hail only). The Airpointer® system is been excellent for remote off-grid operations as it includes significant diagnostics abilities to allow for planned maintenance, and also offers low power consumption for a continuous air monitoring unit. It also allows for analyzers to be swapped out over time depending on the need for various parameters to be monitored. The station uses a cellular modem and booster to ensure reliable two-way communications and control of both the Airpointer® and the Schneider power management and monitoring system, including the ability to remotely start/stop the back-up generator, and modify system settings as required.

Wood (formerly Amec Foster Wheeler) was selected to assist FMFN design, build, install, and commission the Namur Lake AMS, and have been managing the calibrations and data QA/QC, as well as monthly reporting the station was commissioned. The Namur Lake AMS represents, as far as FMFN is aware, the world's first successful implementation of an off-grid, continuous air monitoring station.

Funding for the operation of the Namur Lake AMS was approved in 2021-22 and continued funding will be requested for subsequent years consistent with the Moose Lake Access Management Plan (MLAMP). FMFN's initial investment in design, construction, installation, and commissioning of the Namur Lake AMS constitutes an approximately $700,000 investment, and has been a critical site for FMFN to understand current air quality impacts in the Moose Lake area, which it will continue to be into the future and in conjunction with the finalized MLAMP. More information on the Namur Lake AMS is contained in Supplemental Attachment #8.

PHASE 2: Continue implementation of recommendations related to ambient air monitoring from the Fort McKay Air Quality and Odour Advisory Committee

a) Commission portable monitoring station at Poplar Creek. Data collected from the site will be analyzed and reported on regular intervals. It is anticipated that this portable station will be in operation for at least three to five years. Data will be continually assessed and the FMAQO Advisory Committee (Recommendation 14/15 Subcommittee) will provide recommendations on the future necessity for this monitoring station (i.e. is a permanent monitoring station needed at this location).

b) Ongoing operation of semi-continuous GCs for sulphur compounds and VOCs in Fort McKay. This will include on-going improvement of the monitoring methodology, data analysis and provision of the quality-controlled data to stakeholders. New semi-continuous methods for measuring sulphur compounds and VOCs were acquired and implemented as part of the Oski-ôtin research station transition. Once full implementation and testing is complete, semi-continuous monitoring in Fort McKay will be included as part of the long-term active air monitoring network.

c) Implement Fort McKay focused pilot study for triggered sampling of VOCs and sulphur compounds. AEP, Fort McKay, and the WBEA will work together to establish trigger levels, sampling time and volume for the pilot study. It is expected that the pilot study will be for one year (2022-2023). A recommendation on

incorporating triggered sampling for VOCs and sulphur compounds into the long-term active air monitoring network will be provided after completion of the one-year pilot (focused) study.

e) Evaluate the existing meteorological network within 30 km of Fort McKay and propose future changes to the network that will help address the questions: Is ground level data adequate to support source attribution of actual ground level flow conditions? If sufficient – why? If not – why and what is needed? A report commissioned by WBEA resulted in nine recommendations on improving the meteorological monitoring network. These recommendations will be reviewed by the Recommendation 14/15 subcommittee.

PHASE 3: Complete data analysis and reporting from the Oski-ôtin research station including:

a) Phase-out of operations at the Oski-ôtin research station;
b) Continued data analysis and reporting;
c) Initiate instrument comparison between Oski-ôtin instruments and new WBEA instruments; and
d) Detailed comparison of GEM-MACH output with Oski-ôtin data from August 2017 – October 2018 for odour event analysis (funded under A-PD-6-2223).

PHASE 4: Strengthen Community Reporting of Odours

a) Continue the Community Odour Monitoring Program (COMP) in the AOSR;
b) Create awareness of the COMP and app for community members;
c) Modify COMP to support the FMMN 2022/2023 ICBM program for odour;
d) If desired by the OSM program, expand COMP app to the Cold Lake and Peace River oil sands regions; and
f) Use a combination of high resolution weather forecast model back-trajectories and the GEM-MACH model to determine the sources and forecast predictability of odour events (linked to A-PD-6-2223).

PHASE 5: Develop Adaptive Monitoring Approach for Active Ambient Air Monitoring Network

a) The first step in applying an adaptive monitoring approach will be to articulate the specific monitoring objectives for each parameter (by station) monitored in the active air monitoring network. The output will be a matrix of stations, parameters and objectives identified for each parameter. This matrix is a deliverable for the 2021-22 fiscal year.
b) Develop a document that classifies each active air monitoring station/parameter funded by the OSM Program (e.g. regulatory monitoring, community monitoring etc.).
c) Develop a shared understanding of regulatory and community expectations for monitoring that will guide the adjustment of the current long-term surveillance program to fit the OSM adaptive monitoring framework.
d) Develop a structured approach to apply adaptive monitoring to the active air monitoring network where appropriate. This will involve:
   - Determining air quality parameters appropriate for the application of the EEM framework;
   - Establishing baselines for selected parameters; and
   - Establishing limits of change for selected parameters.

e) In subsequent years, air monitoring data will be assessed against the limits of change to determine if air quality has changed, whether this change is due to oil sands operations and if the change is of concern.

Collaboration with two new CBM work plans

The FMFN and FMMN are collaborating on submission of two community-based monitoring work plans to OSM for consideration. These work plans are focused on: (1) dust monitoring in the community (led by FMFN); and (2) odour monitoring in the community (led by FMMN). The WBEA has a strong role in both work plans which involve community monitoring of both dust and odours and coordinating and integrating this monitoring with current WBEA monitoring and associated data management and analyses.

10.2 Describe how changes in environmental Condition will be assessed *

Incorporating, as appropriate, the adaptive monitoring approach adopted by the OSM Program was initiated in 2021-22 for the active air monitoring network. This adaptive monitoring approach, applying the principles of the EEM framework, will allow future air quality data assessments against limits of change established by the OSM Program. It is recognized that the Air and Deposition TAC will need to work with other TACs that measure effects-based indicators to determine the relation between air quality and environmental and human impacts based on the EEM framework.

Some methods that can be used to assess changes in environmental condition include but are not limited to: (1) comparing concentrations of key parameters with AAAQOs, AAAQGs, LARP triggers and limits, CAAQS thresholds, Fort McKay air quality thresholds and other relevant benchmarks; (2) Identifying temporal and spatial changes in ambient air quality; (3) based on (1) and (2) determining if there are emerging issues that required further investigation; and (4) informing the public on ambient air quality through indicators such as the AQHI and FMAQI.

Environmental change can also be assessed by: (i) determining the presence/absence of odours reported through the COMP app; and (ii) comparing these data to VOC and RSC species measured by semi-continuous GCs during odour and non-odour periods. Methodologies tested in this study can be used to assess environmental change if applied in long-term monitoring programs.

Data from Oski-ôtin provide multiple years of a large suite of air pollutant measurements. These are used to validate satellite remote sensing retrievals and to improve and validate the numerical air quality prediction model. Both remote sensing observations and model output are used to provide assessments of change, specifically changes in emissions, concentrations, exposure and deposition of specified air pollutants that are associated with changes in oil sands related activities. In addition, the air quality model output can be used as an important tool for cumulative effects assessment. Independently, data from the multiple years of Oski-ôtin measurements can be used to assess changes in the frequency and magnitude of acute pollution events that impact on the Fort McKay community. Also, surface data from the Oski-otin monitoring site has been integrated with satellite remote sensing data and model development to produce output that supports the prediction of environmental change.

10.3 Are There Benchmarks Being Used to Assess Changes in Environmental Condition? If So, Please Describe, If Not, State "NONE" *****

Specific benchmarks include AAAQOs, AAAQGs, thresholds defined by the Lower Athabasca Regional Plan (LARP), thresholds defined by the Canadian Ambient Air Quality Standards (CAAQS), AQHI, FMAQI, ADMF (critical loads), Fort McKay's Ambient Air Quality Permissible Levels, Moose Lake Ambient Air Quality Targets and other benchmarks.

At the Waskōw ohci Pimâtisiwin air monitoring station, trigger levels have been established for H2S and SO2. The instruments at this station are able to record elevated H2S and SO2 concentrations. If additional air quality parameters are added to the emergency response station, trigger levels will need to be determined before implementing the monitoring equipment. Reference (Interim H2S/TRS/SO2 Fort McKay Acute Emergency Response Process Alberta Health, 2019).

Additional limits of change will be developed for selected air quality parameters using the adaptive monitoring approach.

(e.g., objectives, tiers, triggers, limits, reference conditions, thresholds, etc.)

10.4 Provide a Brief Description of the Western Science or Community-Based Monitoring Indigenous Community-Based Monitoring Methods by Project Phase *

PHASE 1: Operation of existing ambient air monitoring stations in the WBEA, LICA, and PRAMP airsheds

The methods used to monitor continuous air quality within the three oil sands deposits are consistent with the Air Monitoring Directive (Alberta Environment and Parks, 2016). The instrumentation is standard and used across the country in routine air monitoring. The monitoring protocols are well documented and available to the public. The monitoring methods used to measure particulate matter, volatile organic compounds and polycyclic aromatic hydrocarbons using semi-continuous or time-integrated techniques also must follow the Air Monitoring Directive requirements. The SO2 and H2S monitors in the acute air monitoring in Fort McKay (Waskōw ohci Pimâtisiwin) are calibrated at a higher range so that elevated concentrations of these pollutants can be quantified and compared to the acute air quality levels established for the community.

The Namur Lake AMS doesn't meet certain AMD and certain framework data completeness requirements. Working with the TAC, opportunities will be assessed for improving off-grid technology (batteries, solar panels or generator systems) that will allow year-round operation and cost efficiency.

PHASE 2: Continue implementation of recommendations related to ambient air monitoring from the Fort McKay Air Quality and Odour Advisory Committee

The WBEA will lead the implementation of monitoring in Fort McKay with support from AEP. Status of implementation will be communicated to the OSM Science Secretariat through quarterly reporting and to the Fort McKay Air Quality Odour and Advisory Committee (and associated subcommittees).

PHASE 3: Continued data analysis and reporting from the Oski-ôtin research station

In this phase, the quality control and reporting will be completed for data collected until the fall of 2020 at the Oski-ôtin research station. Analysis of changes in the chemical composition of plumes reaching Fort McKay, source attribution, and their link to odour episodes will continue, as will model development to enhance capacity to predict episodes. Also, an instrument comparison project will be considered for selected common parameters previously measured at the Oski-ôtin research station and currently measure by WBEA in Fort McKay. This comparison study may start as early as fall of 2021 depending on travel restrictions. This will determine the level of comparability of data collected at the research station with newly deployed equipment to ensure continuity of essential measurements.

PHASE 4: Strengthen Community Reporting of Odours

The COMP program consists of a mobile application available for both Android and iOS devices, allowing members of all communities of the RMWB to submit information about the odours they experience throughout the region. The COMP will continue to be implemented and expanded as more community members become aware and comfortable using the COMP mobile application. The COMP mobile app will be modified to accommodate the odour observation data from the FMMN ICBM program for odours and WBEA will assist in training FM community members on the use of the app. Data from the program will be reviewed against ambient air quality parameters collected in the oil sands region to better understand the relationship between odours and ambient air quality. If requested, WBEA will work with AEP, AER, LICA and PRAMP to determine if there are opportunities to expand the COMP program to the Cold Lake and Peace River oil sands regions.

10.5 List the Key Indicators Measured, If Not Applicable, State N/A *****

The long-term air monitoring program's key indicators include major pollutants (PM2.5, O3, NO2, SO2) required for land-use plan and CAAQS reporting. Additionally, major air pollutants are used to calculate the AQHI and report it in real-time as an indicator of health risk to ambient air quality.

Other air pollutants will be/are also monitored at provincial monitoring sites and may be used as indicators of air quality (e.g., hydrocarbons and sulphur compounds). H2S and SO2 are key indicators at the Waskōw ohci

Pimâtisiwin station.

From Recommendation #14/15 - 13 parameters in the Air Quality Focal Parameter List including acetaldehyde, carbon disulphide, carbonyl sulphide, methanol, naphthalene, ozone, sulphur dioxide, nitrogen dioxide, hydrogen sulphide, total reduced sulphur, benzene, mixed (m,p) xylenes, toluene and additional 3 parameters (non-methane hydrocarbon (NMHC), acrolein, and benzo[a]pyrene are also key indicators.

Odour occurrences logged by the COMP system is a key indicator.

11.0 Knowledge Translation

In the space below, please provide the following:

- *Describe the plan for knowledge transfer and distribution of learnings from the project. This could include workshops, publications, best practice documentation, marketing plan, etc.*
- *Demonstrate that the knowledge transfer plan is appropriate for the intended end-users.*

Knowledge transfer and distribution will be assured through several mechanisms. These will include communication by Airshed organizations (WBEA, LICA and PRAMP) to stakeholders and partners on the on-going active monitoring program's status, and communication of knowledge generated by the monitoring programs. Airsheds have developed products (apps and websites) specifically focused on transferring network learnings and understandings to the public in an understandable manner. Some of these include social media, advertising campaigns, and the creation of community-specific annual air quality factsheets. Specific examples of these products are:

- Annual technical reports that provide year-over-year analysis of monitoring results, and annual data trends (https://annualtrends.wbea.org/)
- Quarterly newsletters that provide information about recent monitoring results and updates regarding air monitoring operations (deployment of new stations or monitoring technology).
- Novel approaches to data visualization provided in PRAMP's monthly dashboard reports and LICA's 'Air Quality DNA Data Visualization intended to help the public understand air quality in an approachable and engaging way.
- Air quality displays in community centers and public spaces throughout the oil sands regions. These installations often include unique AQHI lanterns or 'live' AQHI displays and posters with information to promote clean air.
- Region-tailored classroom programs for school-age children about local air quality, including hand-held air quality measurement devices.

The COMP website was released in 2019 and provides users with the ability to view all submitted odour observations and provides information about air quality and odours. Every year, an annual report is released that provides analysis of the odour observations and air quality at the times observations were submitted. The website and the reports can be found at comp.wbea.org.

The airsheds also collect data used to calculate the AQHI used on multiple platforms (AEP websites, weather website & apps, airshed websites) to inform citizens about local air quality and make informed decisions about their health.

Technical and scientific knowledge transfer from ECCC scientists to Alberta scientists and technologists will be fundamental to the successful operation of new instrumentation in Fort McKay. It is anticipated that this knowledge transfer will continue beyond 2022-23.

12.0 External Partners

List by project or project phase each component that will be delivered by an external party (including analytical laboratories) and name the party. Describe and name the associate work plan/grant/contract for these services. * state none if not required

PHASE 1 will be delivered by Airshed organizations (WBEA, LICA, and PRAMP) and Fort McKay First Nation
PHASE 2 will be delivered by WBEA with significant involvement from Fort McKay First Nation, Fort McKay Métis, AEP and ECCC
PHASE 3 will be delivered by ECCC with significant involvement from WBEA, AEP, Fort McKay First Nation and Fort McKay Métis

PHASE 4 will be delivered by WBEA with involvement from ECCC and the FMMN PHASE 5 will be delivered by the Air and Deposition TAC

*To ensure complete work plan proposal submission, all grants and contracts listed in this section should also be captured in Grants & Contracts.

13.0 Data Sharing and Data Management

For 2022-23 the following approach will be taken by the OSM Program related to data sharing.

For all work plans of a **western science** nature funded under the OSM Program, data sharing is a condition of funding and must align with the principle of **"Open by Default"**. In this case, all data is to be shared with the OSM Program as directed by the OSM Program Data Management work plan.

For all work plans involving **Indigenous Knowledge** as defined below and funded under the OSM Program, data sharing is a condition of funding and the Indigenous Knowledge components of the work plan must align with the principle of **"Protected by Default".** In this case, all data as defined as Indigenous Knowledge, are to be retained by the Indigenous community to which the Indigenous Knowledge is held.

Indigenous Knowledge is defined as:

> "The knowledge held by First Nations, Inuit and Métis peoples, the Aboriginal peoples of Canada. Traditional knowledge is specific to place, usually transmitted orally, and rooted in the experience of multiple generations. It is determined by an Aboriginal community's land, environment, region, culture and language. Traditional knowledge is usually described by Aboriginal peoples as holistic, involving body, mind, feelings and spirit. Knowledge may be expressed in symbols, arts, ceremonial and everyday practices, narratives and, especially, in relationships. The word tradition is not necessarily synonymous with old. Traditional knowledge is held collectively by all members of a community, although some members may have particular responsibility for its transmission. It includes preserved knowledge created by, and received from, past generations and innovations and new knowledge transmitted to subsequent generations. In international or scholarly discourse, the terms traditional knowledge and Indigenous knowledge are sometimes used interchangeably."

This definition was taken from the Canadian Government's Tri-council Policy Statement for Ethical Research involving Humans (Chapter 9, pg. 113) and is an interim definition specific to the Oil Sands Monitoring Program.

Data Sharing and Data Management Continued

13.1 Has there, or will there be, a Data Sharing Agreement established through this Project? *

YES

13.2 Type of Quantitative Data Variables:

Both

13.3 Frequency of Collection:

Real Time

13.4 Estimated Data Collection Start Date:

2022-04-01

13.5 Estimated Data Collection End Date:

2023-03-31

13.6 Estimated Timeline For Upload Start Date:

2022-06-01

13.7 Estimated Timeline For Upload End Date:

2023-09-30

13.8 Will the data Include traditional knowledge as defined by and provided by an Indigenous representative, Community or Organization?

NO

TABLE 13.9 Please describe below the Location of Data and Data Type:

Add a Data Source by clicking on the table and then clicking on the blue "+" symbol on the bottom right side of table

Name of Dataset	Location of Dataset (E.g.: Path, Website, Database, etc.)	Data File Formats (E.g.: csv, txt, API, accdb, xlsx, etc.)	Security Classification
WBEA continuous and time-integrated monitoring data, air quality events, annual trends	https://wbea.org/network-and-data/integrated-data-search/ https://wbea.org/historical-monitoring-data/ https://wbea.org/air/air-quality-events/ https://annualtrends.wbea.org/	.csv	Open by Default

LICA continuous and time-integrated monitoring data	https://www.alberta.ca/access-air-quality-and-deposition-data.aspx	.csv	Open by Default
PRAMP continuous and time-integrated monitoring data	https://www.alberta.ca/access-air-quality-and-deposition-data.aspx	.csv	Open by Default
FMFN Namur Lake continuous monitoring data	TBD	.csv	Open by Default
Oski-ôtin research station data (for previous years)	https://www.canada.ca/en/environment-climate-change/services/oil-sands-monitoring/monitoring-air-quality-alberta-oil-sands.html	.csv	Open by Default
Community Odour Monitoring Program (COMP) Data	https://comp.wbea.org/	.csv	Open by Default

14.0 2022/23 Deliverables

Add an additional deliverable by clicking on the table and then clicking on the blue "+" symbol on the bottom right side of table.

Type of Deliverable	Delivery Date	Description
Technical Report	Q1	WBEA - Monthly data reports for continuous and integrated data LICA - Monthly data reports for continuous and integrated data PRAMP - Monthly dashboard reports summarizing monitoring results
Technical Report	Q2	WBEA - WBEA Ambient Annual Report 2021 - Volume 1 Continuous Data; Volume 2 Integrated Data; Volume 3 Site Documentation WBEA - Monthly data reports for continuous and integrated data LICA- 2021 LICA Annual Report LICA - Monthly data reports for continuous and integrated data PRAMP - Annual Technical Review for 2021 PRAMP - Monthly data reports and dashboard reports summarizing monitoring results
Technical Report	Q3	WBEA - Monthly data reports for continuous and integrated data LICA - Monthly data reports for continuous and integrated data PRAMP - Monthly dashboard reports summarizing monitoring results

Technical Report	Q4	WBEA - Monthly data reports for continuous and integrated data LICA - Monthly data reports for continuous and integrated data PRAMP - Monthly dashboard reports summarizing monitoring results
Technical Report	Q4	2022 Community Odour Monitoring Program Annual Report
OSM Program Annual Progress Report (required)	Q4	Annual Progress Report
Technical Report	Q4	Annual air quality report for Namur Lake AMS
Key Engagement/Participation Meeting	Q1	TAC Meetings
Key Engagement/Participation Meeting	Q2	TAC Meetings
Key Engagement/Participation Meeting	Q3	TAC Meetings
Key Engagement/Participation Meeting	Q4	TAC Meetings
Other (Describe in Description Section)	Q1	ECCC paper on odour source apportionment based on Oski-otin data circulated for comments
Peer-reviewed Journal Publication	Q1	ECCC paper on column measurements of nitrogen dioxide and sulfur dioxide submitted for publication
Peer-reviewed Journal Publication	Q2	ECCC paper on GEM-MACH back-trajectory work submitted for publication
Peer-reviewed Journal Publication	Q2	ECCC paper on odour source apportionment based on Oski-otin data submitted for publication
Peer-reviewed Journal Publication	Q2	ECCC paper on isotope analysis
Other (Describe in Description Section)	Q4	Report on Oski-otin / Waskōw ohci Pimâtisiwin transition & comparison experiments

15.0 Project Team & Partners

In the space below please provide information on the following:

- *Describe key members of the project team, including roles, responsibilities and expertise relevant to the proposed project.*
- *Describe the competency of this team to complete the project.*
- *Identify any personnel or expertise gaps for successful completion of the project relative to the OSM Program mandate and discuss how these gaps will be addressed.*
- *Describe the project management approach and the management structure.*

• Bob Myrick (Project Lead) – provide co-ordination between team members and the OSM Program, as well as facilitate alignment and integration within the OSM Program
• Sanjay Prasad (Component Lead) – complete deliverables linked to the WBEA
• Michael Bisaga (Component Lead) – complete deliverables linked to LICA and PRAMP
• Zheng Yang (Air Monitoring Scientists) – provide scientific support
• Erin Horb (Project Management) – support project lead in managing contracts and SoE development
• Ralf Staebler – lead for Oski-ôtin station
• Cristian Mihele – operations, Oski-ôtin research station
• Felix Vogel – lead, greenhouse gas measurements
• Vitali Fioletov – lead, remote sensing
• Paul Makar – air quality modelling
• Greg Wentworth – Air and Deposition TAC Lead

This team consists of experts that bring forward substantial knowledge and experience in air monitoring and research. There are no major gaps in personnel or expertise, although subject matter experts will be brought in, if required, on an as needs basis for specific issues. The Project Lead is mostly a co-ordinator role, and leads the development of the work plan as well as deliverables associated with improving integration and implementing the adaptive monitoring approach.

16.0 Project Human Resources & Financing

Section 16.1 Human Resource Estimates

Building off of the competencies listed in the previous section, please complete the table below. Add additional rows as necessary. This table must include **ALL staff involved** in the project, their role and the % of that staff's time allocated to this work plan. The AEP calculated amount is based on an estimate of $120,000/year for FTEs. This number cannot be changed. The OSM program recognizes that this is an estimate.

Table 16.1.1 AEP

Add an additional AEP Staff member by clicking on the table and then clicking on the blue "+" symbol on the bottom right side of table. The total FTE (Full Time Equivalent) is Auto Summed (in Table 16.2.1) and converted to a dollar amount.

Name (Last, First)	Role	% Time Allocated to Project
Director, Airshed Sciences	Project Lead/Coordinator	15%
Atmospheric Scientist	Air and Deposition TAC Lead	15%
Atmospheric Science Data Analyst	Project Support, SOE Reporting, Contract Management	50%
Air Monitoring Scientist	Ambient Air Monitoring Technical and Science Support	20%

Table 16.1.2 ECCC

Add an additional ECCC Staff member by clicking on the table and then clicking on the blue "+" symbol on the bottom right side of table. The total FTE (Full Time Equivalent) is Auto Summed in Table 16.2.2

Name (Last, First)	Role	% Time Allocated to Project
Budden, Andrew	Technical support	0%
Overtime	Station decommissioning	0%
Wen, Deyong	Scientific support, data processing	0%
Leonardelli, Sandro	OSM coordination	0%

Ars, Sebastien	Scientist – Isotopes	0%

The tables below are the financial tables for Alberta Environment & Parks (AEP) and Environment & Climate Change Canada. All work plans under the OSM Program require either a government lead or a government coordinator.

Section 16.2 Financing

The OSM Program recognizes that many of these submissions are a result of joint effort and monitoring initiatives. A detailed "PROJECT FINANCE BREAKDOWN" must be provided using the Project Finance Breakdown Template provided, accessible here (ctrl + click the link below). Please note that completion of this Project Finance Breakdown Template is mandatory and must be submitted along with each workplan.

PROJECT FINANCE BREAKDOWN TEMPLATE (CTRL+CLICK HERE)

Table 16.2.1 Funding Requested BY ALBERTA ENVIRONMENT & PARKS

Organization – Alberta Environment & Parks ONLY	Total % time allocated to project for AEP staff	Total Funding Requested from OSM
Salaries and Benefits *(Calculated from Table 16.1.1 above)*	**100.00%**	**$120,000.00**
Operations and Maintenance		
Consumable materials and supplies		$0.00
Conferences and meetings travel		$0.00
Project-related travel		$3,000.00
Engagement		$0.00
Reporting		$0.00
Overhead		$0.00
Total All Grants *(Calculated from Table 16.4 below)*		**$0.00**
Total All Contracts *(Calculated from Table 16.5 below)*		**$13,011,553.00**
Sub- TOTAL *(Calculated)*		**$13,134,553.00**
Capital*		$0.00
AEP TOTAL *(Calculated)*		**$13,134,553.00**

* The Government of Alberta Financial Policies (*Policy # A600*) requires that all **capital asset** purchases comply with governmental and departmental legislation, policies, procedures, directives and guidelines. **Capital assets** (*Financial Policy # A100*, Government of Alberta, January 2014) are tangible assets that: have economic life greater than one year; are acquired, constructed, or developed for use on a continuing basis; are not held for sale in ordinary course of operations; are recorded and tracked centrally; have a cost greater than $5,000.

Some **examples of capital asset equipment include:** laboratory equipment, appliances, boats, motors, field equipment, ATV's/snowmobiles, stationary equipment (pier/sign/weather), fire/safety equipment, pumps/tanks, heavy equipment, irrigation systems, furniture, trailers, vehicles, etc. (*Financial Policy # A100*, Government of Alberta, January 2014).

Table 16.2.2 Funding Requested BY ENVIRONMENT & CLIMATE CHANGE CANADA

Organization – Environment & Climate Change Canada ONLY	Total % time allocated to project for ECCC staff	Total Funding Requested from OSM
Salaries and Benefits FTE *(Please manually provide the number in the space below)*		
Salaries and Benefits		$363,272.83
Operations and Maintenance		
Consumable materials and supplies		$39,500.00
Conferences and meetings travel		$0.00
Project-related travel		$28,000.00
Engagement		$0.00
Reporting		$6,000.00
Overhead		$35,461.50
ECCC TOTAL *(Calculated)*		**$472,234.33**

* ECCC cannot request capital under the OSM program. Any capital requirements to support long-term monitoring under the OSM program should be procured by Alberta and captured in that budget table.

Table 16.3

Complete ONE table per Grant recipient.

Add a Recipient by clicking on the table and then clicking on the blue "+" symbol on the bottom right side of table. The total of all Grants is Auto Summed in Table 16.2.1

GRANT RECIPIENT - ONLY: Name	Click or tap here to enter text.
GRANT RECIPIENT - ONLY: Organization	Click or tap here to enter text.
Category	**Total Funding Requested from OSM**
Salaries and Benefits	$0.00
Operations and Maintenance	
Consumable materials and supplies	$0.00
Conferences and meetings travel	$0.00
Project-related travel	$0.00
Engagement	$0.00
Reporting	$0.00
Overhead	$0.00
GRANT TOTAL *(Calculated)*	**$0.00**

Table 16.4

Complete ONE table per Contract recipient.

Add a Recipient by clicking on the table and then clicking on the blue "+" symbol on the bottom right side of table. This section is only to be completed should the applicant intend to contract components or stages of the project out to external organizations. The total of all Contracts is Auto Summed in Table 16.2.1

CONTRACT RECIPIENT - ONLY: Name	Sanjay Prasad
CONTRACT RECIPIENT - ONLY: Organization	Wood Buffalo Environmental Association
Category	**Total Funding Requested from OSM**
Salaries and Benefits	$2,980,000.00
Operations and Maintenance	
Consumable materials and supplies	$5,550,209.34
Conferences and meetings travel	$0.00
Project-related travel	$0.00
Engagement	$0.00
Reporting	$513,201.18
Overhead	$2,204,733.48
CONTRACT TOTAL *(Calculated)*	**$11,248,144.00**
CONTRACT RECIPIENT - ONLY: Name	Michael Bisaga
CONTRACT RECIPIENT - ONLY: Organization	Lakeland Industry and Community Association
Category	**Total Funding Requested from OSM**
Salaries and Benefits	$144,755.31
Operations and Maintenance	
Consumable materials and supplies	$412,265.30
Conferences and meetings travel	$10,965.00
Project-related travel	$0.00
Engagement	$0.00
Reporting	$145,010.00
Overhead	$35,321.75
CONTRACT TOTAL *(Calculated)*	**$748,317.36**
CONTRACT RECIPIENT - ONLY: Name	Michael Bisaga
CONTRACT RECIPIENT - ONLY: Organization	Peace River Area Monitoring Program
Category	**Total Funding Requested from OSM**
Salaries and Benefits	$171,776.68
Operations and Maintenance	
Consumable materials and supplies	$389,235.53
Conferences and meetings travel	$8,741.82
Project-related travel	$39,338.17
Engagement	$0.00
Reporting	$149,596.42

Overhead	$41,403.43
CONTRACT TOTAL *(Calculated)*	**$800,092.05**
CONTRACT RECIPIENT - ONLY: Name	Ryan Abel
CONTRACT RECIPIENT - ONLY: Organization	Fort McKay First Nation
Category	**Total Funding Requested from OSM**
Salaries and Benefits	$0.00
Operations and Maintenance	
Consumable materials and supplies	$20,000.00
Conferences and meetings travel	$0.00
Project-related travel	$120,000.00
Engagement	$0.00
Reporting	$75,000.00
Overhead	$0.00
CONTRACT TOTAL *(Calculated)*	**$215,000.00**

Table 16.5 GRAND TOTAL Project Funding Requested from OSM Program

The table below is auto calculated, please do not try to manually manipulate these contents.

Category	Total Funding Requested from OSM
Salaries and Benefits ***Sums totals for salaries and benefits from AEP and ECCC ONLY***	$483,272.83
Operations and Maintenance	
Consumable materials and supplies *Sums totals for AEP and ECCC ONLY*	$39,500.00
Conferences and meetings travel *Sums totals for AEP and ECCC ONLY*	$0.00
Project-related travel *Sums totals for AEP and ECCC ONLY*	$31,000.00
Engagement *Sums totals for AEP and ECCC ONLY*	$0.00
Reporting *Sums totals for AEP and ECCC ONLY*	$6,000.00
Overhead *Sums totals for AEP and ECCC ONLY*	$35,461.50
Total All Grants (from table 16.2.1 above) *Sums totals for AEP Tables ONLY*	$0.00
Total All Contracts (from table 16.2.1 above) *Sums totals for AEP Tables ONLY*	$13,011,553.00
Sub- TOTAL	$13,606,787.33
Capital* *Sums total for AEP*	$0.00
GRAND PROJECT TOTAL	$13,606,787.33

Some **examples of capital asset equipment include:** laboratory equipment, appliances, boats, motors, field equipment, ATV's/snowmobiles, stationary equipment (pier/sign/weather), fire/safety equipment, pumps/tanks, heavy equipment, irrigation systems, furniture, trailers, vehicles, etc. (*Financial Policy # A100*, Government of Alberta, January 2014).

17.0 FINANCIAL MANAGEMENT

The OSM Program reserves the right to reallocate project funding during the current fiscal year on the basis of project performance and financial overspend or underspend.

☒ *Please check this box to acknowledge you have read and understand*

In the space below please describe the following:

- *Discuss how potential cost overruns and cost underruns will be managed.*
- *If this is a continuing project from last year, identify if this project was overspent or underspent in the previous year and explain why.*
- *Describe what risks and/or barriers may affect this project.*

Potential risks and barriers include delays in the contract approval process, travel restrictions for government personnel, continuation of COVID 19 restrictions and delays in hiring new personnel (if applicable) may also impact the budget requested for this work plan.

The proposed budget for this work plan is $13,606,787. This is $551,448 higher than the 2020-21 proposed budget and $2,065,694 higher than the 2020-21 approved budget. The primary reasons for budget changes are:

(1) Increased cost for WBEA station operation expenses (insurance, utilities), WBEA Centre occupancy cost, vehicle maintenance, reference/standard gases, materials, consumables, spare parts, capital, station infrastructure, increased EPEA requirements for time-integrated sampling, continued implementation of FMAQO Rec 14/15 recommendations and administration. Please see details in Supplemental Attachment #02.
(2) Increased network operation costs for LICA.
(3) Decreased network operation costs for PRAMP related to completion of the capital replacement plan (PRAMP now owns its air monitoring stations).
(4) Scaling down of operations and data analysis at Oski-ôtin for ECCC.
(5) Full coverage of annual operating costs for the Namur Lake station.

Attachments:

Supplemental Attachment #01 – Budget spreadsheet
Supplemental Attachment #02 – Detailed budget including cost difference from 2021/22 (WBEA)
Supplemental Attachment #03 – Detailed budget (LICA)
Supplemental Attachment #04 – Detailed budget (PRAMP)
Supplemental Attachment #05 – Detailed budget (ECCC)
Supplemental Attachment #06 – Oil Sands Monitoring Program - Field Sampling Schedule
Supplemental Attachment #07 – Monitoring Activities in an EEM Framework (with existing linkages)
Supplemental Attachment #08 – Namur Lake Air Monitoring Station Construction History & Background

18.0 Alternate Sources of Project Financing – In-Kind Contributions

Table 18.1 In-kind Contributions

Add an In Kind Contribution by clicking on the table and then clicking on the blue "+" symbol on the bottom right side of table.

DESCRIPTION	SOURCE	EQUIVALENT AMOUNT ($CAD)
SCIENCE: Zhimei Jiang (VOC operations and analysis)	ECCC	$40,605.00
SCIENCE: Cris Mihele (site management, sulfur instrumentation)	ECCC	$40,605.00
SCIENCE: Gang Lu (instrument specialist)	ECCC	$27,070.00
SCIENCE: Andrew Elford (IT support)	ECCC	$27,070.00
SCIENCE: Ralf Staebler (Principal Investigator)	ECCC	$27,070.00
SCIENCE: Felix Vogel (lead scientist)	ECCC	$27,070.00
TECH: Raj Santhaneswaran (technical support	ECCC	$27,070.00
TECH: Roman Tiuliugenev (technical support)	ECCC	$27,070.00
TECH: Andrew Sheppard (technical lead)	ECCC	$13,535.00
TECH: Lauriant Giroux (technical support)	ECCC	$13,535.00

COORD: Daniella Napolitano/Keta Joshi	ECCC	$22,470.00
COORD: Nora Boyer	ECCC	$13,535.00
COORD: Evarose Santos	ECCC	$13,535.00
COORD: Stewart Cober	ECCC	$13,535.00
	TOTAL	**$333,775.00**

19.0 Consent & Declaration of Completion

Lead Applicant Name

Bob Myrick

Title/Organization

Director, Airshed Sciences, Alberta Environment and Parks

Signature

Click or tap here to enter text.

Date

2021-10-05

Government Lead / Government Coordinator Name (if different from lead applicant)

Click or tap here to enter text.

Title/Organization

Click or tap here to enter text.

Signature

Click or tap here to enter text.

Date

Click or tap to enter a date.

PROGRAM OFFICE USE ONLY

Governance Review & Decision Process

this phase follows submission and triggers the Governance Review

TAC Review (Date):

Click or tap to enter a date.

ICBMAC Review (Date):

Click or tap to enter a date.

SIKIC Review (Date):

Click or tap to enter a date.

OC Review (Date):

Click or tap to enter a date.

Final Recommendations:

Decision Pool:

Choose an item.

Notes:

Click or tap here to enter text.

Post Decision: Submission Work Plan Revisions Follow-up Process

This phase will only be implemented if the final recommendation requires revisions and follow-up from governance

ICBMAC Review (Date):

Click or tap to enter a date.

SIKIC Review (Date):

Click or tap to enter a date.

OC Review (Date):

Click or tap to enter a date.

Comments:

Decision Pool:

Choose an item.

Notes & Additional Actions for Successful Work Plan Implementation:

Click or tap here to enter text.