Public Health Assessment & Response Plan for Airborne Health Risks

TRANSMOUNTAIN

PUBLIC HEALTH ASSESSMENT AND RESPONSE PLAN FOR AIRBORNE HEALTH RISKS ASSOCIATED WITH PIPELINE/TERMINAL OPERATIONS AND INCIDENTS (AIR MONITORING PLAN)

This document will be updated from time to time. If you wish to receive notification of updates, please send an email to emergency_management@transmountain.com requesting to be notified when a new version of the document is available online. Manual holders, as indicated on the distribution list, will receive updates automatically as required.

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Responsibility

The accountability for the Public Health Assessment and Response Plan for Airborne Health Risks Associated with Pipeline/Terminal Operations and Incidents (Air Monitoring Plan) development and maintenance is a combined effort by the Trans Mountain Manager, Emergency Management and the Manager, Environment. This accountability is such:

The document is owned by the Emergency Management Program as a supplemental plan to the Emergency Response Plan (ERP), however it is developed and maintained in cooperation with the Environment Protection Program who is responsible for the implementation of the Air Monitoring Plan during an emergency.

The administrative management for the Air Monitoring Plan will be administered by the Emergency Management Program.

Plan Revisions

All requests for change must be made through the Manager, Emergency Management using the Revision Request Form located in this section of the manual.

Revisions after Release or Exercise

In the event that Trans Mountain experiences an incident (worst case or otherwise), or conducts an exercise or training session, the effectiveness of the ERP and its supplemental plans will be evaluated and updated as necessary.

Changes in Operating Conditions

If a new or different operating condition develops, or if new information which would substantially affect the implementation of the ERP and its supplemental plans is identified, then Trans Mountain will modify these to impacted Plans to address such changes.

Revision Request Form

Requested by:	Date:
Dept/Agency:	Phone No.:
Revision Type: ___ Addition ___ Deletion ___ Correction	
Manual Section:	Page:
Revision (attach separate sheet if necessary):	
Signature of Requestor:	
Send to: Manager, Emergency Management Trans Mountain 2700-300 - 5th Avenue S.W. Calgary, AB T2P 5J2 Canada Fax: (403) 514-6401	

To be completed by Manager, Emergency Management	
Date Received:	Comments:
Date Reviewed:	
Issued as Revision: Y/ N	
If No, reason for Rejection:	
Signature Manager, Emergency Management:	

Control Sheet

Revision Number	Date of Revision	Change(s)	Name
1	January 2018	New Plan Issued	J. Kereliuk
2	February 2020	Plan updated: • Change of title of the plan to *Public Health Assessment and Response Plan for Airborne Health Risks Associated with Pipeline/Terminal Operations and Incidents* • Revision of scope to include large, scheduled maintenance events • Movement of content (Section 4.0) and change of title, to Section 3.0 *Air Monitoring Initiation* • Addition of new content Section 3.2 *Initial Air Monitoring Strategy* • Movement of tables *Air Monitoring for Product Release* and *Air Monitoring for Fire* from Appendix to Section 3.0; titles changed • Movement of table *Standards for PCOCs* from Section 3.0 to Appendix II – Standards for PCOCs • Addition of appropriate references to the Health Authority to Development of Evacuation Zones and Shelter-in-Place Criteria (Section 3.3.1) • Additional content to Fixed Reading Monitors (Section 3.5.1) • Additional content to Direct Reading Monitors (Section 3.5.2) • Applicable Guidelines and Action Levels (Section 4.0) improved readability by creating subsections • *Applicable Guidelines and Action Levels* clarification of language, with the addition of the term ‘guidelines’ • Addition of United States Environmental Protection Agency – Acute Exposure Guideline Levels to the guidelines and standards • Revised Appendix II – Standards for PCOCs to have ppb and ppm units; added additional guideline criteria for reference	K. McLernon
3	July 2021	• Revision of Appendix II - Standards for PCOCs guideline criteria limits	

4	April 2022	• Updated to include TMEP (Trans Mountain Pipeline System) • Removal of acronym AMP • Section 2.0, Updated “Environment Unit Lead” to “Environment Unit Leader” • Additional content to Fixed Reading Monitors (Section 3.5.1) • Addition of Appendix III - Detection by Terminal Permanent Air Monitoring Stations • Clarification that the EUL can also initiate the Air Monitoring Plan	K. McLernon
5	June 2023	• Section 2.3 changed confidential appendix to Incident Notification Guideline and changed location from ERP to Emergency toolbox	R. Wade
6	August 2023	• Addition to Appendix II - Standards For Potential Chemicals of Concern: Sources and Detection Limits	R. Wade

1.0 INTRODUCTION

The protection of air quality in an emergency is a priority for Trans Mountain. Monitoring and mitigation of impacts during the response to a release is a main focus of the Incident Management Team, which will establish, and be located in, the Incident Command Post (ICP). The timely assessment of the condition of air quality provides valuable information, allowing for assessment of public health risk and protection of neighbouring communities.

The fundamental concepts of the Public Health Assessment & Response Plan for Airborne Risks ("Air Monitoring Plan") are initiated upon declaration of an emergency through the TAS process and are maintained until the development of the incident specific air monitoring plan. The incident specific air monitoring plan evolves from the Air Monitoring Plan and will be scaled according to the magnitude of the incident.

The Air Monitoring Plan will function as a "living document" in which information collected during sampling and monitoring will be used to continuously update the response strategies and monitor their effectiveness to achieve the objectives as laid out in the Incident Action Plan (IAP).

1.1 Scope

In the event of an emergency that impacts, or potentially could impact, air quality and has the potential to affect the public, the Air Monitoring Plan will be activated in conjunction with the appropriate ERP. The Air Monitoring Plan is considered a subset of Trans Mountain's ERP(s) and has been developed to align with the Incident Command System (ICS).

1.1.1 Maintenance Events

The plan will also guide air monitoring during large scheduled maintenance events, particularly **Appendix II – Standards for PCOCs: Sources and Detection Limits**. If it is identified that air monitoring is required, Air Monitoring Team(s) will be assembled, and an event specific plan will be generated in consultation with the EH&S Director and Operations Manager.

Should monitoring data indicate that an action level is reached, the Air Monitoring Team, in conjunction with the EH&S Director and Operations Manager, will initiate an assessment of public health risk. Using the guidelines and objectives in **Section 3.2**, as well as **Table 3-1 Initial Air Monitoring Action Levels and Response Strategies for Product Release and Fire** and **Appendix II – Standards for PCOCs: Sources and Detection Limits** as reference material, the Team will evaluate the data and consult with the Medical Health Officer of the Health Authority with jurisdiction to determine if the air monitoring strategy should be adjusted and if additional public safety measures should be recommended and/or communicated. Should public safety measures be recommended, the Trans Mountain Emergency Response Plan (ERP) will be activated, and an ICP, including an Environmental Unit (EU) will be stood up.

1.2 Objectives

The objectives of the Air Monitoring Plan are to:

- Anticipate and identify Potential Chemicals of Concern (PCOC) from product releases and/or fires;
- Evaluate, via proper monitoring principles, public health exposures;
- Facilitate development and implementation of incident-specific air monitoring and response strategies to protect the public; and
- Identify action levels for PCOC that triggers assessment of public health risk.

1.3 Implementation of the Air Monitoring Plan

Activation of the Trans Mountain ERP will occur when an emergency is declared. Once an emergency is declared, and a need is identified for air monitoring, the Air Monitoring Plan will be initiated, and the Air Monitoring Team(s) will be mobilized.

The Air Monitoring Plan will be used in conjunction with other appropriate plans for the response phase of the incident until the incident specific air monitoring plan is developed. These plans will be used during the transition from a response phase to the remediation phase as determined by Unified Command. Implementation of the Air Monitoring Plan is a function of the Planning Section's EU.

2.0 ROLES AND RESPONSIBILITIES FOR INCIDENTS

The following personnel are responsible and accountable for carrying out their specific duties to complete the requirements under the Air Monitoring Plan.

2.1 Environmental Unit Leader

The Environmental Unit Leader (EUL) is responsible for environmental matters associated with the response including ambient air monitoring for public health exposure. The EUL is responsible for the implementation of the Air Monitoring Plan. Duties for this role can be found in the Trans Mountain ICS Guide.

The Assistant Environmental Unit Leader supports the primary EUL with oversight and management of Technical Specialists.

2.2 Air Monitoring Technical Specialist

The Air Monitoring Technical Specialist is part of the EU and is responsible for implementation of the Air Monitoring Plan and development of the incident specific air monitoring plan. The incident specific air monitoring plan outlines the monitoring of ambient air quality in nearby communities potentially impacted by a release.

The Air Monitoring Technical Specialist initiates the Air Monitoring Plan by contacting and deploying the Air Monitoring Team and coordinating the communication of air monitoring results from the field to Unified Command through the EUL and Planning Section Chief.

Additionally, this role coordinates closely with regulatory agencies participating within the EU to develop an incident specific air monitoring plan and assessments of public health risk. Specific duties for this role can be found in Trans Mountain's ICS Guide.

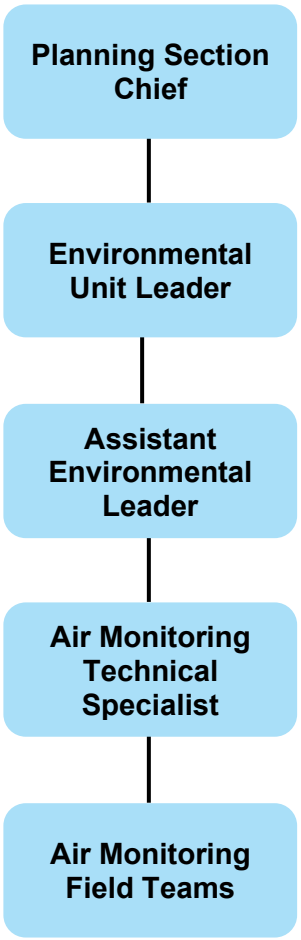

Figure 1: Air Monitoring Positions Under Incident Command System

2.3 Air Monitoring Team

The Air Monitoring Team is part of the EU and is responsible for performing air monitoring in accordance with the Air Monitoring Plan. The Air Monitoring Team is comprised of pre-identified third-party contractors based on technical knowledge, relevant experience, and response times. The third-party contractor will mobilize to the location of the incident and begin ambient air monitoring as soon as possible, once the Air Monitoring Plan has been initiated. Contractors are listed in the Incident Notification Guideline located in the Emergency Toolkit.

3.0 AIR MONITORING INITIATION DURING INCIDENTS

3.1 Initiation Timeline

3.1.1 Trans Mountain Alert System and Initiation of the Plan

The Air Monitoring Plan will be initiated when an emergency is declared by Trans Mountain using the Trans Mountain Alert System (TAS) process (senior management discussion). The TAS call is initiated within 30 minutes of the release being identified. At the conclusion of the TAS call, the Air Monitoring Plan will be initiated, and mobilization of the Air Monitoring Team will occur. The Air Monitoring Plan is most often initiated before the ICP for the incident has been established.

3.1.2 Air Monitoring Team Mobilization

Once the Air Monitoring Plan has been activated, the Air Monitoring Team (third party contractor) will be instructed to mobilize, as soon as possible, to the location of the release and begin nearby community air monitoring. This step in the response is carried out by the EUL or Air Monitoring Technical Specialist and occurs before the ICP has been established and Unified Command is operational.

The general strategy is to:

- Mobilize adequate resources to monitor nearby communities based on the information available during the TAS call;
- Prioritize sensitive receptors and downwind communities for monitoring;
- Establish appropriate monitoring perimeter between the community and the release to begin collecting real time data;
- Communicate initial air monitoring results as soon as possible to the Air Monitoring Technical Specialist; and
- Initiate electronic data website sharing for fixed system monitoring and direct reading measurements as appropriate, if available telecommunication services permit (i.e., cell service).

The Air Monitoring Team will follow the prescribed actions outlined in **Table 3-1**, until an incident specific air monitoring plan is developed and approved.

3.1.3 Incident Command Post (ICP)

The ICP is set up and established as soon as reasonably possible by the Trans Mountain Incident Management Team (dependent on mobilization of personnel and resources).

Appropriate local, municipal, provincial, and federal agencies will be invited to participate in the EU. The multi-jurisdictional EU lies within the Planning Section of the ICP.

3.2 Initial Air Monitoring Strategy

The initial air monitoring strategy sets out action levels for pre-identified PCOCs for product releases or fires. Action Levels are the concentration of a PCOC that trigger the EU to assess public health risk. For the purposes of the Air Monitoring Plan, action levels are set at the detection limit of the monitoring

instruments for each individual PCOC as outlined in **Table 3-1**. This strategy acts as an interim measure until the incident specific air monitoring plan is developed.

When monitoring data indicates that an action level is reached, the EUL or Air Monitoring Technical Specialist will initiate an assessment of public health risk. Using the guidelines and objectives in **Appendix II – Standards for PCOCs: Sources and Detection Limits** as reference material, the EU will evaluate the data and consult with the Medical Health Officer or Health Authority with jurisdiction to determine if the air monitoring strategy should be adjusted and if additional public safety measures should be recommended and/or communicated.

Table 3-1: Initial Air Monitoring Action Levels and Response Strategies for Product Release and Fire

Air Monitoring for Product Release			
Potential Chemical of Concern (PCOC)	**Action Level**	**Instrument**	**Action to be Taken**
Total volatile organic compounds (TVOCs)	Detection - 0.1 ppm	MultiRAE	EU to assess public health risk.
		AreaRAE	
Benzene (C_6H_6)*	Detection - 0.05 ppm	UltraRAE 3000	EU to assess public health risk. Request Air Monitoring Team to increase frequency of benzene sampling.
		Gastec tube (or similar) #121L	
Sulphur dioxide (SO_2)	Detection - 0.1 ppm	MultiRAE	EU to assess public health risk.
Hydrogen sulphide (H_2S)	Detection - 0.1 ppm	MR Pro Sensor	
		MultiRAE PID	
Air Monitoring for Fire			
PCOC	**Action Level**	**Instrument**	**Action to be Taken**
Particulate matter 10 micrometers (PM10)	Detection - 0.001 mg/m^3	DustTrak Aerosol Monitor	EU to assess public health risk.
Particulate matter 2.5 micrometers (PM2.5)	Detection - 0.001 mg/m^3	DustTrak Aerosol Monitor	
Carbon monoxide (CO)	Detection - 1 ppm	MultiRAE Sensor	
	Detection - 0.5 ppm	Gastec tube #1LC	
Nitrogen dioxide (NO_2)	Detection - 1 ppm	MultiRAE PID	
	Detection - 0.1 ppm	MultiRAE Sensor	
	Detection - 0.1 ppm	Gastec tube #9L	

*Measure benzene at detection of VOC.

3.3 Development of an Incident Specific Air Monitoring Plan

Once the ICP is established, the local, regional, provincial/state and federal agencies with jurisdiction present in the EU will participate in the development of an incident specific air monitoring plan coordinated by the EUL and/or Air Monitoring Technical Specialist. The initial (general) strategy, as per **Section 3.2**, **Table 3-1**, will be maintained until the incident specific air monitoring plan has been developed and approved by Unified Command.

Several factors will be considered during the development of the incident specific air monitoring plan:

Incident Details	• Location (i.e., physical address, or global positioning system [GPS] coordinates) • Type and amount of product released and/or on fire • Safety Data Sheets (SDS) for released product • Exclusion zone air monitoring results

Receptors	• Location in relation to product release and/or fire
	  ○ i.e., distance, down-wind/stream, up wind/stream
	• Type of receptors
	  ○ i.e., intermediate, commercial, industrial, farmland, residential, schools, daycares, hospitals, immune compromised individuals

Location Details	• Urban versus rural setting • Accessibility • Weather conditions • Inversions • Exclusion zone boundary • Land ownership (i.e., private versus public) • Aerial maps
Sample Methodologies	• Equipment capability ○ i.e., range, resolution, specificity, chemical interferences, previous results, data extrapolation
Plume Dispersion Model	• Where required inputs are available, a plume dispersion model will be prepared to help determine potential inhalation hazards.

Due to the time delay from air sample collection and the subsequent laboratory analysis, the response strategies will be based on the real-time air monitoring. The EU may decide that air sampling and laboratory analysis is required for additional reference of subsequent effects depending on the severity of the emergency and the potential for elevated levels of non-real time measurable PCOCs.

The multi-jurisdictional agencies and the Air Monitoring Technical Specialist within the EU will discuss the above details to determine the most practical monitoring strategy for the incident specific air monitoring plan, including the identification of, and if necessary, the initiation of additional monitoring.

The air monitoring actions levels and response strategies will be updated, as necessary, from those described and implemented initially (as per **Section 3.2, Table 3-1**).

3.3.1 Development of Evacuation Zones and Shelter-In-Place Criteria

Trans Mountain does not have the authority to independently issue public safety orders (i.e., evacuation (of area) or shelter in place). Public safety orders will be issued by the Local Authority, and/or the Health Authority. Public safety actions can be recommended by the Unified Command, based on air monitoring data and recommendations provided by the EU. The EUL and/or Air Monitoring Technical Specialist will provide input to the Incident Commander until the EU and Unified Command has been established.

When a PCOC action level is detected, the EU will initiate an assessment of public health risk. In the event that the EU recommends a public safety order be issued, the Planning Section Chief will be notified with an ICS-213 general message form for escalation to the Unified Command.

Refinement of the proposed evacuation zone may be made by the Unified Command, the Local Authority, Fire Department, and/or the Health Authority. Additional considerations in the determination of evacuation zones can include receptor profiles, time of day and weather, transportation routes and methods, and stability of situation.

3.4 Reporting Timeframes

The timeframes for reporting data are dependent on the conditions of the specific release.

Factors that may affect reporting timeframes are:

- Time the release occurs (i.e., middle of the night versus Monday morning);
- Time for contractor staff to mobilize to the location (i.e., rural or urban location);
- Time to set up the ICP (i.e., travel time for Trans Mountain staff and participating regulators to arrive at the ICP location); and/or
- Access and setup time of typical telecommunication systems (i.e., data sharing website, ICP communications).

3.4.1 Initial Air Monitoring Data Results

The TAS call will occur within 30 minutes of the emergency being identified. At the conclusion of the TAS call, mobilization of the Air Monitoring Team will be initiated. An initial report briefing will be provided by the Air Monitoring Team to the Air Monitoring Technical Specialist within 1-hour of the Team's arrival to the site. The information report, via phone or radio, should include the number of individuals composing the Air Monitoring Team, the instruments being used and preliminary monitoring results.

3.4.2 Updates and Monitoring Data

In urban areas, telecommunications allow the contractor to set up a secure website for data sharing where direct reading results and fixed monitoring data is updated in real time.

Permanent ambient fence line data is available in real time at the Edmonton, Sumas and Burnaby Terminals and at the Westridge Marine Terminal. Local regional ambient air monitoring stations provide

publicly available data online for urban areas in both British Columbia and Alberta which can also be accessed.

Updates regarding air monitoring data will be communicated to the Planning Section Chief for inclusion in situational updates provided to Unified Command. The frequency of the air monitoring updates will be determined by the Planning Section Chief in consultation with the EUL.

Updates, in rural locations, will be made via radio or cell phone to the Air Monitoring Technical Specialist; the frequency of these updates will be established by the EUL and/or Air Monitoring Technical Specialist and the Air Monitoring Team based on air monitoring results and potential risk to nearby communities.

3.5 Monitoring Equipment

3.5.1 Permanent Monitors

Permanent air monitoring stations that provide continuous monitoring of VOCs, ozone, and toxic gases are in place at the Edmonton, Sumas, Burnaby, and Westridge Marine Terminals. Meteorological parameters like air temperature, relative humidity, wind speed and direction, atmospheric pressure, and precipitation are also continuously measured (see **Appendix III - Detection by Terminal Permanent Air Monitoring Stations**).

3.5.2 Fixed Reading Monitors

AreaRAE instruments are used as fixed air monitoring units during an incident that utilize wireless technology to send real time data to the EU for up to five sensors including: LELs, O_2, VOCs, and toxic gases (H_2S, SO_2, CO or NO_2). Fixed air monitoring units, when available, will be set up around the impacted area to assess migration of air emissions.

3.5.3 Direct Reading Monitors

Mobile air monitoring teams are deployed to nearby communities or public areas to assess ambient air quality using direct reading instruments. Direct reading monitors, or instruments with similar capabilities, that may be used include the following:

- ppbRAE (TVOCs ppb);
- MiniRAE (TVOCs ppm);
- MultiRAE (Lite, Regular, or Pro), Q-RAE Plus or VRAE (H_2S, SO_2, LEL, CO, NO_2);
- UltraRAE or UltraRAE-3000 (benzene when equipped with benzene SEP tubes); and
- SidePak AM510 Aerosol Monitor or DustTrak DRX Aerosol Monitor. (Note: this unit is not intrinsically safe [PM10, PM2.5]).

Where cellular service is available, air monitoring data will be digitally communicated in real time to the Air Monitoring Technical Specialist via a secure website.

3.6 Daily Reports

Reports will be produced by the Air Monitoring Team summarizing the activities, conditions, and sampling. Reports will be prepared as per **Appendix IV – Daily Monitoring Report Summary (Product Releases)** and **Appendix V – Daily Monitoring Report Summary (Fire).**

The monitoring report will be submitted daily or when milestone events occur (i.e., phase of on-site clean-up completed, significant weather changes, and exclusion zone expansion/contraction).

4.0 APPLICABLE GUIDELINES AND ACTION LEVELS

4.1 Standards and Guidelines

In the event of a release, or fire, standards and guidelines that are used to assess public safety are:

- Ambient Air Quality Objectives;
- Occupational Exposure Limits; and
- Acute Exposure Guideline Levels.

Appendix II – Standards for PCOCs: Sources and Detection Limits outlines the published, recognized standards and guidelines for ambient air quality, worker exposure limits, and acute public exposure levels applicable to the measurable PCOCs for a product release or fire.

The standards and guidelines used during an emergency scenario include, but are not limited to, the following, depending on the location of the emergency:

- Alberta Ambient Air Quality Objectives and Guidelines;
- The Alberta Occupational Health and Safety Code: Schedule 1 – Occupational Exposure Limits for Chemical Substances;
- BC Ambient Air Quality Objectives and Guidelines;
- British Columbia Occupational Health and Safety Regulation: Section 5.48 – WorkSafeBC – Table of Exposure Limits for Chemical or Biological Substances;
- Metro Vancouver's Ambient Air Quality Objectives and Guidelines; and
- United States Environmental Protection Agency – Acute Exposure Guideline Levels.

In some cases, a monitoring instrument's detection limit is not low enough to detect actionable levels of PCOCs in ambient air quality. For some substances Acute Exposure Guideline Levels (AEGL) have not been published or are less conservative than the substance's Occupational Exposure Limits (OEL). For these reasons, all listed standards and guidelines should be referenced and considered when assessing public health risk and when developing the incident specific air monitoring plan.

5.0 MONITORING PRODUCT RELEASES

5.1 Potential Chemicals of Concern

The list of real time measurable PCOCs has been pre-determined based on available crude product information and Safety Data Sheets (SDS).

Table 5-1 outlines the *Direct Reading PCOCs*[1] for crude product release compounds.

Table 5-1: Direct Reading PCOCs identified by Trans Mountain – Product Release

Product Type: Crude Oil & Refined Product	
Benzene (C_6H_6)	Sulfur dioxide (SO_2)
Total volatile organic compounds (TVOCs)	Hydrogen sulfide (H_2S)

Comprehensive analysis of Canadian crude oil properties, which has the most frequent updates, can be found at www.crudemonitor.ca—a committee-driven and industry-funded initiative to maintain historical information on crude types.

[1] The identification of additional PCOCs for monitoring, could occur, based on the actual product involved and the specifics of the incident; these would be noted in the preparation and updating of the incident specific air monitoring plan by the multi-jurisdictional agencies and the Air Monitoring Technical Specialist within the EU

6.0 MONITORING FIRES

6.1 Potential Chemicals of Concern

Fires may involve crude oil or refined products. The list of real time measurable PCOCs has been pre-determined based on available chemical product information and SDS.

Table 6-1 outlines the *Direct Reading PCOCs* for fire compounds:

Table 6-1: Direct Reading Fire PCOCs

Product Type: Crude Oil & Refined Product	
Benzene (C_6H_6)	Sulfur dioxide (SO_2)
Total volatile organic compounds (TVOCs)	Hydrogen sulfide (H_2S)
Carbon monoxide (CO)	Nitrogen dioxide (NO2)
Particulate matter 10 micrometers (PM10)	Particulate matter 2.5 micrometers (PM2.5)

7.0 COMMUNICATION

7.1 Air Monitoring Team and Environment Unit

Communications between the EU and the Air Monitoring Team is paramount to meet the objectives of the Air Monitoring Plan. Once community monitoring has commenced, the Air Monitoring Team will:

- Continually evaluate the monitoring results, and the status of the product release and/or fire is contained and stable;
- Notify the EU immediately upon detection of PCOCs as identified in **Appendix II – Standards for PCOCs: Sources and Detection Limits**;
- Set up a secure website to share direct reading and fixed monitoring data in real time to the EU, where possible; and
- Prepare and submit daily monitoring reports to the EU—see **Appendix IV – Daily Monitoring Report Summary (Product Releases)** and **Appendix V – Daily Monitoring Report Summary (Fire).**

7.2 Communication Methods to At-Risk Populations

If public communications to at-risk populations in relation to air quality is required, the EU will draft an *ICS-213 General Message Form* and deliver it to:

- The Operations Section Chief;
- The Information Officer; and
- The Liaison Officer.

Protocols and supplemental plans, including the Liaison Officer agency briefings and the Trans Mountain Crisis Communications Plan, will be utilized to distribute the messaging in coordination and collaboration with the participating jurisdictions and regulatory bodies. At risk populations will be identified and measures taken to reinforce communications of key and pertinent messages by the Joint Information Office in conjunction with the Liaison Officer.

8.0 RECORDS AND RECORD MAINTENANCE

All related air monitoring documentation will be maintained in the incident file as outlined in the ERP.

APPENDIX I – DEFINITIONS AND ACRONYMS

Definitions

Action Level	The concentration of a PCOC that requires the EU to assess public health risk.
Alarm Level	The level at which the instrument alarms to notify personnel of a hazardous environment.
Direct Reading	Instruments that permit real-time measurements of air contaminants.
Emergency	A condition that results in or may result in: • Death or injury requiring hospitalization; • Explosion or fire; • Leak, rupture or release; and/or • Any significant event such as earthquake, flood, severe storm or bomb threat that has the potential to impact inland Terminals and/or Tank Farms.
Guideline Criteria	Guideline criteria are airborne concentrations of chemicals that, if exceeded for a sustained period, may warrant actions by the unified command to protect impacted community areas and/or recommend shelter-in-place or evacuations if conditions persist. They do not represent chemical concentrations that necessarily produce health effects from short duration exposures, nor should they be used to set guidelines for repatriation and long-term exposure.
Incident Command Post	A Unified Area Command is established when incidents under an Area Command are multi-jurisdictional.
Incident Command System	A standardized on-site management system designed to enable effective, efficient incident management by integrating a combination of facilities, equipment, personnel, procedures, and communications operating within a common organizational structure (as per the Trans Mountain ICS Guide).
Potential Chemicals of Concern (PCOC)	A pre-determined list of chemicals that may be released into atmosphere during a product release or fire.
Product Release	Any liquid hydrocarbon released from Trans Mountain sites, equipment or facilities.
Receptors	The public population outside of the exclusion zone, at risk of exposure to contaminants during a product release and/or fire.

Air Monitoring Team	A team of Trans Mountain staff and external third parties, who are prepared and trained to respond in the event of a product release and/or fire.
Sensitive Receptors	Receptors that may exhibit a different or enhanced response than the majority of the population when exposed to the same level of PCOC and are given additional considerations when developing sampling strategies and monitoring.

Acronyms

AAQO	Ambient Air Quality Objectives
AB	Alberta
AEGL	Acute Exposure Guideline Levels
BC	British Columbia
BTEX	Benzene, Toluene, Ethylbenzene and Xylene
C_6H_6	Benzene
CL	Ceiling Limit
CO	Carbon Monoxide
ERP	Emergency Response Plan
EU	Environment Unit
EUL	Environmental Unit Leader
hr	Hour
H_2S	Hydrogen Sulfide
IAP	Incident Action Plan
ICP	Incident Command Post
ICS	Incident Command System
LEL	Lower Exposure Limit
mg/m^3	milligrams per cubic meter
NO	Nitrogen Oxide
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
O_2	Oxygen
O_3	Ozone

OEL	Occupational Exposure Limit
OHS	Occupational Health and Safety
PCOC	Potential Chemicals of Concern
PEL	Permissible Exposure Limit
PM_{10}	Particulate matter measuring less than 10 micrometers in diameter
$PM_{2.5}$	Particulate matter measuring less than 2.5 micrometers in diameter
ppb	parts per billion
ppbv	parts per billion volume
ppm	parts per million
ppmv	parts per million volume
SDS	Safety Data Sheet
SO_2	Sulphur Dioxide
STEL	Short Term Exposure Limit
TAS	Trans Mountain Alert System
TRS	Total Reduced Sulphur
TVOC	Total Volatile Organic Compounds
TWA	Time Weighted Average
$\mu g/m^3$	micrograms per cubic meter
VOC	Volatile Organic Compounds (and Total VOC, TVOC)

APPENDIX II – STANDARDS FOR PCOCS: SOURCES AND DETECTION LIMITS

PCOC	unit	Guideline Criteria															
		AB AAQO[1]			BC AAQO[2]			Metro Vancouver AAQO[3]			AB OHS OEL[4] *8-hr***	AB OHS CL[4]	BC OHS STEL[5] *15 mins****	BC OHS TWA[5] *8-hr****	AEGL-1[6]		Monitoring Equipment Detection Limit**
		1-hr	8-hr	24-hr	1-hr	8-hr	24-hr	1-hr	8-hr	24-hr					1-hr	8-hr	
H_2S	ppb	10	-	3	5	-	2	5 (desirable) 10 (acceptable)	-	-	10,000	15,000	10,000	-	510	330	100
	ppm	0.01	-	0.003	0.005	-	0.002	0.005 (desirable) 0.01 (acceptable)	-	-	10	15	10	-	0.51	0.33	0.1
C_6H_6	ppb	9	-	-	-	-	-	-	-	-	500	2,500	2,500	500	52,000	9,000	50
	ppm	0.009	-	-	-	-	-	-	-	-	0.5	2.5	2.5	0.5	52	9	0.05
SO_2	ppb	172	-	48	75	-	-	70	-	-	2,000	5,000	5,000	2,000	200	200	100
	ppm	0.172	-	0.048	0.075	-	-	0.07	-	-	2	5	5	2	0.2	0.2	0.1
CO	ppb	13,000	5,000	-	13,000	5,000	-	13,000	5,000	-	25,000	-	100,000	25,000	83,000	27,000	1,000
	ppm	13	5	-	13	5	-	13	5	-	25	-	100	25	83	27	1
NO_2	ppb	159	-	-	60	-	-	60	-	-	3,000	5,000	1,000	-	500	500	100
	ppm	0.159	-	-	0.06	-	-	0.06	-	-	3	5	1	-	0.50	0.50	0.1
TPM*	ug/m^3	-	-	100	-	-	120	-	-	-	10	-	-	10	-	-	0.001
PM_{10}	ug/m^3	-	-	-	-	-	50	-	-	50	3	-	-	3	-	-	0.001
$PM_{2.5}$	ug/m^3	80	-	29	-	-	25	-	-	25	-	-	-	-	-	-	0.001

1 Alberta Ambient Air Quality Objectives (2019)
2 British Columbia Ambient Air Quality Objectives (2019)
3 Metro Vancouver Ambient Air Quality Objectives (2020)
4 Alberta Occupational Health and Safety Occupational Exposure Limit
5 OHS Guidelines Part 5: Chemical Agents and Biological Agents
6 US Environmental Protection Agency Acute Exposure Guideline Level
* Particulates Not Otherwise Regulated (Total Dust)
**PCOC can be detected by fixed and mobile monitoring equipment
***8-hour TWA limit means the time weighted average (TWA) concentration of a substance in air which may not be exceeded over a normal 8-hour work period.
****Short-term exposure limit (STEL) means the time weighted average (TWA) concentration of a substance in air which may not be exceeded over any 15-minute period, limited to no more than 4 such periods in an 8-hour work shift with at least one hour between any 2 successive 15-minute excursion periods.

C_6H_6 = Benzene
CO = Carbon Monoxide
H_2S = Hydrogen Sulfide
NO_2 = Nitrogen Dioxide
OEL = Occupational Exposure Limits
OHS = Occupational Health and Safety
PCOC = Potential Chemical of Concern
PM10 = Particulate matter 10 micrometers
PM2.5 = Particulate matter 2.5 micrometers
SO_2 = Sulfur Dioxide
STEL = Short-Term Exposure Limits
TPM = Total particulate matter
TWA = Time Weighted Average

APPENDIX III - DETECTION BY TERMINAL PERMANENT AIR MONITORING STATIONS

PCOC	Westridge	Edmonton	Burnaby	Sumas	Monitoring Equipment	Measurement Intervals
H_2S and Mercaptan as TRS	✓	✓	✓	✓	Thermo Fisher Scientific 43iQTL with CDN 101	Continuous
SO_2	✓	✓	✓	✓	Thermo Fisher Scientific 43iQ Sulfur Dioxide Analyzer	Continuous
NO, NO_2 and NO_x	✓	✓	✓	✓	Thermo Fisher Scientific 42iQ NO-NO_2-NO_x Analyzer	Continuous
O_3	✓	✓	✓	✓	Thermo Fisher Scientific 49iQ Ozone Primary Standard	Continuous
Total respirable $PM_{2.5}$	✓	✓	✓	✓	Thermo Fisher Scientific Model 5030i SHARP (Synchronized Hybrid Ambient Real-time) particulate monitor	Continuous
Respirable $PM_{2.5}$ - speciated samples	✓	-	-	-	Met One Instruments, Speciation Air Sampling System (SASSTM)	Every 6 days
Diesel particulate matter	✓	-	-	-	Magee Scientific Aethalometer Model AE33	Continuous
VOCs as BTEX	✓	✓	✓	✓	AMA Instruments GC 5000 BTX	Continuous
Meteorological parameters*	✓	✓	✓	✓	-	-

BTEX = Benzene, Toluene, Ethylbenzene and Xylene
H_2S = Hydrogen Sulfide
NO = Nitric Oxide
NO_2 = Nitrogen Dioxide
NO_x = Nitrogen Oxides
O_3 = Ozone
PCOC = Potential Chemical of Concern
$PM_{2.5}$ = Particulate matter 2.5 micrometers
SO_2 = Sulfur dioxide
TRS = Total Reduced Sulphur
VOC = Volatile Organic Compound

*Meteorological parameters measured include air temperature, relative humidity, wind speed and direction, atmospheric pressure, precipitation, and reduced visibility.

APPENDIX IV – DAILY MONITORING REPORT SUMMARY (PRODUCT RELEASES)

MONITORING REPORT		
To:	Location:	
Project No.:	Report No.:	Date:
Project Name:	Time In:	Time Out:

POTENTIAL CHEMICALS OF CONCERN		

CLEAN-UP ACTIVITIES/STATUS

SITE DIAGRAM


WEATHER CONDITIONS		
Wind Direction:	Temperature:	Precipitation
Wind Intensity:	Humidity:	Other:

MONITORING LOCATIONS					
1.	Lat:	Long:	6.	Lat:	Long:
2.	Lat:	Long:	7.	Lat:	Long:
3.	Lat:	Long:	8.	Lat:	Long:
4.	Lat:	Long:	9.	Lat:	Long:
5.	Lat:	Long:	10.	Lat:	Long:

DIRECT READING SAMPLE RESULTS SUMMARY				
Location (reference # above)	**TVOCs**	**C_6H_6**	**SO_2**	**H_2S**

DIRECT READING SAMPLE RESULTS SUMMARY				
Location (reference # above)	**TVOCs**	**C_6H_6**	**SO_2**	**H_2S**

COMMENTS (i.e., nearby activities, odour, etc.)	
Name:	Email:
Title:	Tel:

APPENDIX V – DAILY MONITORING REPORT SUMMARY (FIRE)

MONITORING REPORT		
To:	Location:	
Project No.:	Report No.:	Date:
Project Name:	Time In:	Time Out:

POTENTIAL CHEMICALS OF CONCERN		

CONTROL ACTIVITIES/STATUS

SITE DIAGRAM


WEATHER CONDITIONS		
Wind Direction:	Temperature:	Precipitation
Wind Intensity:	Humidity:	Other:

MONITORING LOCATIONS					
1.	Lat:	Long:	6.	Lat:	Long:
2.	Lat:	Long:	7.	Lat:	Long:
3.	Lat:	Long:	8.	Lat:	Long:
4.	Lat:	Long:	9.	Lat:	Long:
5.	Lat:	Long:	10.	Lat:	Long:

DIRECT READING SAMPLE RESULTS SUMMARY								
Location (reference # above)	**TVOCs**	**C_6H_6**	**SO_2**	**H_2S**	**CO**	**NO_2**	**PM_{10}**	**$PM_{2.5}$**

COMMENTS (i.e., nearby activities, odour, etc.)	
Name:	Email:
Title:	Tel: