



OIL AND GAS COMMISSION

B.C. Oil and Gas Commission Emergency Response Plan Requirements

November, 2004

Revised December 13, 2004

OGC-OD-C&E-2700

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1 Introduction

This guide provides the minimum British Columbia Oil and Gas Commission (OGC) emergency preparedness and response requirements for the upstream petroleum industry and adopts the current edition of CSA Standard CAN/CSA Z-731. It is the responsibility of the licensee (including approval and permit holders) to determine when an emergency response plan (ERP) is required and the type of plan required. The guide details common emergency preparedness and response requirements that apply to any hazard related to upstream petroleum operations and sets out additional requirements specific to sour wells, sour pipelines, sour production facilities and associated gathering systems, high vapour pressure (HVP) pipelines, spills of hydrocarbons and produced water, and hydrocarbon storage in caverns. For the drilling of sour wells, refer to [*Section 11 of the BC Oil and Gas Handbook*](#).

Legal authority for requirements related to the safe conduct of operations of wells and facilities and the prevention of waste and spillage is contained in various sections throughout the [*Petroleum and Natural Gas Act*](#), the [*Pipeline Act*](#), the [*Drilling and Production Regulation*](#), the [*Pipeline Regulation*](#) and the [*Sour Pipeline Regulation*](#).

1.1 Purpose of an ERP

A key component of emergency preparedness and response is the development of an ERP, which is defined as a document developed to ensure quick access to critical information necessary to effectively respond to an emergency. A schematic illustrating the ERP development process is shown in Figure 1. The extent of the information contained within the plan is determined by the potential hazard(s) identified.

The purpose of an ERP is to ensure a quick, effective and appropriate response to emergencies in order to protect the public, company, and contract personnel from fatalities and irreversible health effects and the environment from damage. An ERP addresses worst-case emergency scenarios, potential hazards to the public, and systems required for adequate response.

A comprehensive ERP

- must be well organized to ensure quick access to critical information;
- coordinates activities among industry responders, emergency services, local authorities, governments, and others who have a role in providing an effective response;
- ensures communication with all parties involved in or potentially affected by the emergency;
- assists personnel in determining the level of emergency and the appropriate response;

- clearly establishes roles and responsibilities of all responders;
- identifies response organizations and command control structures;
- identifies predetermined resources, required personnel, equipment, and services; and
- increases public confidence in the ability of industry to handle emergencies.

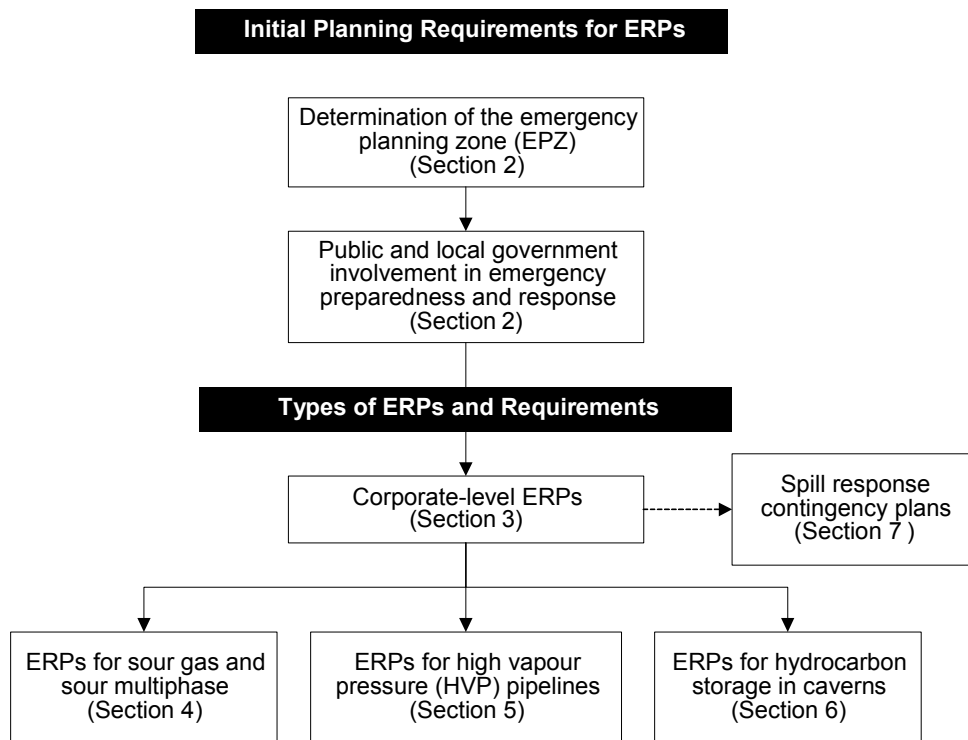
1.2 Oil and Gas Commission Guidelines

The Oil and Gas Commission is using the Alberta Energy and Utilities Board's, (EUB), Guide 71 as the framework for OGC Guidelines for Emergency Response Plans, with revisions to take into account legislation requirements in British Columbia. These guidelines also incorporate many accepted emergency response practices used by industry and the OGC

1.3 How to Use This Guide

The main sections of this Guide are as follows:

- Section 2: Initial Planning Requirements for Specific ERPs describes the methodology used for determining the initial size of an emergency planning zone (EPZ). Notification and consultation requirements for public and local government involvement are also defined in this section.
- Section 3: Corporate Level ERPs describes the requirements for corporate-level plans, including incident classification and corresponding action plans, communications plan, personnel responsibilities, and response management centres.
- Section 4: Sour Gas and Sour Multiphase ERPs outlines the minimum required content for different types of specific sour gas and sour multiphase ERPs and the circumstances when each type of plan is acceptable.
- Section 5: High Vapour Pressure (HVP) Pipeline ERP Requirements outlines the current ERP requirements for HVP pipelines.
- Section 6: ERP Requirements for Hydrocarbon Storage in Caverns details the current ERP requirements for hydrocarbon storage in caverns.
- Section 7: Spill Response Contingency Plans deals with contingency plan content and spill training exercise and notification requirements. Enforcement actions for noncompliance to these requirements are also discussed in this section.



9 Figure 1. Emergency preparedness and response program flowchart

1.4 Regulatory Requirements for ERPs

1.4.1 Corporate-Level ERPs

In accordance with the [Drilling and Production Regulation](#), the [Pipeline Regulation](#) pursuant to the [Pipeline Act](#), CEPA/E2 requirements, the OGC requires all licensees to have, as a minimum, a corporate-level ERP. Corporate-level ERPs do not require OGC approval but must be submitted for review upon request.

1.4.2 Specific ERPs for Sour Wells

In accordance with [Section 11 of the BC Oil and Gas Handbook](#), a licensee must prepare a specific ERP for all sour wells requiring a plan and submit the ERP to the OGC for approval.

1.4.3 Specific ERPs for Sour Production Facilities

In accordance with the [Sour Pipeline Regulation](#), the [Drilling and Production Regulation](#) and the [Public Involvement Guideline](#) pursuant to

the [Pipeline Act](#), a licensee must prepare a specific ERP for all sour production facilities and associated gathering systems requiring a plan and submit the ERP to the OGC for approval.

1.4.4 Specific ERPs for HVP Pipelines

In accordance with *CAN/CSA Z-731*, a licensee must prepare ERPs for pipelines transporting HVP products and submit the ERP to the OGC for approval.

1.4.5 Spill Response Contingency Plans

In accordance with the [Pipeline Act](#) and the [Environmental Management Act](#), a licensee of an oil well, a saltwater disposal well, or a liquid pipeline must develop and submit for approval a spill response contingency plan encompassing production and pipeline facilities and trucking routes. Unless the licensee is an active oil spill cooperative member in the area where its operations are located, the licensee must also purchase spill cleanup equipment to ensure that environmental risk to a body of water is minimized.

1.4.6 Specific ERPs for Hydrocarbon Storage in Caverns

In accordance with *CAN/CSA Z-731*, a licensee must prepare a specific ERP for hydrocarbon storage in caverns and submit the ERP to the OGC for approval.

2 Initial Planning Requirements for Specific ERPs

2.1 Determination of the Emergency Planning Zone (EPZ)

The EPZ is a priority area surrounding a well, pipeline, or facility where immediate response actions are required in the event of an emergency. A licensee must determine an initial EPZ using methodology defined below that delineates the area of greatest immediate impact from an uncontrolled release of hydrogen sulphide (H₂S) or HVP product.

Once the licensee establishes the size of the EPZ, it must carry out the necessary public and local government notification and consultation described in the [Drilling and Production Regulation](#), the [Sour Pipeline Regulation](#) and the [Public Involvement Guideline](#) prior to the development of a specific ERP.

2.1.1 Sour Well EPZs

Refer to [Section 11 of the BC Oil and Gas Handbook](#).

2.1.2 Sour Production Facility EPZs

The EPZ for a sour production facility is calculated by using the largest H₂S release volume from any pipeline entering or leaving the facility. If the facility has an acid gas disposal well on site, the EPZ for the well may determine the size of the EPZ for the sour production facility. Graphs for determining sour production facility EPZs are in Figures 3 and 4 of Appendix 2.

2.1.2.1 Sour Pipeline and Sour Multiphase Pipeline EPZs

The EPZ for a sour pipeline or a sour multiphase pipeline is determined using the maximum licensed operating pressure, the internal diameter, and the licensed maximum H₂S concentration to calculate the H₂S release volume in cubic meters (m³) for each segment of pipeline. The release volume at the break point is the drained volume, which may be the sum of release volumes from several segments that may exist between emergency shutdown valves (ESDs) and check valves. The equation for calculating the maximum potential H₂S release volume is found in Appendix 2. For sour multiphase pipelines, the volume of H₂S is determined by the following equation:

$$V = \frac{(\text{GLR} \times \text{GVF})}{1000 (\text{GLR} + \text{GVF})} \times V_{\text{pl}} \times H$$

Where: V = Potential H₂S release volume at standard condition (m³)
GLR = Produced gas-liquid ratio at maximum operating pressure (MOP) (m³/m³)
GVF = ratio of produced gas volume at standard conditions to the volume of gas at MOP (m³/m³)
V_{pl} = volume of the pipeline (m³)
H = licensed H₂S content (moles/kilomole) for the pipeline

The equation could be made more similar to the “gas calculation” by incorporating the V_{pl} calculation and the factor of 1000 as follows:

$$V = 0.785 \times 10^{-6} D^2 L \frac{(GLR \times GVF) \times H}{(GLR + GVF)}$$

Where: D = internal diameter of pipe in millimeters (mm)
L = length of pipe between block valves (km)

An H₂S release volume must also be calculated for pipelines that transmit sour gas or a sour multiphase product containing less than 10 moles of H₂S per kilomole of natural gas in order to determine the size of the EPZ.

The release volume calculation for pipelines assumes that

- ESDs close instantaneously upon failure of the pipeline and check valves close instantaneously downstream of the failure; and
- manual block valves do not close instantaneously and the entire volume of gas in that segment of the pipeline is released.

Graphs for determining pipeline EPZs using the maximum H₂S release volumes are found in Figures 3 and 4 in Appendix 2.

2.1.3 Reduced EPZs

The requirements specified in [Section 11 of the BC Oil and Gas Handbook](#) continue to apply to the use of reduced EPZs until a comprehensive review is completed and new requirements are adopted. All licensees requesting reduced EPZs are required to submit an H₂S release rate assessment for OGC approval prior to submitting the reduced EPZ request

2.1.4 HVP Pipeline EPZs

There is currently no established procedure for calculating an EPZ for HVP pipelines. Licensees must conduct a plume dispersion assessment based on release volumes for each segment of pipeline. The volume release at the breakpoint is the drained volume, which may be the sum of release volumes that exist between ESD valves and check valves.

The Canadian Association of Petroleum Producers (CAPP) guidelines¹ recommend an EPZ of 1.5 times the distance from the point of release to the isopleth representing the 50 per cent lower flammable limit (LFL).

2.1.5 EPZs for Hydrocarbon Storage in Caverns

There is no established procedure for calculating an EPZ based on release of hydrocarbons stored in caverns. A licensee may use the current industry EPZ of 0.8 km until such time as a government/stakeholder committee has studied the

¹ Canadian Petroleum Association (CPA) Guide: *An Emergency Response Planning Process Guideline for HVP Operators in Alberta*, July 27, 1992.

issue and presented recommendations for incorporation into the next edition of this guide.

2.2 Public and Local Government Involvement in Emergency Preparedness and Response

2.2.1 Overview

Expectations and requirements detailed in this guide apply to notification of and consultation with all British Columbia communities, including First Nations and Metis settlements. Public and local government involvement in emergency preparedness and response must take place at various stages of resource development, including

- prior to submitting an ERP application to the OGC or developing a specific ERP for new wells, pipelines, and facilities or major modifications to existing ones resulting in significant change to EPZs or procedures;
- prior to completion, servicing, or testing operations that are not carried out consecutive to drilling operations;
- personal consultation once every two years for existing wells, pipelines, and facilities with approved specific ERPs unless signed agreements are in place for an exemption; and
- after finalization of sale agreement and prior to the transfer from one licensee to another of wells, pipelines, and facilities requiring specific ERPs.

A licensee must address public and local government involvement requirements described in this section prior to final development of specific ERPs. These requirements are considered to be minimums. Other guidelines, such as [CAPP's Guide for Effective Public Involvement](#) may also assist in preparing for and conducting public involvement programs.

[Section 11 of the BC Oil and Gas Handbook](#) and the [Public Involvement Guideline](#) details additional public notification requirements for special sour well ERPs where reduced EPZs are requested.

A licensee must record all supporting information pertaining to public and local government involvement programs, including information regarding unsuccessful attempts to contact or obtain the cooperation of any required persons and any outstanding issues to be resolved, and must disclose that information to the OGC.

2.2.2 Preparation for Public and Local Government Involvement

2.2.2.1 Public

Prior to conducting a public involvement program, a licensee must identify all persons, residences, local authorities, and publicly used facilities within and immediately adjacent to the EPZ that should be consulted and included in the ERP, such as

- permanent and part-time residents, including those residing on dead-end roads beyond the EPZ where occupants must egress through the EPZ;
- private and public recreational property owners, operators, and occupants;
- business owners and operators and industrial operators, including oil and gas operators;
- registered trappers, guides, outfitters, and grazing lease and allotment users;
- appropriate local municipal (rural and urban) authorities, including PEP and health authorities;
- any individuals known to the licensee who may have special needs and should be included in the ERP based on previous industry experience in the area;
- publicly used facilities, such as schools, community centres, senior citizen centres, registered and random campgrounds, and picnic areas; and
- non-resident landowners that don't live on the property within the EPZ.

This identification can be accomplished through such means as

- discussions with community leaders and municipal officials,
- contacting other industrial operators in the area,
- contacting applicable local public interest groups,
- contacting applicable provincial government departments and agencies, and
- requesting and reviewing land titles for the area.

In the event that an EPZ intersects a rural subdivision, the entire subdivision must be included within the EPZ. If an EPZ includes a portion of an urban centre, the licensee is not required to identify each individual residence within the urban centre; however, contact must be made with PEP prior to conducting public involvement to establish and agree upon roles and responsibilities.

During public involvement programs, the licensee must make individual residences in the urban centre aware that they are within the EPZ and of the public protection measures in place in the event of an emergency. This should be done through appropriate notification, such as mail-outs, open houses, and newspaper advertisements.

All publicly used facilities, such as schools, community centres, senior citizen centres, registered campgrounds, and picnic areas within the area from the edge of the calculated EPZ radius to twice the calculated EPZ radius, the Emergency Awareness Zone (EAZ), must also be identified in the ERP; however, direct contact or consultation is not required.

2.2.2.2 Local Government

Clear identification of the roles and responsibilities to be carried out during an emergency is essential to public safety. The local municipal authorities (rural and urban) have a mandated responsibility to protect the public within their area of jurisdiction and play a key role in the licensee's emergency response. The licensee remains responsible for ensuring that appropriate emergency response measures are in place and can be implemented, including those for areas of potential impact beyond the EPZ and the EAZ. These responsibilities must be clearly outlined in the ERP.

Therefore, coordination of roles and responsibilities with the local municipal authorities, including PEP, the medical officer of health (or designate) and/or the director of Environmental Health services of affected regional health authorities and/or environmental health officers for First Nations and Inuit Branch Health Canada (FNIHB-HC) must take place, be well understood, and agreed to prior to conducting the public involvement program. If changes are required as a result of public consultation, further discussions must take place with the appropriate local government authority. This allows for quick and efficient response to any emergency that may occur at a licensee's operations and supports the goal of protecting the public, including those outside of the EPZ and within urban centres, from adverse impact.

If a licensee has a mutual aid and emergency response agreement with local government authorities and other responders, this must be referenced in the ERP so that roles and responsibilities are clear. This is to ensure that there is no confusion or misunderstanding of the roles and responsibilities in the event of an incident requiring activation of the ERP.

2.2.3 Developing Public Information Materials

A licensee is required to develop an information package for distribution to all persons identified in Section 2.2.2.1 during the public involvement process. This package must contain sufficient information to allow the parties to understand the proposed or existing operation, the impact an emergency may have on them, the procedures in place to respond to an emergency, and public protection measures.

As a minimum, an information package must include

- a description of the proposed or existing wells, pipelines, or facilities covered by the ERP;
- identification of the potential hazards associated with the wells, pipelines, or facilities;
- H₂S concentrations, release rates, release volumes, and EPZ determinations for all wells and pipelines for the initial package only, however, a licensee may elect to create multiple information packages designed to address planning areas and only include the applicable release rates, volumes and EPZ determinations for each area. For public information materials associated with updates the licensee must inform residents that additional information will be provided upon request;
- a map of the operations in the general area;
- Company name, company contact name, a 24-hour emergency company contact number;
- the OGC contact number and the Provincial Emergency Program (PEP) contact number;
- a description of potential health impacts that could result from exposure to H₂S, sulphur dioxide (SO₂), or any other toxic or hazardous substance that could be released;
- actions to be taken if resident suspects a release of H₂S or SO₂ is occurring;
- information on special emergency procedures unique to the community, such as hospitals and schools, that could affect emergency response;
- appropriate public protection measures;
- the location of reception/evacuation center; and
- procedures in place to respond to an emergency.

Prior to commencement of the public involvement program, a copy of the public information package must be provided to the OGC so that staff can respond to questions and concerns. A copy must also be submitted to the OGC with the submission of the ERP.

2.2.4 Conducting Public Involvement Programs

A licensee is required to conduct public involvement programs for the development of an ERP in conjunction with other notification or consultation programs covered in the [Public Involvement Guideline](#). This ensures that there is no confusion regarding the details of the project and the impact that an emergency situation may have on the surrounding community.

Licensee representatives who have the necessary background to provide details of the emergency procedures in place and to address questions and concerns that may arise must conduct the public involvement program in person with all identified individuals. A licensee representative must

address any special request for modifications to the ERP and for additional information.

A licensee is required to review key emergency response information with all members of the public identified in the ERP or with PEP. This ensures that members of the public are familiar with potential emergencies and corresponding public protection measures pertaining to emergency response procedures.

If more than one licensee is conducting a public involvement program in the same area, the OGC strongly encourages that a single licensee representative who has the information and delegated authority represent the other licensees. All parties must be provided with the opportunity for follow-up discussions with the appropriate licensee representative if concerns arise.

The OGC recognizes that licensees may sometimes have difficulty establishing contact or meeting in person with

- residents or other persons who may be away for extended periods of time, have “no trespassing” signs posted on their property, or have unlisted telephone numbers; and
- nonresident persons, such as registered trappers, industrial operators, and recreational property owners, operators, and occupants.

The OGC requires the licensee to contact these parties and to arrange a suitable meeting time or provide an information package by registered mail with an offer to meet to address any questions and concerns regarding emergency preparedness and response. If a licensee is unable to make contact with an individual, the licensee must retain a record of the attempts made to contact that individual. It is the licensee’s responsibility to show that reasonable efforts were made.

A licensee must provide all parties with a copy of the public information package, as detailed in Section 2.2.3, along with an opportunity to discuss the information. Licensees are expected to provide a reasonable amount of time, having regard for the specific circumstances of the individual, for parties to review an information package and have questions and concerns addressed.

A licensee is required to obtain the following information from all persons, residences, local authorities, and public facilities listed in Section 2.2.2.1:

- exact location of the residence or place of business, including egress routes (legal description or address);
- name of key contact and a 24-hour contact telephone number (home, business, cell phone, or other) and an alternate contact;

- names of all family members in residence;
- number of occupants, specifying adults and preschool and school-age children;
- names of those with special needs, such as those who require evacuation assistance, request early notification/communication, have no telephones, require transportation assistance, or for whom there may be a language barrier;
- any additional concerns or comments; and
- any other information deemed necessary to ensure that effective emergency response procedures are developed.

While members of the public are not legally required to provide personal information, the licensee must clearly explain that the information is important to ensure an effective emergency response and thus provide public protection and safety. Personal information is protected by the privacy provisions of the [*Freedom of Information and Protection of Privacy Act*](#) (FOIP) and must be kept confidential at all times.

In keeping with the spirit of FOIP, a licensee must only acquire information necessary to the ERP, and this information should only be provided to key emergency responders who require it for immediate response purposes in the event of an emergency and to the OGC. If members of the public are unwilling to provide personal information, a licensee must consider those residents to have special needs and include the appropriate emergency response measures, such as early notification, in the ERP.

Public concerns about livestock and pets in emergency situations should be addressed during the public involvement program. Although public safety is the primary purpose of emergency preparedness and response, licensees should address livestock and pet safety in the ERP when feasible.

3 Corporate-Level ERPs

3.1 Requirements

Specific emergency response plans are not required for every drilling, production, or pipeline operation in the province. In these situations the OGC requires a licensee to have preplanned procedures available that will allow for effective response to an emergency. The corporate-level ERP must address the basic fundamentals of how the licensee will handle such an emergency.

A licensee must determine the level of detail required to address each item in a corporate-level ERP, depending on the nature of the operations that it covers. Corporate-level ERPs must meet all the requirements specified in CAN/CSA Z-731, as well as including information on

- classifying incidents and possible responses for specified incidents,
- a communications plan that addresses
 - communications with response team, support services, and government,
 - communications with the public and media, and
 - downgrading emergency levels,
- responsibilities of licensee personnel, and
- emergency response management centres.

3.1.1 Criteria for Classifying Incidents and Possible Action Plans

All incidents are classified as either a level 1, 2 or 3 emergency. Incidents that can be handled on site through normal operating procedures are typically defined as a level 1 emergency, while those with a more complex resolution are usually defined as level 2 and 3 emergencies.

The following incident classification and corresponding action plans must be included in a corporate-level ERP and must be used to classify all incidents.

Level 1: Potential Emergency

- There is no immediate danger to public or environment as no H2S has been released;
- Release of Hazardous substance is confined to the lease or company property;
- Creates little or no media interest;
- Low potential for it to escalate;
- Handled by company personnel;

- No immediate threat to workers.

Action Plan

- Alert all well site/facility personnel. Evaluate problem and initiate appropriate remedial action;
 - Unnecessary personnel to leave the site;
 - Notify company representative(s);
 - Alert mobile monitoring equipment and be ready for a callout or mobilize monitoring equipment if location is remote;
 - Advise OGC and local provincial emergency program representative (PEP);
 - In some cases, where there are large numbers of residents, notify or evacuate residents in accordance with site-specific plan;
 - Prepare for evacuation in case of escalation of the situation.
-

Level 2: Emergency

- There is a potential for risk to the public or environment, as the emergency could extend beyond company property;
- Control of hazardous substance is still possible;
- Creates local or regional media interest;
- May require the involvement of external emergency services, federal, provincial or local agencies.

Action Plan

- Ensure all level 1 actions are taking place;
 - Initiate evacuation of emergency planning zone (EPZ);
 - Set up roadblocks to isolate the EPZ;
 - Discuss issuance of a closure order with the OGC's head office in Fort St. John;
 - Send out monitoring crew; initiate mobile monitoring;
 - Send company representative to reception centre;
 - Inform senior company personnel;
 - Establish communications links to off-site control centre;
 - Assemble ignition crew and ready ignition equipment in case of escalation of the situation.
-

Level 3: Major Emergency

- There exists an immediate danger to the public or environment;
- Control of the situation has been lost;
- Creates provincial or national media interest;

- Uncontrolled release of hazardous substance;
- Extensive involvement of external emergency services, federal and/or provincial agencies;
- Emergency extends beyond company property.

Action Plan

- Ensure all level 1 and 2 actions are taking place;
 - Mobile monitoring equipment in place;
 - Ignite release if any of the ignition criteria are met;
 - Advise OGC and PEP of the state of emergency;
 - Expand EPZ as required.
-

In addition to these requirements, a corporate-level ERP must also define appropriate actions, including public protection measures that the licensee could take at each level of emergency. For information regarding public protection measures required for sour gas, see Section 4.3.

3.1.2 Communications Plan

Procedures must be established and detailed in the ERP for contacting and maintaining communications with key licensee personnel, government, support services, members of the public (within and outside of the EPZ), and the media. The licensee is required to identify all key communications systems and equipment needed to effectively respond to an emergency.

3.1.2.1 Communications with Response Team, Support Services, and Government

An ERP must clearly define the responsibility to contact the OGC and other responders in the event of an emergency. The OGC must be notified immediately at any level of emergency.

The level of emergency is determined by the licensee according to its plan and confirmed through consultation with the OGC. The licensee must contact OGC at all levels of emergency.

3.1.2.2 Communications with the Public and Media

The ERP must clearly describe procedures that will be implemented during the incident to contact and maintain communications with directly impacted members of the public in order to keep them informed of the situation and actions being taken. This includes plans for communicating and implementing public protection procedures, such as evacuating and sheltering occupants within and beyond the EPZ.

The ERP must also clearly describe procedures that will be used to inform and update the media and provide assistance in getting factual messages out to the public at large in an expeditious manner.

Media releases must be generated and released as significant developments occur. A licensee coordinates media releases with the OGC prior to release to ensure consistency and accuracy of information.

Information is communicated through written news releases, news conferences, and any other effective means the licensee chooses to use. A licensee spokesperson is identified to carry out this role and to interact with the OGC and other applicable government agencies.

The following information must be released to the general public as soon as possible during an incident:

- type and status of incident,
- location and proximity of the incident to people in the vicinity,
- areas impacted by the incident,
- effects the incident may have on people in the vicinity,
- actions the general public should take if they experience adverse effects,
- description of the products involved and their short- and long-term effects,
- public protection measures to follow, evacuation direction, and any other emergency response measures to consider,
- actions being taken to correct the situation and time period anticipated, and
- contacts for additional information.

The OGC may release information when a licensee is late in complying or fails to comply with the above. In any case, the OGC may choose to issue a media release as it perceives the need.

3.1.2.3 Downgrading Emergency Levels

Once a situation improves, the decision to downgrade a level 1, 2 or 3 emergency is made by the licensee in consultation with the OGC and PEP.

All affected persons and the media must be kept informed of the status of an emergency.

3.1.3 Responsibilities of Personnel

The ERP must identify specific roles and responsibilities of personnel required to effectively respond to any emergency. Key personnel and responders and their alternates must also be identified. One or more functions can be assigned to an individual, depending on the complexity of the potential response to an emergency.

The following responsibilities must be assigned to specific personnel as applicable

- field incident command,
- public safety coordination, including evacuation and sheltering,
- security (roadblocks, rovers, etc.),
- air quality monitoring,
- on-site safety and ignition, and
- communications with the responders and media/public communication.

3.1.4 Response Management Centres

The ERP must describe how the licensee will manage and coordinate a response to an emergency. It must identify which response management centres are to be activated as a result of a worst-case emergency at its operations, address the roles and responsibilities of personnel at each centre, and outline how coordination and communication between centres will be managed.

The ERP must clearly outline the communications procedures to be used between response management centres to ensure adequate information flow among licensee representatives and other responders at the emergency site, corporate-level decision-makers, the OGC, and other government departments and agencies. The CSA Z-731 provides details on the usual roles and responsibilities of the centres, at which level of emergency each may be activated, the persons who should attend, and required communication links.

In the event that evacuation is required, a licensee must activate a reception centre located outside the EPZ. For wells with a small number of residences in the EPZ, a reception centre may not be necessary if the licensee can demonstrate that the location of residents can be managed effectively without one. The ERP must identify the licensee representative responsible for opening the reception centre and meeting evacuees. Any concerns the evacuees may have should be addressed at this time. Once evacuees have been registered at the registration centre and have indicated where they may be contacted, they are free to go as they please, or if they wish it, the licensee must provide assistance in arranging temporary accommodation.

4 Sour Gas and Sour Multiphase ERPs

4.1 Requirements

This section sets out the OGC's minimum required content for different types of specific sour gas and sour multiphase ERPs. It also specifies under what circumstances each type of plan is acceptable. Specific ERPs for sour gas and sour multiphase operations must address all requirements outlined in CAN/CSA Z-731 and Sections 2 and 3 of this guide, as well as information on

- types of ERPs, requirements, and content,
- public protection measures,
- maps and equipment lists,
- mutual aid agreements,
- telephone lists,
- post-incident assessment,
- plan distribution and maintenance, and
- reporting and record keeping.

4.2 Types of ERPs, Requirements, and Content

A licensee must determine which of the following types of specific ERPs are required

- sour well ERP
- sour production facility ERP
- supplemental information to an existing sour production facility ERP

4.2.1 Sour Well ERPs

For sour wells, refer to [Section 11 of the BC Oil and Gas Handbook](#).

4.2.2 Sour Production Facility ERPs

A licensee must submit ERPs for sour production facilities and associated sour gathering systems when

- a special sour well is part of the gathering system,
- there is surface development within the calculated EPZ of any sour well associated with the sour production facility, or
- there is surface development within the calculated EPZ of any pipeline containing H₂S in the gas phase under pipeline license conditions. Please be advised that in accordance with the [Pipeline Regulation](#), a licensee of a pipeline transmitting gas containing more than 10 moles of H₂S gas per kilomole of natural gas or of a liquid filled pipeline transporting an HVP liquid shall maintain an ERP in accordance with OGC guidelines. This ERP may be subject to any future assessments as deemed necessary by the OGC.

All required new sour production facility ERPs, as well as any supplemental information to a current sour production facility ERP for newly added wells and pipelines, must be approved by the OGC before

commencement of operations. An approved copy of the sour production facility ERP must be kept on site and made available to OGC inspectors when requested. If an existing sour production facility is sold to another company, the new licensee must submit an ERP to the OGC for approval within 30 days of the change of ownership. Both licensees must ensure that emergency response procedures to protect the public will not be compromised prior to approval of the new ERP.

When a new facility is constructed for which an ERP is required or there are major modifications to an existing facility which significantly changes the roles and responsibilities of implementing an ERP, the licensee must hold a meeting with licensee personnel and extend invitations to government departments and agencies and other responders who have a role in initial response within 30 days prior to facility start-up or start-up of the modified portion of the plant. Documentation of all meetings, such as meeting sign-in sheets, invitations, and minutes, must be retained for a period of one year for audit purposes.

A sour production facility ERP must address all details outlined in CAN/CSA Z-731 and Sections 2 and 3 and include the following information:

- plan distribution list (see Section 4.10)
- area map (see Section 4.4)
- introduction and summary, which includes
 - key licensee contacts (24-hour number)
 - OGC 24 hour contact number and PEP 24 hour contact number
 - name and location of the sour production facility
 - general land use and population density within the gathering system (number of residents or level of transient use, public facilities, roads, type of land use, etc.)
 - date of latest revision
- wells, pipelines, and sour production facilities information, which includes
 - location of wells, ESDs, pipelines, and facilities
 - maximum potential H₂S release rates and volumes for all wells and pipeline segments within the system; maximum licensed operating pressure, internal diameter, licensed H₂S content for pipelines, length of pipeline between emergency shutdown valves, compressibility factor, and pipeline minimum operating temperature
 - size of the EPZs for all wells and pipelines
 - production facility and gathering system codes, and pipeline license numbers
- procedures for emergency detection, notification, and confirmation, which includes
 - a description of how an emergency will be detected
 - a description of how the licensee will be alerted of an incident

- a description of how confirmation of a release will occur
- criteria for classifying incidents and corresponding action plans (see Section 3.1.1)
- personnel responsibilities (see Section 3.1.3)
- communications plan (see Section 3.1.2)
- public protection measures (see Section 4.3)
- resident information (see Section 2.2.4)
- emergency telephone listing (see Section 4.7)
- government involvement (see Section 2.2.2)
- mutual aid agreements (see Section 4.6)
- post-incident assessment (see Section 4.8)
- plan maintenance (see Section 4.11)

Sour production facility ERPs must be continuously updated in the field to reflect changes in surface development (wells, pipelines and facilities) within the EPZ. Any significant changes in the above must be submitted to the OGC and plans updated. In addition to the above, sour production facility ERPs must be reviewed and updated at least annually (within 12 months of the date of the last submitted sour production facility ERP to the OGC) and necessary changes made at that time. The OGC requires resident contact information to be included in these updates. Resident contact information may be updated through means other than direct contact, such as by telephone confirmation.

4.2.2.1 Supplemental Information to Current Sour Production Facility ERPs

If a current sour production facility ERP exists that addresses emergency response procedures specific to drilling, completion, servicing, or testing operations, a licensee may choose to submit supplemental information for approval of these operations in place of a new ERP. The current ERP must meet the requirements outlined in Table 1.

As a minimum, the following supplemental information to the sour production facility ERP must be submitted to the OGC:

- complete resident information for drilling, completion, servicing, or testing operations (see Section 2.2.2),
- well or pipeline location,
- the maximum cumulative H₂S release rate of all zones open to the wellbore, or in the case of a 21-day temporary surface pipeline, the H₂S release volume for each segment of pipeline,
- the calculated EPZ,
- a map of the well or pipeline EPZ (as per Section 4.4), and
- a telephone list specific to the operations (as per Section 4.7).

Table 1. Supplemental information requirements

Operation	Requirements
Drilling of special sour or sour wells	A current sour production facility ERP that addresses the following: <ul style="list-style-type: none">• All information listed in Section 4.2.2• Emergency response procedures specific to drilling of wells• Personnel responsibilities specific to drilling• Entire well EPZ included within the sour production facility EPZ
Completion, servicing, or testing of <ul style="list-style-type: none">• Special sour wells• Sour wells (wellhead off)	A current sour production facility ERP that addresses the following: <ul style="list-style-type: none">• All information listed in Section 4.2.2• Emergency response procedures specific to the completion, servicing, or testing of wells• Personnel responsibilities specific to the completion, servicing, or testing of wells• Entire well EPZ included within the sour production facility EPZ
In-line testing using 21-day temporary surface pipelines	A current sour production facility ERP that addresses the following: <ul style="list-style-type: none">• All information listed in Section 4.2.2• Emergency response procedures and personnel responsibilities specific to in-line testing of wells• Entire pipeline EPZ included within the sour production facility EPZ

A licensee must have supplemental information to a current sour production facility ERP and a copy of the sour production facility ERP on site during any drilling, completion, servicing, or testing operation. All holders of supplemental information for these operations and residents listed in the calculated EPZ must be notified upon completion of the operation and advised that the supplement is no longer in effect.

4.3 Public Protection Measures

ERPs must address key measures to protect the public during emergency situations.

4.3.1 Notification

The licensee must notify all residents within the EPZ prior to entering the sour zone for all special sour and sour drilling operations. The ERP must identify special needs individuals within the EPZ requiring notification during a level-1 emergency. As a minimum, those members of the public must be notified at a level-1 emergency so they may decide whether to voluntarily evacuate. If necessary, licensee personnel may be required to provide early evacuation assistance because of an identified special need.

Notification to all others within the EPZ must begin no later than a level-2 emergency in conjunction with other mandatory protection measures. Notification to the general public outside the EPZ must take place in conjunction with the local authority based on monitored air quality and other situations that might arise during the emergency.

4.3.2 Evacuation

Evacuation is the primary public protection measure for long-term releases if the public can be safely removed from an area during or prior to a release of sour gas. For any incident that may occur once a well has been spudded, the OGC requires the licensee to initiate public protection measures for the entire EPZ. **Evacuation of the public within the EPZ must be initiated no later than a level-2 emergency in accordance with actions defined in the specific ERP if the zone of highest H₂S release has been penetrated. Evacuation should commence with those downwind and closest to the release.**

In an incident where the zone of highest H₂S release has not been penetrated but other producing formations (sweet or sour) are open to the wellbore, the evacuation procedures may differ from the mandatory actions identified above. The ERP must address how each situation will be managed.

The ERP must include procedures for locating transients, such as hunters, trappers, and recreational users. Special procedures may be required for evacuating publicly used facilities.

If large numbers of people are involved, assistance with transportation (i.e., using school buses) or changes in the normal notification procedures may be required, and the ERP must address such situations.

Evacuation of the EPZ should take place before a release of sour gas has the potential to affect people off site or as soon as possible to avoid any exposure to H₂S. EPZ evacuation at a level-1 emergency is generally not required; however, as stated in Section 4.3.1, individuals identified in the plan as requiring notification must be contacted and provided the opportunity to evacuate or have assistance provided to evacuate because of an identified special need.

The public outside the EPZ must be notified and evacuated in accordance with criteria in Table 2 and in conjunction with the local authority responsible for the area. As a minimum, notification and evacuation beyond the EPZ is based on monitored levels of H₂S and SO₂ as given in Table 2.

Broadcast media (radio, television) will be used to notify residents outside the EPZ in the event that immediate evacuation of the area must take place. Evacuation of the area outside the EPZ should be a coordinated response through a licensee’s ERP and the municipality plan.

Table 2. Notification and evacuation requirements *outside* the EPZ

H₂S concentrations in unevacuated areas	Requirement
1-9 ppm	Individuals must be informed of the concentrations and advised to leave. All other individuals should consider leaving the area and seek medical advice if health symptoms develop.
10 ppm	Immediate evacuation of the area must take place or the release must be ignited.
(Note: H ₂ S Evacuation Level – when downwind monitoring at the nearest unevacuated downwind residence, outside the emergency planning zone, indicates a level of 10 ppm, evacuation procedures will be initiated if safe to do so).	
SO₂ concentrations in unevacuated areas	Requirement
1 ppm	Voluntary
2 ppm	Evacuation of the area should begin
5 ppm	Mandatory evacuation of the area

4.3.3 Sheltering

Sheltering must be considered the primary protective measure in limited circumstances when

- there is not enough time or warning to safely evacuate the public that may be at risk,
- residents are waiting for evacuation assistance,
- there is a sour gas release of limited duration (e.g., due to a pipeline rupture),
- the location of a release has not been identified, or
- the public would be at higher risk if evacuated.

The ERP must identify the limited circumstances when sheltering would be considered as a viable option. When it is considered, sheltering instructions must be included in the ERP. Residents must be provided with sheltering instructions in the public information package.

4.3.4 Ignition Criteria for Sour Well Releases

Specific ignition criteria are given in [Section 11 of the BC Oil and Gas Handbook](#). Ignition of a sour gas flow to the atmosphere must take place as soon as all personnel working at the site can be cleared to a safe distance and when one of the following conditions has been met:

- evacuation of the EPZ cannot be accomplished
- monitoring results indicate H₂S concentrations in excess of 15 parts per million (ppm) for 15 minutes in unevacuated areas
- monitored H₂S concentrations exceed 1 ppm (1-hour average) in urban density developments
- monitoring is not taking place due to weather or other unforeseen circumstances
- the release cannot be brought under control in the short term (ignition decision will be made in consultation with OGC)

Once any of the above criteria has been met, ignition must occur within 15 minutes of the decision to ignite.

A licensee must take immediate steps to prepare for ignition at the earliest signs of a well control problem to ensure there will be no delay. OGC staff may make the decision that the licensee must take immediate steps. If the operator does not agree to ignite a release, the decision to ignite will be made by the OGC. Ignition does not negate the need for continuing with evacuation.

The decision-making authority to ignite the well must be assigned to a licensee representative on site. All ERPs must include ignition procedures, including a description of the equipment to be used in the event ignition criteria are met.

All special sour wells must have a dual ignition system on site during all drilling, completion, servicing, or testing operations in the critical zone(s). The primary ignition system must be installed such that activation can be achieved from a safe location through a triggering device that allows for complete egress of all personnel from the well site prior to ignition taking place. The secondary system may be a manual system, such as a flare gun.

Ignition Procedures

Each plan should describe the procedures to be followed by well site personnel to ignite an uncontrolled flow. This is a hazardous operation and the procedures must recognize the safety of both on-site personnel and the public.

4.3.5 Isolation of the EPZ

A licensee must ensure that procedures are identified in the ERP and in place to isolate the EPZ. Roadblocks must be established to isolate the EPZ and prohibit unauthorized entry into the area upon the declaration of a level-2 emergency. It may be necessary to obtain a closure order (issued by the OGC) or to declare a local state of emergency to restrict access to a

designated area. A local state of emergency may be declared by the local authority should the incident escalate beyond the defined EPZ.

It also may be necessary for Transport Canada to issue a Notice to Airmen (NOTAM) to advise pilots of restrictions in the airspace above the EPZ or to close the airspace for a certain radius from the release (a no-fly zone). NOTAMs or closure of airspace may be requested by the OGC at a level 2 or 3 emergency.

4.3.6 Air Quality Monitoring

Air quality monitoring is required to track and record the presence and concentrations of H₂S and SO₂ during a sour gas or sour multiphase product release and following ignition of a release.

Air quality monitoring equipment is used to

- track the plume,
- determine if ignition criteria are met,
- determine whether evacuation and/or sheltering criteria have been met, particularly beyond the EPZ,
- assist in determining when the emergency can be downgraded,
- determine roadblock locations, and
- determine concentrations in areas being evacuated to ensure that evacuation is safe.

The type of air monitoring units and the number of monitors required are based on site-specific information, including

- access and egress points,
- population density and proximity to urban density developments, and
- local conditions.

For special sour wells, if the calculated EPZ includes a portion of an urban density development, a minimum of two mobile air quality monitors are required: the first to monitor the boundary of the urban density development and the second to track the plume. The first unit must be on site during drilling, completion, servicing, or testing in potentially sour zones. The second unit must be dispatched at a level-1 emergency. Additional units may be required where there are multiple urban density developments.

Air quality monitoring must occur downwind, with priority being directed to the nearest un-evacuated residence or areas where people may be present. Monitored H₂S and SO₂ information must be made available to the OGC and the Ministry of Water, Land and Air Protection, as well as the public, on a regular basis throughout a sour gas emergency.

The ERP must provide detail on the intended use and procedures surrounding the activation of air quality monitoring equipment, such as stationary and mobile air quality monitoring units and personal handheld monitors.

For sour wells, the licensee must decide whether a mobile air quality monitoring unit(s) will be placed on standby or dispatched to the wellsite at a level-1 emergency. Prior to entering the sour zone, the licensee must determine where the equipment is located and what the estimated travel time is to the wellsite. The minimum required criteria for mobile air quality monitoring equipment are outlined in Table 3 and must be addressed in the ERP.

Table 3. Downwind mobile air quality monitoring requirements

	Level-1 emergency	Level-2 emergency	Level-3 emergency
Sour well	<p>If estimated time of arrival is greater than the estimated time for gas to surface,¹ then dispatch to site.</p> <p>If estimated time of arrival is less than the estimated time for gas to surface, place on standby.</p>	Deploy unit(s) from well site and commence mobile air quality monitoring. ²	Continue mobile air quality monitoring.
Special sour well	<p>If the calculated EPZ includes a portion of an urban density development, mobile air quality monitoring unit must be on the lease during sour drilling, completion, servicing, or testing of potential sour zones. Request additional air quality monitoring unit(s).</p> <p>or</p> <p>If there is no urban density development, a mobile air quality monitoring unit(s) must be dispatched to the well site at a level-1 emergency.</p>	<p>Deploy unit(s) from well site and commence mobile air quality monitoring.</p> <p>Request additional air quality monitoring unit(s), if required.</p>	<p>Continue mobile air quality monitoring.</p> <p>Request additional air quality monitoring unit(s), if required.</p>
Production facilities containing sour gas	Deploy unit(s) to area of release and commence mobile air quality monitoring.	<p>Continue mobile air quality monitoring.</p> <p>Request additional air quality monitoring unit(s), if required.</p>	<p>Continue mobile air quality monitoring.</p> <p>Request additional air quality monitoring unit(s), if required.</p>

¹ An estimated time for gas to surface should be based on the time to circulate bottoms-up.

² If a mobile air quality monitoring unit has not arrived on site by the time that gas has reached the surface, ignition criteria may have been met for a partially controlled or an uncontrolled release.

4.4 Maps

Maps included in the ERP must be sized to provide a clear representation of the entire mapped area. Maps must clearly identify

- surface location(s) of the operation(s); access roads are required for specific well ERPs only
- EPZ boundaries being used (reduced or calculated) and EAZ boundaries
- residence locations and reference numbers within the EPZ, including those residences bordering the EPZ or on dead-end roads requiring egress through the EPZ
- provincial, local, and access roadways and dead-ends
- topographical features, including lakes, rivers, streams, and any significant elevation feature that could affect either dispersion of a sour gas release or the ability to evacuate members of the public
- campgrounds, recreation areas, churches, schools, hospitals, and any other publicly used facilities within the mapped area
- trap line, grazing lease, and range allotment boundaries and their reference numbers for the full map area
- other industrial operations, including oil and gas operations
- locations of emergency shutdown devices
- railways and airports for the full map area
- corporate boundaries (hamlets, villages, towns, etc.) for the full map area
- a legend, scale, and north indicator
- potential roadblock locations
- urban density developments and individual residences within an area twice the radius of the EPZ (the EAZ), or if using a reduced EPZ, within an area of the calculated EPZ radius

Note that

- EPZ maps must encompass an area at least twice the radius of the EPZ (the EAZ);
- if a reduced EPZ is used, the map must encompass an area at least twice the radius of the reduced EPZ or to the distance of the calculated EPZ, whichever is less, and
- public facilities and residences (seasonal or otherwise) shall be ground truthed to the boundary of the EAZ.

When developing maps for sour production facility ERPs, the licensee may elect to omit illustrating all roadblock locations if procedures for establishing roadblocks are well defined in the plan. All third-party wells and pipelines tied into the production facility must be illustrated on the map; however, other area wells and pipelines may be excluded from the map as long as the contact information for those licensees is included in the plan. Additionally, for complex gathering systems, licensees may

choose to map the boundaries for all of the EPZs combined, rather than each well or segment of pipeline.

4.5 Equipment List

A wide range of equipment is required to effectively respond to an emergency. The ERP must include a list of the following types of equipment:

- communications equipment (number, types and location of equipment, and radio frequencies)
 - Those requiring communications equipment include but are not limited to the evacuation coordinator, rovers, roadblock, and air monitoring personnel
- roadblock kits (number and contents)
- ignition equipment (maintained on site)
- gas monitoring equipment (number, type and location)

4.6 Mutual Aid Agreements

A licensee of a sour production facility is responsible for emergency response procedures for the entire gathering system. If there is a separate facility ERP for the gathering system that is tied into the sour production facility then both ERPs will require a bridging paragraph outlining what emergency communication will take place between the sour production facility licensee and the gathering system licensee in the event of an emergency on the gathering system. The sour production facility-bridging paragraph must reference the other ERP and vice versa.

A licensee that requires the response of others or the use of resources from other responders should enter into mutual aid agreements with other parties, including other industry licensees and local authorities. The OGC's position differs from the CAN/CSA Z-731 in that regard. The agreement defines each participant's responsibilities for providing aid and support during an incident. Local authorities have legislated responsibility to respond to any incident that may impact the public. They may also assist the licensee with other responsibilities agreed to during planning.

CAPP has published the *Mutual Aid Agreements for Emergency Response Guideline* to assist upstream petroleum licensees in establishing mutual aid agreements. This guide may be used as a reference when designing mutual aid agreements.

4.7 Telephone Lists

Internal telephone lists must include key personnel designated to assist in emergency response, with a key contact name, alternate contact, and

contact numbers (home phone, work phone, mobile phone, pager, and facsimile, etc.).

A telephone list of external emergency support services that may be required in an emergency, including government departments and agencies, communication services, air monitoring services, fire-fighting services, and oil spill cooperatives, must be compiled and regularly updated.

4.8 Post-Incident Assessment

Within 30 days of the end of a Level 2 or Level 3 incident, a licensee must file with the OGC an operator incident summary report structured as outlined in Appendix 3. After reviewing the operator incident summary report, the OGC may require that the licensee attend a meeting to further discuss the incident.

4.9 Compensation

Refer to the [Petroleum and Natural Gas Act](#) for a process designed to facilitate agreement in the matter of compensation to the public for any resulting damage.

4.10 Plan Distribution

A licensee is required to submit one paper copy of the ERP to the OGC for review and approval. It may distribute the ERP to others electronically as long as a hard copy is provided upon request.

A licensee must ensure that additional copies (either full or partial) of the ERP are provided to all persons requiring one. The need for distribution is determined through communication with all responders during plan development. **Confidential resident and personal information must only be included in the OGC and key responder copies.**

A licensee is also required to provide a copy of the ERP, excluding confidential resident and personal information, to any resident within the EPZ who requests in writing to have a copy. Once the ERP is submitted to the OGC, it may be requested and released, with the exception of personal information, under the [Freedom of Information and Protection of Privacy Act](#) (FOIP). A licensee must maintain a record of ERP distribution, including updates and amendments distributed.

4.11 Plan Maintenance

A licensee must distribute updates to ERP holders according to the requirements of Section 4.10. Changes in information that are

instrumental to implementing the plan must be distributed to plan holders immediately, regardless of the regular review period. Errors and/or omissions identified in the ERP by the OGC, licensee, or other party are expected to be corrected immediately.

4.12 Reporting and Record Keeping

A licensee's ERP must include procedures to be used for reporting and recording information during and following an emergency. These records provide documentation to be used for auditing, historical, and analytical purposes. A licensee must ensure that each key responder is provided instructions to be used for reporting and record keeping. All documentation recorded during and following an emergency must be retained and provided to the OGC upon request.

4.13 Training

A licensee must undertake training sessions on a regular basis for fulfilling functions defined in its ERP in accordance with CAN/CSA Z-731 to ensure that responsible personnel retain competency in emergency response procedures. Personnel must be trained and capable of carrying out their responsibilities at all times. The licensee can accomplish this by providing training sessions and response exercises.

4.14 Exercise Requirements

A licensee must test sour production facility and associated gathering system ERPs on a regular basis through the following types of planned exercises to promote emergency response preparedness:

- Tabletop, combined with a communications exercise, held annually for each area ERP, except in a year when a major exercise is held
- Major, once every three years for each area ERP

In situations where licensees have multiple area ERPs with the same response personnel and infrastructure, the ERPs may be tested simultaneously through one exercise.

Each licensee is required to notify the OGC 30 days in advance of a scheduled exercise and invite representatives to participate or observe. The licensee is required to develop a report of exercise results to be maintained for audit purposes. The report must contain the following information:

- type of exercise held
- scope and objectives
- persons involved
- outcome (objectives achieved)
- lessons learned

- action plan, including timelines

Sour well ERPs do not require an exercise unless specifically requested by the OGC. However, as described in Section 4.2.1, a licensee must review its ERP by conducting a meeting with key responders no more than 24 hours prior to conducting operations in the sour zone(s).

5 High Vapour Pressure (HVP) Pipeline ERP Requirements

All HVP pipeline ERPs must be approved by the OGC before the pipeline is commissioned. A licensee must hold a meeting with required government departments, agencies, and responders within 30 days prior to commencement of pipeline operations.

A licensee must develop an ERP that is specific to its operations. As a minimum, an HVP pipeline ERP must address all related requirements outlined in CAN/CSA Z-731 and Sections 2 and 3 of this guide.

6 ERP Requirements for Hydrocarbon Storage in Caverns

A licensee operating caverns for storage of hydrocarbons must have an OGC-approved ERP prior to start-up of storage operations. A licensee must hold a meeting with required government departments, agencies, and key responders within 30 days prior to commencement of cavern storage operations.

The ERP must be custom designed for individual operations and address all related requirements outlined in CAN/CSA Z-731 and Sections 2 and 3 of this guide. Any further requirements for ERPs will follow from a comprehensive government/stakeholder review of cavern storage ERP requirements.

7 Spill Response Contingency Plans

7.1 Requirements

Consistent with the direction given in CAN/CSA Z-731, operators must assess the risk their operations pose to the environment and ensure adequate response capability in the event of a spill, particularly into moving water. Spill preparedness requirements apply to all wells, facilities, and pipelines licensed by the OGC and cover all operations, such as drilling of wells and the injection, producing, and processing of liquids.

A licensee is exempt from the requirement to develop a spill response contingency plan or to purchase spill cleanup equipment if it is an active member in good standing of an oil spill cooperative in the area where its operations are located. A “member in good standing” means that licensee membership fees are fully paid up and that the licensee has met the obligations of that cooperative.

A licensee that is not a member of an oil spill cooperative must either join the oil spill cooperative or submit its own spill response contingency plan and obtain separate approval from the OGC. The plan must meet the same requirements stated in this guide where they relate to its specific operations. Details of any spill response contingency plan expertise provided by third parties must also be included where applicable.

7.2 Spill Response Contingency Plan Contents

If not exempted from the requirements of Section 7.1, a licensee must have a plan in place to address a release of any liquid product onto land or water from a well, pipeline, or facility described above. The plan, in the form of a manual, must address the following components:

- a description of initial emergency response procedures and actions, as well as all contacts;
- an inventory of wells, pipelines (carrying liquids), and associated facilities;
- topographical maps showing designated spill control points (where applicable), access roads, urban centres, bodies of water and streams, information related to water supply intakes for municipal and industrial operations, pipelines, wells, and facilities within the operating area;
- roles, responsibilities, and expertise of company personnel to manage the response; the on-scene commander role can be filled with a designated company employee or a third party with appropriate expertise;
- policies for worker safety at an oil spill containment site;
- inventory and location of response equipment;

- containment and recovery procedures applicable to the type, volume, and nature of the production and time of year; and
- annual training and exercise programs, a record of the training and exercise, and recommendations for continuous improvement.

7.3 Spill Training Exercises and Notification Requirements

If not affiliated with a spill cooperative, a licensee must conduct its own exercise. It is up to the licensee to choose between conducting a deployment or a tabletop type of exercise.

Spill cooperative members operating wells, pipelines, or facilities must incorporate training exercises into their preparedness plans by

- being represented and participating at a minimum of one cooperative annual exercise in the area where its operations are located; attendance at an exercise held outside of the area in which the licensee operates facilities is considered satisfactory, provided that the administrator of the spill cooperative involved is notified for tracking purposes;
- having an area representative complete a recognized spill response course or on-scene commander course in lieu of attendance at a particular spill cooperative area exercise; or
- having an area representative complete a recognized spill response self-study course in lieu of exercise attendance (this option cannot be used for two consecutive years). If the option of taking a course in lieu of exercise attendance has been used, the cooperative administrators must be notified.

Notification of annual spill equipment deployment training exercises must be submitted in writing to the OGC 30 days in advance of the exercise and include the following information:

- the type of training exercise to be conducted, the date on which it will be conducted, and the legal description of the land on which it will be conducted;
- a map showing the general topography and location of and the access routes to the deployment area and the location of any municipal water intakes within 3 km of the deployment area;
- the proposed spill material and volume to be used, if any;
- comments on the public use of the area, the collection and disposal of garbage, and a statement indicating the extent, if any, of anticipated surface disturbance to stream banks or shorelines at the test site; and
- the name of the landowner on whose land the training exercise will be held, and a statement indicating that the landowner has no objection to the exercise proceeding at the proposed test site.

Notification of annual spill equipment deployment training exercises must also meet the following criteria:

- If the exercise is to be held on Crown lands, a licensee must submit written notification to the appropriate Crown office (Public Lands or Forest Area) 30 days in advance of the exercise. An access agreement must be in place for exercises that involve private lands.
- Any spill medium used must be edible canola oil or mineral oil, dyed with an innocuous dye that harms neither water quality nor flora and fauna.²
- A copy of the notification must be kept on site during the exercise.

7.4 Training Exercise Report Summaries

A copy of the training exercise report summary must be completed within 30 days following the training exercise. These reports must be available to the OGC upon request for a period of two years following each training exercise.

7.5 Higher-Risk Operations

Licensees that operate higher-risk facilities, such as

- pipelines (carrying liquids) crossing named water bodies or
- facilities, wells, or pipelines (carrying liquids) located within 100 m of a named water body as defined in Appendix 1 Glossary,
- must evaluate the risk and ensure that they have response capabilities and expertise, in addition to membership in a spill equipment cooperative.

Examples of this heightened preparedness are frequent control point inspections, water flow monitoring, deployment exercise completion that incorporates these facilities, and ready access to additional spill containment equipment in conjunction with a high level of spill containment expertise.

At the request of the OGC, licensees with such operations must demonstrate that they are equipped to handle the increased potential for environmental damage from these types of facilities by providing evidence that the above items have been incorporated into their plans.

² A dye currently recognized as acceptable by the OGC is available through Western Canada Spill Services Ltd. (WCSS).

8 ERP Compliance and Enforcement Programs

8.1 Compliance Program Overview

The OGC uses a combination of ERP reviews, assessments, and field inspections to ensure that licensees are compliant with the requirements detailed in this guide. The audit and inspection program objectives are to ensure that

- licensees have an ERP in place that meets OGC requirements;
- existing wells, pipelines, and facilities undergoing an ownership transfer have submitted a new ERP for OGC approval;
- ERP training test exercises are conducted in accordance with the requirements of this guide;
- licensee personnel and their contractors are trained and capable of responding to any emergency; and
- public and government notification and involvement are adequate.

8.2 Enforcement

A licensee of wells, pipelines (carrying liquids), or facilities that does not have an approved spill contingency plan or a licensee that fails to maintain membership in good standing in a spill cooperative will be subject to enforcement action.

A licensee of wells, pipelines and facilities that do not have an ERP that meets OGC's requirements may be subject to enforcement action up to, but not limited to shut-ins.

Appendix 1 Glossary

Air Quality Monitoring—measurement of atmospheric concentrations of a hazardous substance such as H₂S and SO₂.

British Columbia Provincial Emergency Program (PEP)—aids local governments in analyzing hazards and risks, develop and test emergency plans, train and organize emergency staff and volunteers. PEP also manages all agencies in the event of an emergency or disaster, which cannot be handled locally.

Closure Order—when the OGC believes that, because of hazardous conditions in a field or at a well, it is necessary or expedient to close an area and to shut out all persons except those specifically authorized, the commission may make an order in writing setting out and delimiting the closed area.

Emergency—a present or imminent event outside the scope of normal operations that requires prompt coordination of resources to protect the health, safety, and welfare of people and to limit damage to property and the environment.

Emergency Awareness Zone (EAZ) – the area twice the radius of the Emergency Planning Zone (EPZ).

Emergency Operations Centre (EOC)—an operations centre established in a suitable location to manage the larger aspects of the emergency. In a high-impact emergency there may be a number of EOCs established to support the response. These may include corporate EOCs (regional, headquarters), a municipal EOC, a joint off-site regional EOC, and the provincial government COMOC.

Emergency Planning Zone (EPZ)—an area surrounding a facility, pipeline, or well where residents or other members of the public may be at highest risk during the early stages of an uncontrolled release of toxic materials such as H₂S or explosion or fire and the area for which the licensee must have a specific emergency response plan.

Emergency Response Plan (ERP)—a comprehensive plan to protect the public, including criteria for assessing an emergency situation and procedures for mobilizing response personnel and agencies and establishing communications and coordination, that is to be followed by all parties in the event of an incident.

Facility—any building, structure, installation, equipment, or appurtenance over which the OGC has jurisdiction and that is connected to or associated with the recovery, development, production, handling, processing, treatment, or disposal of hydrocarbon-based resources or any associated substances or wastes. This does not include wells or pipelines.

Gathering System—the network of pipelines, pumps, tanks, and other equipment that carry oil and gas to a processing plant or to other separation equipment.

High Vapour Pressure (HVP) Pipeline—a pipeline system containing hydrocarbon mixtures in the liquid or quasi-liquid state with a vapour pressure greater than 110 kPa absolute at 38°C. Some examples are liquid ethane, ethylene, propane, butanes, and pentanes plus.

Hydrogen Sulphide (H₂S)—a naturally occurring gas found in a variety of geological formations and also formed by the natural decomposition of organic matter in the absence of oxygen. H₂S is colourless, heavier than air, and extremely toxic. In small concentrations it has a rotten egg smell and causes eye and throat irritation.

Hyper-susceptible - a person or persons who may be abnormally reactive to a given exposure to toxins and whose reaction may occur in orders of magnitude greater than that of the susceptible population. Hypersusceptibles include those persons with impaired respiratory function, heart disease, liver disease, neurological disorders, eye disorders, severe anemia, and suppressed immunological function.

Incident - an unexpected occurrence or event that requires action by emergency personnel to prevent or minimize the impact on the safety and health of people and on property and the environment.

Level 1 Emergency—there is no immediate danger to the public or environment as no H₂S has been released; the emergency is confined to the lease or company property.

Level 2 Emergency—there is potential for risk to the public or environment, as the emergency could extend beyond company property. However, control is still possible.

Level 3 Emergency - An immediate danger to the public or environment exists; control of the situation has been lost.

Local Authority means

- (i) for a municipality, the municipal council,
- (ii) for an electoral area in a regional district, the board of the regional district if the regional district has been granted the powers of the municipality under the [*Emergency Program Act*](#), or
- (iii) for a national park, the park superintendent or the park superintendent's delegate if an agreement has been entered into with the government of Canada under section 4 (2) (e) in which it is agreed that the park superintendent is a local authority for the purposes of the [*Emergency Program Act*](#).

Lower Explosive Limit (LEL)—the lowest concentration of gas or vapour (percent by volume in air) that burns or explodes if an ignition source is present at ambient temperatures.

Major (full-blown) Exercise—as described in CAN/CSA-Z731, an exercise involving emergency response agencies, the licensee, and the deployment of all resources required

to test the licensee's ERP and intended to provide a realistic simulation of an emergency response.

Mobile Air Quality Monitoring - Use of sophisticated portable equipment capable of tracking substances such as H₂S or SO₂ and of measuring very low (ppb) atmospheric concentrations.

Municipal Emergency Operations Centre—the centre from which responsible municipal officials manage and support emergency operations within their jurisdiction, as well as formulate protective actions and provide public information. The centre has adequate workspace, maps, status boards, and communications capability.

Municipal Emergency Plan—the emergency plan of the local authority required under Section 6 of the [*Emergency Program Act*](#).

Mutual Aid—an agreement developed between two or more public and/or private facilities or operations to provide assistance to the parties of the agreement. Such an agreement is between two or more parties such as oil and gas companies, service companies, and local authorities.

On-site Command Post (OSCP)—an emergency operations centre established in the immediate vicinity of the incident to provide immediate and direct response to the emergency and initially staffed by company personnel.

Partially Controlled Flow - A restricted flow of product at surface that cannot be shut off at the licensee's discretion with equipment on site.

Public—the group of people who may be or are impacted by an emergency (e.g., employees, contractors, neighbors, emergency response organizations, regulatory agencies, the media, appointed or elected officials, visitors, customers, etc., as appropriate).

Publicly Used Facility—places where the presence of people can be anticipated. Examples include places of business, cottages, campgrounds, churches, and other locations created for use by the public. Includes any similar development the OGC may designate as a public facility.

Regional Emergency Operations Centre (REOC)—an operations centre established in a suitable location off site near the emergency to manage the larger scale aspects of the emergency response and staffed jointly by government and industry personnel.

Residence – Dwelling occupied on a full or part time basis.

Shelter - remaining indoors for short-term protection from exposure to toxic gas releases.

Sour Gas - natural gas, including solution gas, containing H₂S.

Sour Multiphase Product - any liquid that contains H₂S in the gas phase.

Sour Multiphase Pipeline - a pipeline that transmits a multiphase product that contains more than 10 moles of H₂S per kilomole of natural gas in the gas phase.

Sour Pipeline—a gas pipeline that transmits gas containing more than 10 moles of H₂S gas per kilomole of natural gas.

Sour Production Facility—any facility that processes sour gas.

Sour Well—any oil or gas well expected to encounter sour gas-bearing formations during drilling or any oil or gas well capable of producing sour gas.

Special Needs—those persons for whom early response actions must be taken for reasons such as requiring evacuation assistance, requesting early notification, not having telephones, requiring transportation assistance, or experiencing a language barrier.

Special Sour Well—a designation that reflects the proposed well's proximity to populated centers and its maximum potential H₂S release rate during the drilling state. The casing or open-hole flow configuration is used in arriving at this designation.

Sulphur Dioxide (SO₂)—a colourless, water-soluble, suffocating gas formed by burning sulphur in air; also used in the manufacture of sulphuric acid. SO₂ has a pungent smell similar to a burning match.

Surface Development—occupied permanent or part-time dwellings, publicly used facilities including campgrounds, places of business, and any other surface development where the public may gather on a regular basis.

Susceptible—the subpopulation of persons who may be considered more sensitive to the effects of H₂S and SO₂, including the elderly, pregnant women, and the very young, particularly preschool-aged children.

Tabletop Exercise—as described in CAN/CSA Z-731, an informal exercise generally used to review resource allocation, roles, and procedures and for orientation of new personnel to emergency operations without the stress and time constraints of a full-scale exercise.

Uncontrolled Flow—a release of product that cannot be shut off at the licensee's discretion.

Upstream Petroleum Industry—constitutes all facilities, equipment, substances, and operations used in the exploration, recovery, processing, and transporting of petroleum within the BC Oil and Gas Commission (OGC) jurisdiction. Generally, this includes oil

and gas operations upstream of a refinery and the storage and transportation of unrefined products by pipeline between oil and gas production facilities or other end points.

Urban Centre—a city, town, village, summer village, hamlet with not less than 50 separate buildings, each of which must be an occupied dwelling; any First Nation reserve; other incorporated centres; any similar development the OGC may designate as an urban centre.

Urban Density Development—any incorporated urban centre, unincorporated rural subdivision, or group of subdivisions with not less than 50 separate buildings, each of which must be an occupied dwelling; any other similar development the OGC may designate as an urban centre.

Water Body—natural or manmade; contains or conveys water continuously, intermittently, or seasonally. A natural water body is any location where water flows or is present, whether the flow or the presence of water is continuous, seasonal, intermittent, or occurs only during a flood. This includes, but is not limited to, the bed and shore of a river, stream, lake, creek, lagoon, swamp, marsh, slough, muskeg, or other natural drainage, such as ephemeral draws, wetlands, riparian areas, floodplains, fens, bogs, coulees, and rills. Examples of a manmade water body include, but are not limited to, a canal, drainage ditch, reservoir, dugout or other manmade surface feature. (EUB Guide 56)

Appendix 2 EPZ Curves

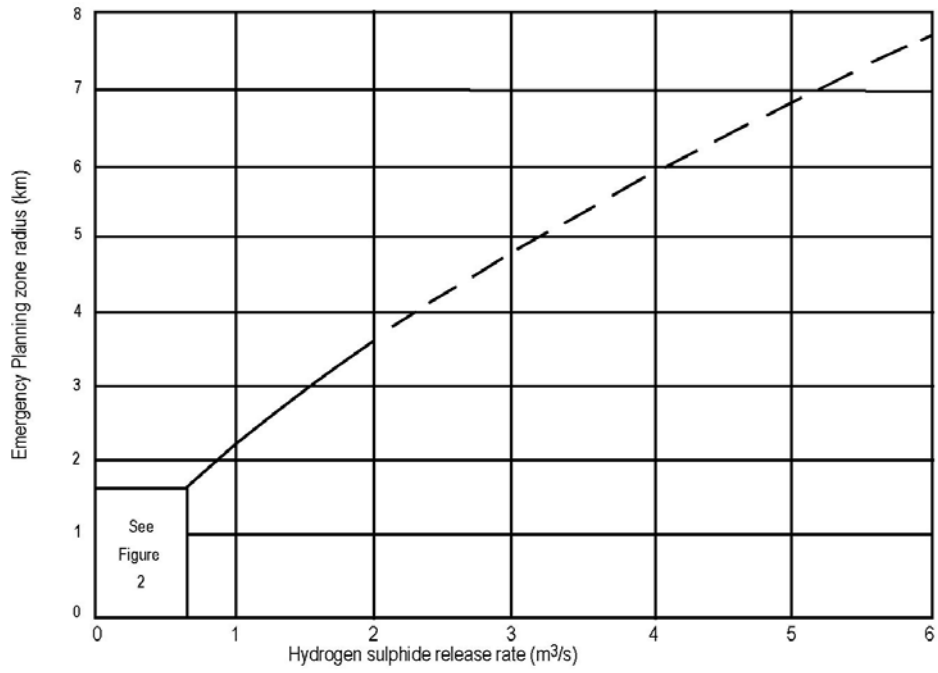


Figure 1. Emergency planning zones for wells

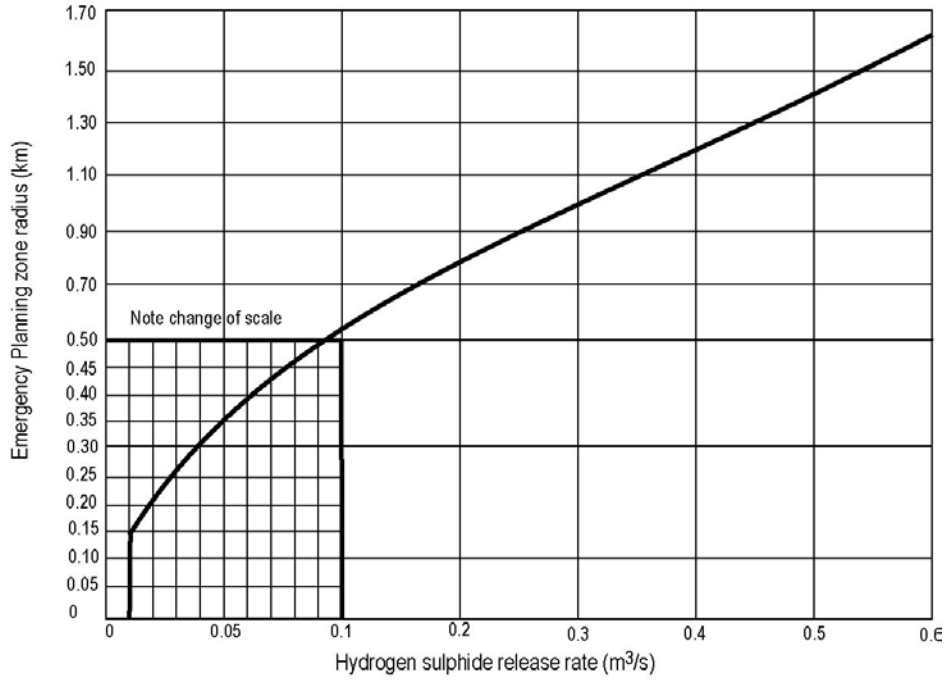


Figure 2. Emergency planning zones for wells

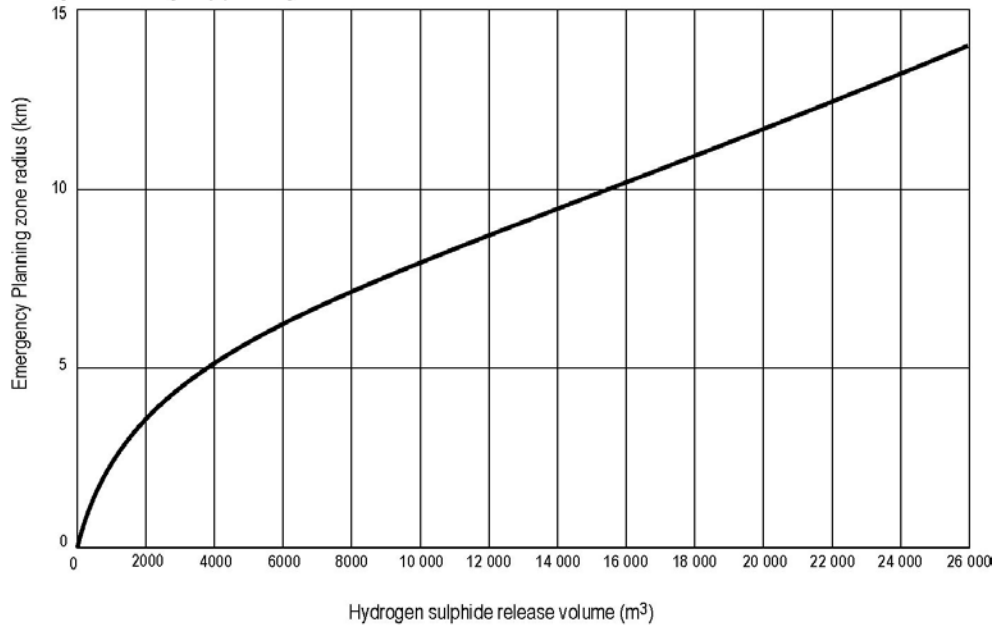


Figure 3. Emergency planning zones for sour gas plants, pipelines, and production facilities

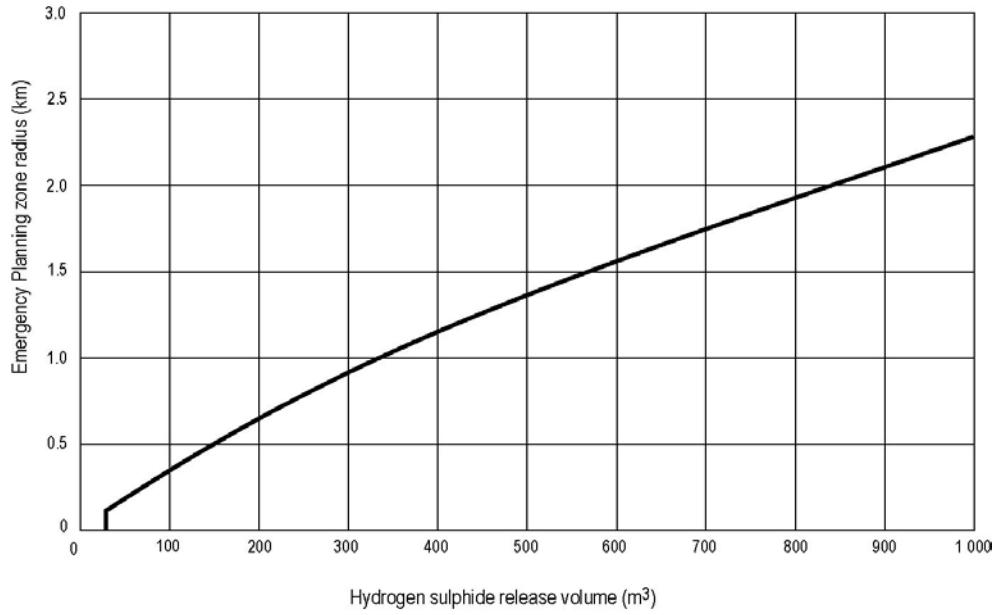


Figure 4. Emergency planning zones for sour gas plants, pipelines, and production facilities (detail)

Pipeline H₂S Release Volume

The equation for calculating the maximum potential H₂S release volume from a pipeline is as follows:

$$V = \frac{2.232 \times 10^{-6} D^2 L (P+101.325) H}{Z (T+273)}$$

Where: V = maximum potential H₂S release volume in m³
D = internal diameter of pipe in millimetres (mm)
L = length of pipeline between block valves (km)
P = licensed maximum operating pressure in kilopascals (kPa)
H = licensed H₂S content (moles/kilomole) for the pipeline
Z = compressibility factor at Pr and Tr
T = pipeline minimum operating temperature (°C)

Appendix 3 Operator Incident Summary

The Operator Incident Summary should be structured as indicated below, with the details outlined included as appropriate. The OGC requires two copies of the Operator Incident Summary. If the operator does not address all requested information, the OGC will request a revised report from the operator through written correspondence.

- **Contents**
- **Executive Summary**
 - Incident location; map of the area, including the unique well identifier, if applicable
 - Occurrence date and time
 - Duration of the incident
 - Contractor(s), if applicable
 - Summary of events
 - Estimated cost of the incident and control
 - Type and volume of lost production
- **Recommendations**
 - Actions to improve existing operations
 - Actions to prevent future occurrences
 - Actions to inform affected public of outcomes and findings
- **Background to the Incident**
 - Operator history in the area
 - Details of any previous nearby incidents
 - Summary and assessment of conditions and events immediately preceding the incident
 - Copy of the specific emergency response plan(s) if in effect or the corporate-level emergency response plan, with comment on how well the plan(s) worked or where improvements could be made
- **Description of the Incident**
 - Summary of the event
 - Details of internal and external notification
 - Response and control measures
 - Details of any monitoring programs (air, water, soils), including their results
 - Security and safety measures for the site and potentially affected area
 - Use of contractors
 - Communications program and media involvement, including an assessment of their effectiveness, what worked well, and where improvements can be made

- Actual or suspected cause, the rationale used to determine the cause, and if applicable, the progression from a kick to a blow to a blowout
- **A copy of the drilling plan**, if applicable, including an **overview of geology** relative to the well in question. Also required is a **summary sheet of well data**, such as
 - the STICK diagram
 - mud weight at the time of incident
 - formation name, depth, and pressure
 - H₂S content
 - reservoir releases (gas, oil, condensate, water) and flow rates
 - initial release point at surface
 - release geometry (horizontal, vertical, diffused, etc.)
 - restricted (valve partially closed, etc.) or unrestricted flow
 - details of any relief wells
 - list of equipment losses
- **Description of all potential impacts and steps taken during the incident** to monitor and minimize the effects on
 - public
 - workers
 - environment
 - animals (domestic and wildlife)
- **A copy of or sufficient detail respecting appropriate maintenance and operating programs** related to the incident (e.g., SCADA systems, pipeline corrosion program, ESD valve operating conditions and maintenance programs, tour reports, drilling recorder and mud volume information, blowout preventer test and inspection report, employee certifications)
- **All third-party analyses of any pipeline or equipment failures** (e.g., metallurgical reports), if applicable
- **Copy of personnel statements**, if available
- **Conclusions respecting the incident**, with emphasis on
 - how the knowledge gained from this incident will be shared with other operators
 - timeline to implement actions, including measurement points that will be used to ensure actions are followed up, resulting in lasting improvement

The information contained in your report may be the subject of a request for information pursuant to the [*Freedom of Information and Protection of*](#)

Privacy Act (FOIP). Please identify those portions of your report that you believe contain confidential information and explain, within the report, why you believe the information to be confidential.

Appendix 4 Government Agencies

- 1) **Oil and Gas Commission**
200 10003 110th Ave.
Fort St. John, BC
V1J 6M7
24-Hour Contact Number: (250) 261-5700
Incident Reporting Number: 1-800-663-3456
<http://www.ogc.gov.bc.ca/>
- 2) **British Columbia Provincial Emergency Program**
Headquarters
PO Box 9201 Stn Prov Govt
Victoria, BC
V8W 9J1
Incident Reporting Number: 1-800-663-3456
<http://www.pep.bc.ca/>
- 3) **Royal Canadian Mounted Police (RCMP) or local police department**
Determine appropriate jurisdiction
- 4) **British Columbia Ministry of Water, Land and Air Protection**
Headquarters
PO Box 9339 Stn Prov Govt
Victoria, BC
V8W 9M1
Incident Reporting Number: 1-800-663-3456
http://www.gov.bc.ca/bvprd/bc/channel.do?action=ministry&channelID=-8395&navId=NAV_ID_province
- 5) **Local Municipal Government/First Nation**
- 6) **British Columbia Ministry of Forests, Forest Service**
Headquarters
PO Box 9529, Stn Prov Govt
Victoria, BC
V8W 9C3
http://www.gov.bc.ca/bvprd/bc/channel.do?action=ministry&channelID=-8385&navId=NAV_ID_province
- 7) **Workers' Compensation Board of British Columbia**
Head Office
PO Box 5350 Stn Terminal
Vancouver, BC
V6B 5L5
<http://www.worksafebc.com/>

- 8) **British Columbia Ministry of Transportation**
Headquarters
940 Blanshard Street
Victoria, BC
V8W 3E6
http://www.gov.bc.ca/bvprd/bc/channel.do?action=ministry&channelID=-8394&navId=NAV_ID_province
- 9) **Local fire department, hospitals and ambulance services and local health units**
Determine appropriate jurisdiction