Continuous Improvement: History of the H_2S Model

Pre-2008

The emergency planning zone (EPZ) is the basis for planning an emergency response to a sour gas release. To ensure an appropriate level of planning, preparedness, and response capability, licensees must properly characterize the hazard and the distance within which initial and priority-based response actions will occur.

Before the development of a computerized model to calculate EPZs, a nomograph was used; a nomograph uses release rate or release volume as the only data input.

2008: ERCBH2S Model

In April 2008, the Alberta Energy Regulator released ERCBH2S, a computer model that licensees use to calculate EPZ sizes. ERCBH2S was developed based on several conservative assumptions, including dispersion conditions and the type of release.

In 2008, our approach for calculating the EPZ radius was based on the worst-case combination of several elements, including dispersion conditions (stable low wind versus neutral high wind, etc., in 54 different cases) and the type of accidental release (guillotine rupture versus small hole, horizontal versus vertical release, etc.). The unlikely worst-case scenario (i.e., mitigation not employed or not working) was included in the model.

With better input data, a model provides more accurate information and, therefore, much higher-quality emergency response plans. Models must be updated to reflect the evolution of scientific data and methodology.

2009: ERCBH2S Model Update

In 2009, the ERCBH2S model was updated to calculate EPZ size based on the weighted probability of occurrence of the dispersion conditions. The model uses historical meteorological data to determine the fraction of time that each dispersion condition occurs and weights the values to produce the expected EPZ. Common use of ERCBH2S evaluated the rare scenario where mitigations did not function (for example, automated shutdown valves did not close). Hence, the EPZ represented an average of an unlikely worst-case scenario.

Subsequent enhancements up to 2011 were routine bug fixes.

2025: AERH2S (Model Rename and Update)

We have updated ERCBH2S and renamed it AERH2S. With the release of AERH2S, our approach to calculating the EPZ radius is based on the reasonable worst-case combination of dispersion conditions (stable low wind versus neutral high wind, etc., in 54 different cases) and the type of accidental release (guillotine rupture versus small hole, horizontal versus vertical release, etc.) using the expected operational conditions of pressure, temperature, H_2S content, and mitigation settings.

This approach is a reasonable worst-case assessment based on the most likely operational scenarios for sour operations. Like ERCBH2S, AERH2S uses more input data, resulting in a more refined output.