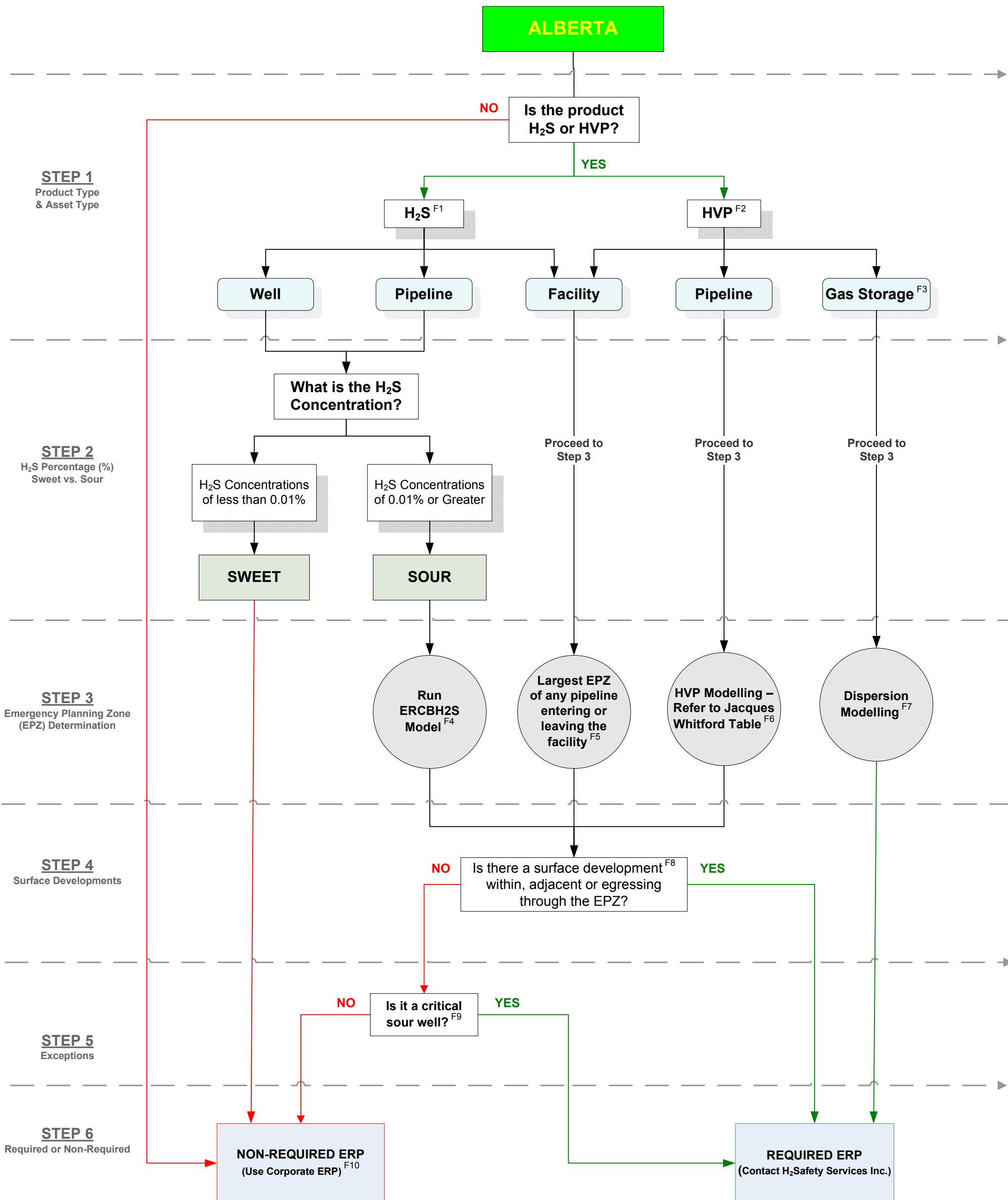


CRITERIA TO DETERMINE WHEN A SOUR OPERATIONS EMERGENCY RESPONSE PLAN (ERP) IS REQUIRED

(DOES NOT INCLUDE Drilling / Completions / Well Servicing / Workovers)



- F1 Hydrogen Sulphide is 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, has a molecular weight that is heavier than air, and is extremely toxic. In small concentrations, it has a rotten egg smell and causes eye and throat irritations. Depending on the particular gaseous mixture, gas properties, and ambient conditions, a sour gas release may be:
- Heavier than air (dense), so it will tend to drop towards the ground with time,
 - Lighter than air (buoyant), so it will tend to rise with time, or
 - About the same weight as air (neutrally buoyant), so it will tend to neither rise nor drop but with time disperse.
- F2 High vapour pressure (HVP) pipeline is a pipeline system conveying hydrocarbons or hydrocarbon mixtures in the liquid or quasi-liquid state with a vapour pressure greater than 110 kilopascals absolute at 38°C, as determined using the Reid method (see ASTM D 323). **OR High vapour pressure (HVP) products have a vapour pressure greater than 240 kPa at 38°C (34.8 psig at 100°F) and include ethane, propane, butane and pentanes plus, either as a mixture or as a single component. A leak from a vessel or pipe containing HVP products can result in a BLEVE.** The primary hazard associated with high vapour pressure (HVP) products is direct exposure to flame. The largest hazard area for emergency response planning is based on a flash fire. There is no specific model currently provided by the ERCB for calculation of the EPZ for HVP product release.
- F3 Gas Cavern Storage refers to gas held in inventory underground under pressure in three types of facilities. These are: (1) depleted reservoirs in oil and/or gas fields, (2) aquifers, and (3) salt cavern formations.
- F4 Calculating EPZs for Hydrogen Sulphide - The licensee must use ERCBH2S properly, prior to filing the ERP, to calculate the size of the EPZ for sour gas with a hydrogen sulphide (H₂S) concentration of 0.1 moles per kilomole (mol/kmol) (0.0001 mole fraction or 100 ppm) or greater. The licensee should be prepared to defend and provide documentation for all user selected inputs in the determination of the EPZ.

Sour Gas Wells - The H₂S release rate entered into ERCBH2S is determined by the wellhead absolute open flow (AOF) according to the type of well operation (see Table 1). The ERCB requires that the H₂S release rate assessment be conducted in accordance with Directive 056. Because the H₂S release rate is an important factor in determining the EPZ, the ERCB strongly encourages the filing of a presubmission H₂S release rate assessment to its Geology and Reserves Group for review prior to the submission of an application.

Sour Oil Wells, Sour Water Disposal Wells, and Sour Observation Wells - Sour oil wells producing oil effluent with a gas-to-liquid ratio less than or equal to 1000 m³/m³, sour water disposal wells, and sour observation wells operate with essentially no separate gas phase at operating pressure. However, a depressured spill pooling on the ground may release sour solution gas dissolved in the liquid.

The EPZ is determined by the H₂S release rate and is calculated using the maximum expected H₂S concentration in the gas phase (at stock tank conditions), the maximum gas-to-liquid ratio for the fluids (at stock tank conditions), and the maximum liquid flow rate. The solution gas composition of the stock tank gas (15°C and 101.325 kilopascals [kPa], dry gas) is entered into ERCBH2S. For wells that cannot flow to the surface without mechanical assistance, the H₂S release rate is considered zero. These wells therefore do not require an ERP.

Sour Gas Pipelines - Sour gas pipelines contain H₂S in the gas phase and include sour gas with greater than 10 mol/kmol, natural gas with less than or equal to 10 mol/kmol, and acid gas or oil effluent with a gas-to-liquid ratio greater than 1000 m³/m³. Oil effluent is produced from oil wells and is a multiphase mixture with hydrocarbon liquids, gas, and produced water in any combination. If liquids are present, they do not form a pool but are released as an aerosol as the pipeline depressurizes.

The gas phase composition at reference conditions (15°C and 101.325 kPa, dry gas) is entered into ERCBH2S. The combined composition of the gas and liquid phases could be entered but is not required. The H₂S volume released from each pipeline segment is used to calculate the size of the EPZ. The segment volume depends on many pipeline factors, including, in decreasing order of importance, pressure, diameter, emergency shutdown (ESD) valves, closure, length, and temperature. Pipeline ESD valves close according to a pressure drop set point, by detecting a pressure rate of change, or by remote/manual closure. The volume of gas released upon a release from a pipeline segment depends on the ESD valve closure and affects the size of the EPZ.

Sour Liquid Pipelines - Pipelines transporting sour oil effluent with a gas-to-liquid ratio less than or equal to 1000 m³/m³, crude oil, low pressure products, or salt water operate with essentially no separate gas phase at operating pressure. However, a depressured spill pooling on the ground may release sour solution gas dissolved in the liquid. The solution gas composition of the stock tank gas (15°C and 101.325 kPa, dry gas) is entered into ERCBH2S. The EPZ is determined by the H₂S release rate and is calculated using the maximum expected H₂S concentration in the gas phase (at stock tank conditions), the maximum gas-to-liquid ratio for the pipeline fluids (at stock tank conditions), and the maximum pipeline liquid flow rate.

- F5 The EPZ for a facility that handles or processes sour fluids is the largest EPZ of any pipeline entering or leaving the facility measured outward in all directions from the facility lease boundary. If the facility has a sour gas well, sour water disposal well, or acid gas disposal well on site, the EPZ for the well may determine the size of the EPZ for the facility. The EPZ for an HVP facility is calculated using the EPZ for the largest pipeline entering or leaving the facility measured from the facility inlet.
- F6 Operators are strongly encouraged to use the table in Appendix 10 of the draft CAPP Companion Planning Guide to ERCB Directive 071 or an appropriate dispersion model to determine the EPZ size for a pipeline release of HVP product. Areas where site-specific considerations could influence the size of the EPZ should be modelled accordingly.

Pipeline Size		Ethane, Propane, and Butane Mix (No Ethylene)	Ethylene
3"	88.9mm	250m	250m
4"	114.3mm	300m	350m
6"	168.3mm	500m	550m
8"	219.1mm	700m	750m
10"	273.1mm	900m	1000m
12"	323.9mm	1100m	1200m
16"	406.4mm	1600m	1600m

- F7 The EPZ for an HVP product release from a cavern storage facility should be determined using a dispersion model. The licensee should ensure that persons undertaking a hazard assessment for HVP product are competent and suitably qualified by virtue of their training and experience. When a dispersion model is used to calculate EPZ size, detailed documentation may be required for review by the ERCB, if requested, that clearly describes the methods, assumptions, and modelling uncertainties in enough detail that a third party could duplicate the numerical results. The licensee must submit an ERP for approval for any facility storing HVP product in caverns.
- F8 Surface Developments are dwellings that are occupied full time or part time, publicly used development, public facilities, including campgrounds and places of business, and any other surface development where the public may gather on a regular basis. Surface development includes residences immediately adjacent to the EPZ and those from which dwellers are required to egress through the EPZ.
- F9 A critical well is defined by the following criteria:
- Release Rate > 2.0 m³/s,
 - Release Rate > 0.3 m³/s but < 2.0 m³/s and the well is located within 5.0 km of an urban centre,
 - Release Rate > 0.1 m³/s but < 0.3 m³/s and the well is located within 1.5 km of an urban centre, or
 - Release Rate > 0.01 m³/s but < 0.1 m³/s and the well is located within 500 m of an urban centre.

F10 Corporate-level ERP Requirements

Site-specific ERPs are not required for every drilling, production, or pipeline operation in the province. When a site-specific ERP is not required, a corporate-level ERP is used by the licensee to handle emergency events.

1) The licensee must have a corporate-level ERP with preplanned procedures that will aid in effective response to an emergency.

The licensee is expected to determine the level of detail required to address each item in a corporate-level ERP based on the hazards and potential consequences of the emergency scenarios that its operations pose to the public and/or environment and to keep the plans current. Corporate-level ERPs do not require ERCB approval; however, the ERCB may request that they be submitted for review.

2) As a minimum, the licensee must include the following information in its ERP:

- key licensee contacts,
- a 24-hour licensee emergency contact telephone number,
- a method of classifying incidents and response actions for specific incidents,
- a communications plan that addresses
 - communication with response team, support services, and government,
 - communication with the public and media, and
 - downgrading and stand-down of emergency levels,
- responsibilities of personnel required to respond to an emergency,
- establishment of incident management systems, and
- activation of a reception centre.

3) The licensee must ensure that a call to its 24-hour emergency telephone number initiates immediate action.

4) The licensee must ensure that its 24-hour emergency telephone number is posted by way of a conspicuous sign erected at the primary entrance to all licensee wells and facilities.

Reference Documents:

- ERCB Directive 71 – November 2008 (includes Nov 24, 2009 Errata)
- ERCB Directive 56 – June 2008 (includes Nov 24, 2009 Errata)
- CAN/CSA Z731-03 – Emergency Preparedness & Response
- CAPP Companion Planning Guide to ERCB Directive 071