SUPPLEMENTAL PLAN A:

PNG TRANSMISSION PIPELINE SYSTEMS

Revised:
September 2022

PACIFIC NORTHERN GAS

PNG Emergency 24-hour Number:
1-800-663-1173
Oil & Gas Commission (OGC) Reporting Number:
1-800-663-3456

PACIFIC NORTHERN GAS
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TABLE OF CONTENTS

1 INTRODUCTION 1-1
1.1 The Western System 1-1
1.2 The Northeast System 1-1
1.2.1 System Throughput Capacity 1-2
1.2.2 System Line Pack 1-2
1.3 Scope 1-2
1.4 Audience 1-2
1.5 How to Use this Plan 1-2
2 HAZARDS AND RISKS 2-1
3 HAZARD PLANNING ZONES FOR THE TRANSMISSION PIPELINE 3-1
3.1 Determining the HPZ 3-1
4 PUBLIC PROTECTION MEASURES 4-1
4.1 Restricting Access – Land, Air and Waterways 4-1
4.2 Notification of Potentially Affected Parties 4-1
4.3 Public Evacuation (Support) Procedure 4-2
5 INITIAL ACTIONS AND NOTIFICATIONS 5-1
5.1 Initial Assessment of Incident 5-1
5.2 Immediate Actions Checklist (“Make Safe”) 5-1
5.3 Internal Notification Process 5-2
5.4 Incident Classification 5-3
5.4.1 Incident Levels 5-3
5.4.2 Using the Incident Classification Matrix 5-5
5.4.3 OGC Incident Classification Matrix 5-6
5.4.4 Plan Activation 5-8
6 HAZARD AND RESPONSE GUIDELINES 6-1
6.1 Defining the Incident-Specific HPZ 6-2
6.2 Implementing Public Protective Measures Based on the Incident-Specific HPZ 6-3
6.3 Notice to Airmen (NOTAM) Request 6-5
6.4 Evacuation 6-6
6.4.1 Speaking Notes: Instructions for Evacuation 6-7
6.5 Transmission Pipeline Release and Isolation 6-8
6.6 Ignition 6-10

6.7 Elevated Flood Risk Procedure 6-11
6.8 Wildland Fire in Vicinity of PNG Assets 6-14
6.9 Security Threat 6-17
6.10 Seismic Event 6-18
6.11 Environmental Spill 6-19
6.12 Decontamination 6-20
6.13 Waste Management 6-21
6.14 Curtailment 6-22
6.15 CNG/LNG Sourcing & Utilization for Emergency Circumstances 6-23
6.16 Mutual Assistance Procedure 6-25
6.17 Serious Injury/Fatality 6-29

7 RESPONSE RESOURCES & CONTRACTORS 7-1
7.1 Equipment 7-1
7.1.1 Personal Equipment 7-1
7.1.2 Transmission Pipeline Emergency Equipment 7-1
7.2 Suppliers & Services 7-1
7.3 Mutual Aid 7-2

8 SAFETY DATA SHEETS 8-1
8.1 Natural Gas 8-1
8.2 Scentinel® S-20 Gas Odorant 8-9

9 CONTACT INFORMATION 9-1
9.1 PNG Contacts 9-1
9.1.1 PNG & TriSummit Utilities Canada Personnel 9-1
9.1.2 PNG Offices & Emergency Contact Information 9-2
9.1.3 PNG Emergency Contact Information 9-3
9.1.4 Emergency Contact Information 9-3
9.2 External Contacts 9-3
9.2.1 Regulators 9-3
9.2.2 Provincial Agencies 9-4
9.2.3 Health Authorities 9-4
9.2.4 Communities 9-4
9.2.5 Critical Infrastructure 9-8
9.2.6 Support Services 9-12
9.2.7 Media 9-15
9.2.8 Key Customer List 9-15

9.2.9 CNG/LNG Suppliers 9-16
9.2.10 Customer Curtailment Lists 9-17
10 PNG PIPELINES 10-1
11 MAPS 11-1
11.1 PNG System Line Map 11-1
11.2 PNG System Schematic – Prince Rupert Mainline and Laterals 11-1

DOCUMENT MANAGEMENT

The Manager, Environment, Health & Safety (EH&S) is responsible for the development and maintenance of the *Pacific Northern Gas Transmission Pipeline Systems Supplemental Plan.* Responsibilities include:

- Developing the plan and managing any future revisions
- Ensuring the systems and response structures are in place, and are able to meet the requirements set out in the plan
- Ensuring the plan is updated as soon as a deficiency that risks the safety of emergency response staff, employees, or the public arises
- Ensuring an annual review of the plan is conducted for completeness

Plan Revisions

Initiating Revisions

All requests for change must be made through the Manager, EH&S using the *Revision Request Form*.

Distribution of Revisions

Revised plans and/or sections are distributed, with a brief description of the changes by the Manager, EH&S. All revisions should be documented in the *Revision Log*.

Revisions After Exercises or Incidents

In the event Pacific Northern Gas (PNG) conducts an exercise or training session, or experiences an incident, the effectiveness of the plan will be evaluated and updated thereafter as necessary.

Changes in Operating Conditions

If new or different operating condition(s) would substantially affect the implementation of the ERP, PNG will modify the plan to address such changes.

REVISION REQUEST FORM

A Revision Request Form allows requests for changes to be made to the PNG ERP. All requests for change must be coordinated through the PNG Manager, EH&S using the Revision Request Form.

REVISION REQUEST FORM	
Requested By:	**Date:**
Department/Agency:	
Email:	**Phone Number:**
Plan Name:	**Revision Type:** ❑ Addition ❑ Deletion ❑ Correction
Section:	**Page Number:**
Description of Revision (attach separate sheet if necessary):	
Name of Requestor:	
Send to: Manager, EH&S Pacific Northern Gas #750 – 888 Dunsmuir St Vancouver, BC V6C 3K4	**OR** ehs@png.ca Fax: 604-697-6210
This section to be completed by Manager, EH&S.	
Date Received:	**Date Reviewed:**
Issued as Revision: ❑ Yes ❑ No	
If revisions not accepted, explain reason:	

REVISION LOG

The Revision Log ensures all changes made to the PNG ERP are accounted for and easily referenced. The Revision Log is managed by the PNG Manager, EH&S. All fields in the Revision Log must be completed.

REVISION LOG				
Annual Update & Submission Due: September 17				
Revision No.	**Date**	**Section No.**	**Page No.**	**Summary of Revisions**
001	Nov. 2010	all	all	
002	July 2013	all	all	
003	March 2015	select	select	
004	April 2015	all	all	
005	May 2015	all	all	
006	June 2016	all	all	
007	July 2017	all	all	
100	11 September 2018	all	all	New format with updates to all sections
101	10 September 2019 (Annual Update)	Document Management	Select	Updated Manager, EH&S title throughout
		all	Select	Minor updates to flow, grammar, and accuracy
		3	Select	Restructured section
		5.3.	5-2	Added a prompt to notify the OGC of the incident level
		6	6-1	Added procedure table of contents
		6.4.1.	6-7	Enhanced Speaking Notes: Instructions for Evacuation
101	10 September 2019 (Annual Update)	6.5.	6-8, 6-9	Enhanced Transmission Pipeline Release and Isolation Procedure
		6.7.	6-11, 6-12, 6-13	Enhanced Flood Advance Planning and Response Procedure

REVISION LOG				
Annual Update & Submission Due: September 17				
Revision No.	**Date**	**Section No.**	**Page No.**	**Summary of Revisions**
		6.8.	6-14, 6-15, 6-16	Enhanced Wildland Fire Advance Planning and Response Procedure
		6.15.	6-23, 6-24	Enhanced/developed CNG and LNG Sourcing Procedure
		6.16.	6-25, 6-26, 6-27, 6-28	Added new Mutual Assistance Procedure
		7.1.2.	7-1	Removed Pipeline Repair Fittings from Northeast Emergency Equipment Table and updated Welding Equipment to say “Yes” for Fort St John
		7.1.2.	7-1	Removed Bypass Equipment from Northwest Emergency Equipment table
		9	Select	Updated contact lists
		9	9-13	Add new contact section: Response Equipment and Services
102	17 September 2020	Document Management	Select	Updated Manager, EH&S title throughout
		Document Management	Select	Updated Vice President, Operations and Engineering title throughout
		Disclaimer page	Select	Updated address
		All Images	Select	Updated all images, graphs with new PNG branding
		All	Select	Removed and replaced AltaGas with TriSummit Utilities where appropriate
		Revision Request Form	Page v	Updates to addresses and general formatting

REVISION LOG				
Annual Update & Submission Due: September 17				
Revision No.	**Date**	**Section No.**	**Page No.**	**Summary of Revisions**
		5.3	5-2, 5-3	Updated titles and clarified process
		5.3	5-3	Update chart with new position titles
		6.8	6-14, 6-15, 6-16	Updated procedure with minor content additions
		6.10	6-18	Updated procedure with minor content additions
		6.16	6-25, 6-26, 6-27, 6-28	Update to Mutual Assistance Partners
		9.0	Select	Updated contact lists
103	17 September 2021	Distribution List	ix – x	Updated Distribution List
		All	Select	Updated Senior Manager, Operations and Customer Service to Director, Operations and Customer Service
				Added in Director, Asset Management and Projects as Designate for Director, Operations and Customer Service.
		5.3	5-2	Clarified notification process
			5-3	Updated flow chart
		5.4.3	5-8	Removed reference to drilling kicks
		6.15	6-24	Removed AltaGas from list of CNG/LNG suppliers
		9.0	Select	Updated contact lists
104	26 September 2022	9.0	Select	Updated contact lists
		11.0		EPZ map

DISTRIBUTION LIST

Title	Location	Copy No.
Fort St. John EOC	Fort St John, BC	1
Terrace EOC	Terrace, BC	2
Dawson Creek EOC	Dawson Creek, BC	3
Vancouver Office	Vancouver, BC	4
Summit Lake Comp Station Op/Technician	Summit Lake, BC	5
Tumbler Ridge Gas Plant	Tumbler Ridge, BC	6
Tumbler Ridge Office	Tumbler Ridge, BC	7
Manager, Operations NE	Dawson Creek, BC	8
Manager Construction Maintenance NE	Fort St John, BC	9
Coordinator, Lands – Rights & Third Party Management	Fort St John, BC	10
Director, Asset Management and Project Delivery	Terrace, BC	11
Director, Operations and Customer Service	Terrace, BC	12
Manager Customer Service	Smithers, BC	13
Maintenance Coordinator	Terrace, BC	14
Manager Customer Care	Terrace, BC	15
Coordinator, Lands – Permitting & Indigenous Relations	Smithers, BC	16
Service Group Leader – Dawson Creek	Dawson Creek, BC	17
Service Group Leader – Terrace	Terrace, BC	18
Service Group Leader – Prince Rupert	Prince Rupert, BC	19
Service Group Leader – Kitimat	Kitimat, BC	20
Service Group Leader – Smithers	Smithers, BC	21
Service Group Leader – Burns Lake	Burns Lake, BC	22
Service Group Leader – Vanderhoof	Vanderhoof, BC	23
Service Group Leader – Fort St John	Fort St John, BC	24
Senior Plant Operator – Tumbler Ridge	Tumbler Ridge, BC	25
Plant Operator – Tumbler Ridge	Tumbler Ridge, BC	26
President	Vancouver, BC	27
VP Operations & Engineering	Vancouver, BC	28
VP Regulatory Affairs & Gas Supply	Vancouver, BC	29
VP Finance	Vancouver, BC	30
Manager, Environment, Health & Safety	Vancouver, BC	31

Title	Location	Copy No.
Director, Business Development & Stakeholder Relations	Vancouver, BC	32
Manager Human Resources	Vancouver, BC	33
Burns Lake Office	Burns Lake, BC	34
Customer Care (Floor)	Terrace, BC	35
Utility Group Leader – Burns Lake	Burns Lake, BC	36
Utility Group Leader – Fort St. John	Fort St John, BC	37
Utility Group Leader – Dawson Creek	Dawson Creek, BC	38
Utility Group Leader – Terrace	Terrace, BC	39
Utility Group Leader – Terrace	Terrace, BC	40
Project Engineer – Terrace	Terrace, BC	41
Senior Project Manager	Terrace, BC	42
Senior Measurement Tech – Terrace	Terrace, BC	43
Manager Operations Administration	Terrace, BC	44
Project Engineer – Terrace	Terrace, BC	45
Project Engineer – Fort St. John	Fort St John, BC	46
Manager Construction Maintenance	Smithers, BC	47
Procurement/Warehouse Leader – Terrace	Terrace, BC	48
Asset Integrity Engineer	Vancouver, BC	49
Manager, Engineering and Projects	Terrace, BC	50
Senior Measurement Tech – Fort St John	Fort St John, BC	51
Construction Manager	Terrace, BC	52
Health, Safety & Environmental Field Lead	Terrace, BC	53
Environmental Lead	Terrace, BC	54
External Distribution	Location	Copy No.
ATCO Control Centre	Edmonton, AB	101
ATCO Control Centre	Edmonton, AB	102

1 INTRODUCTION

The PNG West Transmission Pipeline System carries odorized methane, with no measurable H_2S. It connects with the Enbridge Pipeline System, near Summit Lake, British Columbia, and extends 587 km to the west coast at Prince Rupert. The pipeline between Summit Lake and Terrace has been partially paralleled, or looped, with a second line to increase throughput capacity. PNG also owns and operates over 300 km of lateral transmission pipelines, extending into various communities, the most significant being dual lines extending approximately 57 km into Kitimat.

1.1 The Western System

PNG owns and operates natural gas distribution facilities to deliver gas from its transmission pipeline system to homes and businesses in the various communities located throughout British Columbia. PNG currently has exclusive franchise agreements with the municipalities of Prince Rupert, Port Edward, Kitimat, Terrace, Smithers, Burns Lake, Houston, Fraser Lake, and Vanderhoof. PNG also has operating agreements with the municipalities of Telkwa and Fort St. James that entitle it to install and operate gas distribution facilities in those municipalities with renewable 10-year terms.

1.2 The Northeast System

PNG's Northeast system serves Fort St. John and the Dawson Creek area through connections with the Enbridge Pipeline System at several locations. The entire Northeast system consists of approximately 160 km of transmission lines. The transmission pipeline services the natural gas utility system in the area.

PNG has exclusive franchise agreements with Dawson Creek, Fort St. John, the District of Taylor, and the Village of Pouce Coupe. PNG operates its gas distribution facilities in the Tumbler Ridge area pursuant to a certificate of public convenience and necessity issued by the British Columbia Utilities Commission.

Figure 1 - PNG Service Areas Map

1.2.1 System Throughput Capacity

The system throughput capacities are:

- Maximum peak day 1416.00 103 m^3/day
- Normal day (winter season) 567.00 103 m^3/day

1.2.2 System Line Pack

The target for system line pack is:

- 3541 103 m^3/day during heating season
- 2,833 103 m^3/day during non-heating season.

If line pack drops below 2,833 103 m^3cf, Pipeline Gas Control will notify PNG.

1.3 Scope

This supplemental plan encompasses operations and assets regulated by the BC Oil and Gas Commission (OGC), specifically the transmission pipeline. When an incident occurs involving the pipeline, this supplemental plan should be activated and appropriate reporting to designated authorities will be initiated.

1.4 Audience

This document is intended for all PNG personnel who have received Incident Command System (ICS) training and incident response training. This plan has been made available to first responders, responding and supporting agencies and communities, local, regional, and First Nations governments, and the public, for their reference.

1.5 How to Use this Plan

The *PNG Transmission Pipeline Systems Supplemental Plan* is an operational guide designed to be used by staff in conjunction with the *Pacific Northern Gas (PNG) Core Emergency Response Plan (ERP)* to effectively prepare for, respond to, and recover from emergencies and disasters.

This supplemental plan provides site-specific information, as well as hazard and response procedures, related to the transmission pipeline system and its infrastructure.

Reference the Core ERP for the processes, policies, and procedures associated with activation of the emergency plan, the ICS structure, and the establishment of an Emergency Operations Centre (EOC). Additionally, the Core ERP explains protocols and processes for incident response, including notifications and communications.

The supplemental plan is divided into two sections: non-confidential and confidential. The confidential section captures sensitive company information and will be made available, as needed, to agency representatives associated with the response at the time of an incident.

2 HAZARDS AND RISKS

The types of hazards in which this supplemental plan may be activated include:

- Natural disasters
- Human-caused (accidental or intentional) incidents
- Information technology incidents

In both the western and northeast regions, the Transmission Pipeline traverses mountains and hills, rivers and creeks, valleys, and forested and urban areas. Thus, hazards include:

- Wildfire
- Flooding and erosion
- Land movement
- Seismic event (primarily in the west)
- Intentional and unintentional ground disturbances (i.e., third-party hits)
- Malicious intent
- Technical and/or structural failures

PNG identifies hazards and manages associated risk within the scope of the Transmission Integrity Management Plan. During an incident, regardless of assumed trigger(s), a Hazard Planning Zone (HPZ) needs to be reviewed and confirmed.

3 HAZARD PLANNING ZONES FOR THE TRANSMISSION PIPELINE

The PNG Transmission Pipeline System transports odorized methane for the utility. Odorization provides a prompt (immediate) awareness to the public of a breach in the infrastructure. Additionally, natural gas transmission pipelines have a predefined hazard planning zone of 115 m to each side of the centre of the right-of-way (ROW). In the event of an incident, the HPZ must be evaluated and confirmed.

The **Hazard Planning Zone (HPZ)** is the geographical area within which persons, property, or the environment may be affected by an incident based on the hazards associated with the product being released. The HPZ is used for planning purposes and as the basis, in the event of an incident, to identify where immediate response actions are required. The Incident Commander and EOC Director will work together to identify and determine the HPZ of the incident.

The HPZ depends on the type of product (gas) being transported, the size of the pipe impacted, and the quantity and pressure of the gas.

During an incident, the HPZ is the minimal area that needs to be considered when responding to an incident. The HPZ may be adjusted once incident-specific data and influencing factors have been collected, collated, and analyzed.

The **Emergency Planning Zone (EPZ)** is the geographical area that encompasses all the hazard planning zones (HPZ) identified for an incident. If only one HPZ exists for the infrastructure or the incident, then the EPZ will have the same boundary as the HPZ. For facilities with the potential for the release of multiple products, and thus multiple HPZs, the EPZ will share a boundary with the largest HPZ identified.

Because PNG's Transmission Pipeline transports only one product (odorized methane), any incident involving the Transmission Pipeline will lead to the creation of a single HPZ and the EPZ will share this boundary. The pre-defined Hazard Planning Distance used when planning for incidents involving the release of methane is **115 m.**

3.1 Determining the HPZ

In the event of an incident, the incident-specific HPZ must be evaluated and confirmed. The procedure to determine the HPZ can be found in *Section 6.1 Defining the Incident-Specific HPZ*. Additional information can be found in the *Core Emergency Response Plan, Section 3.2.5 Hazard Planning Zone Determination.* Emergency Services should respond with the CANUTEC guidelines in mind, until the HPZ can be identified by PNG and reviewed and confirmed by emergency services and PNG (Unified Command), when established.

Re-evaluate the HPZ regularly, or upon a change in the circumstances, to expand or contract the zone in consultation with emergency services and the EOC.

4 PUBLIC PROTECTION MEASURES

The safety of responders and the public is always PNG's first priority in any emergency. PNG will work in coordination with first responders to protect people. The extent to which public protection measures will be taken depends on the hazards that are present. There must also be consideration to ensure protection measures are outside of any area that may present a safety concern.

Public protection measures will initially be implemented in the area immediately surrounding the incident site, and then expand to include areas downwind of the incident, before further expanding to encompass and protect the full HPZ area.

4.1 Restricting Access – Land, Air and Waterways

Immediately upon arrival, cordon off the incident site to ensure the safety of the attending responders and the public. This can be done using cones, flags, sawhorses, or any other equipment available to indicate restricted access.

In addition, roadblocks may need to be established to ensure the safety of the public. PNG personnel will work with emergency services (fire, police) to determine when this is required, and where specific access should be restricted.

It may also be necessary for other transportation routes to be restricted to protect public safety, including air traffic, rail lines, and waterways. Notify the transportation entities identified in *Section 9 Contact Information* as soon as possible in the event of a large gas release to communicate the need to restrict access in the area.

- **Airports:** Airports within 2 km of the incident must be notified immediately.
- **Airspace:** Contact NAV CANADA to issue a Notice to Airmen (NOTAM) to advise pilots of restrictions in the airspace above the incident site or to close the airspace for a certain radius from the release. See *Section 6.3 Notice to Airmen (NOTAM) Request*.
- **Railway:** Rail companies must be notified to halt trains on tracks within the HPZ.
- **Waterways:** If boat traffic is common on the river/lake within the HPZ, request via Emergency Management BC (EMBC) to halt boat traffic and restrict access.

4.2 Notification of Potentially Affected Parties

PNG will notify potentially affected parties that an incident has occurred to explain the risks and to provide safety instructions. Potentially affected parties are those who may be in danger because of an incident. As per *Section 3 Hazard Planning Zones for the Transmission Pipeline*, the predefined HPZ is 115 m to each side of the centre of the ROW. Potentially affected parties may include:

- Residents
- Landowners
- Businesses and neighbouring operators
- First Nation communities
- Neighbours

Depending on the type and status of the incident, the area affected, and surrounding conditions, potentially affected parties should be informed to stand by or evacuate. When the area is once again safe for the resumption of normal activities, the parties will be notified.

4.3 Public Evacuation (Support) Procedure

An evacuation will depend on the type of incident, meteorological conditions, ignition sources, and potential exposure of the public.

Any buildings within the evacuation zone (especially downwind) should be monitored for gas levels. If gas is detected, the buildings must be evacuated.

To ensure public safety, the attending fire department and/or RCMP will decide if an evacuation is necessary. The local authority will be engaged through Unified Command and/or the PNG EOC in conjunction with the local authority's own EOC.

The PNG Incident Commander may provide technical advice and recommendations on public safety measures to emergency services, including the need to evacuate, and the suggested areas, which would be determined by the HPZ. PNG employees may participate in door-to-door evacuations, if imminent danger exists to the public, or when requested by the local authority.

If the situation requires immediate public safety measures be taken, defined as those actions that must be taken "now", without any delay, to save lives from extreme risk, the PNG Incident Commander is authorized to begin notifying and evacuating the public without consulting the EOC Director or emergency services. Notifications to emergency services and/or the local authorities of the tactical evacuation will be made by the EOC.

The detailed evacuation procedure can be found in *Section 6.4 Evacuation*. Additional information can be found in the *Core Emergency Response Plan, Section 3.2.6 Public Protection Measures*.

5 INITIAL ACTIONS AND NOTIFICATIONS

The **First on Scene** is responsible for the initial actions, until relieved by a more senior or qualified PNG employee, or until support from emergency services or other response agencies arrive at the incident site. A coordinated response will be carried out between PNG, emergency services, and other involved agencies.

5.1 Initial Assessment of Incident

Operations personnel will evaluate all incidents and investigate alarms (where applicable). Many incidents may not be considered emergencies after an investigation is conducted. Upon completion of the incident evaluation, operations personnel will determine the incident level and then implement the appropriate immediate actions.

The severity of the situation defines the level of emergency, the potential hazards to the public and the environment, and the appropriate response.

5.2 Immediate Actions Checklist ("Make Safe")

When following incident management protocols for PNG, the overarching idea is to make the site of the incident "safe" again as quickly as possible while protecting the PNG employees and emergency personnel responding to the incident, the public, and the environment.

PNG FIRST ON THE SCENE:	
❑	Ensure personal safety: • Don all necessary PPE. • Remove any sources of ignition. • Evacuate all non-essential personnel from the area.
❑	Call 9-1-1, if necessary, to request assistance from emergency services.
❑	Assist injured persons within the capabilities of your training and if safe to do so.
❑	Check in with your Manager or the Manager On-Call.
❑	Initiate appropriate control measures to manage the situation.
❑	Transfer command to the senior trained person on-scene upon arrival, to assume the role of Incident Commander.

INCIDENT COMMANDER:	
❑	If other responders on site, receive briefing of situation; assume control of the incident site.
❑	If an Incident Command Post (ICP) has been established by first responders (fire/police), join Unified Command.
❑	If not already done, establish the ICP at a safe location.
❑	Assess and confirm the emergency situation.
❑	Assess and confirm personnel safety measures; implement additional safety measures, as required.
❑	Recommend evacuation be carried out by the fire department, if appropriate. Delegate rovers to assist, or if fire department unavailable, conduct immediate notifications to evacuate.
❑	Make initial internal notifications.
❑	Determine initial incident level.
❑	In conjunction with the EOC Director, determine the initial HPZ.
❑	Implement required public protection measures.

5.3 Internal Notification Process

At the onset of an incident, the Incident Commander (or delegate) will notify the Manager On-Call and/or Director, Operations and Customer Service, or their designate, the Director, Asset Management and Projects, as soon as possible. The Manager On-Call will notify the Director, Operations and Customer Service, or their designate, the Director, Asset Management and Projects, if not already notified.

Having multiple points of contact and backups ensures the internal notification process at the start of an incident is seamless and prevents confusion if individual points of contact are unavailable.

The Incident Commander and the Manager On-Call (and/or Director, Operations and Customer Service, or their designate, the Director, Asset Management and Projects) will together:

i. Confirm the incident level.

ii. Activate the ERP.

iii. Determine the appropriate activation of the ICP and EOC.

iv. Notify the OGC of the incident level.

The Manager On-Call mobilizes the initial resources for the site and the ICP.

The Director, Operations and Customer Service, or their designate, the Director, Asset Management and Projects, notifies the Vice President, Operations and Engineering.

The Vice President, Operations and Engineering notifies key stakeholders within PNG and TriSummit Utilities. Notifications to the Manager, the Director, Operations and Customer Service, or their designate, the Director, Asset Management and Projects, and the Vice President, Operations and Engineering will likely be made by telephone. Resource notifications can be made via telephone or email. Text message remains an option.

The Director, Operations and Customer Service, or their designate, the Director, Asset Management and Projects, mobilizes the initial resources for the EOC.

Situation updates will be made through the ICP or, if activated, the EOC.

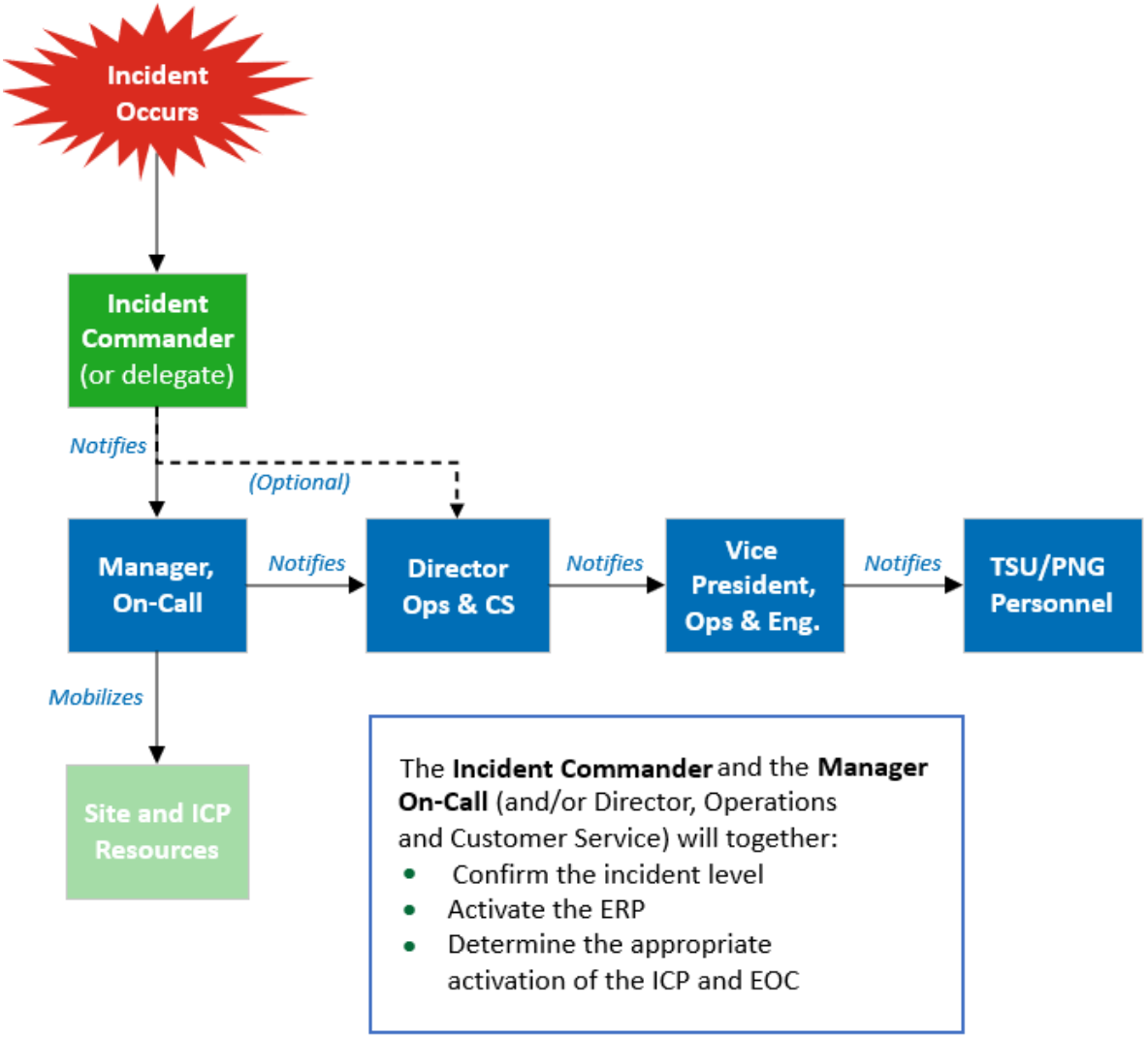


Figure 2 – Internal Notification Flowchart

5.4 Incident Classification

5.4.1 Incident Levels

The classification of an incident is determined using the *OGC Incident Classification Matrix*. The matrix is used to calculate the probability that the incident may escalate from the time that it is discovered. The nature

and scope of an incident may not immediately be clear, and adjustment to the incident level may be required as more information becomes available or the incident evolves.

Incident levels define the severity of an incident, based on the potential hazards or impacts to personnel, the public and the environment, and indicate the appropriate organizational response, notifications, and activations.

The OGC's Incident Classification Matrix identifies four incident levels, with Minor categorized as low-risk and Level 3 as a high-risk emergency:

- Minor
- Level 1
- Level 2
- Level 3

A higher level is assigned when the incident meets one or more conditions of the higher level.

Minor

A Minor incident has a risk score of 1-2 and has no consequential impacts on an organization.

Level 1

A Level 1 incident has a risk score of 3-4 (Moderate).

Factors to consider may include:

- Are personnel at immediate risk?
- Is there immediate danger to the public or environment?
- Is the release of a hazardous substance confined to the PNG property?
- Is there low risk for incident escalation?
- Can the incident be exclusively handled by PNG personnel?
- Is the incident likely to create little or no media interest?

Level 2

A Level 2 incident has a risk score of 5-6 (Major). Factors to consider may include:

- Is there a potential for risk to the public and environment?
- Is the control of hazardous substances still possible?
- Is the incident likely to require the involvement of external emergency services, or local or provincial agencies?
- Has the incident generated local or regional media attention?

Level 3

A Level 3 incident has a Risk Score of 7-8 (Serious). Factors to consider may include:

- Is there immediate danger to public or environment?
- Is there an uncontrolled release of a hazardous substance?
- Does the response require extensive involvement of external emergency services, or local or provincial agencies?
- Has the incident generated media interest: local, provincial, or national?

5.4.2 Using the Incident Classification Matrix

The Incident Classification Matrix is used to determine the level of any incident, from Minor to a Level 3 emergency. The steps for determining the incident level risk score are:

1. Read through the descriptions under Consequence Ranking and check off the first description that best matches the situation. There can be multiple checks; however, only the highest ranked item is used in the calculation of an incident level.
2. The Probability Level is the likelihood that an incident can escalate. Review the Probability Chart and select the best choice based on what you know about the incident at the time of scoring.
3. Calculate the risk score by adding the Consequence and Probability values together. Compare the value to the Incident Classification table to determine the incident level.

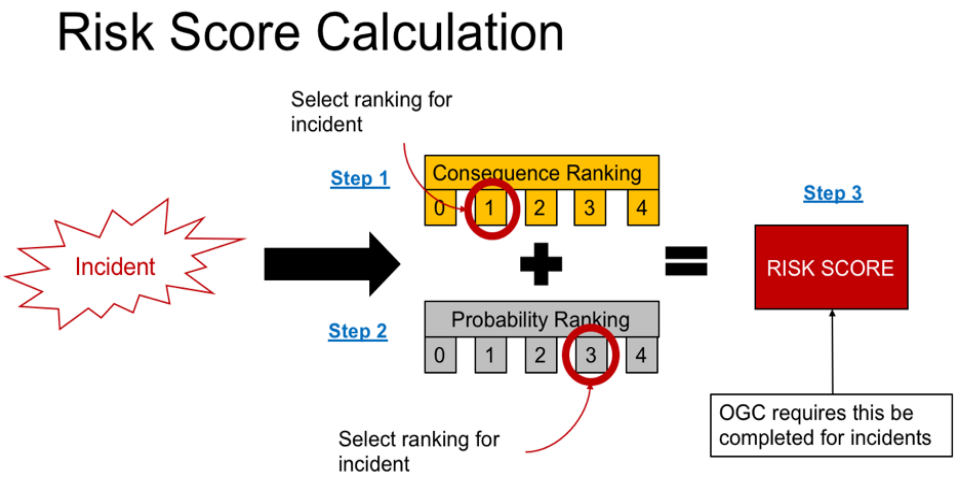


Figure 3 – Calculating the Risk Score

5.4.3 OGC Incident Classification Matrix

Instructions: Start at the top and continue down until you check off any one box in both consequence and probability to determine the incident classification. This matrix is required as an attachment upon submission of an incident through the Online Minor Incident Reporting System.

TABLE 1. CONSEQUENCE RANKING

RANK	CONSEQUENCE (any one of the following)
4	❑ Major on-site equipment or infrastructure loss ❑ Major act of violence, sabotage, or terrorism that impacts permit holder assets ❑ Reportable liquid spill beyond site, uncontained and affecting environment ❑ Gas release beyond site affecting public safety
3	❑ Threats of violence, sabotage, or terrorism ❑ Reportable liquid spill or gas release beyond site, potentially affecting public safety, environment, or property ❑ HAZMAT worker exposure exceeding allowable limits ❑ Major on-site equipment failure
2	❑ Major on-site equipment damage ❑ A security breach that has potential to impact people, property, or the environment ❑ Reportable liquid spill or gas release potentially or beyond site, not affecting public safety, environment, or property
1	❑ Moderate on-site equipment damage ❑ A security breach that impacts oil and gas assets ❑ Reportable liquid spill or gas release on location ❑ **Occurrence of magnitude 4.0 or greater induced earthquake within 3 km of oil and gas operations or any earthquake that is felt on surface within a 3 km radius of oil and gas operations
0	❑ No consequential impacts

** For this consequence criteria, a probability score of 2 or higher must be used

TABLE 2. PROBABILITY RANKING

RANK	PROBABILITY (any one of the following)
4	❑ Uncontrolled, with control unlikely in near term
3	❑ Escalation possible; under or imminent control
2	❑ Escalation unlikely; controlled or likely imminent control
1	❑ Escalation highly unlikely; controlled or imminent control
0	❑ Will not escalate; no hazard; no monitoring required

TABLE 3. INCIDENT RISK SCORE AND CLASSIFICATION

CONSEQUENCE ____+ PROBABILITY ___ = RISK SCORE ____ (this must be completed)

Risk Score	Incident Level
Score of 1-2	**Minor** *Form A: Minor Incident Notification Form*
Score of 3-4	**Level 1 Incident** *ERP*
Score of 5-6	**Level 2 Incident** *ERP*
Score of 7-8	**Level 3 Incident** *ERP*

			Probability				
			4	3	2	1	0
			☐ Uncontrolled, with control unlikely in near term	☐ Escalation possible; under or imminent control	☐ Escalation unlikely; controlled or likely imminent control	☐ Escalation highly unlikely; controlled or imminent control	☐ Will not escalate; no hazard; no monitoring required
Consequence	4	☐ Major on-site equipment or infrastructure loss ☐ Major act of violence, sabotage, or terrorism that impacts permit holder assets ☐ Reportable liquid spill beyond site, uncontained and affecting environment ☐ Gas release beyond site affecting public safety	Level 3	Level 3	Level 2	Level 2	Level 1
	3	☐ Threats of violence, sabotage, or terrorism ☐ Reportable liquid spill or gas release beyond site, potentially affecting public safety, environment, or property ☐ HAZMAT worker exposure exceeding allowable ☐ Major on-site equipment failure	Level 3	Level 2	Level 2	Level 1	Level 1
	2	☐ Major on-site equipment damage ☐ A security breach that has potential to impact people, property, or the environment ☐ Reportable liquid spill or gas release potentially or beyond site, not affecting public safety, environment, or property	Level 2	Level 2	Level 1	Level 1	Minor Notification Form
	1	☐ Moderate on-site equipment damage ☐ A security breach that impacts oil and gas assets ☐ Reportable liquid spill or gas release on location ☐ **Occurrence of magnitude 4.0 or greater induced earthquake within 3 km of oil and gas operations or any earthquake that is felt on surface within a 3 km radius of oil and gas operations. Probability score of 2 or higher must be used.	Level 2	Level 1	Level 1	Minor Notification Form	Minor Notification Form
	0	☐ No consequential impacts	Level 1	Level 1	Minor Notification Form	Minor Notification Form	No Notification Required

** For this consequence criteria, a probability score of 2 or higher must be used.

Spill Reporting Criteria

Where the permit holder holds or maintains rights, the permit holder must report all spills of materials identified below to the BC OGC:

- A spill or release of any amount of materials that impacts waterways
- Hydrocarbons; 100 L where the hydrocarbon contains no toxic materials and does not impact waterways
- Produced/salt water; 200 L where the fluid contains no toxic materials
- Fresh water; 10,000 L
- Drilling or invert mud; 100 L
- Sour natural gas; 10 kg or 15 m^3 by volume where operating pressure is > 100 PSI
- Condensate; 100 L
- Any fluid including hydrocarbons, drilling fluids, invert mud, effluent, emulsions, etc., that contain toxic substances; 25 L

Please refer to the BC Environmental Management Act; Spill Reporting Regulation, Schedule "Reporting Levels for Certain Substances" for determining reportable spillage amounts of other substances.

Other Reportable Incidents

The Commission's Incident Risk Classification Matrix is designed to assist permit holders in determining which incidents must be reported. However, some incidents may not meet the criteria outlined in the Incident Classification Matrix but still require notification to the OGC as a minor notification. These include the following:

- Spills or release of hazardous substances that are not provincially regulated, such as radioactive substances
- Major damage to oil and gas roads or road structures
- Pipeline incidents, such as spills during construction phase, exposed pipe caused by flooding, pipeline over pressure, or failure (without release) of any pressure control or electrostatic-sensitive device (ESD) device during operations
- Security-related issues that are relatively minor; such information may be required for tracking and monitoring purposes only

5.4.4 Plan Activation

Any incident that requires the prompt coordination of action to protect the health, safety, or welfare of people, or to minimize the impact to the environment, property, and infrastructure, will warrant the activation of the ERP. Most often these will be incidents of a Level 2 or 3.

In consultation with the Incident Commander, the EOC Director will confirm the incident level.

The activation of the *Transmission Pipeline Systems Supplemental Response Plan*, and subsequently the EOC, is determined at the onset of an incident based on the information available at the time and may change (escalate/de-escalate) throughout the duration of the incident. This is authorized by the EOC Director, in conjunction with the Incident Commander, and will be driven by evolving conditions and information. In cases where the exact nature and consequences of the event is unknown at the time of notification, the general approach is to gather as much information as possible to make the best judgement.

Activation of the ERP, particularly when there is potential for escalation, will enable the mobilization of resources and support evolving response requirements.

A re-assessment, with each operational period (new IAP), or after significant events affecting the incident (e.g., gas under-control, escalating event) will be conducted to determine if the incident has escalated or can be downgraded. An update to the probability score and a review and confirmation of current state consequences will generate an updated incident level.

The EOC Director, in consultation with the OGC, will make the determination to increase or downgrade the incident level, or to terminate the incident.

6 HAZARD AND RESPONSE GUIDELINES

PNG employees should use the following as guidance, as applicable, to inform their response. The checklists present the minimum requirements for task considerations that must be done. Additional tasks can be added as the incident demands. Some tasks are one-time actions, while others are ongoing or repetitive actions for the duration of the incident.

6 HAZARD AND RESPONSE GUIDELINES 6-1
6.1 Defining the Incident Specific HPZ 6-2
6.2 Implementing Public Protective Measures 6-3
6.3 Notice to Airmen (NOTAM) Request 6-5
6.4 Evacuation 6-6
6.4.1 Speaking Notes: Instructions for Evacuation 6-7
6.5 Transmission Pipeline Release and Isolation 6-8
6.6 Ignition 6-10
6.7 Elevated Flood Risk Procedure 6-11
6.8 Wildland Fire in Vicinity of PNG Assets 6-14
6.9 Security Threat 6-17
6.10 Seismic Event 6-18
6.11 Environmental Spill 6-19
6.12 Decontamination 6-20
6.13 Waste Management 6-21
6.14 Curtailment 6-22
6.15 CNG/LNG Sourcing & Utilization for Emergency Circumstances 6-23
6.16 Mutual Assistance Procedure 6-25
6.17 Serious Injury/Fatality 6-29

6.1 Defining the Incident-Specific HPZ

DEFINING THE INCIDENT-SPECIFIC HPZ

SCOPE

A Hazard Planning Zone (HPZ) is the geographical area determined by using the hazard planning distance as a radius, and within which persons, property, or the environment may be affected by an incident.

The HPZ is used to identify where prompt response actions are required in the event of an incident.

ACTIVITIES

- ❑ Confirm location of the incident site(s).
- ❑ Gather combustible gas indicator measurements to establish radius of gas readings.
- ❑ Establish the approximate radius of gas odour.
- ❑ Measure wind direction and wind speed.
- ❑ Identify (and mitigate) possible ignition sources.
- ❑ Consider the possible risks of exposure; considerations may include:
  - Rural versus urban area
  - The possibility of the gas migrating (surrounding buildings, sewers, underground ducts, enclosed areas, etc.)
- ❑ Identify parties that may be impacted, consider:
  - Residents
  - Schools
  - Healthcare facilities
  - Trappers/hunters
  - Backcountry recreationalists
- ❑ Identify any infrastructure at risk, including:
  - Roadways (communicate to EOC if primary or secondary road)
  - Rail
  - Airport within 2 km
  - Airspace by requesting NOTAM
  - Waterways that are used by boats
- ❑ Confirm ETA of resources:
  - Delays will influence the time for bringing the incident under control.
- ❑ Contact CANUTEC (1-888-226-8832) to develop a plume model; if able and appropriate.
- ❑ Prepare map of the HPZ; include in the map the above noted data, along with locations of:
  - Radiuses
  - Wind direction
  - Population (residents, schools, traplines)
  - Staging area(s)
  - Roadblocks
  - Ignition sources
  - Infrastructure (including roads, rail, airport, waterways, healthcare facilities, etc.)
- ❑ Share plume model/HPZ map with first responder's Incident Commander(s).
- ❑ Share HPZ map with appropriate agencies.
- ❑ Assess the situation for the potential for escalation and other possible complicating factors.
- ❑ Re-evaluate regularly, or upon a change in the circumstances, to expand or contract the zone in consultation with emergency services and the EOC.

6.2 Implementing Public Protective Measures Based on the Incident-Specific HPZ

IMPLEMENTING PUBLIC PROTECTIVE MEASURES BASED ON THE INCIDENT SPECIFIC HPZ

SCOPE

The Hazard Planning Zone (HPZ) is used to identify where immediate response actions are required in the event of an incident.
Depending on the incident-specific HPZ, some or all the noted activities may be actioned.

Procedure is referenced after Initial Make Safe Actions (immediate actions) are completed and the incident specific HPZ is identified.

ACTIVITIES

- ❑ Communicate need for public protective measures (evacuation) to emergency services and community:
  - Support the notification of the public that evacuation is advised.
  - See *Section 6.4 Evacuation*.
- ❑ If gas is escaping, identify sources of ignition and remove them if possible and safe to do so.
- ❑ Establish a safety perimeter based on the HPZ.
- ❑ Consider requesting the of closure of airspace, roads, rail, and waterways, as appropriate.
- ❑ Identify roadblock leader.
- ❑ Identify rovers.
- ❑ Coordinate the elimination of hazards from damaged property and/or utilities on site.
- ❑ Obtain frequent meteorological updates, particularly wind direction and speed.
- ❑ A shift in wind direction requires immediate re-evaluation of the HPZ.
- ❑ Request security resources to maintain safety perimeter, and, if required, protection of PNG and public property.
- ❑ Communicate to ICP and/or EOC Scribe all actions taken, and ensure that a log of all activities and decisions is maintained.

Air Monitoring

- ❑ Conduct air monitoring to support the establishment of the initial HPZ.
  - Continue air monitoring to track the presence and levels of LEL and H_2S in maintaining the parameters of the HPZ:
    - □ Monitor the plume movement, dispersion, or rising levels.
  - Maintain awareness of levels in context of responder safety, including rovers and those staffing roadblocks.
- ❑ Select appropriate air monitoring device(s):
  - Utilize handheld air monitors for *initial* and continuous monitoring to aid in the definition of the HPZ and the expansion/contraction of the plume.
  - Request mobile air monitoring units to supplement handheld readings of LEL and H_2S, during the release and following the ignition of a release.
  - Equip all personnel in the area of a H_2S release with H_2S detection monitors and SCBA.
- ❑ Maintain a record of the air monitoring results using the *Ambient Air Monitoring Form* available in the Core ERP (*Appendix C.2 Response Support Forms*).
- ❑ Deploy units downwind and upwind depending on how the plume is tracking:

IMPLEMENTING PUBLIC PROTECTIVE MEASURES BASED ON THE INCIDENT SPECIFIC HPZ

- Prioritize the nearest un-evacuated residence or area where people may be present.
- For ground level emissions, including unignited, uncontrolled releases, utilize the mobile monitor wind direction.
- For emissions from a flare or an ignited uncontrolled release, consider the wind aloft (elevated windsock) rather than near ground level winds.
- For gases heavier than air, such as H_2S, the gas prefers to hug the ground and follow topographic features:
  - Consult with topographic maps to estimate likely trajectory for plume.
- In calm winds, sampling should be used to determine where the concentration is strongest:
  - Consider the wind direction aloft, rather than near ground level wind.
- An elevated release may travel for some distance before touching down.

❑ Monitor wind direction and speed from Environment Canada, actual and forecasted, as well as site.
❑ Re-assess the boundaries of the HPZ as air monitoring data evolves.

Roadblocks

❑ Establish roadblocks to limit access.
❑ Consider access/egress of responders and evacuees.
❑ Position vehicle in a highly visible area to oncoming traffic.
❑ Use intersecting crossroads as much as possible to maximize the monitoring of traffic flow.
❑ Do not completely block road.
❑ Engage the four-way flashers on vehicle.
❑ Wear traffic vest to maintain visibility to traffic.
❑ Record names, addresses, and contact information of evacuees leaving the area; ask those leaving the area to register at the identified reception centre.
❑ Ensure that only resources and equipment approved by the Incident Commander are allowed to enter the secured area.
❑ Record names, contact information, and location for those entering the area.
❑ If an evacuation is underway, **only** first responders and approved response personnel are to enter the area.
❑ Attend to the roadblock until relieved.

Rovers

❑ Monitor gas migration above and below ground; verify boundary of the safety perimeter.
❑ Support first responders (fire, police, etc.) in instigating and communicating protective measures.
❑ Advise impacted public to evacuate if emergency services not present on site.
❑ Begin notification of public with those in closest proximity to the incident location and downwind of the location:
  - Proceed to those located within the remainder of HPZ.
  - Utilize messaging in *Section 6.4 Evacuation.*
  - PNG personnel do not have authority to order the public to evacuate the premises. If evacuation is refused, record name and address and notify the police.
❑ If contact cannot be made through a personal visit, request resources to conduct a thorough survey of the area.
❑ Check on an ongoing basis for gas migration above and below ground, and for accumulation in nearby buildings and fixtures.
❑ Repeat until gas is controlled and accumulations are vented.
❑ Follow Site Safety Plan, i.e., monitor gas levels, check in, etc. **Responder safety is the first priority.**

6.3 Notice to Airmen (NOTAM) Request

NOTICE TO AIRMEN (NOTAM) REQUEST PROCEDURE

SCOPE

If airspace is impacted by the incident, it may be necessary to contact NAV CANADA to request that a Notice to Airmen (NOTAM) be issued to inform aircraft of the potential dangers. NAV CANADA is responsible for the collection, evaluation, and dissemination of NOTAMs.

It is the responsibility of the EOC to assess the likelihood of risk to aircraft. This assessment should be conservative since aircraft such as low-flying helicopters and hot-air balloons may be at significant risk from natural gas plumes or fires.

ACTIVITIES

- ❑ The Planning Section and Operations Section work together to determine:
  - Location of incident in latitude and longitude
  - Radius of plume
  - Estimate of altitude of plume in feet above ground level
  - Estimate of speed and direction of plume (in knots and degrees if possible)
- ❑ **Contact the NAV CANADA Flight Information Centre at 1-866-992-7433.**
  - Inform the duty officer that PNG requests a NOTAM due to significant release of natural gas/gas fire/gas explosion.
  - Give the location, radius, altitude, and movement information above.
  - Clearly communicate units of measure of information shared.
  - Provide the EOC contact information. If there are any further questions, the duty officer MUST be able to contact PNG to confirm.
  - Record the NOTAM number for future reference if provided.
  - Do not hang up until the duty officer does so.
- ❑ Inform the NAV CANADA Information Centre (1-866-992-7433) if the location, radius, altitude, or movement information changes significantly, as the NOTAM must be amended:
  - Quote the NOTAM number and provide the amended information.
- ❑ Inform the NAV CANADA Information Centre (1-866-992-7433) when gas determined under control or fire has dispersed:
  - Quote the NOTAM number and request that the NOTAM be cancelled.

6.4 Evacuation

EVACUATION PROCEDURE

SCOPE

The following provides guidance to supporting, and where necessary, conducting an evacuation.

Depending on the specific incident, some or all the noted activities may be actioned.

**The following is to be referenced after Initial Make Safe Actions (immediate actions) are completed and the incident specific HPZ is identified.*

Note:

If the situation requires immediate public safety measures be taken, defined as those actions that must be taken "now", without any delay, to save lives from extreme risk, the PNG Incident Commander is authorized to begin notifying and evacuating the public without consulting the EOC Director. Notification to emergency services and/or the local authority of the tactical evacuation will be made by the EOC.

ACTIVITIES

- ❑ Assess incident, identify hazard (gas, heat, etc.) and determine current/potential risk to responders and public.
- ❑ Determine if immediate public safety measures are needed.
- ❑ Determine appropriate initial public safety measures – evacuation order or alert, within the pre-determined zone.
- ❑ Communicate public safety measure information to emergency services and/or local authority.
- ❑ Support first responders (fire, police, etc.) in instigating and communicating evacuation, as required.
- ❑ Identify exit route:
  - Establish access control (roadblocks) to the HPZ.
- ❑ Advise impacted public to evacuate if emergency services not present on site:
  - PNG personnel do not have authority to order the public to evacuate the premises. If evacuation is refused, record name and address and notify the police.
- ❑ Identify a reception centre, determined in conjunction with the local authority; communicate location to evacuees.
- ❑ Arrange rovers or a helicopter to search the area to locate transients, hunters, trappers, recreational users, and other area operators who may be at risk.
- ❑ Provide the Contact Centre with instructions to relay to residents to aid in the safe evacuation of individuals within the specified area(s).
  - Align with first responder/local authority messaging; if unavailable, see the sample messaging at the end of the procedure.
- ❑ Assist with the coordination of support services, including transportation to the reception centre, food, lodging, emotional support, information about the incident, and family reunification.
- ❑ Monitor environmental parameters for the specified area(s) to aid in the determination of when an evacuation rescind can be issued.
- ❑ Update first responder/local authority frequently.
- ❑ Coordinate, with the local authority, the re-entry into the impacted area.

6.4.1 Speaking Notes: Instructions for Evacuation

Prior to alerting residents of an evacuation:

- Determine whether it is safe to leave the area in their vehicles, or whether evacuation by foot is required.
- Identify a designated safety meeting area or muster point for evacuees to gather and wait, particularly if it is not safe to travel by vehicle and/or they require transportation assistance to the identified reception centre.
- Ensure you have a detailed safe travel route to the safety meeting area, muster point, or reception centre (as applicable).

If evacuation is recommended, communicate the following to residents and members of the public in the hazard area. The EOC will provide you with the information required to "fill in the blanks" for the specific incident you are responding to.

- *Hi, my name is [insert name]. I work with Pacific Northern Gas.*
- *We are responding to an incident in the area. For your safety, we recommend you evacuate the area immediately.*
- *Please inform your family or anyone else in your home/building, gather your pets, and evacuate the area immediately.*
- *[Hand them the Evacuated Resident's Checklist AND Safe Travel Route] These documents provide suggestions on what to do and detailed instructions for evacuating.*

If you have confirmed it as safe to travel by vehicle:

- *It is still safe for you to evacuate in your own vehicle. If you could please safely make your way in your vehicle (if driving) to the identified safe meeting area or muster point at [provide location of safe meeting area, and any instructions for a specific route they should take] and wait for me to arrive. I will need to provide you with additional information so you can stay updated regarding the incident and for further instructions.*

Once you have met the evacuees at the safe meeting area or muster point:

- Confirm who has been evacuated and from where.

For individuals going to the reception centre advise:

- *A reception centre has been set up at [reception centre facility name and address]. It is recommended that you head to the reception centre as soon as possible and register yourself and your family.*

If you have confirmed it as unsafe to travel by vehicle and residents are required to evacuate by foot:

- *For your safety, because of the nature of the incident, it is unsafe for you to travel by vehicle. Please make your way by foot to the identified safe meeting area or muster point and wait for me to arrive. This is where we will be picked up and taken to the reception centre.*
- *I will need to provide you with a few additional details so you can stay updated regarding the incident and evacuation instructions.*

Once you have met the evacuees at the safe meeting area or muster point, collect the following:

- Who has been evacuated and from where?

6.5 Transmission Pipeline Release and Isolation

TRANSMISSION PIPELINE RELEASE AND ISOLATION GUIDELINES

SCOPE

The following provides guidance to address a transmission pipeline release and/or requirement for pipeline isolation.

Depending on the specific incident, some or all the noted activities may be actioned.

**The following is to be referenced after Initial Make Safe Actions (immediate actions) are completed and the incident specific HPZ is identified.*

Hazards which may cause a transmission pipeline breach or release and/or may prompt the need for pipeline isolation include:

- Imminent arrival of wildfire
- Flooding and/or erosion
- Land movement
- Seismic event (primarily in the west)
- Intentional and/or unintentional ground disturbances (i.e., third-party hits)
- Malicious intent
- Technical and/or structural failures

ACTIVITIES

- ❑ Deploy field observers to gather damage intelligence as soon as possible.
- ❑ If gas is blowing:
  - Monitor gas migration above and below ground; establish boundary of the safety perimeter.
  - Remove sources of ignition, if safe to do so.
  - Do not extinguish burning gas from a pipeline break:
    - Assume safe position and allow controlled burn out.
  - Request the fire department to use water spray to protect surrounding property.
  - Monitor on an ongoing basis for gas migration above and below ground, and for accumulation in nearby buildings and fixtures:
    - Repeat until gas is controlled and accumulations are vented.
- ❑ Activate the EOC as required to:
  - Support response requirements.
  - Evaluate and provide authorization to isolate pipeline segment(s).
- ❑ Assess damage and evaluate requirements to isolate the transmission pipeline segment; consider:
  - Immediacy of public hazard
  - Decay of system pressures
  - Position of the release
  - Potential and/or actual impacts of the release
  - Potential to mitigate impacts through segment isolation
  - Potential impacts (upstream/downstream) of the segment isolation
  - Options if pressure reduced
- ❑ If authorized by EOC, issue instructions to applicable personnel to isolate the transmission pipeline segment in accordance with isolation plan:

TRANSMISSION PIPELINE RELEASE AND ISOLATION GUIDELINES

- Establish communication with Gas Control to determine and monitor valve status.

❑ Determine the required valve operation and sequencing:

- Document and review the shutdown procedure, before initiating shutdown.
- Manually and/or remotely close valves in accordance with the isolation plan.
- Reduce mainline pressure as required through compressor stations or vented to atmosphere through blow-down stacks:
  - Follow required blow-down procedures if blow-down is necessary.

❑ Once the isolation plan is developed and implemented:

- Communicate the plan and valve status to gas control.
- Conduct damage assessment and pipeline repair as required.

6.6 Ignition

IGNITION GUIDELINES

SCOPE

The following provides guidance on the option to deliberately ignite to mitigate the risk of human exposure to the substance. This option would be considered by PNG as a protective measure only in the rarest of circumstances, as odorized methane, transported by the transmission pipeline system does not contain H_2S (sour gas).

Depending on the specific incident, some or all the noted activities may be actioned.

**The following is to be referenced after Initial Make Safe Actions (immediate actions) are completed and the incident specific HPZ is identified.*

ACTIVITIES

- ❑ Identify that the public safety hazard is such that deliberate ignition of the methane could be an appropriate mitigation option.
- ❑ Confirm with the EOC Director that deliberate ignition is an appropriate option to assess.
- ❑ Consult with the Fire Chief in Unified Command to determine if deliberate ignition is an appropriate option to assess.
- ❑ Confirm site weather conditions; obtain weather forecast.
- ❑ Update the plume model, with the support of CANUTEC, using current and forecasted weather.
- ❑ Assess the following criteria (EOC Operations and Planning and Incident Commander):
  - Proximity of the release to public areas and/or evacuated areas
  - Perimeter of the hazard area that has been established
  - If it is safe for responders
  - If ignition will worsen the situation by endangering the public or the environment
  - The possibility of an explosion if there are obstructions or areas of congestion within the perimeter of the vapour cloud
  - Availability of ignition equipment, and training of staff in its use
  - If ignition will damage the equipment being used to control the product
  - Impacts to other values at risk including property, livestock, timber, or infrastructure
- ❑ Establish at the incident site:
  - Live monitoring of wind direction
  - Assess possibility of explosion if there are obstructions or areas of congestion within the perimeter of the vapour cloud
  - Prepare to remove response equipment that could be damaged by ignition:
    - If equipment is being utilized to control the incident, assess the consequences of removing the equipment and communicate to the EOC.
  - Confirm, in coordination with emergency services, that the public is outside the vapour cloud
  - Secure the perimeter.
- ❑ Submit assessment of criteria to EOC Director and to Fire Chief.
- ❑ Fire Chief and EOC Director to decide if deliberate ignition is the appropriate response action to address the risk to public safety.
- ❑ Consult with the OGC on the decision to ignite.
- ❑ Remove response equipment that could be damaged by ignition.
- ❑ Confirm, in coordination with emergency services, that responders are outside the vapour cloud.
- ❑ Instigate ignition within 15 minutes of confirmation to ignite.
- ❑ Move personnel at site to a safe distance.
- ❑ Action the certified ignition strike team.
- ❑ Prepare post ignition plan, considering damage assessment of equipment and the environment, public communications, etc.

6.7 Elevated Flood Risk Procedure

FLOOD ADVANCE PLANNING AND RESPONSE PROCEDURE

SCOPE

The following provides guidance to mitigate impacts to PNG infrastructure in the event of an elevated risk of flood (advance planning), as well as response and recovery activities in the case a flood event has occurred.

Depending on the specific incident, some or all of the noted activities may be actioned.

Flood hazards include:

- Freshet
- Rain on snow events
- Runoff events
- Dam failures

Protective activities should only be used if the projected time of flood impact at site allows for sufficient time to safely leave the site.

ADVANCE PLANNING ACTIVITIES

- ❑ Obtain and assess current meteorological data and flood forecasts from River Forecast Centre or Emergency Management BC (EMBC).
- ❑ Activate the EOC to support advance planning activities and communications internally and externally.
- ❑ Review safe working procedures with personnel for working around elevated or fast-moving water:
  - Suspend site projects not critical to operations.
- ❑ Assess and identify risk to infrastructure.
- ❑ Consider and implement appropriate protective and precautionary activities to protect the system before the flood reaches the area, including:
  - Increase patrols (land and air) in the alert area; monitor for rising water levels.
  - Coordinate the establishment of berms or flood control measures, as required.
  - Consider equipment needs and sources.
  - Identify and locate additional sandbags/heavy equipment resources.
  - Identify the priority areas for sand bag deployment.
  - Consider locating valves, which may be needed to isolate potential inundation areas.
  - Consider isolation of sections of the gas system.
- ❑ Conduct planning activities in collaboration with the local authority's EOC and the Provincial Regional Emergency Operations Centre (PREOC).
- ❑ Participate in EMBC coordination calls to glean additional situational awareness and communicate impacts, if any, and possible or actual consequences (public safety and utility).
- ❑ Monitor, through EMBC coordination calls and local contacts, risks to communications, both to PNG assets and locations, and to personnel working from home; such risks include, but are not limited to, interruption to radio, cellular, land line, and internet fiber.
  - Assess, prepare, and communicate plans to address interruptions in advance, if and as possible.
- ❑ Issue public safety information regarding protective actions for the utility and appliances before, during, and after a flood.

FLOOD ADVANCE PLANNING AND RESPONSE PROCEDURE

Evacuation Alert/Order Issued

- ❑ Receive the issued Evacuation Alert or Evacuation Order for the area:
  - Review Evacuation Alert with the Ministry of Forests, Lands,-Natural Resource Operations & Rural Development (FLNRORD) to confirm safe and appropriate personnel presence at the site and planned protective strategies:
    - □ Station personnel at strategic locations.
    - □ Evacuate non-essential personnel from high-risk areas as soon as practical and as directed, to ensure personnel safety.
    - □ Contact Call Centre or PNG Check-In Line, and EOC when clear of site and in the safe zone.
  - If Evacuation Order is declared, reconfirm protective strategies with FLNRORD:
    - □ Communicate evacuation order to all PNG personnel in the area; ensure evacuation of all PNG personnel to a safe area.
    - □ Contact Call Centre or PNG Check-In Line and EOC when clear of site and in the safe zone.
- ❑ Assess areas at risk and implement isolation plans as required:
  - Locate valves that may be needed to isolate potential inundation areas.
  - Shut off gas at riser.
  - Isolate sections of the gas distribution system.
- ❑ Prepare post-flood recovery plan which details activities such as inspection, survey, repair, regasification, and relight prior to re-entry of evacuees once authorities have approved access to the area.
- ❑ Reiterate public safety information regarding actions to be taken before, during, and after an evacuation.

POST-FLOOD ACTIONS

- ❑ Await instruction from FLNRORD Incident Commander when it is safe to return to the area:
  - Coordinate working in the area.
  - Conduct recovery and restoration activities in collaboration with the local government EOC and the Provincial Regional Emergency Operations Centre (PREOC).
- ❑ Conduct patrol of affected areas; deploy qualified personnel to gather damage intelligence as soon as possible.
- ❑ Instruct all personnel on possible hazards in the area before entering the area:
  - Consider additional hazards generated from the flood event, such as land movement, neighbouring and/or dependent infrastructure impacts such as damage to bridges, other underground utilities, etc.
- ❑ Inspect the affected area and/or infrastructure when the water has receded:
  - Ensure communications have been established at the site.
  - Accompany outside agency inspectors when the area is being inspected.
  - Consider inspecting each distribution installation to determine the extent of the damage.
- ❑ Coordinate the elimination of hazards from damaged property and/or utilities on site.
- ❑ Review and confirm isolation strategies and relight plan.

FLOOD ADVANCE PLANNING AND RESPONSE PROCEDURE

RECOVERY ACTIVITIES

- ❑ Implement isolation plans as required.
- ❑ Repair any damaged infrastructure:
  - Replace any regulators that have been submerged in water, as mud and dirt will impact the operation of these units.
  - Replace any meters that have water in the interior of the body, as mud and dirt will impact the operation of these units.
  - The meter should be left in the “off” position.
- ❑ Implement regasification and relight plans:
  - Ensure electrical services have been re-established; electrical service must be available before gas service will be restored to individual premises.
  - The restoration of flooded appliances will be the homeowner’s responsibility.

6.8 Wildland Fire in Vicinity of PNG Assets

WILDLAND FIRE ADVANCE PLANNING AND RESPONSE PROCEDURE

SCOPE

The following provides guidance to mitigate impacts to PNG infrastructure in the event of a wildland fire in the vicinity (advance planning), as well as response and recovery activities.

Depending on the specific incident, some or all the noted activities may be actioned.

Note:

PNG infrastructure includes, but is not limited to, above-ground assets such as plants, pump stations, radio towers, etc.

Considerations of risk of underground assets include potential for earth-moving equipment creating berms and fire breaks, and potential for heat impacts in presence of variable depth of cover.

Protective activities should only be used if the projected time of fire impact at site allows for sufficient time to safely leave the site.

ADVANCE PLANNING ACTIVITIES

- ❑ Obtain and assess current wildfire location and forecasts from BC Wildfire Service and Emergency Management BC (EMBC).
- ❑ Activate the EOC to support advance planning activities and communications internally and externally.
- ❑ Review safe working procedures with personnel, including requirements located in the Wildfire Regulation related to working near wildfires or when wildfire risk is high:
  - If an area is under the threat of fire activity, work as appropriate to ensure minimum personal risk; evacuate all unnecessary personnel.
  - Suspend site projects and maintenance work not critical to operations.
- ❑ Assess and identify risk to infrastructure.
- ❑ Monitor, through EMBC coordination calls and local contacts, risks to communications both to PNG assets and locations, and to personnel working from home; such risks include, but are not limited to, interruption to radio, cellular, land line, and internet fiber.
  - Assess, prepare, and communicate plans to address interruptions in advance, if and as possible.
- ❑ Consider appropriate protective and precautionary activities to protect the system before the wildfire reaches the area:
  - Increase transmission line patrols in the alert area.
  - Set up sprinklers.
  - Deploy dirt and sand to bury above ground infrastructure.
  - Install fire blankets to above-ground valve sites.
  - Apply gel/foam to infrastructure (if approved and non-corrosive).
  - Coordinate, as required with FLNRORD (or other authority), permission to access restricted areas to implement protective measures to PNG infrastructure.
- ❑ Monitor areas where BC Wildfire Services is responding for activities in the vicinity of the right-of-way (ROW), such as earth movement to generate berms and firebreaks adjacent and/or across ROW, or moving equipment across the ROW; identify protective measures such as:
  - On-site supervising

WILDLAND FIRE ADVANCE PLANNING AND RESPONSE PROCEDURE

- Identification of locations and implementation of measures to enable safe ROW crossings

❑ Participate in EMBC coordination calls to glean additional situational awareness and communicate impacts, if any, and possible or actual consequences (public safety and utility).
❑ Collaborate on protective strategies with external agencies, including FLNRORD and EMBC.
❑ Consider consequence management strategies.
❑ Issue public safety information regarding actions to be taken before, during, and after an evacuation.

EVACUATION ALERT/ORDER ISSUED

❑ Receive the issued Evacuation Alert or Evacuation Order for the area:
- Review Evacuation Alert with FLNRORD, to confirm safe and appropriate personnel presence at the site and protective strategies:
  - □ Station personnel at strategic locations.
  - □ Evacuate non-essential personnel from high-risk areas as soon as practical and as directed to ensure personnel safety.
  - □ Contact Call Centre or PNG Check-In Line, and EOC when clear of site and in the safe zone.
- If Evacuation Order declared, reconfirm protective strategies with FLNRORD:
  - □ Communicate evacuation order to all PNG personnel in the area; ensure evacuation of all PNG personnel to a safe area.
  - □ Contact Call Centre or PNG Check-In Line, and EOC when clear of site and in the safe zone.

❑ Areas will continue to be served by gas until it is safe to assess the situation post-fire.
❑ Identify and communicate safe pipeline crossing locations.
❑ Prepare plan for re-entry once authorities have approved access to the area:
- Detail activities, such as inspection, survey, repair, regasification, and relight activities.

❑ Reiterate public safety information regarding actions to be taken before, during, and after an evacuation.

POST-WILDLAND FIRE ACTIONS

❑ Await instruction from BC Wildfire Incident Commander when it is safe to return to the area:
- Coordinate working in the area.
- Conduct recovery and restoration activities in collaboration with the local government EOC and the Provincial Regional Emergency Operations Centre (PREOC).

❑ Conduct an air and/or ground patrol of affected areas; deploy qualified personnel to gather damage intelligence as soon as possible.
❑ Instruct all personnel on possible hazards in the area before entering the area.
❑ Inspect the area affected and/or previously threatened by the wildfire for fire damage to stations, mains, services, and meters:
- Ensure communications have been established at the site.
- Accompany outside agency inspectors when the premises are being inspected.
- Ensure appropriate firefighting equipment is available at the site and the site is safe.
- Check area for any open or smoldering fires that should then be extinguished.
- Inspect each distribution installation to determine the extent of damage.

❑ Coordinate the elimination of hazards from damaged property and/or utilities on site:

WILDLAND FIRE ADVANCE PLANNING AND RESPONSE PROCEDURE

- Assess any fire damaged trees around the work area, and remove any that are deemed potentially hazardous.

❑ Review and confirm isolation strategies and relight plan.

RECOVERY ACTIVITIES

❑ Implement isolation plans as required.
❑ Repair any damaged infrastructure.
❑ Implement regasification and relight plans:

- Ensure electrical services have been re-established; electrical service must be available before service will be restored to individual premises.

6.9 Security Threat

SECURITY THREAT GUIDELINES

SCOPE

The following provides guidance to responding to a security threat or incident.

Depending on the specific incident, some or all the noted activities may be actioned.

Situations that may activate this procedure include:

- Threat or suspicious activity
- Trespassing
- Vandalism
- Sabotage (including terrorism consequences)
- Cyber attack/control systems security threat (e.g., SCADA)

Note:
If a threat against PNG infrastructure is received, it will be assumed as valid until the RCMP have investigated and determined otherwise. If any person is in immediate danger or could become in immediate danger as a result of a threat to PNG personnel or property, contact RCMP immediately.

ACTIVITIES

- ❑ Notify the control centre immediately of any suspicious activities, such as:
  - Suspicious individuals
  - Suspicious vehicles parked at or near the incident site
  - Suspicious packages located at or near infrastructure or an incident site
  - Signs of unauthorized access including vandalism or breach of security
- ❑ If the situation is judged to be UNSAFE in any way:
  - Withdraw to what is judged to be a safe distance.
  - Immediately contact RCMP (9-1-1).
  - Do not engage any individuals in any way.
  - Await the arrival of the RCMP at the incident site.
- ❑ If the situation is considered SAFE:
  - Request that RCMP (9-1-1) be called to the site.
  - Try to preserve any possible evidence found which may indicate malicious activity.
- ❑ Do not touch or move suspicious devices.
- ❑ Remain on site to serve as a point of contact for the authorities.
- ❑ Cooperate and support the RMCP investigation of the site:
  - The decision to remain on site to assist the investigations voluntary. PNG does not expect its personnel to assist if they prefer not to do so.
- ❑ Inventory damages/property loss and estimate cost of repair or replacement.
- ❑ Make notes of evidence obtained.
- ❑ Obtain duplicate photos taken during the investigation.
- ❑ Support documentation and reporting.

6.10 Seismic Event

SEISMIC EVENT GUIDELINES

SCOPE

The following provides guidance to responding to a seismic event.

Depending on the specific incident, some or all the noted activities may be actioned.

Note:
Awareness of a seismic event can be made from either direct detection, or through a notification.

ACTIVITIES

Felt by personnel

- ❑ Drop, Cover and Hold On until the shaking has stopped.
- ❑ Ensure your personal safety.
- ❑ Check in with Customer Service Representative and/or supervisor.
- ❑ Notify Gas Control.
- ❑ Request report on any variances in the system.
- ❑ Look for visual or instrument indications of system impacts and/or gas leak.
- ❑ Establish need (if appropriate and safe to do so) to conduct an operational assessment.
- ❑ Consider additional hazards generated from the seismic event, such as landslide, avalanche, neighbouring and/or dependent infrastructure impacts such as damage to bridges, overhead powerlines, etc.
- ❑ Obtain specifics on time, location, magnitude of the seismic event and estimates of the strength of ground shaking from Geological Survey of Canada or EMBC.
- ❑ Generate a plan to conduct the assessment.
- ❑ Participate in EMBC coordination call to glean additional situation awareness.

Notified of seismic event

- ❑ Establish location and safety of personnel in the vicinity.
- ❑ If safe to do so, request personnel to look for visual or instrument indications of system impacts and/or gas leak.
- ❑ Notify Gas Control.
- ❑ Request report on any variances in the system.
- ❑ Notify PNG Engineering.
- ❑ Establish need (if appropriate and safe to do so) to conduct an operational assessment.
- ❑ Consider additional hazards generated from the seismic event, such as landslide, avalanche, neighbouring and/or dependent infrastructure impacts such as damage to bridges, overhead powerlines, etc.
- ❑ Obtain specifics on time, location, magnitude of the seismic event and estimates of the strength of ground shaking from Geological Survey of Canada or EMBC.
- ❑ Generate a plan to conduct the assessment.
- ❑ Participate in EMBC coordination call to glean additional situation awareness and communicate impacts, if any, and possible/actual consequences (public safety and utility).
- ❑ Monitor, through EMBC coordination calls and local contacts, impacts and risks to communications, both to PNG assets and locations, and to personnel working from home; such risks include, but are not limited to: interruption to radio, cellular, land line, and internet fiber.
- ❑ Assess, prepare, and communicate plans to address interruptions in advance, if and as possible.

6.11 Environmental Spill

ENVIRONMENTAL SPILL OR RELEASE PROCEDURES

SCOPE

The following provides guidance to responding to an environmental spill (defined as any event that has the potential to adversely affect the natural environment and/or human health and safety).

Depending on the specific incident, some or all the noted activities may be actioned.

**The following is to be referenced after Initial Make Safe Actions (immediate actions) are completed and the incident specific HPZ is identified.*

Note:

Any environmental damage shall be remedied in consultation with relevant stakeholders and third parties.

ACTIVITIES

- ❑ Implement additional control measures, beyond standard emergency procedures, to limit migration of the spill into culverts or drains that could carry the material into a waterbody.
  - Contain liquids with earthen berms or other material if necessary to prevent such migration.
- ❑ Reference product Safety Data Sheets (SDS).
- ❑ Consult *SPI 11.4.2 Environmental Incident Response* for additional guidance on actions and reporting.

6.12 Decontamination

DECONTAMINATION GUIDELINES

SCOPE

The following provides guidance on the establishment of a Decontamination Area and the safe removal and cleansing of contaminated PPE tools and equipment should the situation during the response and/or recovery from the incident.

Depending on the specific incident, some or all the noted activities may be actioned.

ACTIVITIES

- ❑ Locate the Decontamination Area to be:
  - Outside, but adjacent to, the area where spill cleanup activities will take place.
  - Accessible by response vehicles, transport vehicles, and equipment.
  - Placed on higher ground and upwind of the incident site, if possible.
  - Clearly marked with separate entry and exit points.
- ❑ Stock Decontamination Area with brushes, decontamination detergents, wash pools or tubs, and other cleaning materials; confirm access to water for cleaning purposes.
- ❑ During spill cleanup, and as required, decontaminate PPE, tools, and/or equipment within the Decontamination Area:
  - Ensure personnel enter the Decontamination Area at the designated entry point and leave at the designated exit point.
  - Wear appropriate PPE, including goggles, when engaged in decontamination activities.
  - Clean heavily contaminated areas of PPE first with cloths or brushes when standing in a wash pool; then, wipe residual contaminants off with additional cloth.
  - Ensure personnel step out of and away from heavily contaminated boots and clothing.
  - Place disposable clothing and used cleaning materials into designated containers within the Disposal Staging Area.
  - Transfer all liquids used in decontamination to storage containers in the Disposal Staging Area.
- ❑ Monitor to ensure that decontamination procedures take place only within the Decontamination Area:
  - Assign monitoring to the Site Safety Assistant.

6.13 Waste Management

WASTE MANAGEMENT GUIDELINES

SCOPE

The following provides guidance on managing waste should the need be identified as a consequence of the response and recovery to an incident. The appropriate handling, storage, transport, disposal, and tracking of waste associated with a spill is essential for effective response and recovery to an incident.

Depending on the specific incident, some or all the noted activities may be actioned.

ACTIVITIES

- ❑ Identify types of waste generated during an incident response that would require controlled management and disposal.
- ❑ Treat and dispose hazardous and non-hazardous waste in a manner that complies with or exceeds the B.C. *Environmental Management Act,* the *Hazardous Waste Regulation*, the *Federal Transportation of Dangerous Goods Act* and regulations, and the WHMIS guidelines.
- ❑ Obtain appropriate permits for the storage, handling, and disposal of hazardous or special wastes.
- ❑ Secure appropriate contractors/service providers for waste transportation and disposal.
- ❑ Establish a Disposal Staging Area adjacent to the Decontamination Area for the temporary storage of:
  - Contaminated PPE, tools, and equipment that require more thorough cleaning than can be carried out on site.
  - Contaminated materials such as earth, mud, disposable decontamination aids (e.g., rags or sorbent pads).
- ❑ Equip the Disposal Staging Area with trash bags, bins, or drums to hold contaminated material, tools, or PPE.
- ❑ Process waste within the Disposal Staging Area:
  - Pump contaminated liquid waste into storage tanks.
  - Secure solid waste (e.g., earth) in poly bags or designated disposal bins.
  - Collect non-contaminated waste in bags, totes, or drums.
  - Place soiled, re-usable PPE in poly bags.
- ❑ Position transport vehicle(s) directly adjacent to the Disposal Staging Area prior to loading.
- ❑ Load waste containers and bags into a transport vehicle(s), ensuring no contaminated materials fall outside the *Disposal Staging Area.*
- ❑ Ensure proper transport manifesting is completed.
- ❑ Transport contaminated materials to the appropriate disposal site, obeying all appropriate provincial regulations.
- ❑ Complete and submit all required documentation to the EOC for filing.

6.14 Curtailment

CURTAILMENT GUIDELINES

SCOPE

The following provides guidance on the process of curtailment and would be referenced in emergencies that result in an impact to the transmission pipeline or a gas plant, with the potential to disrupt gas supply and result in customer supply interruptions. It provides considerations to take to maintain the system and provision of utility services.
Depending on the specific incident, some or all the noted activities may be actioned.
Note: There may be circumstances where Pipeline Gas Control will notify PNG when curtailment is necessary. PNG shall be responsible for determining, and notifying, interruptible customers, as per the process below.

ACTIVITIES

- ❑ Provide as much advance notice of the probability and/or necessity to curtail interruptible gas supply:
  - Written notice must be provided; if customer is notified by phone, follow-up with written confirmation.
- ❑ Identify the customers to be curtailed:
  - Curtailment will occur on a pro-rate basis.
  - Proration guidelines for industrial customers are provided in *Section 9.2.10 Customer Curtailment Lists:*
    - Subject to gas pipeline operating conditions, PNG may, in its discretion, only curtail the interruptible requirements of the large industrial customers due to the minor volumes of interruptible gas being consumed by the smaller industrial customers.
- ❑ Allocate the available interruptible gas to each customer based on their bona fide daily interruptible gas requirements:
  - An indicator of the customer's bona fide requirement is the consumption rate in effect just prior to when the need for curtailment arose.
  - The customer's bona fide interruptible requirement divided by all customers' interruptible requirements paying the same interruptible rate determines the customer's prorated share of the available interruptible gas.
- ❑ Issue the Notice of Curtailment:
  - State effective time.
  - State volume of gas, if any, that can be taken by the customer.
- ❑ Implement curtailment in the following order:
  - First Curtailment Level: large industrial customers
  - Second Curtailment Level: second level customers
  - Third Curtailment Level: commercial interruptible sales customers:
    - Commercial interruptible sales customers are required to have an alternative fuel source since all gas deliveries can be curtailed.
  - Fourth Curtailment Level: large commercial transport customers
- ❑ Issue media notice:
  - Use traditional and social media, requesting all customers make efforts to reduce consumption.

*Should customers utilize gas in excess of the volume specified by PNG in the Notice of Curtailment, unauthorized overrun charges, as specified in the customer's agreement with PNG, will be applied.

6.15 CNG/LNG Sourcing & Utilization for Emergency Circumstances

CNG/LNG SOURCING AND UTILIZATION PROCEDURE

SCOPE

The following provides guidance for incidents that impact the Transmission Pipeline or Tumbler Ridge Gas Plant, resulting in a disruption or potential interruption of natural gas supply to customers. It provides considerations to determine the feasibility of utilizing CNG or LNG to mitigate customer supply interruptions.

Note: Typically, CNG utilization is more effective for high pressure lines, whereas LNG utilization is more effective for lower pressure lines.

Depending on the specific incident, some or all the noted activities may be actioned.

ACTIVITIES

- ❑ Ensure "Make Safe" actions have been taken (see *Initial Make Safe Actions (immediate actions)*).
- ❑ Take steps to mitigate potential customer supply interruptions:
  - Shut in pipeline.
  - Curtail interruptible customers.
  - Request customers to reduce consumption.
- ❑ Assessing feasibility for the use of CNG or LNG will be dependent on the severity of the situation and several factors and variables including (but not limited to):
  - Forecasted amount of CNG/LNG required
    - Current and forecast loading requirement
    - Current line pack/flow
  - Timely availability of supply
  - Timely availability of equipment
  - Timely availability of transportation services
  - Access to appropriate location for insertion. Additional considerations include:
    - Road access
    - Isolation points
    - Compatibility of fittings
  - Distance and time to transport CNG/LNG to insertion point
- ❑ Make contact *as soon as possible* with CNG/LNG suppliers, transporters, and equipment suppliers to determine feasibility based on the timely availability of:
  - CNG/LNG Supply
  - CNG/LNG Transportation
  - Equipment, including:
    - CNG/LNG transport trailer(s)
    - CNG/LNG storage containers
    - Mobile vaporizer(s) (as applicable)
    - Mobile odorizer (as applicable)
    - Mercaptan supply (as applicable)
    - Hoses and compatible connectors
- ❑ Current options for suppliers, in no specific order, include the following:
  - Plum Gas Solutions

CNG/LNG SOURCING AND UTILIZATION PROCEDURE

- Campus Energy Partners
- CryoPeak
- Yukon Energy
- FortisBC
- Ferus (transportation)

Note – Contact information for the above listed CNG/LNG suppliers can be found in *Section 9 Contact Information*.

- ❑ Generate a Job-Specific CNG/LNG Safety and Logistics Plan with consideration for the following:
  - Collaborate with suppliers on the:
    - Availability of trained drivers and contingency strategy to support transportation of CNG/LNG to insertion point and support with ongoing CNG/LNG supply operation
    - Availability of skilled personnel to support the operation and insertion of CNG/LNG ongoing
  - Security requirements at the CNG/LNG insertion point
  - PPE requirements
  - Site requirements to manage on site equipment and supplies
  - Safety plan with consideration for just-in-time training to ensure the safety of personnel involved with the operation at the CNG/LNG insertion point
- ❑ Execute the plan for utilization of CNG/LNG once feasibility is confirmed, based on the timely availability of CNG/LNG supply, equipment, and an adequate CNG/LNG Safety and Logistics Plan.
- ❑ Closely monitor the transportation and insertion of CNG/LNG ongoing, and make modifications to the CNG/LNG Safety and Logistics Plan as required to ensure ongoing safety and effective use of CNG/LNG.

6.16 Mutual Assistance Procedure

MUTUAL ASSISTANCE PROCEDURE

SCOPE

The following provides guidance to request and/or provide mutual assistance to/from mutual assistance partners (member companies).

In the event additional resources are required to support incident response and/or recovery, PNG has mutual assistance agreements in place with industry partners.

Request for mutual assistance can be made at any time during the incident response/recovery process where additional resources are (or are anticipated to be) required, beyond PNG's internal resource capabilities. PNG will attempt to mobilize its own and contract staff before calling upon mutual assistance.

PNG may also **provide** mutual assistance if another utility encounters an emergency event that requires additional resources to support their response and/or recovery.

PNG has membership in the following mutual assistance agreements:

- TriSummit Utilities
- Canadian Gas Association (CGA) Mutual Assistance Agreement
- Northwest Mutual Assistance Agreement (NWMAA) (Gas Supply)

Authority to decide whether to activate or provide mutual assistance resides with the President or VP, Operations & Engineering.

The activities below have been broken down based on whether PNG is:

- Requesting mutual assistance
- Utilizing mutual assistance
- Providing mutual assistance

ACTIVITIES

Requesting Mutual Assistance

- ❑ Determine the scope of the incident:
  - Type of incident
  - Estimate of current and/or potential damages
  - Number of customers impacted or potentially impacted
  - Demographics
    - Location demographics (rural/urban/mountain)
    - Weather conditions (current/long term/extreme heat or cold)
    - Hazardous conditions (flooding, wildfire, smoke, etc.)
- ❑ Estimate the type and quantity of required additional resources including personnel, equipment, or natural gas supply:
  - Consider types of resources/work needed to support response and recovery, such as:
    - Construction/maintenance crews

MUTUAL ASSISTANCE PROCEDURE

- □ Dewatering crew
- □ Leak survey
- □ Welding
- □ Service restoration (relights)
- □ Meter sets
- □ Locating
- □ Other

❑ Determine the most applicable mutual assistance agreement to activate in response to the incident and resource requirements:
- ○ Consider the type of resources required (some agreements are for personnel, equipment, or natural gas supply)
- ○ Assess feasibility for the use of the resources. Considerations include:
  - □ Timely availability of resources
  - □ Ability of PNG and the community to meet the logistical needs for assisting crews
  - □ Associated economic costs
  - □ Assess any legal requirements

❑ Consult relevant mutual assistance agreements for details and requirements for requesting assistance.

❑ Initiate a mutual assistance mobilization call, per the protocols outlined in the applicable mutual assistance agreement:
- ○ Communicate details of the incident:
  - □ Provide a description of the work needed to address the emergency, ordered most urgent to least urgent.
  - □ Provide estimates of resources needed by type (i.e., personnel, equipment, materials, etc.):
    - Communicate any specific skill requirements and associated certification expectations.
  - □ Communicate any specific equipment and tool requirements.
  - □ Request from mutual assistance partners estimated quantities of resources the mutual assistance partners may or can provide, and the timing of availability.
- ○ Considerations for discussion, include:
  - □ Transportation concerns, including:
    - Current evacuation orders
    - Fuel availability and supply
    - Transportation exemptions
  - □ Staging areas to be used by assisting crews
  - □ Availability of mutual assistance partner's resources
    - Discuss crew rotations (i.e., every 2 weeks, 3 weeks, etc.).

❑ Discuss required release date of assisting resources.

❑ Obtain contact name and information for each mutual assistance partner's (possible and actual) liaison.

❑ Send a formal letter of invitation to the assisting mutual assistance partner(s) as per protocols outlined in the applicable mutual assistance agreement(s).

Utilizing Mutual Assistance (once approved)

❑ Appoint a Mutual Assistance Coordinator.

❑ Mutual Assistance Coordinator to:

MUTUAL ASSISTANCE PROCEDURE

- Coordinate logistical issues using mutual assistance agreement checklists or other sources, some considerations include:
  - Orientation and training; confirm responding resources certifications are valid for the work intended (seek exemptions if applicable)
  - Accommodations for assisting crews
  - Housing
  - Transportation
  - Administrative requirements
    - Assisting crew rotations
    - Level of supervision required/availability of PNG required supervision
      - Identify span of control
    - Safety personnel
    - Administrative support
  - Assess and prepare/address needs to ensure equipment compatibility (i.e., radios, pipe fittings, etc.)
- Collaborate with PNG Accounting, Legal, Regulatory, and HR to ensure administration and financial requirements are appropriately collected and documented and contractual considerations (assistance and union) are made, and to identify and manage risks.
- Establish a connection with the responding organization's liaison to:
  - Provide the name and contact information for the person(s) designated as PNG's Mutual Assistance Coordinator, Operations Liaison(s) and person(s) to be designated as supervisory personnel to accompany the mutual assistance support crews and equipment.
  - Provide the code of conduct expected of mutual assistance support personnel.
  - Provide deployment details including:
    - Name, title, and contact information of person to report to
    - Staging Area address and information for checking in
    - When PNG expects/requires the mutual assistance partner resources to arrive
    - What the anticipated duration of the assistance request is
    - The location of secured parking for staged equipment and vehicles
- Ensure mutual assistance support personnel have required supplies (i.e., vehicles, any special tools/material, etc.).
- Provide support, assist with challenges, and regularly communicate with assisting partner(s).
- Assist in demobilization of mutual assistance support personnel:
  - Arrange for transportation routes and travel details to return resources.

Providing Mutual Assistance

- ❑ Participate on mutual assistance mobilization call to understand the circumstances of the incident and resource requirements being requested by the requesting agency.
- ❑ Assess the assistance request and risk to PNG responders, based on the information gathered from the call; consider:
  - Type of incident
  - Estimate of current and/or potential damages
  - Number of those impacted or potentially impacted
  - Demographics
    - Location demographics (rural/urban/mountain)

MUTUAL ASSISTANCE PROCEDURE

- Weather conditions (current/long term/extreme heat or cold)
- Hazardous conditions (flooding, fire, smoke, aftershock, etc.)

- ❑ Determine whether providing mutual assistance is feasible for PNG; consider:
  - Implications to internal response capability (availability of personnel and/or equipment)
  - Safety considerations based on the scope of the incident and related hazards
  - Availability of qualified PNG personnel to provide the assistance requested
  - Availability and location of remaining PNG personnel; confirm ability to continue to meet PNG needs and response times
    - Relocate, if necessary, to meet PNG needs
  - Availability of compatible equipment to provide the assistance requested
  - Availability and location of remaining PNG response equipment/tools; confirm ability to continue to meet PNG needs and response times
    - Relocate, if necessary, to meet PNG needs
  - Financial or reputational implications
- ❑ Respond to request within 24 hours of the first call and be prepared to provide an estimate of the number of employees available to assist.
- ❑ Obtain confirmation from President or VP, Operations & Engineering that PNG will provide assistance:
  - Receive letter of invitation to assist from requesting organization (per protocols outlined in the applicable mutual assistance agreement).
  - Sign letter of invitation and return to requesting organization:
    - Authority to decide whether to provide mutual assistance resides with the President or VP, Operations & Engineering
- ❑ Do not release or dispatch any resources (contract or in-house) unless committed to and confirmed by the requesting organization.
- ❑ Assess requirements in order to perform assistance work, including:
  - Employee logistics; Confirm:
    - Employee certifications are valid for the work intended
    - Number of employees available
    - Required supervision
    - Duration of assistance
  - Skill requirements
    - Certification expectations
  - Tool/equipment requirements
    - Determine if there is a need to send material supplies (i.e., pipe fittings, regulators, etc.)
  - Travel requirements and accommodations, including cross-border travel
  - Legal requirements/contractual obligations
- ❑ Issue request for employee interest to initiate planning process; in coordination with PNG Human Resources.
- ❑ Determine team, confirm route, plan accommodations, mobilize vehicle, etc.
- ❑ Complete any necessary paperwork, as required.

6.17 Serious Injury/Fatality

SERIOUS INJURY /FATALITY PROCEDURE

SCOPE

Guidance on managing serious injury or fatality occurring to individuals who are in the HPZ at the time of the incident, or responders injured while performing their duties.

ACTIVITIES

Refer to PNG HR policies and guidelines.

7 RESPONSE RESOURCES & CONTRACTORS

7.1 Equipment

7.1.1 Personal Equipment

PNG Operations personnel who could be dispatched as a responder to a gas incident should have the following as standard personal equipment:

PERSONAL EMERGENCY EQUIPMENT	
• Combustible gas indicator	• Gloves
• Fire-resistant coveralls	• Hearing protection
• Hard hat	• First aid kit
• Safety eyewear	• Cell phone
• Safety footwear	• Flashlight (with extra batteries)
• High-visibility apparel	• Notepad, pen, pencil

7.1.2 Transmission Pipeline Emergency Equipment

NORTHEAST EMERGENCY EQUIPMENT		
Description	**Fort St. John**	**Dawson Creek**
Welding equipment	**Yes**	**Yes**
Purging equipment	**Yes**	**Yes**
Pre-tested pipe	**Yes**	**No**

NORTHWEST EMERGENCY EQUIPMENT		
Description	**Terrace**	**Burns Lake**
Welding equipment	**Yes**	**Yes**
Purging equipment	**Yes**	**Yes**
Pre-tested pipe	**Yes**	**Yes**

7.2 Suppliers & Services

Agreements have been established between PNG and major contractors to provide assistance during emergency conditions. Pre-qualified contractors will follow PNG standard practices so safety is not compromised.

Specific contact information can be found in *Section 9 Contact Information*.

7.3 Mutual Aid

In the event additional resources are required to support the response and/or recovery, PNG has signed mutual assistance agreements with other utility companies. PNG will attempt to mobilize its own and contract staff before calling upon mutual aid.

PNG has membership in the following mutual assistance agreements:

- TriSummit Utilities
- Canadian Gas Association (CGA) Mutual Assistance Agreement
- Northwest Mutual Assistance Agreement (NWMAA) (Gas Supply)

The mutual assistance agreements are stored in the Corporate Office in Vancouver. Copies can be obtained through the Manager, EH&S or the VP, Operations and Engineering.

When discussing the option to activate a mutual aid agreement, impacts and considerations regarding the following should be assessed:

- Operations
- Human resources/labour relations
- Logistics
- Communications
- Legal
- Regulatory
- Insurance
- Finance

PNG may also be requested to provide mutual assistance to another utility when they encounter an emergency event that requires additional resources to support their response and/or recovery.

For more information see *Section 6.16 Mutual Assistance Procedure*.

8 SAFETY DATA SHEETS

Odorized methane is transported through PNG's Transmission Pipeline system. The following Safety Data Sheets (SDS) detail who supplies the product, its recommended use, and measures to be taken if there is an accidental release or if first aid is required:

8.1 Natural Gas

SUBSTANCE	NATURAL GAS (METHANE)
	Natural Gas SDS
CAS No.	74-82-8
Chemical Formula:	CH_4
Appearance:	colourless, odourless gas
Flash Point:	-221^0C
Auto Ignition Temp.:	537^0C
Lower Explosive Limit:	5% (will vary with composition of the gas)
Upper Explosive Limit:	15% (will vary with composition of the gas)
Location:	The distribution and transmission pipelines operated by PNG contain sweet natural gas. Fugitive emissions and equipment failures may result in the release of natural gas to the atmosphere.
Hazard:	Extremely flammable. Simple asphyxiant - high concentrations can displace oxygen in air and cause suffocation.
BC Exposure Limit:	Short-term exposure limit (STEL)/ceiling 1000 ppm
Precautions:	Natural gas will usually dissipate harmlessly in the air, but it is highly combustible and will displace oxygen. Ignition sources must be eliminated in processing areas. Gas detection equipment should be maintained and calibrated as recommended by the manufacturer.

PNG PACIFIC NORTHERN GAS

Natural Gas
Revision date: July 31, 2017

SAFETY DATA SHEET

Section 1: Identification

1.1 Product identifier:

Natural Gas

Other means of Identification: Aliphatic hydrocarbon mixture (Alkanes C_1 - C_4); primarily Methane (C_1)

1.2 Recommended use:

Identified uses: Natural gas in distribution pipeline as fuel for household uses.

Restrictions on use: For use only within regulated transmission pipelines.

1.3 Supplier:

Pacific Northern Gas Ltd.
Suite 2550 – 1066 West Hastings Street
Vancouver, British Columbia
Canada V6E 3X2
Tel.: (604) 691-5680 Fax: (604) 697-6210

1.4 Emergency telephone number (24-hour):

1 800 663-1173

Section 2: Hazard Identification

2.1 Classification:

Flammable Gas, Cat. 1; H220
Gases under pressure – Compressed gas; H280
Simple asphyxiant Cat. 1

2.2 Label elements:

Danger
Extremely flammable gas.
Contains gas under pressure; may explode if heated.
May displace oxygen and cause rapid suffocation.

Prevention:

Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

Response:

Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
In case of leakage, eliminate all ignition sources.

2.3 Other hazards:

Compressed gas rapidly releasing from containment can cause freezing of tissue (frostbite).

Section 3: Composition / Information on Ingredients

Chemical Name	CAS No.	Wt.%
Natural gas	8006-14-2	100
Mixture of the following components:		
Methane	74-82-8	95 – 99.9
Ethane	74-84-0	1 - 3
Propane	74-98-6	1
Butane	106-97-8	<1
Mercaptan odourant	Mixture 74-93-1 + 75-01-8	0.0003 (3 ppm)

PNG PACIFIC NORTHERN GAS

Natural Gas
Revision date: July 31, 2017

SAFETY DATA SHEET

Section 4: First-Aid Measures

4.1 Description of first-aid measures:

This material is an extremely flammable gas. First aid providers should take precautions to ensure their safety before attempting rescues (e.g. remove any source of ignition, use a buddy system, wear a respirator). A smell of rotten eggs from the odourant (mercaptan) is a warning to the presence of a gas leak.

Inhalation: If symptoms develop move victim to fresh air and keep comfortable for breathing. If breathing has stopped, call 911, trained personnel should begin rescue breathing or if the heart has stopped, immediately start cardiopulmonary resuscitation (CPR). Immediately call a poison center or doctor.

Eye Contact: If eye irritation develops, move victim to fresh air. Flush eyes with clean water or eye-wash saline. In case of freezing or frostbite from rapidly releasing compressed gas: get emergency medical attention.

Skin Contact: In case of freezing or frostbite from rapidly releasing compressed gas: Remove source of exposure. For brief contact with a small amount: Rewarm with body heat. For extensive contact with a large amount: Call 911 to get immediate medical attention.

Ingestion: Not an applicable route of exposure.

4.2 Most important symptoms and effects, acute and delayed:

Inhalation: Natural gas in high concentrations in the air displaces oxygen and may cause suffocation. Symptoms of exposure may include increased breathing and pulse rate, loss of muscular coordination, emotion upset, abnormal fatigue from exertion, dizziness, nausea, gasping and possible loss of consciousness.

Eye and Skin Contact: Gas leak in air, may cause reversible eye irritation. Close contact with compressed gas rapidly releasing from containment can cause freezing of tissue (frostbite).

4.3 Indication of any immediate medical attention and special treatment needed:

In case of asphyxiation or loss of consciousness emergency medical attention is required.

4.4 Medical Conditions Aggravated by Exposure:

Not available

Section 5: Fire-fighting Measures

5.1 Extinguishing media:

Do not extinguish a leaking gas fire unless leak can be stopped. Shut off flow of gas from a safe location.
Small fire: Dry chemical or CO_2.
Large fire: Water spray or fog.
Unsuitable extinguishing media: Not available

5.2 Special hazards arising from the product:

Extremely flammable gas. Will be easily ignited by heat, sparks or flames. Will form explosive mixtures with air.
Ignition of a large volume of gas vapour mixed with air causes sudden expansion and turbulence resulting in an explosion known as vapour cloud explosion.
Natural gas can accumulate in confined spaces and low areas, resulting in an explosion and asphyxiation hazard.

SAFETY DATA SHEET

5.3 Special protective equipment and precautions for fire-fighters:

Shut off flow of gas from a safe location.
For public safety, isolate the spill or leak area for at least 100 meters in all directions. Keep unauthorized personnel away. Stay upwind. Keep out of low areas.
Wear positive pressure self-contained breathing apparatus and thermal-protective fire-fighter's clothing.
Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
Do not direct water at source of leak or safety devices; icing may occur.
Withdraw immediately in case of rising sound from venting safety devices.
For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.
If a tank is involved in a fire, isolate for 1600 m in all directions; also consider initial evacuation for 1600 m in all directions.

Section 6: Accidental Release Measures

6.1 Personal precautions, protective equipment and emergency procedures:

Evacuate the area. Shut off flow of gas from a safe location. Extinguish all sources of ignition (sparks, flames and internal combustion engines). No smoking. Remove sources of heat. Move to a safe location and stay upwind of the gas leak.

If a leak is suspected:

1. Do not start your vehicle or any equipment that could be a potential ignition source near the suspected leak.
2. Do not turn on lights or appliances powered by electricity, batteries (including portable phones) or natural gas.
3. Do not use a match or lighter.
4. Report gas leak incidents immediately.

6.2 Environmental precautions:

Prevent spreading of flammable gases through sewers, ventilation systems and into confined spaces.

6.3 Methods and material for containment and cleaning up:

Isolate the area until the gas has dispersed. Monitor workplace air for levels of oxygen and flammable gas before anyone is allowed into area. Pay special attention to low-lying areas where the gas may have accumulated.

Section 7: Handling and Storage

7.1 Precautions for safe handling:

Must be handled only by trained personnel under approved operating procedures that comply with the codes, regulations, technical standards and specifications for gas distribution systems of the municipality, province and Government of Canada.
Observe handling regulations for compressed flammable gases in distribution systems.

7.2 Conditions for safe storage:

Comply with regulations for compressed flammable gases in pipelines.

Section 8: Exposure Controls / Personal Protection

8.1 Control parameters:

Ingredient	ACGIH® TLV®	Other Exposure Limits
Aliphatic hydrocarbon gases – Alkane [C1 – C4]	Minimal oxygen content (appendix F) Explosion hazard	TWA: 1000 ppm British Columbia, Alberta, Ontario

8.2 Exposure controls:

Engineering controls: Methods include mechanical ventilation (dilution and local exhaust). Provide sufficient local exhaust and general (dilution) ventilation to maintain the gas concentration below one tenth of the lower explosive limit. Use a non-sparking, grounded ventilation system separate from other exhaust ventilation systems. Administrative controls and personal protective equipment may also be required.
For large-scale operations handling compressed flammable gas, consider installation of leak and fire detection equipment and a suitable automatic fire suppression system.

PACIFIC NORTHERN GAS

Natural Gas
Revision date: July 31, 2017

SAFETY DATA SHEET

8.3 Individual protection measures:

Eye/Face protection: Wear safety glasses with side-shields.

Skin protection: Wear thermal protective gloves. Wear fire-retardant work clothing.

Respiratory protection: In workplaces where airborne vapour concentrations exceed exposure limits, use a combination of engineering controls (e.g. ventilation) and personal protection (e.g. wear an approved supplied-air respirator). Consult safety supplier for respirator specifications.

Other protection: A respiratory protection program that meets the regulatory requirement, such as Canadian Standards Association (CSA) Standard Z94.4, must be followed whenever workplace conditions warrant a respirator's use.

Section 9: Physical and Chemical Properties

9.1 Information on basic physical and chemical properties:

Appearance:	Gas. Colourless, invisible.
Odour:	Odour of rotten eggs from added odourant (mercaptan)
Odour threshold:	Not available
pH:	Not applicable
Melting point/freezing point:	-182°C (-296°F) for methane
Initial boiling point and boiling range:	-162°C (-259°F) for methane
Flash point:	Not available
Flammability (solid, gas):	Extremely flammable gas.
Upper/lower flammability or explosive limits:	LEL: 5% for methane UEL: 15.4% for methane
Evaporation rate:	Evaporates rapidly at room temperature
Vapour pressure:	Not available
Vapour density:	0.055 (air = 1)
Relative density:	Not applicable
Solubility (ies):	Insoluble in water
Partition coefficient (n-octanol/water):	Not available
Auto-ignition temperature:	537°C (999°F) for methane
Decomposition temperature:	Not available
Viscosity:	Not applicable

Section 10: Stability and Reactivity

10.1 Reactivity:

Reactions with strong oxidizing agents and halogen compounds increase the risk of fire and explosion.

10.2 Chemical stability:

Stable. Releases of compressed gas to air are extremely flammable or explosive in the presence of an ignition source. May cause a flash fire.

10.3 Possibility of hazardous reactions:

Contact with strong oxidizing agents and halogens increase the risk of fire and explosion.

10.4 Conditions to avoid:

Avoid releases of natural gas to air.
Avoid exposure to heat and ignition sources.
Avoid contact with incompatible materials.

10.5 Incompatible materials:

Avoid contact with oxygen and strong oxidizing agents (e.g. chlorine, fluorine, peroxides, nitrates and perchlorates) which can increase risk of fire and explosion. Incompatible with halogen compounds (e.g. chlorine gas), contact may cause an explosion.

Pure Methane gas is corrosive to acrylonitrile butadiene styrene (ABS) and high density polyethylene (HDPE). Slightly corrosive to polypropylene.

10.6 Hazardous decomposition products:

Combustion produces carbon dioxide and carbon monoxide.

Section 11: Toxicological Information

11.1 Information on toxicological effects:

Likely routes of exposure

Inhalation; Skin contact; Eye contact.

Acute toxicity

Inhalation: Natural Gas in high concentrations in the air displaces oxygen and can cause symptoms of oxygen deprivation (asphyxiation). Natural gas concentration of greater than 14% (140 000 ppm) will displace oxygen (O_2) to 18% in air and cause oxygen deprivation.
Symptoms of oxygen deficiency are:
O_2=12-16% - breathing and pulse rate are increased, with slight loss of muscular coordination;
O_2=10-14% - emotional upsets, abnormal fatigue from exertion, disturbed respiration;
O_2=6-10% - nausea and vomiting, inability to move freely, collapse, possible loss of consciousness;
O_2=below 6% - convulsive movements, gasping, possible respiratory collapse and death.

Exercise increases the body's need for oxygen, symptoms will occur more quickly during exertion in an oxygen-deficient environment.
Ingestion: Not a likely route of exposure.

Skin: Not absorbed through the skin.

Skin corrosion / irritation

Close contact with compressed gas rapidly releasing from containment can cause freezing of tissue (frostbite).

Serious eye damage / irritation

Close contact with compressed gas rapidly releasing from containment can cause freezing of tissue (frostbite).

STOT (Specific Target Organ Toxicity) – Single exposure

Natural gas component propane, and some other closely related aliphatic hydrocarbons (isobutane and butane), are weak cardiac sensitizers in humans following inhalation exposures to high concentrations. Cardiac sensitizers may cause the sudden onset of an irregular heartbeat (arrhythmia) and, in some cases, sudden death, particularly when under stress.
At high concentrations, the components of Natural gas can cause depression of the central nervous system (CNS) based on animal and human information. Unconsciousness (narcosis) from inhalation of ethane has been observed due to CNS depression at approximately 130000 ppm (13%).
Unconsciousness (narcosis) from inhalation of butane has been observed due to CNS depression at approximately 17000 ppm (1.7%).

STOT (Specific Target Organ Toxicity) – Repeated exposure

Data not available

Aspiration hazard

Does not meet criteria for classification for aspiration toxicity.

Sensitization - respiratory and/or skin

Data not available.

SAFETY DATA SHEET

11.1 Information on toxicological effects (continued):

Carcinogenicity

This mixture does not contain any component that is considered a human carcinogen by IARC (International Agency for Research on Cancer), ACGIH (American Conference of Governmental Industrial Hygienists, OSHA (Occupational Safety and Health Administration) or NTP (National Toxicology Program).

Reproductive toxicity

Data not available

Germ cell mutagenicity

Not known to be mutagenic.

Interactive effects

Data not available

Section 12: Ecological Information

12.1 Toxicity:

Natural gas is not expected to result in any ecological damage to water or land. VOC gases are reportable to the National Pollutant Release Inventory, Environment Canada. Methane is regulated as a greenhouse gas.

12.2 Persistence and degradability:

Inherently bio-degradable.

12.3 Bioaccumulative potential:

Not applicable

12.4 Mobility in soil:

Data not available

Section 13: Disposal Considerations

13.1 Disposal methods:

An appropriate flare in a safe location. Dispose of waste natural gas in accordance with applicable local, provincial and federal regulations. Contact local authorities for disposal of large quantities of product.

Section 14: Transport Information

14.1 Canada Transportation of Dangerous Goods (TDG) Regulations:

UN1971, NATURAL GAS, COMPRESSED with high methane content, Class 2.1

Emergency Response Guide 115

Section 15: Regulatory Information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture:

Canada

National Pollutant Release Inventory: VOC gases are NPRI reportable substances.

NSNR status: All ingredients are listed on the DSL or are not required to be listed.

USA

TSCA status: All ingredients are on the TSCA Inventory or are exempt from TSCA Inventory requirements.

PNG PACIFIC NORTHERN GAS

Natural Gas
Revision date: July 31, 2017

SAFETY DATA SHEET

Section 16: Other Information

Revision date:

July 31, 2017

References and sources for data:

CCOHS Cheminfo
HSDB® – Hazardous Substances Data Bank®
NIOSH Pocket Guide
CNESST – Commission des normes, de l'équité de la santé et de la sécurité du travail

Legend to abbreviations:

ACGIH – American Conference of Governmental Industrial Hygienists
OSHA - Occupational Safety and Health Administration
TWA – Time weighted average
TLV - Threshold Limit Value
VEMP – Valeur d'exposition moyenne pondérée
WHMIS – Workplace Hazardous Materials Information System.

Additional information:

The Supplier (as identified in Section 1.3 of this SDS) and its affiliates make no representation or warranty (express or implied) of any kind, and without limiting the generality of the foregoing as to the completeness or accuracy of the information contained in this safety data sheet ("SDS"). This SDS is intended only as a guide to the appropriate handling of the product by properly trained personnel using suitable precautions. Individuals receiving this SDS must exercise their independent judgment in determining its appropriateness for a particular purpose. The Supplier. and its affiliates will not be liable for any damages or injuries which may result from the use of or reliance on this SDS. This SDS is only for the use of the customers (and their employees and agents) of the Supplier and its affiliates, and any distribution of this SDS by such customers to third parties is prohibited without the written consent of the Supplier.

8.2 Scentinel® S-20 Gas Odorant

SAFETY DATA SHEET

Chevron Phillips Chemical Company LP

Scentinel® A Gas Odorant

Version 3.3 Revision Date 2020-06-16

According to Regulation (EC) No. 1907/2006, Regulation (EC) No. 2015/830

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1

Product information

Product Name : Scentinel® A Gas Odorant
Material : 1119674, 1119564, 1106807, 1098462, 1102596, 1086453, 1098407, 1086452, 1102264, 1072060, 1098463, 1103512, 1070006, 1024777, 1024776, 1024775, 1024774, 1029441, 1029442, 1029443, 1029444, 1029445

EC-No.Registration number

Chemical name	CAS-No. EC-No. Index No.	Legal Entity Registration number
Ethyl Mercaptan	75-08-1 200-837-3 016-022-00-9	Chevron Phillips Chemicals International NV 01-2119491286-30-0000

1.2

Relevant identified uses of the substance or mixture and uses advised against

Relevant Identified Uses Supported : Manufacture of Ethanethiol used under Strictly Controlled Conditions
Use at Industrial Site - Intermediate
Injection as odorant in Liquified Petroleum Gas under Strictly Controlled Conditions – Industrial
Injection as odorant in Liquified Petroleum Gas under Strictly Controlled Conditions – Consumer

1.3

Details of the supplier of the safety data sheet

Company : Chevron Phillips Chemical Company LP
10001 Six Pines Drive
The Woodlands, TX 77380

Local : Chevron Phillips Chemicals International N.V.
Airport Plaza (Stockholm Building)
Leonardo Da Vincilaan 19
1831 Diegem
Belgium

SDS Number:100000068741 1/19

SDS Requests: (800) 852-5530
Technical Information: (832) 813-4862
Responsible Party: Product Safety Group
Email:sds@cpchem.com

1.4

Emergency telephone:

Health:
866.442.9628 (North America)
1.832.813.4984 (International)
Transport:
CHEMTREC 800.424.9300 or 703.527.3887(int'l)
Asia: CHEMWATCH (+612 9186 1132) China: 0532 8388 9090
EUROPE: BIG +32.14.584545 (phone) or +32.14583516 (telefax)
Mexico CHEMTREC 01-800-681-9531 (24 hours)
South America SOS-Cotec Inside Brazil: 0800.111.767 Outside Brazil: +55.19.3467.1600
Argentina: +(54)-1159839431

Responsible Department	:	Product Safety and Toxicology Group
E-mail address	:	SDS@CPChem.com
Website	:	www.CPChem.com

ODOR-FADE WARNING

A GAS LEAK CAN CAUSE A FIRE OR EXPLOSION RESULTING IN SERIOUS INJURY OR DEATH.

Be aware that the stenching chemical added to gas to make it detectable may not warn of a gas leak or the presence of propane or natural gas to all persons in every instance.

Instances where the odorant in an odorized gas may be undetectable include:

• Odor intensity may fade or be eliminated for a variety of chemical and physical causes, including the oxidation of rusting pipes, adsorption into or sticking onto the interior of pipes or appliances, or absorption into liquids.
• Contact with soil in underground leaks may de-odorize or remove odorant from the gas.
• Some people have a diminished ability, or inability to smell the stench. Factors that negatively affect a person's sense of smell include age, gender, medical conditions, and alcohol/tobacco usage.
• The stench of odorized gas may not awaken sleeping persons.
• Other odors may mask or hide the stench.
• Exposure to the odor for even a short period of time, may cause nasal fatigue, where a person can no longer smell the stench.

Gas detectors listed by the Underwriters Laboratories (UL) can be used as an extra measure of safety for detecting gas leaks, especially under conditions where the odorant alone may not provide an adequate warning. Gas detectors emit a loud, shrill sound when gas is present and do not depend on sense of smell. Because the odor intensity can fade or people may have problems with their sense of smell, we recommend installing, per manufacturer's instructions, one or more combustible gas detectors, in suitable locations to ensure adequate coverage to detect gas leaks.

Educate yourself, your employees, and your customers with the content of this warning and other important facts associated with the so-called "odor-fade phenomenon."

SECTION 2: Hazards identification

2.1

Classification of the substance or mixture
REGULATION (EC) No 1272/2008

Flammable liquids, Category 1	H224: Extremely flammable liquid and vapor.
Acute toxicity, Category 4	H302: Harmful if swallowed.
Acute toxicity, Category 4	H332: Harmful if inhaled.
Skin sensitization, Sub-category 1B	H317: May cause an allergic skin reaction.
Short-term (acute) aquatic hazard, Category 1	H400: Very toxic to aquatic life.
Long-term (chronic) aquatic hazard, Category 1	H410: Very toxic to aquatic life with long lasting effects.

2.2

Labeling (REGULATION (EC) No 1272/2008)

Hazard pictograms :

Signal Word : Danger

Hazard Statements :

H224	Extremely flammable liquid and vapor.
H302 + H332	Harmful if swallowed or if inhaled.
H317	May cause an allergic skin reaction.
H410	Very toxic to aquatic life with long lasting effects.

Precautionary Statements :

Prevention:

P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P233	Keep container tightly closed.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection/ hearing protection.

Response:

P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P391	Collect spillage.

Storage:

P403 + P235	Store in a well-ventilated place. Keep cool.

Hazardous ingredients which must be listed on the label:

- 75-08-1 Ethyl Mercaptan

SAFETY DATA SHEET

Scentinel® A Gas Odorant

Version 3.3 Revision Date 2020-06-16

SECTION 3: Composition/information on ingredients

3.1 - 3.2
Substance or Mixture

Synonyms : ETSH
Ethanethiol
Ethyl Mercaptan

Molecular formula : C2H6S

Hazardous ingredients

Chemical name	CAS-No. EC-No. Index No.	Classification (REGULATION (EC) No 1272/2008)	Concentration [wt%]
Ethyl Mercaptan	75-08-1 200-837-3 016-022-00-9	Flam. Liq. 1; H224 Acute Tox. 4; H302 Acute Tox. 4; H332 Skin Sens. 1B; H317 Aquatic Acute 1; H400 Aquatic Chronic 1; H410	99

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1
Description of first-aid measures

General advice : Move out of dangerous area. Show this material safety data sheet to the doctor in attendance. Material may produce a serious, potentially fatal pneumonia if swallowed or vomited.

If inhaled : If unconscious, place in recovery position and seek medical advice. If symptoms persist, call a physician.

In case of skin contact : If on skin, rinse well with water. If on clothes, remove clothes.

In case of eye contact : Flush eyes with water as a precaution. Remove contact lenses. Protect unharmed eye. Keep eye wide open while rinsing. If eye irritation persists, consult a specialist.

If swallowed : Keep respiratory tract clear. Never give anything by mouth to an unconscious person. If symptoms persist, call a physician. Take victim immediately to hospital.

SECTION 5: Firefighting measures

Flash point : -48°C (-54°F)

Autoignition temperature : 295°C (563°F)

5.1
Extinguishing media

Suitable extinguishing media : Alcohol-resistant foam. Carbon dioxide (CO2). Dry chemical.

Unsuitable extinguishing media	:	High volume water jet.

5.2

Special hazards arising from the substance or mixture

Specific hazards during fire fighting	:	Do not allow run-off from fire fighting to enter drains or water courses.

5.3

Advice for firefighters

Special protective equipment for fire-fighters	:	Wear self-contained breathing apparatus for firefighting if necessary.
Further information	:	Collect contaminated fire extinguishing water separately. This must not be discharged into drains. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations. For safety reasons in case of fire, cans should be stored separately in closed containments. Use a water spray to cool fully closed containers.
Fire and explosion protection	:	Do not spray on an open flame or any other incandescent material. Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapors). Use only explosion-proof equipment. Keep away from open flames, hot surfaces and sources of ignition.
Hazardous decomposition products	:	Carbon oxides. Sulfur oxides.

SECTION 6: Accidental release measures

6.1

Personal precautions, protective equipment and emergency procedures

Personal precautions	:	Use personal protective equipment. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapors accumulating to form explosive concentrations. Vapors can accumulate in low areas.

6.2

Environmental precautions

Environmental precautions	:	Prevent product from entering drains. Prevent further leakage or spillage if safe to do so. If the product contaminates rivers and lakes or drains inform respective authorities.

6.3

Methods and materials for containment and cleaning up

Methods for cleaning up	:	Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13).

6.4

Reference to other sections

Reference to other sections	:	For personal protection see section 8. For disposal considerations see section 13.

SAFETY DATA SHEET

Scentinel® A Gas Odorant

Version 3.3 Revision Date 2020-06-16

SECTION 7: Handling and storage

7.1

Precautions for safe handling
Handling

Advice on safe handling	:	Avoid formation of aerosol. Do not breathe vapors/dust. Avoid exposure - obtain special instructions before use. Avoid contact with skin and eyes. For personal protection see section 8. Smoking, eating and drinking should be prohibited in the application area. Take precautionary measures against static discharges. Provide sufficient air exchange and/or exhaust in work rooms. Open drum carefully as content may be under pressure. Dispose of rinse water in accordance with local and national regulations. Persons susceptible to skin sensitization problems or asthma, allergies, chronic or recurrent respiratory disease should not be employed in any process in which this mixture is being used.
Advice on protection against fire and explosion	:	Do not spray on an open flame or any other incandescent material. Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapors). Use only explosion-proof equipment. Keep away from open flames, hot surfaces and sources of ignition.

7.2

Conditions for safe storage, including any incompatibilities

Storage

Requirements for storage areas and containers	:	No smoking. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Observe label precautions. Electrical installations / working materials must comply with the technological safety standards.

SECTION 8: Exposure controls/personal protection

8.1

Control parameters
Ingredients with workplace control parameters

SK

Zložky	Podstata	Hodnota	Kontrolné parametre	Poznámka
Ethyl Mercaptan	SK OEL	NPEL priemerný	0,5 ppm, 1,3 mg/m3	
	SK OEL	NPEL krátkodobý	1 ppm, 2,6 mg/m3	

SI

Sestavine	Osnova	Vrednost	Parametri nadzora	Pripomba
Ethyl Mercaptan	SI OEL	MV	0,5 ppm, 1,3 mg/m3	
	SI OEL	KTV	1 ppm, 2,6 mg/m3	

RO

Componente	Sursă	Valoare	Parametri de control	Notă
Ethyl Mercaptan	RO OEL	STEL	1 mg/m3	

PT

Componentes	Bases	Valor	Parâmetros de controlo	Nota
Ethyl Mercaptan	PT OEL	VLE-MP	0,5 ppm,	

SAFETY DATA SHEET

Scentinel® A Gas Odorant

Version 3.3 Revision Date 2020-06-16

PL

Składniki	Podstawa	Wartość	Parametry dotyczące kontroli	Uwaga
Ethyl Mercaptan	PL NDS	NDS	1 mg/m3	
	PL NDS	NDSch	2 mg/m3	

NO

Komponenter	Grunnlag	Verdi	Kontrollparametrer	Nota
Ethyl Mercaptan	FOR-2011-12-06-1358	GV	0,5 ppm, 1 mg/m3	

MK

Съставки	Основа	Стойност	Параметри на контрол	Бележка
Ethyl Mercaptan	MK OEL	MV	0,5 ppm, 1,3 mg/m3	

LV

Sastāvdaļas	Bāze	Vērtība	Pārvaldības parametri	Piezīme
Ethyl Mercaptan	LV OEL	AER 8 st	1 mg/m3	

LT

Komponentai	Šaltinis	Vertė	Kontrolės parametrai	Pastaba
Ethyl Mercaptan	LT OEL	IPRD	1 mg/m3	O,

O patekimas per nepažeistą odą

IS

Komponenter	Grunnlag	Verdi	Kontrollparametrer	Nota
Ethyl Mercaptan	IS OEL	TWA	0,5 ppm, 1 mg/m3	

IE

Components	Basis	Value	Control parameters	Note
Ethyl Mercaptan	IE OEL	OELV - 8 hrs (TWA)	0,5 ppm,	

HU

Komponensek	Bázis	Érték	Ellenőrzési paraméterek	Megjegyzés
Ethyl Mercaptan	HU OEL	AK-érték	1 mg/m3	i,
	HU OEL	CK-érték	1 mg/m3	i,

i Ingerlő anyag (izgatja a bőrt, nyálkahártyát, szemet vagy mindhármat)

HR

Sastojci	Temelj	Vrijednost	Nadzorni parametri	Bilješka
Ethyl Mercaptan	HR OEL	GVI	0,5 ppm, 1,3 mg/m3	
	HR OEL	KGVI	2 ppm, 5,2 mg/m3	

GR

Συστατικά	Βάση	Τιμή	Παράμετροι ελέγχου	Σημείωση
Ethyl Mercaptan	GR OEL	TWA	10 ppm, 25 mg/m3	
	GR OEL	STEL	10 ppm, 25 mg/m3	

GB

Components	Basis	Value	Control parameters	Note
Ethyl Mercaptan	GB EH40	TWA	0,5 ppm, 1,3 mg/m3	
	GB EH40	STEL	2 ppm, 5,2 mg/m3	

FR

Composants	Base	Valeur	Paramètres de contrôle	Note
Ethyl Mercaptan	FR VLE	VME	0,5 ppm, 1 mg/m3	Valeurs limites indicatives,

Valeurs limites indicatives Valeurs limites indicatives

FI

Aineosat	Peruste	Arvo	Valvontaa koskevat muuttujat	Huomautus
Ethyl Mercaptan	FI OEL	HTP-arvot 15 min	0,5 ppm, 1,3 mg/m3	

ES

Componentes	Base	Valor	Parámetros de control	Nota
Ethyl Mercaptan	ES VLA	VLA-ED	0,5 ppm, 1,3 mg/m3	

EE

Komponendid, osad	Alused	Väärtus	Kontrolliparameetrid	Märkused
Ethyl Mercaptan	EE OEL	Piirnorm	0,5 ppm, 1 mg/m3	C,

C Kantserogeensed ained

SDS Number:100000068741 7/19

DK

Komponenter	Basis	Værdi	Kontrolparametre	Note
Ethyl Mercaptan	DK OEL	GV	0,5 ppm, 1 mg/m3	

DE

Inhaltsstoffe	Grundlage	Wert	Zu überwachende Parameter	Bemerkung
Ethyl Mercaptan	DE TRGS 900	AGW	0,5 ppm, 1,3 mg/m3	

CH

Inhaltsstoffe	Grundlage	Wert	Zu überwachende Parameter	Bemerkung
Ethyl Mercaptan	CH SUVA	MAK-Wert	0,5 ppm, 1,3 mg/m3	
	CH SUVA	KZGW	1 ppm, 2,6 mg/m3	

BG

Съставки	Основа	Стойност	Параметри на контрол	Бележка
Ethyl Mercaptan	BG OEL	TWA	1 mg/m3	

BE

Bestanddelen	Basis	Waarde	Controleparameters	Opmerking
Ethyl Mercaptan	BE OEL	TGG 8 hr	0,5 ppm, 1,3 mg/m3	

AT

Inhaltsstoffe	Grundlage	Wert	Zu überwachende Parameter	Bemerkung
Ethyl Mercaptan	AT OEL	MAK-KZW	0,5 ppm, 1,3 mg/m3	
	AT OEL	MAK-TMW	0,5 ppm, 1,3 mg/m3	

DNEL : End Use: Workers
Routes of exposure: Inhalation
Potential health effects: Chronic effects, Systemic effects
Value: 14,5 mg/m3

DNEL : End Use: Workers
Routes of exposure: Skin contact
Potential health effects: Chronic effects, Systemic effects
Value: 2,06 mg/kg

DNEL : End Use: Workers
Routes of exposure: Inhalation
Potential health effects: Chronic effects, Local effects
Value: 18,6 mg/m3

PNEC : Fresh water
Value: 0,0001 mg/l

PNEC : Marine water
Value: 0,00001 mg/l

PNEC : Fresh water sediment
Value: 0,00049 mg/kg

PNEC : Marine sediment
Value: 0,000049 mg/kg

PNEC : Soil
Value: 0,000039 mg/kg

8.2 Exposure controls

Engineering measures

Adequate ventilation to control airborned concentrations below the exposure guidelines/limits. Consider the potential hazards of this material (see Section 2), applicable exposure limits, job activities, and other substances in the work place when designing engineering controls and selecting personal protective equipment. If engineering controls or work practices are not adequate to prevent exposure to harmful levels of this material, the personal protective equipment listed below is recommended. The user should read and understand all instructions and limitations supplied with the equipment since protection is usually provided for a limited time or under certain circumstances.

Personal protective equipment

Respiratory protection	:	Wear a supplied-air NIOSH approved respirator unless ventilation or other engineering controls are adequate to maintain minimal oxygen content of 19.5% by volume under normal atmospheric pressure. Wear a NIOSH approved respirator that provides protection when working with this material if exposure to harmful levels of airborne material may occur, such as:. Air-Purifying Respirator for Organic Vapors. Full-Face Air-Purifying Respirator for Organic Vapors, Dusts and Mists. Use a positive pressure, air-supplying respirator if there is potential for uncontrolled release, exposure levels are not known, or other circumstances where air-purifying respirators may not provide adequate protection.
Hand protection	:	The suitability for a specific workplace should be discussed with the producers of the protective gloves. Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. Also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion, and the contact time. Gloves should be discarded and replaced if there is any indication of degradation or chemical breakthrough.
Eye protection	:	Eye wash bottle with pure water. Tightly fitting safety goggles.
Skin and body protection	:	Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place. Wear as appropriate:. Remove and wash contaminated clothing before re-use. Skin should be washed after contact. Footwear protecting against chemicals.
Hygiene measures	:	When using do not eat or drink. When using do not smoke. Wash hands before breaks and at the end of workday.

For additional details, see the Exposure Scenario in the Annex portion

SECTION 9: Physical and chemical properties

9.1

Information on basic physical and chemical properties

Appearance

Form	:	Liquid
Physical state	:	Liquid
Color	:	Colorless
Odor	:	Repulsive

Safety data

Flash point	:	-48°C (-54°F)
Lower explosion limit	:	2,8 %(V)
Upper explosion limit	:	18 %(V)
Oxidizing properties	:	No
Autoignition temperature	:	295°C (563°F)
Molecular formula	:	C2H6S
Molecular weight	:	62,14 g/mol
pH	:	Not applicable
Pour point	:	No data available
Boiling point/boiling range	:	35°C (95°F)
Vapor pressure	:	16,20 PSI at 37,8°C (100,0°F)
Relative density	:	0,84 at 15,6 °C (60,1 °F)
Water solubility	:	Negligible
Partition coefficient: n-octanol/water	:	No data available
Viscosity, kinematic	:	No data available
Relative vapor density	:	2,1 (Air = 1.0)
Evaporation rate	:	1
Percent volatile	:	> 99 %

SECTION 10: Stability and reactivity

10.1

Reactivity : Stable under recommended storage conditions.

10.2

Chemical stability : This material is considered stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.

10.3

Possibility of hazardous reactions

Hazardous reactions : Hazardous reactions: Hazardous polymerization does not occur.

Hazardous reactions: Vapors may form explosive mixture with air.

10.4
Conditions to avoid : Heat, flames and sparks.

10.5
Materials to avoid : May react with oxygen and strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.

10.6
Hazardous decomposition products : Carbon oxides
Sulfur oxides

Other data : No decomposition if stored and applied as directed.

SECTION 11: Toxicological information

11.1
Information on toxicological effects

Acute oral toxicity

Ethyl Mercaptan : LD50: 682 mg/kg
Species: Rat
Sex: male
Method: Fixed Dose Method

Acute inhalation toxicity

Ethyl Mercaptan : LC50: 11,23 mg/l
Exposure time: 4 h
Species: Rat
Sex: male
Test atmosphere: vapor

Skin irritation

Ethyl Mercaptan : slight irritation.

Eye irritation
Ethyl Mercaptan : slight irritation. Information given is based on data obtained from similar substances.

Sensitization

Ethyl Mercaptan : The product is a skin sensitizer, sub-category 1B.
Information given is based on data obtained from similar substances.

Repeated dose toxicity

Ethyl Mercaptan : Species: Rat, Male and female

Sex: Male and female
Application Route: Inhalation
Dose: 25, 100, 400 ppm
Exposure time: 13 wks
Number of exposures: 6 hr/d, 5 d/wk
NOEL: 100 ppm
Lowest observable effect level: 400 ppm
Method: OECD Guideline 413
Information given is based on data obtained from similar substances.

Species: Rat, Male and female
Sex: Male and female
Application Route: Oral
Dose: 0, 10, 50, 200 mg/kg
Exposure time: 42-53 days
NOEL: 50 mg/kg
Method: OECD Guideline 422
Information given is based on data obtained from similar substances.

Species: Rat, Male and female
Sex: Male and female
Application Route: Inhalation
Dose: 9, 97, 196 ppm
Exposure time: 13 wks
Number of exposures: 6 hr/d, 5 d/wk
NOEL: >=196 ppm
Method: OECD Guideline 413
Information given is based on data obtained from similar substances.

Species: Rat, Male and female
Sex: Male and female
Application Route: Inhalation
Dose: 0.03, 0.26, 0.55 mg/L
Exposure time: 13 wks
Number of exposures: 6 hr/d, 5 d/wk
NOEL: 0,03 mg/l
Method: OECD Test Guideline 413
Information given is based on data obtained from similar substances.

Genotoxicity in vitro

Ethyl Mercaptan	:	Test Type: Ames test Metabolic activation: with and without metabolic activation Method: Mutagenicity (Escherichia coli - reverse mutation assay) Result: negative Test Type: Mouse lymphoma assay Method: OECD Guideline 476 Result: Ambiguous Test Type: Sister Chromatid Exchange Assay Metabolic activation: with and without metabolic activation Result: positive

Genotoxicity in vivo

Ethyl Mercaptan	:	Test Type: Micronucleus test Species: Mouse Method: Mutagenicity (micronucleus test) Result: negative

Reproductive toxicity

Ethyl Mercaptan	:	Species: Rat Sex: male and female Application Route: Oral diet Dose: 0, 10, 50, 200 mg/kg Exposure time: 42-53 days Number of exposures: once daily Method: OECD Guideline 422 NOAEL Parent: 200 mg/kg NOAEL F1: 50 mg/kg Information given is based on data obtained from similar substances.

Developmental Toxicity

Ethyl Mercaptan	:	Species: Rat Application Route: Inhalation Dose: 0, 0.037, 0.28, or 0.56 mg/L Number of exposures: 6 hrs/d Test period: GD 6-19 Method: OECD Guideline 414 NOAEL Teratogenicity: > 0,56 mg/l Information given is based on data obtained from similar substances. Species: Rat Application Route: Inhalation Dose: 0, 10, 100, 200 ppm Number of exposures: 6 hrs/d Test period: GD 6-19 Method: OECD Guideline 414 NOAEL Teratogenicity: > 200 ppm NOAEL Maternal: > 200 ppm Information given is based on data obtained from similar substances.

Aspiration toxicity

Ethyl Mercaptan	:	May be harmful if swallowed and enters airways.

CMR effects

Ethyl Mercaptan	:	Carcinogenicity: Not available Mutagenicity: Not mutagenic in Ames Test. Teratogenicity: Animal testing did not show any effects on fetal development. Reproductive toxicity: Animal testing did not show any effects on fertility.

Scentinel® A Gas Odorant

Further information	:	Solvents may degrease the skin.

SECTION 12: Ecological information

12.1

Toxicity

Toxicity to fish

Ethyl Mercaptan	:	2,4 mg/l Exposure time: 96 h Species: Oncorhynchus mykiss (rainbow trout) Method: OECD Test Guideline 203

Toxicity to daphnia and other aquatic invertebrates

Ethyl Mercaptan	:	EC50: < 0,1 mg/l Exposure time: 48 h Species: Daphnia magna (Water flea) static test Method: OECD Test Guideline 202

Toxicity to algae

Ethyl Mercaptan	:	EC50: 3 mg/l Exposure time: 72 h Species: Pseudokirchneriella subcapitata (green algae) Method: OECD Test Guideline 201

M-Factor

ethanethiol	:	M-Factor (Acute Aquat. Tox.)	10
		M-Factor (Chron. Aquat. Tox.)	10

12.2
Persistence and degradability

Biodegradability

Ethyl Mercaptan	:	aerobic Result: Not readily biodegradable. 0 % Testing period: 29 d Method: OECD Test Guideline 301F

12.3
Bioaccumulative potential
Elimination information (persistence and degradability)

Bioaccumulation	:	This material is not expected to bioaccumulate.

12.4
Mobility in soil

Mobility

Ethyl Mercaptan	:	The product will be dispersed amongst the various environmental compartments (soil/ water/ air).

12.5
Results of PBT and vPvB assessment

Results of PBT assessment	:	This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6
Other adverse effects
Ecotoxicology Assessment

Short-term (acute) aquatic hazard

Ethyl Mercaptan	:	Very toxic to aquatic life.

Long-term (chronic) aquatic hazard

Ethyl Mercaptan	:	Very toxic to aquatic life with long lasting effects.

SECTION 13: Disposal considerations

13.1

Waste treatment methods

The information in this SDS pertains only to the product as shipped.

Use material for its intended purpose or recycle if possible. This material, if it must be discarded, may meet the criteria of a hazardous waste as defined by US EPA under RCRA (40 CFR 261) or other State and local regulations. Measurement of certain physical properties and analysis for regulated components may be necessary to make a correct determination. If this material is classified as a hazardous waste, federal law requires disposal at a licensed hazardous waste disposal facility.

Product	:	The product should not be allowed to enter drains, water courses or the soil. Do not contaminate ponds, waterways or ditches with chemical or used container. Send to a licensed waste management company.
Contaminated packaging	:	Empty remaining contents. Dispose of as unused product. Do not re-use empty containers. Do not burn, or use a cutting torch on, the empty drum.

For additional details, see the Exposure Scenario in the Annex portion

SECTION 14: Transport information

14.1 - 14.7

Transport information

The shipping descriptions shown here are for bulk shipments only, and may not apply to shipments in non-bulk packages (see regulatory definition).

Consult the appropriate domestic or international mode-specific and quantity-specific Dangerous Goods Regulations for additional shipping description requirements (e.g., technical name or names, etc.) Therefore, the information shown here, may not always agree with the bill of lading shipping description for the material. Flashpoints for the material may vary slightly between the SDS and the bill of lading.

US DOT (UNITED STATES DEPARTMENT OF TRANSPORTATION)

UN2363, ETHYL MERCAPTAN, 3, I, MARINE POLLUTANT, (ETHYL MERCAPTAN)

IMO / IMDG (INTERNATIONAL MARITIME DANGEROUS GOODS)

UN2363, ETHYL MERCAPTAN, 3, I, (-48°C), MARINE POLLUTANT, (ETHYL MERCAPTAN)

IATA (INTERNATIONAL AIR TRANSPORT ASSOCIATION)

UN2363, ETHYL MERCAPTAN, 3, I

ADR (AGREEMENT ON DANGEROUS GOODS BY ROAD (EUROPE))

UN2363, ETHYL MERCAPTAN, 3, I, (D/E), ENVIRONMENTALLY HAZARDOUS, (ETHYL MERCAPTAN)

RID (REGULATIONS CONCERNING THE INTERNATIONAL TRANSPORT OF DANGEROUS GOODS (EUROPE))

UN2363, ETHYL MERCAPTAN, 3, I, ENVIRONMENTALLY HAZARDOUS, (ETHYL MERCAPTAN)

ADN (EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY INLAND WATERWAYS)
UN2363, ETHYL MERCAPTAN, 3, I, ENVIRONMENTALLY HAZARDOUS, (ETHYL MERCAPTAN)

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

SECTION 15: Regulatory information

15.1

Safety, health and environmental regulations/legislation specific for the substance or mixture
National legislation

Commission Regulation (EU) 2015/830 of 28 May 2015 amending Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)

Water contaminating class (Germany) : WGK 3 highly water endangering

15.2

Chemical Safety Assessment

Components	:	ethanethiol	A Chemical Safety Assessment has been carried out for this substance.	200-837-3

Major Accident Hazard Legislation : 96/82/EC Update: 2003
Highly flammable
7b
Quantity 1: 5.000 t
Quantity 2: 50.000 t

: 96/82/EC Update: 2003
Dangerous for the environment
9a
Quantity 1: 100 t
Quantity 2: 200 t

: ZEU_SEVES3 Update:
FLAMMABLE LIQUIDS
P5a
Quantity 1: 10 t
Quantity 2: 50 t

: ZEU_SEVES3 Update:
ENVIRONMENTAL HAZARDS
E1
Quantity 1: 100 t
Quantity 2: 200 t

SAFETY DATA SHEET

Scentinel® A Gas Odorant

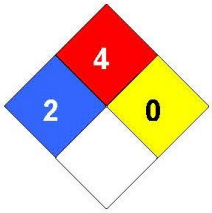
Version 3.3 Revision Date 2020-06-16

Notification status

Europe REACH	:	This product is in full compliance according to REACH regulation 1907/2006/EC.
Switzerland CH INV	:	On the inventory, or in compliance with the inventory
United States of America (USA) TSCA	:	On or in compliance with the active portion of the TSCA inventory
Canada DSL	:	All components of this product are on the Canadian DSL
Australia AICS	:	On the inventory, or in compliance with the inventory
New Zealand NZIoC	:	On the inventory, or in compliance with the inventory
Japan ENCS	:	On the inventory, or in compliance with the inventory
Korea KECI	:	All substances in this product were registered, notified to be registered, or exempted from registration by CPChem through an Only Representative according to K-REACH regulations. Importation of this product is permitted if the Korean Importer of Record was included on CPChem's notifications or if the Importer of Record themselves notified the substances.
Philippines PICCS	:	On the inventory, or in compliance with the inventory
China IECSC	:	On the inventory, or in compliance with the inventory
Taiwan TCSI	:	On the inventory, or in compliance with the inventory

SECTION 16: Other information

NFPA Classification : Health Hazard: 2
Fire Hazard: 4
Reactivity Hazard: 0



Further information

Legacy SDS Number : 25580

Significant changes since the last version are highlighted in the margin. This version replaces all previous versions.

The information in this SDS pertains only to the product as shipped.

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

Key or legend to abbreviations and acronyms used in the safety data sheet			
ACGIH	American Conference of Government Industrial Hygienists	LD50	Lethal Dose 50%
AICS	Australia, Inventory of Chemical Substances	LOAEL	Lowest Observed Adverse Effect Level
DSL	Canada, Domestic Substances	NFPA	National Fire Protection Agency

SDS Number:100000068741 18/19

	List		
NDSL	Canada, Non-Domestic Substances List	NIOSH	National Institute for Occupational Safety & Health
CNS	Central Nervous System	NTP	National Toxicology Program
CAS	Chemical Abstract Service	NZIoC	New Zealand Inventory of Chemicals
EC50	Effective Concentration	NOAEL	No Observable Adverse Effect Level
EC50	Effective Concentration 50%	NOEC	No Observed Effect Concentration
EGEST	EOSCA Generic Exposure Scenario Tool	OSHA	Occupational Safety & Health Administration
EOSCA	European Oilfield Specialty Chemicals Association	PEL	Permissible Exposure Limit
EINECS	European Inventory of Existing Chemical Substances	PICCS	Philippines Inventory of Commercial Chemical Substances
MAK	Germany Maximum Concentration Values	PRNT	Presumed Not Toxic
GHS	Globally Harmonized System	RCRA	Resource Conservation Recovery Act
>=	Greater Than or Equal To	STEL	Short-term Exposure Limit
IC50	Inhibition Concentration 50%	SARA	Superfund Amendments and Reauthorization Act.
IARC	International Agency for Research on Cancer	TLV	Threshold Limit Value
IECSC	Inventory of Existing Chemical Substances in China	TWA	Time Weighted Average
ENCS	Japan, Inventory of Existing and New Chemical Substances	TSCA	Toxic Substance Control Act
KECI	Korea, Existing Chemical Inventory	UVCB	Unknown or Variable Composition, Complex Reaction Products, and Biological Materials
<=	Less Than or Equal To	WHMIS	Workplace Hazardous Materials Information System
LC50	Lethal Concentration 50%		

Full text of H-Statements referred to under sections 2 and 3.

H224	Extremely flammable liquid and vapor.
H302	Harmful if swallowed.
H317	May cause an allergic skin reaction.
H332	Harmful if inhaled.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

CONFIDENTIAL SECTION

PNG's emergency response plan is available online to all external agencies and members of the public. Information in this confidential section is available to persons associate with emergency response.

9 CONTACT INFORMATION

Specific contact information in this section is available to persons associated with emergency response.

10 PNG PIPELINES

Specific pipeline information in this section is available to persons associated with emergency response.

11 MAPS

Detailed infrastructure maps in this section are available to persons associated with emergency response.