

FOCUSED STUDY ACTIVITY WORK PLAN

General Information

Work Plan Unique Identifier:	A-CM-8-1718	
Focused Study Activity Title:	Acute Odour Monitoring Network Pilot Study	
Focused Study Category:	Study to Establish the Current Environmental State	
Geographic Location (<i>choose from drop-down menu. If Project Location is in more than one area choose from second drop-down</i>)	Regional Municipality of Wood Buffalo	Athabasca Oil Sands Region
Monitoring Site(s) Coordinates (<i>latitude and longitude</i>)	Oski-ôtin site in Fort McKay and various locations in the RMWB Latitude: 57.149 Longitude: -111.642	
Project Leader:	Bob Myrick (AEP) Sanjay Prasad (WBEA)	
Organization and contact information:	<p>Environmental Monitoring and Science Division Alberta Environment and Parks 9th Floor, 9888 Jasper Avenue NW Edmonton, Alberta, T5J 5C6 Bob.Myrick@gov.ab.ca; tel. (780) 229-7290</p> <p>Wood Buffalo Environmental Association 100-330 Thickwood Blvd Fort McMurray AB T9K 1Y1 sprasad@wbea.org; tel. (780) 799-4420</p>	
Date Study initiated:	January 2017	
Monitoring Category: (<i>From OSM long-term plan; choose from drop-down menu</i>)	Atmospheric Monitoring	
Strategic Objective of Focused Study: (<i>From OSM long-term plan; choose from drop-down menu</i>)	Objective A1: Detect and report concentration levels and trends of atmospheric substances that are likely to cause adverse human and/or environmental health effects.	
Hypotheses: (<i>Briefly outline the specific hypotheses that your focused study is aiming to address</i>)	Hypothesis 1: Hydrogen sulphide (H₂S) and sulphur dioxide (SO₂) Emergency Response Monitoring System - Concentrations of H ₂ S and SO ₂ will be monitored for the purpose of providing the community of Fort McKay (Fort McKay First Nations and Fort McKay Métis) and the appropriate authorities with the air quality data that, in conjunction with toxicity information, can be used to determine if emergency response actions are necessary.	

	Hypothesis 2: Odour Monitoring Network Design - Perceived odour events in the oil sands region can be related to ambient pollutant concentrations.
<p>Deliverables:</p> <p><i>What tangible goal (s) and/or product(s) will the monitoring produce and when?</i></p>	<ul style="list-style-type: none"> • H₂S and SO₂ Emergency Response Monitoring System - Five minute resolution concentration data for H₂S and SO₂ and a comparison of these data to the alert levels provided by Alberta Health. Email and text notifications to the designated authorities in the event of an exceedance of an alert level. An evaluation of air quality relative to alert levels will be provided on request. • Odour Monitoring Network Design - An annual report showing ambient air pollutant concentrations compared to perceived odour events. This deliverable is tied to workplan A-CM-1-1718. Also recommendation for an Odour Monitoring Network Design will be provided (coordinated with AER, ECCC, WBEA, FMFN and Alberta Health).

Detailed Study Plan

(Please provide detailed information on the specifics of your focused study including – (**keywords, hypothesis and the assumptions and constraints behind your hypothesis**)

Provide a maximum of 10 key words that describe this project. Use commas to separate them:

Fort McKay, air quality, emergency response, sulphur dioxide, hydrogen sulphide, odour identification

Describe how you will test your hypothesis:

Hypothesis 1: H₂S and SO₂ Emergency Response Monitoring System - Concentrations of hydrogen sulphide (H₂S) and sulphur dioxide (SO₂) will be monitored for the purpose of providing the community of Fort McKay (Fort McKay First Nations and Fort McKay Métis) and the appropriate authorities with the air quality data that, in conjunction with toxicity information, can be used to determine if emergency response actions are necessary.

Recommendation 1 from the report called *Recurrent Human Health Complaints Technical Information Synthesis – Fort McKay Area* (Alberta Energy Regulator and Alberta Health, 2016) is as follows:

“Ambient air quality monitoring for acute concentrations of H₂S and SO₂ should be instituted for the purposes of emergency response (including potential evacuation) in the community of Fort McKay within one year. Monitoring should be conducted by EP, funded by industry, and acute thresholds for H₂S and SO₂

concentrations approved by Alberta Health in discussion with Fort McKay. Review of this monitoring program, including the need for additional parameters, should be conducted annually.”

As indicated in the Recommendation, H₂S and SO₂ are the air quality parameters that will be the initial focus of this monitoring program. Additional air quality parameters may be added based on annual reviews of the program. Also, ground level (10 metres) wind speed and direction will be monitored.

The data collected for H₂S and SO₂ for this monitoring program will need to accurately measure ambient concentrations over the full range of levels necessary for emergency response. Alberta Health has provided the alert levels and the associated ambient concentrations for H₂S and SO₂. The data quality objectives for the lower detectable limit, full scale operating range, minimum averaging time and precision based on this information are indicated in Table 1.

Table 1. Data quality objective requirements for instrumentation implemented for emergency response monitoring.

Parameter	Required Monitoring Range		Minimum Averaging Time	Precision
	Lower Detectable Limit	Full Scale Upper Range		
Hydrogen Sulphide	0.01 ppm (can be lower)	10 ppm	5 minutes	1% of measured concentration from lower detection limit to 10 ppm 10% of measured concentration above 10 ppm
Sulphur Dioxide	0.172 ppm (can be lower)	10 ppm	5 minutes	1% of measured concentration from lower detection limit to 10 ppm 10% of measured concentration above 10 ppm

The Oski-ôtin location in Fort McKay has been selected because: (1) it is in the centre of the community of Fort McKay; (2) there is space for an additional emergency response monitoring station; (3) there is land power at this location; and (4) there is an existing ambient air station at this location (see Figure 1).

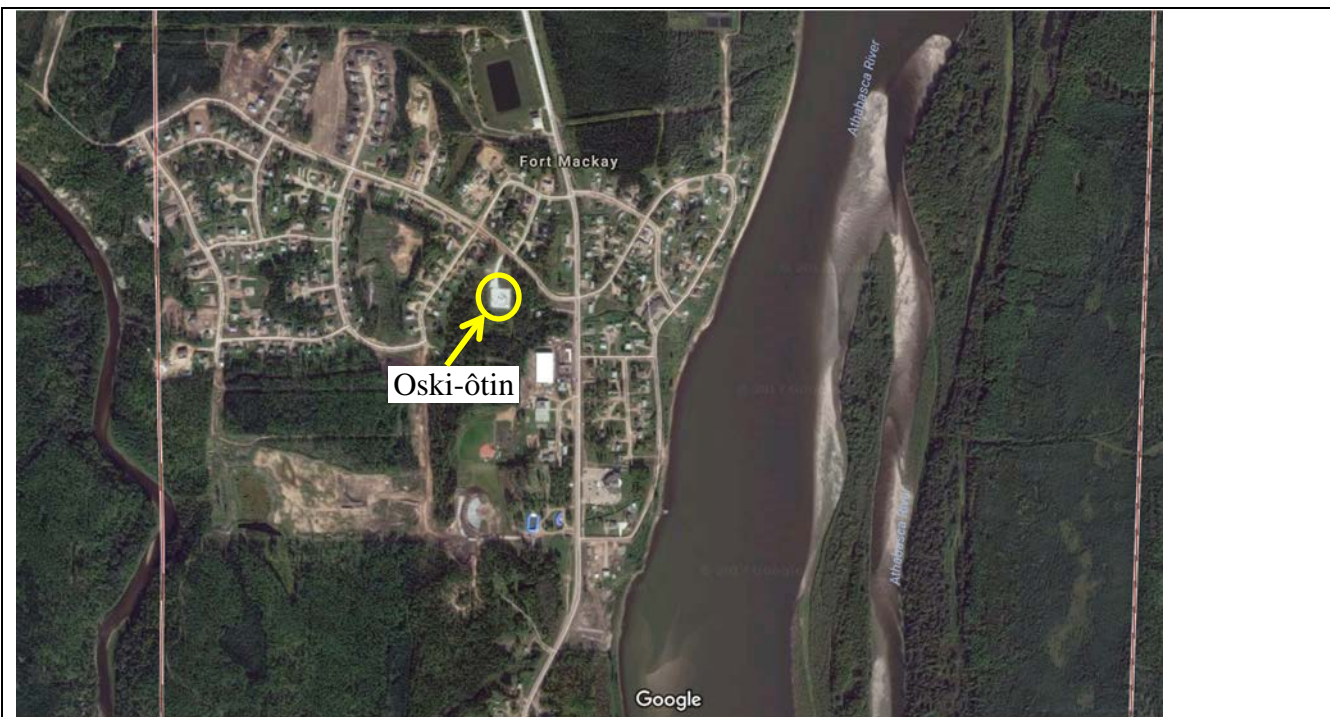


Figure 1 Location of Oski-ôtin Air Monitoring Site in Fort McKay.

The monitoring ranges indicated in Table 1 can be measured by commercially available gas analyzers; Thermo model 450i for H₂S (Thermo Scientific, 2015a) and Thermo model 43i for SO₂ (Thermo Scientific, 2015b). These instruments will be located in a shelter with the appropriate climate control equipment. For the proposed emergency monitoring in Fort McKay, both analyzers will be operated at a range of 0 to 10 ppm, but calibrated at a range of 0 to 1 ppm for the H₂S analyzer and 0 to 2 ppm for the SO₂ analyzer.

H₂S and SO₂ concentrations will be provided digitally for five minute time periods through an Ethernet connection. The existing WBEA notification processes will be used to communicate trigger messages from the equipment to the appropriate authorities (to be clarified what parties need to be notified) via email or text message.

Hypothesis 2: Odour Monitoring Network Design - Perceived odour events in the oil sands region can be related to ambient pollutant concentrations.

The report called *Recurrent Human Health Complaints Technical Information Synthesis – Fort McKay Area* (Alberta Energy Regulator and Alberta Health, 2016) contains recommendations focused on improved detection of air pollutants that may contribute to odours in the community.

Specialized air monitoring equipment will be deployed in the Wood Buffalo Region to identify odour causing air pollutants identified in the Odourant Focal Parameter List and Air Quality Focal Parameter List from the AER/Alberta Health report.

The Odourant Focal Parameter List includes: hydrogen sulphide, carbon disulphide, dimethyl disulphide, 2-methyl thiophene, 3-methyl thiophene, methyl mercaptan, acrolein, acetaldehyde, naphthalene,

benzaldehyde, isoprene, methyl ethyl ketone, n-propylbenzene, p-ethyltoluene, 2-ethyl hexanol, 2-ethyl hexanal, nonanal, 1-ethyl-4-methyl-benzene and alpha pinene.

The Air Quality Focal Parameter List includes: acetaldehyde, carbon disulphide, carbonyl sulphide, methanol, naphthalene, ozone, sulphur dioxide, nitrogen dioxide, hydrogen sulphide, total reduced sulphur, benzene, mixed (m,p) xylenes and toluene.

The following monitoring will be conducted in 2017-18 to address the recommendations from the AER/Alberta Health report. Additional monitoring methodologies will need to be evaluated for potential application in future years.

- RSC Chemical Identification & Quantification – The identification of pollutants related to odour using the adsorbent tube sampling method will be implemented at Bertha Ganter – Fort McKay AMS, and Mannix AMS. Through this method identified reduced sulphur compounds (RSC) related to odours will be quantified. Sample collection will be automatically triggered based on elevated concentrations of sulphur compounds measured using traditional air monitoring equipment.
- WBEA Odour Monitoring Station – WBEA has an air monitoring station that is configured and equipped with analyzers that will be utilized for odour monitoring. The station contains analyzers capable of 24/7 monitoring for odour causing pollutants such as total reduced sulphur (TRS), total hydrocarbons (THC) and methane/non-methane hydrocarbons (CH₄/NMHC) at selected locations. This unit will be strategically located in the region to monitor and identify the odour profile within its vicinity.

Odours reported through workplan A-CM-1-1718 and other odour reporting mechanisms (e.g. AER complaints) will be related to ambient data collected in the community to identify odour causing pollutants and potential sources of odours. Data collected in this study will also be coordinated with speciated VOC and RSC data collected at the Oski-ôtin air monitoring station (A-PD-5-1718 Atmospheric Process Study - Enhanced Ground-Based Monitoring - Oski-ôtin monitoring site).

Additional work will be done to describe an odour monitoring network that will use technology to capture odour information for communities in the oil sands region. This should also address Recommendations 14 and 15 from the AER/Alberta Health report. The result will be an Odour Monitoring Network Design to be implemented in subsequent years. Alberta Environment and Parks will work with the Alberta Energy Regulator, Environment and Climate Change Canada, the Wood Buffalo Environmental Association, Fort McKay First Nations and Alberta Health to develop this network design. This design will address monitoring for pollutants continuously or semi-continuously indicated on the Air Quality Focal Parameter List and Odourant Parameter Focal List.

Assumptions and Constraints behind the hypothesis and the testing method:

Events above the alert trigger levels may not occur. If this is the case, it will be difficult to test the alert level triggering system and the associated health messaging during a real situation.

A power failure is possible during an event that may lead to air pollutant concentrations at levels that will trigger emergency response. If a power failure occurs during an emergency air quality event, then there will be no access to the air quality data. In the future, the appropriate backup equipment and procedures will need to be established in the event of a power failure or power interruption.

Because of the high calibration ranges (0 to 1 ppm for the H₂S analyzer and 0 to 2 ppm for the SO₂ analyzer), additional safety precautions will need to be taken when accessing the monitoring station and conducting maintenance and calibration.

It is assumed that there will be odour events during the study period and that the technologies deployed will be able to measure detectable levels of odour causing compounds.

References:

Alberta Energy Regulator and Alberta Health. 2016. Recurrent Human Health Complaints Technical Information Synthesis: Fort McKay Area. September 2016.

https://www.aer.ca/documents/reports/FortMcKay_FINAL.pdf.

Alberta Environment and Parks. 2016. Air Monitoring Directive. <http://aep.alberta.ca/air/legislation/air-monitoring-directive/>.

Thermo Scientific. 2015a. Model 450i Instruction Manual: Pulsed Fluorescence SO₂-H₂S-CS Analyzer. Part Number 103258-00. 16 May 2015. <https://tools.thermofisher.com/content/sfs/manuals/EPM-manual-Model%20450i.pdf>.

Thermo Scientific. 2015b. Model 43i Instruction Manual: Pulsed Fluorescence SO₂ Analyzer. Part Number 101589-00. 16 May 2015. <https://tools.thermofisher.com/content/sfs/manuals/EPM-manual-Model%2043i.pdf>.

Data Management

If this work generates data please summarize your project-level data management plan.

Deliverables	Timeframe
<p>Data Collection Period:</p> <p>Hypothesis 1: H₂S and SO₂ Emergency Response Monitoring System</p> <p><i>No end date to the data collection time period has been determined. However, the monitoring system will be evaluated annually as indicated by Recommendation 1.</i></p> <p>Hypothesis 2: Odour Monitoring Network Design</p> <p><i>This will include adsorbent tube data and data from the WBEA odour monitoring station.</i></p>	<p>Start : 2017-07-01 End: 2020-03-31</p> <p>Start : 2017-04-01 End: 2018-03-31</p>
<p>Data Analysis Period:</p> <p>Hypothesis 1: H₂S and SO₂ Emergency Response Monitoring System</p> <p><i>Data will be analyzed in real-time against the alert trigger levels.</i></p> <p>Hypothesis 2: Odour Monitoring Network Design</p> <p><i>Data collected from the Community Odour Monitoring Program (A-CM-1-1718) and the Oski-ôtin air monitoring station (A-MD-5-1718) will be included in this analysis.</i></p>	<p>Start : 2018-01-01 End: 2018-03-31</p> <p>Start : 2018-01-01 End: 2018-06-30</p>
<p>Data Release Date:</p> <p><i>Ongoing</i></p>	<p>Five-minute and hourly data will be available to stakeholders in near real time.</p> <p>Quality controlled ambient air quality data will be made available on a monthly basis.</p> <p>Adsorbent tube data will be released within three months following the month of collection.</p>

Reporting and Publications

Provide information on the anticipated reports / publications. (Insert additional rows if needed)

Expected Subject/Titles of Publications or Reports	Short Description of Publication or Report	Expected Year of Publication
Evaluation of the Fort McKay Emergency Response Air Quality Monitoring and Notification System	The report will review data collected at the Fort McKay Emergency Response station against the alert level triggers provided by Alberta Health. The report should include recommendations on improving the monitoring and notification system.	2018
Integration Odour Data Report for Odour Monitoring Program <i>Compilation Report</i>	Review and reporting on Odour related data collected under odour program	2018
RSC Identification/Quantification lab <i>Quarterly / Annual Reports</i>	Report on target sulphur compounds identified using adsorbent tubes method	2017 and 2018
An Odour Monitoring Network Design for the oil sands region.	An evaluation of monitoring methods for compounds indicated in Air Quality Focal Parameter List and Odourant Focal Parameter List. This report will also provide a recommended monitoring design for future odour monitoring. The AER, ECCC, WBEA, FMFN, Alberta Health and others will be engaged in developing this monitoring design.	2018

Technical / Professional Roles and Responsibilities

Identify members of the monitoring team/organization, their roles and responsibilities. Identify monitoring organization leads if different from overall monitoring activity lead. (Insert additional rows if needed)

Role	Responsibilities	Resource Name/Organization
Project Lead	Provide administrative planning implementation, and coordination support activities.	A. Bob Myrick (AEP) B. Sanjay Prasad (WBEA)
Project Scientists	Data analysis and report preparation	Scientist from WBEA and EMSD
Technical Support (WBEA)	Station installation, operation, maintenance and calibration. Operation and edits to the notification system.	WBEA Field Technical Staff
Data manager	Data QA/QC	WBEA Data Management Staff

Deliverables (Year 1) If your Focus Study is longer than 1 year then complete **Appendix 3** for multi-year deliverables breakdown

Provide a summary of tangible quarterly deliverables. Identify major project areas (deliverables) and results that can be identified as a tangible goal. This could include: field work, lab work/ analysis, evaluation, data, reports, publications, SOPs etc. Do not define process as your Deliverable e.g. ‘fly to Ft. McMurray to conduct fieldwork’ or ‘seek Director approval for report’.

Deliverable(s) (please provide enough information to support status reporting)
Q1 – April to June
Present monitoring plan to Fort McKay Air Quality and Odour Advisory Committee
Install monitoring equipment in WBEA portable station
Modify WBEA notification system to allow reporting against defined alert levels
Test of monitoring station and notification system at WBEA Field Operations Centre
Obtain required permits for site location(if necessary)
Install portable station at Oski-ötin location
Operate adsorbent tube monitors and portable odour station
Q2 – July to September
Operate and calibrate emergency response station
Provide five-minute and one-hour data on WBEA web site
Provide alerts to the designated email addresses and text phone numbers as necessary
Operate adsorbent tube monitors and portable odour station
Convene technical working group to work on odour monitoring design
Q3 – October to December
Operate and calibrate emergency response station
Provide five-minute and one-hour data on WBEA web site
Provide alerts to the designated email addresses and text phone numbers as necessary
Operate adsorbent tube monitors and portable odour station
Q4 – January to March

Operate and calibrate emergency response station
Provide five-minute and one-hour data on WBEA web site
Provide alerts to the designated email addresses and text phone numbers as necessary
Operate adsorbent tube monitors and portable odour station
Draft report for odour monitoring design


Detailed Financial Breakdown – Year 1 of 3 (2017-2020)

Also complete **Appendix 2** for the multi-year financial breakdown

Budget requirements – List areas that require budget expenditures: (ADD OR DELETE BUDGET CATEGORIES AS REQUIRED)	OS Funding	External Funding (outside JOSM)
O&M - Operations and Maintenance:		
Helicopter Costs	\$	\$
Field Costs	\$	\$
Data Management	\$	\$
Internal Lab Analysis	\$	\$
Consumable Materials & Supplies	\$	\$
Sub-Total	\$	\$
O&M - Travel		
Field Work	\$	\$
Conferences (<i>identify conference</i>)	\$	\$
Meeting (<i>identify meeting</i>)	\$	\$
Sub-Total	\$	\$
O&M - External Contracts :		
WBEA: Goods and Services Contract for emergency response station (station build, software modifications, station testing, station setup and station operation).	\$32,832 (WBEA) 9 months of station operation (\$3,337 x 9 = \$30,032) Setup of station systems (\$800) Station installation (\$2000)	\$
WBEA: Good and Services Contract to conduct Odourant and Air Quality Focal Parameter lists Chemical Identification & Quantification and operate Odour Monitoring Station.	\$212,168 (WBEA) Chemical quantification in odour monitoring	
External Lab Analysis	\$	\$
Sub-Total	\$245,000	\$
Salaries:		
Project Coordinator		\$

Budget requirements – List areas that require budget expenditures: (ADD OR DELETE BUDGET CATEGORIES AS REQUIRED)	OS Funding	External Funding <i>(outside JOSM)</i>
Technical / Professional Assistants	0.05 FTE (\$5,000) (AEP)	\$
Field Staff		\$
Sub-Total	0.05 FTE (\$5,000) (AEP)	\$
Total Salaries	0.05 FTE (\$5,000)	\$
Total O&M	\$245,000	\$
2017-2018 GRAND TOTAL*	\$250,000	\$

Appendix 1 - Approvals

Project Submitted by:		
Name:		
Organization:	Signature:	Date:
Project Approved by:		
Dr. Monique Dubé (AEP)		Dr. Kevin Cash (ECCC)
Signature 		Signature 
Date		Date

APPENDIX 2 – Detailed Multi-year Financial Breakdown (Complete the following detailed financial breakdown; add or delete categories as required)

Budget requirements	Year 1 (2017- 2018)		Year 2 (2018- 2019)		Year 3 (2019- 2020)	
	Cash	In-kind	Cash	In-kind	Cash	In-kind
1) Salaries and benefits						
a) Investigators			0.1 FTE (\$10,000)		0.1 FTE (\$10,000)	
b) Technical/professional assistants	0.05 FTE (\$5,000)		0.05 FTE (\$5,000)		0.05 FTE (\$5,000)	
c) Field Staff						
d)						
2) Operations and maintenance						
a) Facilities						
b) Equipment						
c) Lab analysis						
d) Data management						
e) Field work						
3) Consumable Materials and supplies						
a)						
b)						
4) Travel						
a) Conferences and meetings						

b) Field work						
c) Project-related travel						
5) Dissemination & Engagement						
a) Publications/Reports						
b) Translation (if required)						
c) Communications						
d) Stakeholder Engagement						
e) Indigenous Peoples Engagement						
6) External Contracts						
a) WBEA	\$245,000		\$350,000		\$400,000	
Grand Total	\$250,000		\$335,000		\$385,000	

APPENDIX 3 –Years 2 and 3 Deliverables (Complete the following detailed breakdown. Provide a summary of tangible quarterly deliverables. Identify major project areas (deliverables) and results that can be identified as a tangible goal.)

Year 2 (2018- 2019)
Deliverable(s) (please provide enough information to support status reporting)
Q1 – April to June
Operate and calibrate emergency response station
Provide five-minute and one-hour data on WBEA web site
Provide alerts to the designated email addresses and text phone numbers as necessary
Operate adsorbent tube monitors and portable odour station
Prepare report on 2017-18 odour monitoring program
Q2 – July to September
Operate and calibrate emergency response station
Provide five-minute and one-hour data on WBEA web site
Provide alerts to the designated email addresses and text phone numbers as necessary
Operate adsorbent tube monitors and portable odour station
Final report on 2017-18 odour monitoring program
Draft report evaluating Year 1 for emergency response station
Q3 – October to December
Operate and calibrate emergency response station
Provide five-minute and one-hour data on WBEA web site
Provide alerts to the designated email addresses and text phone numbers as necessary
Operate adsorbent tube monitors and portable odour station
Final report evaluating Year 1 for emergency response station
Q4 – January to March
Operate and calibrate emergency response station
Provide five-minute and one-hour data on WBEA web site

Provide alerts to the designated email addresses and text phone numbers as necessary
Operate adsorbent tube monitors and portable odour station

Year 3 (2019- 2020)
Deliverable(s) (please provide enough information to support status reporting)
Q1 – April to June
Operate and calibrate emergency response station
Provide five-minute and one-hour data on WBEA web site
Provide alerts to the designated email addresses and text phone numbers as necessary
Operate adsorbent tube monitors and portable odour station
Prepare report on 2018-19 odour monitoring program
Q2 – July to September
Operate and calibrate emergency response station
Provide five-minute and one-hour data on WBEA web site
Provide alerts to the designated email addresses and text phone numbers as necessary
Operate adsorbent tube monitors and portable odour station
Final report on 2018-19 odour monitoring program
Draft report evaluating Year 1 for emergency response station
Q3 – October to December
Operate and calibrate emergency response station
Provide five-minute and one-hour data on WBEA web site
Provide alerts to the designated email addresses and text phone numbers as necessary
Operate adsorbent tube monitors and portable odour station
Final report evaluating Year 1 for emergency response station
Q4 – January to March
Operate and calibrate emergency response station
Provide five-minute and one-hour data on WBEA web site
Provide alerts to the designated email addresses and text phone numbers as necessary

Operate adsorbent tube monitors and portable odour station

Appendix 4 – Detailed Budget for External Contractor (WBEA)

Budget requirements	Description	Year 1 (2017- 2018)	
		OSM Funding	External Funding
1) Salaries and benefits			
a) Technical and Field Staff	Portion of 1 Program Coordinator and WBEA technical staff	\$22,977	
b) Administrative and Program Coordination	Portion of 7 Administration staff and 2 contracts	\$27,360	
c) Science Expertise	Science and Technical consultation	-	
2) Operations and Maintenance			
a) Vehicles and Transportation	Leased vehicles, repairs, insurance, gas	\$278	
b) Helicopter	Flight costs + landing fees		
c) Odour Station	Operations, Calibrations and Maintenance	\$33,000	
d) Data management	Data reporting, QAQC validation, Data Translation, Software License, IT infrastructure and support services, website reporting, rss feeds AQHI, emergency response, data backups, data security, data hosting and publications	\$9,044	
e) Station and Site Maintenance	Retrofit current shelter, additional site access and power requirements	\$10,000	
f) Data Telemetry and cell phone costs	Station modems, data plans, cell phone and satellite phone plans, emergency response data feeds		
g) Station and Facilities Expenses	Station Insurance, Tower Lease, Land Agreements, Utilities, Office Equipment Lease and expenses	\$1,475	
h) Building Leases and Occupancy Costs	Taiganova bays lease and occupancy costs	\$9,866	
i) Quality Assurance	Data Audits, Documentation Management, QAP, Site Documentation -AMD)		
j) Safety	Site Access training, PPE, general safety training, Certificate of Recognition (COR), Health and Safety Policies	\$308	

k) Shipping	General shipping fees, brokerage fees, freight charges		
l) Emergent Items	Unplanned emergency items that needs to be resolved within fiscal year. Requires special resolution and approval to be spent.	\$3,494	
3) Consumable Materials and supplies			
a) Support Gases	Reference standards, calibration gases, support gases and specialized gases to meet emergency response monitoring range, and odour parameters.	\$15,000	
b) Materials and Consumables	Routine spare parts, pump rebuild kits, pumps, scrubbing materials, tubing, inlet filters, tools, sample lines, electrical wires, and odour monitoring equipment.	\$26,000	
4) Travel			
a) Field work – travel	Fort Chipewyan - air travel, accommodation and vehicle rental, per diems		
b) Program work - travel		\$2,055	
c) Conferences, training and meetings	Staff Development, Presentations, Air - specific workshops, conferences	\$1,367	
5) External Contracts			
a) Odour Station Expenses	Setup of portable monitoring equipment for odour chemical identification and quantification, annual integration report, and submission of recommendations to AEP.	\$75,000	
b) Stakeholder Honorariums	Honorariums for Indigenous and ENGO involvement	\$6,028	
c) Financial Audit and Legal	Perform financial audits and legal reviews of contracts and human resource matters	\$1,233	
6) Capital Expense			
a) Capital - Spare Parts	Critical and Spare parts over \$1000 in value		
b) Capital - Equipment	Equipment Replacement and new Inventory		

c) Capital - Support Equipment	Computers, modems, data loggers, IT related		
d) Capital - Office Equipment	Office Equipment - Program related	\$514	
Grand Total		\$ 245,000	