PEMBINA Institute

Landowners' Guide
to Oil and Gas Development

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4th Edition
all new and revised

Section 6

Emergencies

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6. Emergencies

This section outlines what you should do and know in general emergency situations, what may occur and who may be involved in the event of an emergency. It is important to know what can specifically happen if there is a sour gas blowout and how emergencies are classified. Lastly, the section includes shelter-in-place instructions that may be given to you at the onset of a sour gas blowout.

What's in this section

If you see, hear, or smell something unusual and suspect it is an emergency related to oil and gas operations, call the Alberta Energy Regulator's **Energy and Environmental Emergency 24-hour Response Line at 1-800-222-6514** and provide the operator with as much detail as possible about the emergency.

6.1 General emergency situations

If there is an emergency — a well blowout, a pipeline leak or an explosion, for example — you should immediately call the company's 24-hour emergency number (if known), local emergency services (such as the fire department) and the Alberta Energy Regulator (AER). While the AER's 24-hour Energy and Environmental Emergency Response Line is centralized, the AER does have 24-hour response capacity at each of its regional centres. If you place a call to the emergency response line, your call will be triaged to the appropriate field centre for prompt response.

If you are certain that the trouble is coming from an interprovincial or international pipeline, call the toll-free Canada Energy Regulator emergency number at 819-997-7887. If you are uncertain who is responsible, it is best to contact the AER's emergency response line as they also respond to emergencies on CER-regulated lines.

Under Alberta's Environmental Protection and Enhancement Act, it is an offence to release a harmful substance, even a small amount. Any person who should have a degree of control or influence and knows of a release must report it.[1] If you notice any other unusual activity, such as water flowing from a seismic hole, structural damage, surface damage, concerns around abandoned wells or issues related to water wells, you should notify the company and the AER. Even if you are unsure if the incident is an emergency, call the AER's emergency response line as it also acts as a complaints line. Where required, the AER will send a staff person to inspect and take control of the situation. An inspector or an agent from the AER can take any emergency measures they consider necessary to protect human life, health or the environment,[2] and may issue an environmental protection order.[3]

The company is required to handle an emergency situation by, for example, establishing an on-site command post that may involve the AER, local municipality, Alberta Health Services, the

[1] Alberta, *Environmental Protection and Enhancement Act*, RSA 2000, c. E-12, s. 110. https://open.alberta.ca/publications/e12

[2] *Environmental Protection and Enhancement Act*, s. 115(1).

[3] *Environmental Protection and Enhancement Act*, s. 114(1).

Alberta Emergency Management Agency, and other government agencies if needed.[4] If the company does not act immediately to stop the escape of oil or gas from a well or to control a flow of water, the AER can take whatever action is necessary to deal with the situation and protect the public.[5] The AER has far-reaching powers in such circumstances, including shutting down a well. For example, where oil has escaped, the AER can direct the company to contain and clean up the oil, give orders to company employees, or engage outside help and recover the costs from the company later.[6]

Not all operations in the province have a site-specific emergency response plan (ERP), but every company is required to have a corporate-level ERP to handle emergency events. Operations that pose more of a hazard, such as critical sour wells, will have a site-specific ERP in place to notify those living and working in the designated emergency planning zone (see section 6.2). The company is responsible for implementing this plan. See section 6.3 for the actions you should take in such a situation.

At the onset of an incident, if you are within the emergency planning zone, the company should be in contact with you to provide specific instructions, which may include to evacuate or shelter in place. They should also provide you with information on the type and status of the incident, where the incident is occurring, any public protection measures to follow, a description of how the company is responding to the situation, and additional contact information. While the incident is ongoing, the licensee should continue to be in contact with you and give you more information about the products involved and any long-term effects they may have, what you should do if you begin experiencing adverse effects, and regular updates about the areas involved.[7] If you are evacuated, the company will have a reception centre where they will register you as an evacuee and assist in arranging temporary accommodation.

6.2 Emergency response plans

The AER requires companies that produce sour gas to have an appropriate ERP to ensure quick action if there is an operational incident, ranging from a minor leak to a blowout. The AER's minimum requirements for ERPs are given in Directive 071: Emergency Preparedness and Response.

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[4] AER, *Directive 071: Emergency Preparedness and Response* (2023) and *Manual 026: Emergency Preparedness and Response Guide* (2023). https://www.aer.ca/regulations-and-compliance-enforcement/rules-and-regulations/directives/directive-071 and https://static.aer.ca/prd/documents/manuals/Manual026.pdf

[5] Alberta, *Oil and Gas Conservation Act*, RSA 2000, c. O-6, s. 41. https://open.alberta.ca/publications/o06

[6] *Oil and Gas Conservation Act*, ss. 104 and 105.

[7] AER, *Directive 071: Emergency Preparedness and Response*, Appendix 5.

All companies must have a corporate ERP so they can notify the public and respond to any unexpected event. The AER also requires a company to have a specific ERP for a critical sour well, a sour production facility, a sour gas pipeline or a high vapour pressure pipeline. A "critical" sour well is one that has a high H_2S release rate or is close to an urban centre. The release rate is determined by both the percentage of H_2S in the gas and the amount of H_2S that can be delivered to the surface (see the AER's EnerFAQ on critical sour wells).[8]

Even when a site-specific ERP is not required, it is a good idea for you as a landowner or occupant to discuss safety with the company and examine their corporate ERP so you know what will be done if there is a leak or other emergency. When a company is required to have a specific ERP, they must consult or notify those within the emergency planning zone.

6.2.1 Emergency planning zone

An emergency planning zone (EPZ) is an area surrounding a well where residents or other members of the public may be at highest risk in the event of an uncontrolled release of H_2S. The company must be prepared to respond immediately to any event in the EPZ. The zone should be large enough to inform and evacuate the public in the case of an emergency.

The basic size of the EPZ will be determined by the maximum H_2S release rate, but the actual size of the final zone must take into consideration the nature of the terrain and other site-specific features. The extent of the zone will also reflect information gathered during the public involvement process. Directive 071 sets out in detail how a company must involve local government and the public in preparing a specific ERP. The company must provide the public within the EPZ a detailed information package that includes an explanation of the potential hazards, the H_2S concentration and release rates, the company's 24-hour emergency contact telephone number, and the potential health effects of exposure to H_2S and to sulphur dioxide (SO_2), which results from the combustion of H_2S. The package will also describe the procedures for responding to an emergency. People who may be absent for extended periods (e.g., trappers or recreational property owners) must be informed by registered mail.

The company must review this information with all members of the public (or with the urban director of emergency management in an urban area) and address their concerns. In addition to obtaining input into the actual ERP, the company must obtain information from all those living and working in the EPZ — including the exact location of their residence or workplace, exit routes, and key contact names and phone numbers — so that they can be alerted if there is an

[8] AER, "All About Critical Sour Wells – EnerFAQ." https://www.aer.ca/understanding-resource-development/enerfaqs-and-fact-sheets/enerfaqs-sour-wells

emergency.[9] The company must also attempt to identify those with special needs (for example, people with health or mobility problems) who may need to be notified or evacuated earlier than the general population. The type of information regarding the public that the AER requires for an ERP is given in section 4.5 of Directive 071.

Companies must update ERPs annually, and conduct a public awareness program with residents every second year. The companies are responsible for ensuring that resident contact information is up to date.[10]

6.2.2 Corporate emergency response plans

The AER requires all companies drilling for oil and gas to have a corporate ERP, which the regulator can review on request. The ERP describes how a company will manage and communicate during an emergency and is used as a training manual for company employees.

The ERP should set out how the company will coordinate with the local municipal disaster services. As only large cities have safety professionals, if the ERP relies on municipal staff to respond to an emergency then the company will have to ensure that the municipality has enough staff who are adequately trained and equipped to deal with such an event.

There are no regulations regarding compensation in the event of an evacuation. If there is an issue of unpaid costs between a landowner and the company, the issue may be resolved through an alternative dispute resolution (ADR) process in the case of multiple issues between parties, or if compensation is the only concern, the issue may need to be resolved through a small claims court. If individuals need to claim on their personal insurance policies, they should ensure that the company's declaration of an emergency was endorsed by the municipality; if not, some insurance companies may refuse to pay the claim. Regardless of municipal endorsement, since sour gas emergencies can be life threatening, as a landowner you should follow the instructions provided by the company.

6.3 Actions to take during a sour gas emergency

Some substances found in sour gas are poisonous. Hydrogen sulphide (H_2S), for example, is highly toxic and can cause immediate death at concentrations as low as 750 parts per million (ppm).[11] The "rotten egg" smell associated with H_2S can be detected when concentrations are as

[9] The Protection of Privacy Act applies to the information that a company collects about residents and how the company can use that information.

[10] AER, *Directive 071*, section 5.3.

[11] Even at low levels, H_2S is acutely toxic to humans; see T. Guidotti, "Hydrogen Sulphide," *Occupational Medicine* 46, no. 5 (1996). See also Appendix D for a more detailed definition.

low as 0.001 to 0.13 ppm.[12] Concentrations as low as 1–5 ppm may lead to nausea or headaches with prolonged exposure. Concentrations of 20–50 ppm may cause irritation of the nose, throat, and lung, digestive upset, and a loss of appetite. One's sense of smell may also become fatigued (or desensitized) so odour can't be relied on as a warning of exposure. Sense of smell temporarily disappears at concentrations of 100–200 ppm and is accompanied by severe nose, throat and lung irritation. At 250–500 ppm, exposure can lead to pulmonary edema, a potentially fatal buildup of fluid in the lungs. Concentrations above 500 ppm can lead to respiratory paralysis, irregular heartbeat, collapse, and death.[13]

If you live within an EPZ, the company is responsible for providing you with specific information during the consultation process. The public information package and its ERP will include information about the type of hazard, H_2S release rates (if applicable), relevant emergency contact information, and procedures in case of an emergency.[14] You should keep this information at hand for you, your family or staff.

If you smell sour gas, first follow shelter-in-place instructions (see below), and then notify the company and the AER through the Energy and Environmental Emergency Line. Before you decide to leave the area, refer to evacuations provided by the company representative, the municipality, or the AER. As per AER regulations, a notice to evacuate or seek shelter will be given for any H_2S levels above 10 ppm. Depending on the circumstances, sheltering in place may be recommended over evacuation.[15] For more information about critical sour wells, see the AER EnerFAQ on critical sour wells.

Susceptible individuals should evacuate if they are concerned about their health and will probably not want to wait until they experience symptoms or are advised to evacuate an area. This includes pregnant women and those with respiratory conditions, as well as those with limited mobility. The company will advise people whom they know to be susceptible as part of the ERP. In some cases, individuals may want to ask the company to install an H_2S monitor in their home.

It is recommended to move animals with pre-existing conditions if they show signs of distress at levels below 10 ppm H_2S when such levels are predicted to continue for six hours or more. Moving livestock to higher elevations may help if they cannot be evacuated, as H_2S is slightly

[12] Canadian Centre for Occupational Health and Safety, "Cheminfo: Hydrogen Sulphide." http://www.ccohs.ca/products/databases/samples/cheminfo.html#TOC3A

[13] Alberta Health, *Acute Exposure Health Effects of Hydrogen Sulphide and Sulphur Dioxide*. https://www.albertahealthservices.ca/assets/wf/eph/wf-eh-alberta-health-acute-exposure-health-effects-of-hydrogen-sulphide-and-sulphur-dioxide.pdf

[14] AER, *Directive 071*, section 4.4.

[15] AER, *Directive 071*, section 9.

heavier than air and settles in lower areas. Make sure to check with the company to ensure that it is safe to do so.

Wells are sometimes ignited to prevent the escape of H_2S. However, combustion of H_2S forms sulphur dioxide (SO_2). Because high levels of this gas are also harmful, evacuating the area may still be necessary. Currently, the emergency evacuation levels for SO_2 are 5 ppm (measured average over 15 minutes), 1 ppm (3-hour average) and 0.3 ppm (24-hour average).[16] An acute exposure above 20 ppm requires respiratory protection, and an exposure above 100 ppm poses immediate danger to life.[17]

Once you have left an area, you should not return until the company or the AER says that the source of the emission has been addressed.

Four general categories are used for classifying incidents at critical sour wells, as set out in AER Directive 071, Appendix 4:

Alert — The incident can be handled on site by the duty holder (e.g., licensee, operator) through normal response procedures and presents a very low risk to the public.

Level 1 — The incident presents no danger beyond the duty holder's property and no threat to the public and has minimal environmental impact. Duty-holder personnel can manage the incident themselves with immediate control of the hazard.

Level 2 — The incident presents no immediate danger outside the duty holder's property, but it could potentially extend off lease. Outside agencies must be notified. Imminent control of the hazard is probable, but there is a moderate threat to the public or environment.

Level 3 — The incident places the safety of the public in jeopardy from a major uncontrolled hazard. Significant and ongoing environmental impacts are likely. Immediate multi-agency and provincial government involvement is required.

6.4 Shelter in place

Depending on the circumstances of the incident, you may be asked to shelter in place instead of evacuating to minimize your exposure to the hazards. The Alberta government has released a general guide on what to do if you need to shelter in place.[18]

[16] AER, *Directive 071*, section 9.

[17] Alberta Health, *Acute Exposure Health Effects of Hydrogen Sulphide and Sulphur Dioxide*.

[18] Alberta, *Shelter-in-place: What you need to know* (2019). https://open.alberta.ca/dataset/c4a60708-b22c-4b0d-9465-aa54eccc8286/resource/8f910e44-cfa2-4470-985f-e87a952a1944/download/05062019-fs-shelter-in-place-final.pdf

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