

Acid Gas Sequestration

*Michelle Gaucher, Sr. Reservoir Engineer
BC Oil and Gas Commission*

Summary (All headings should be Arial 12pt bold)

Acid gas disposal wells serve an important role in mitigating CO₂ and SO₂ emissions, allowing the responsible development of oil and gas resources. By concentrating H₂S and CO₂ within sequestration reservoirs, the disposal wells become a point source for risk with potential for serious consequences. It is vital for industry and regulators to ensure safety systems sequester the fluid and protect from accidental reservoir release. What are the systems we rely on and are they fail-safe? What can we learn from other well or system failures? What relevant data pertaining to leak rates, oversight, operation and staff expertise levels can be gathered and shared regarding safety valves in this operating environment? This talk is a summary of the BC OGC learnings on acid gas disposal safety systems and a discussion of the work flow that continues to evolve in the pursuit of an incidence free future.

British Columbia has a 25 year history of safe acid gas disposal. A majority of disposal in the past has been related to legacy conventional pool development, especially in the high sour gas Foothills. New projects arising from unconventional Montney development involves lower H₂S content in gas, but in much larger raw gas volumes, requiring disposal projects in new areas – sometimes closer to residents. The BC Oil and Gas Commission has been pro-active with risk review programs and continues to evolve safety and environmental protection, though such tools as regulations, approval order conditions, standards, and procedure audits.

In BC, approval to dispose of H₂S and CO₂ is the responsibility of the OGC Reservoir Engineering team, working in collaboration with staff in geology, hydrology, drilling, safety and facilities. Each application requires characterization and evaluation of the reservoir suitability, including what fluid will flow into the reservoir but also the investigates the possibility of flow out of the reservoir. Consequently, review of an acid gas disposal project also includes evaluation of the risks associated with the entire wellbore; from the reservoir to and including the wellhead with fluid phase/flow, safety valves, staff training, alarming and emergency response requiring detailed evaluation in the review of each project.

Observations/ Learnings

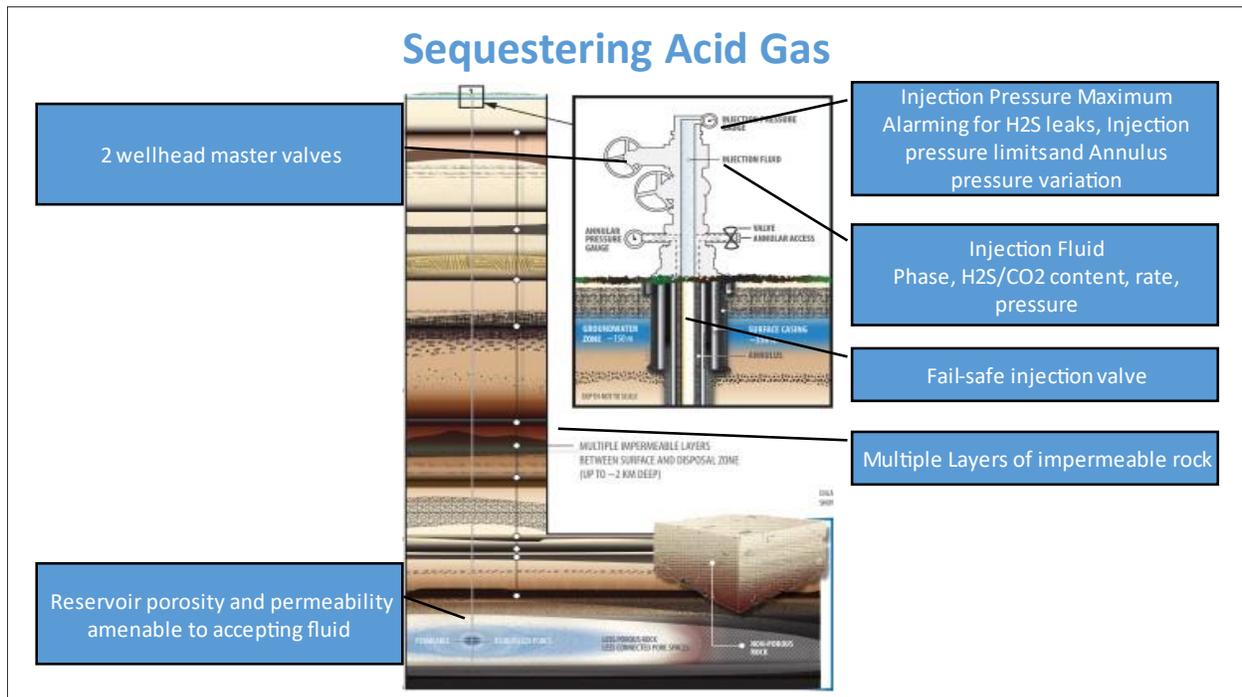
API 14A is an American Petroleum Institute specification providing the requirements for subsurface safety valves (SSSV), a primary component relied upon for assurance from unplanned fluid release. They note the SSSV is “an emergency fail-safe flow controlling safety device.” What is fail-safe? What operating conditions are considered in the specifications? What leak rates are allowed and should allowable rates change when H₂S is a large constituent in the fluid flow?

The design standards for subsurface safety valves, as well as training, accidental release potential and suspended well learnings are still evolving. We continue to learn from past well

control incidents. Mitigation of risk relies on staff experience and training; another area to review with respect to acid gas disposal.

Establishing control system, alarming and training requirements, along with collecting inspection, maintenance and incidents records and disseminating information will be key to keeping operations safe with both aging and new assets.

Additive Information



Acknowledgements

Ron Stefik,

References

[Tubing-Retrievable Safety Valves | Weatherford International](#)

Ray Mireault, "Acid Gas Release Control Methods"

Final Report on the Investigation of the Macondo Well Blowout

Deep Water, The Gulf Oil Disaster and the Future of Offshore Drilling