

MANUAL Risk Assessment & Management Manual

SECTION Sour Gas

DATE O: March 2009

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**Draft - Response Protocol to Applicants of Proposed Sour Gas Wells, Pipelines
and other Facilities - Draft**

**DRAFT
PROTOCOL**

NUMBER:

Summary:

1. All ERPs, confirm AHS contact information details.
2. Any non-critical well, any pipeline or other facility: no assessment required unless the public or the local or municipal authority requests AHS involvement.
3. Any AHS designated Population Critical well: see requirements detailed below.
4. Application of this Protocol to pipelines and other facilities may be varied on a site specific basis.

Alberta Health Services Involvement - Directive 071 (ERCB 2008)

Section 4.2. 6) Prior to commencement of the public involvement program, the licensee must confirm and coordinate roles and responsibilities in accordance with the protocols established with the local Regional Health Authority, the local authority and the municipal director of emergency management (page 18).

Response Elements and Assessment Criteria:

Any and all ERPs:

- I. The emergency contact information for Alberta Health Services - Calgary (AHS) to be included in all ERPs is:
 - 24-hour phone number for the on-call Medical Officer of Health (MOH): (403)-264-5615
 - i. This is the Single-Point-of-Contact for activating emergency response fan out within the AHS region
 - ii. The caller must say this an “emergency”
- II. The AHS contact for Section 4.2. 6) of Directive 071 and for all nonemergency issues (e.g., for administrative purposes, ERP and resident information package updates, or queries) is:
 - Risk Assessment and Management, Environmental Health, Alberta Health Services - Calgary, 10101 Southport Road SW, Calgary, AB,

T2W 3N2, telephone: 403-943-8049, fax: 403-943-8056, email:
dennis.stefani@albertahealthservices.ca

III. Population Critical Level 3 and 4 Wells (2 to >6 m³ H₂S/s):

- For Category E, Type 610 wells that have urban centres within the EPZ

Include in the ERP and in public and emergency responder consultation:

1. Dispersion Modeling of Hydrogen Sulfide (blowout scenario)
 - Delineation of the 100 ppm H₂S (3 minute average) (ERCB vol 5, p. 5-7) isopleths, which defines a radius and area around the wellhead of possible human lethality (CHR November 12 2004. Calgary Health Region Submission for Consideration by the EUB for the EPZ End-point. Prepared by Lambert TW, Goodwin VM, and Stefani, D).
2. Dispersion Modeling of Sulfur Dioxide for ignited blowout (Directive 071), plus flaring and incineration scenarios. In addition to the criteria specified in Directive 071, page 98:
 - a. Voluntary evacuation criteria
 - 0.19 ppm SO₂ (10-minute average) (WHO 2000 Air Quality Guideline)

Note: The Alberta AAQO of 0.06 ppm SO₂ (24-hour average) is based on protection of vegetation. However the World Health Organization air quality guideline of 0.06 ppm (24-hour average) is based on human health protection (WHO 2000 Air Quality Guidelines). The AHS interpretation of the AB AAQO of 0.06 ppm (24-hour average) is consistent with that of WHO.

- b. Alberta SO₂ Ambient Air Quality Objective Exceedances (Directive 071),
 - Identify the size and location of the affected geographic areas, and the magnitude of the exceedances.
3. Assessment of Shelter-in-Place (blowout scenario)

If Shelter-in-Place will be used as an emergency response measure, the following information is required. Indoor sheltering is not viable at the 100 ppm (3-minute average) indoor isopleth, the threshold of possible human lethality.

 - modeling of the elapse time and distance to indoor H₂S concentrations of 100 ppm (3-minute average) in each of the public facilities and in representative privately owned occupied buildings.
 - document facilities within the EPZ that cannot quickly turn off air handling systems and describe how these facilities will be managed.
4. The ERP shall incorporate voluntary evacuation of the vulnerable population when measured H₂S concentrations are approaching or at 0.35 ppm 1-hour average. This is the concentration at which vulnerable people may experience

mild adverse respiratory effects. This is the U.S. EPA draft Acute Reference Exposure concentration for H₂S.

5. Location of Reception Centre(s), include two alternative Reception Centre(s) in the event of one site being at a downwind location during an emergency event.
6. Time to Ignition, demonstrated understanding using dispersion modeling of the relationship between elapse time following an uncontrolled (open flow) release, time to ignition, and the effect on plume footprint (i.e., plume dimensions on the ground) of the H₂S isopleths of 100 and 10 ppm 3-minute averages (10 ppm is specified in Directive 071, Appendix 8 – Ignition Criteria).
7. Dispersion modeling results incorporated into ERP and shared with other emergency response stakeholders, and used during public consultation.
8. Includes presentation of AHS H₂S and SO₂ toxicology in the ERP and in public consultation (Directive 071, page 21).

IV. Population Critical Level 1 to 2 Wells (0.01 to <0.3 and 0.3 to <2 m³ H₂S/s):

- AHS screening assessment will determine which if any of the following additional information (below) is required for ERCB Category E, Type 620, 621 and 622 wells.

As determined by AHS, include in the ERP and in public and emergency responder consultation:

1. Dispersion Modeling of Hydrogen Sulfide (blowout scenario)
 - Delineate the 100 ppm H₂S (3 minute average) (ERCB vol 5, p. 5-7) isopleth, which defines a radius and area around the wellhead of possible human lethality (CHR November 12, 2004. Calgary Health Region Submission for Consideration by the EUB for the EPZ End-point. Prepared by Lambert TW, Goodwin VM, and Stefani, D).
2. Dispersion Modeling of Sulfur Dioxide for ignited blowout (Directive 071), plus flaring and incineration scenarios. Criteria specified in Directive 071, page 98.
3. Assessment of Shelter-in-Place (blowout scenario)

If Shelter-in-Place will be used as an emergency response measure, the following information is required. Indoor sheltering is not viable at the 100 ppm (3-minute average) indoor isopleth, the threshold of possible human lethality.

- modeling of the elapse time and distance to an indoor H₂S concentration of 100 ppm (3-minute average) in each of the public facilities and in representative privately owned occupied buildings.
 - document facilities within the EPZ that cannot quickly turn off air handling systems and describe how these facilities will be managed.
4. The ERP shall incorporate voluntary evacuation of the vulnerable population when measured H₂S concentrations are approaching or at 0.35 ppm 1-hour average. This is the concentration at which vulnerable people may experience mild adverse respiratory effects. This is the U.S. EPA draft Acute Reference Exposure concentration for H₂S.
 5. Location of Reception Centre(s), include two alternative Reception Centre(s) in the event of one site being at a downwind location during an emergency event.
 6. Time to Ignition, demonstrated understanding using dispersion modeling of the relationship between elapse time following an uncontrolled (open flow) release, time to ignition, and the effect on the plume footprint (i.e., plume dimensions on the ground) of the H₂S isopleths of 100 and 10 ppm 3-minute averages (10 ppm is specified in Directive 071, Appendix 8 – Ignition Criteria). The shortest time to ignition is 15 minutes (ERCBH₂S, Volume 3).
 7. Dispersion modeling results incorporated into ERP and shared with other emergency response stakeholders, and used during public consultation.
 8. Includes presentation of AHS H₂S and SO₂ toxicology in the ERP and in public consultation (Directive 071, page 21).
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AHS Definition of Population Critical Well:

Site-specific emergency response plans are required by the ERCB (Directive 071) for critical and noncritical wells during drilling and completion stages that have surface developments within the EPZ. The ERCB defines critical wells (ID 97-06 cited in Directive 071) as described below.

The classification of a proposed well as AHS Population Critical, which mandates the proponent satisfy the requirements set forth on the preceding pages, requires the following condition:

- that all or part of an urban centre is located within the well EPZ.

Or

- the well is classified by the ERCB as a Category E well (i.e., as a nonroutine Type 610 single well or as nonroutine Proximity Critical Wells Types 620,

621 and 622, on the following conditions). Category E wells are described in Directive 056 (2008, Table 7.1) and all include a requirement for personal consultation with and written nonobjection from urban authorities, local authorities and residents. The conditions for classification of these wells as CHR Population Critical are as follows:

- Category E, Type 620 well, defined by the ERCB as the presence of an urban centre within 0.5 km or an urban authority within 1.5 km of the wellhead. This classification is based on Level 1 Critical ($0.01 - <0.1 \text{ m}^3/\text{s H}_2\text{S}$) wells sited within 0.5 km of an urban centre. And, includes an ERCB requirement for personal consultation with and written nonobjection from urban authorities within 1.5 km of the wellhead.
- Category E, Type 621 well, defined as the presence of an urban centre within 1.5 km of the wellhead. This classification is based on Level 1 Critical ($0.1 - <0.3 \text{ m}^3/\text{s}$) wells sited within 1.5 km of an urban centre. And, includes a requirement for personal consultation with and nonobjection from urban authorities within 1.5 km of the wellhead.
- Category E, Type 622 well, defined as the presence of an urban centre within 5 km of the wellhead. This classification is based on Level 2 Critical ($0.3 - <2.0 \text{ m}^3/\text{s}$) wells sited within 5 km of an urban centre. And, includes a requirement for personal consultation with and nonobjection from urban authorities within 5.0 km of the wellhead.
- Category E, Type 610 well, defined by the ERCB as having flow rates $\geq 2 \text{ m}^3/\text{s H}_2\text{S}$, and applies to Levels 3 and 4 Critical Wells. And, includes a requirement for personal consultation with and nonobjection from urban authorities within the EPZ.
 - However, the classification of Type 610 wells as AHS Population Critical includes the requirement that part or all of an urban centre is within the EPZ.

An urban centre is a city, town, new town, village, summer village, or hamlet with not less than 50 separate building each of which must be an occupied building, or other incorporated centre (Directive 071, page 81).

An urban density development is any incorporated urban centre, unincorporated rural subdivision, or group of subdivisions with no fewer than 50 separate buildings, each of which must be an occupied dwelling, or any other similar development the ERCB may designate as an urban density development (Directive 071, page 81).

The drilling stage includes all operations which are continuously attended, from spudding to cementing of the production casing or well abandonment. It includes well completion and well testing. The H_2S flow rate for classification purposes shall be the highest flow rate estimated for drilling and completion.

Notes:

- If an EPZ intersects an urban density development, the licensee must include entire development within the EPZ for the purposes of conducting the public involvement program (ERCB Directive 071, p. 18).
- If part of an urban centre is included within the EPZ, the licensee is not required to identify each individual residence within the urban centre, but must contact the urban director of emergency management to review key emergency response information and confirm and coordinate each party's roles and responsibilities (ERCB Directive 071, page 18)..
- The licensee must notify residents of urban centres that they are within the EPZ and provide details of the emergency public protection measures through a combination of appropriate notification methods such as mail outs, open houses, and newspaper advertisements (Directive 071, page 20).
- Outside the EPZ, the RHA in accordance with the Alberta Public Health Act, Section 52.2, may declare a local state of public health emergency, if it is necessary to prompt the co-ordination of action or the special regulation of persons or property to protect public health (Directive 071, Section 5.2.3, page 22).
- During an emergency, notification and evacuation outside of the EPZ will be in accordance with the licensee's arrangement with the local authority. Notifications mechanisms outlined in the Municipal Emergency Plan response framework may be used by the local authority to notify residents of protection measures outside the EPZ. The notification mechanisms will be based on monitored air quality outside the EPZ. Evacuation outside the EPZ is coordinated through the licensee's ERP and the local authority's MEP response framework. The RHA has a role in accordance with the Alberta Public Health Act, Section 52.2 (Directive 071, Section 14.3.5, page 55).