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Regulators around globe watch Hutchinson, Kan., gas leak incident

Sam Fletcher
OGJ Online

HOUSTON, Mar. 1 Natural gas that apparently escaped from an underground salt storage unit and erupted in Hutchinson, Kan., killing two residents, has put a solution mining operation on hold in the UK and prompted German regulators to seek more information on such activity, an industry consultant said Thursday.

This really catches a lot of people's attention. There has never been a failure of a gas storage cavern before, said Joe L. Ratigan, with Houston-based Sofregaz US Inc., who represented Hutchinson at a hearing by the Kansas Senate Utilities Committee earlier this week.

It should prompt the Kansas Department of Health and Environment (KDHE) to toughen its lax regulation of underground storage facilities in that state, and may prompt other states to rework theirs, he said.

New York has been working for 3 years on a state regulation for hydrocarbons storage caverns but [it] is not yet complete. Louisiana has been working 3-4 years on its regulation, Ratigan said Thursday.

New York's proposed regulation is still in draft form, while Louisiana issued a statewide order governing storage caverns in 1977, following a fire at the West Hackberry site of the Strategic Petroleum Reserve that was finally quelled by the Boots & Coots Inc. wild well control firm. Although it has hydrocarbon storage caverns, Oklahoma has no rule specifically regulating gas storage, Ratigan said.

Hutchinson background

While there has been no official finding yet, the working assumption is that the Jan. 17-18 eruptions of gas and brine in 30-ft geysers in Hutchinson resulted from the loss of 73 MMcf of gas from the Yaggy storage facility 7 miles downwind from the central Kansas community of 40,000 people (OGJ Online, Feb. 21, 2001).

The gas is thought to have escaped through a fist-size hole in the casing of an injection well that was drilled out in 1992 to convert the former propane storage facility into a gas storage unit.

KDHE officials earlier reported the fingerprint of gas venting in Hutchinson matched the gas in storage at Yaggy. That facility is operated by Kansas Gas Service Co., a division of Oneok Inc., Tulsa, which provides gas to 660,000 customers in Kansas and northeast Oklahoma.

Hutchinson officials met Thursday with representatives of Kansas Gas Service, KDHE, and the Kansas Geological Survey a research division of the University of Kansas to assess the

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problem.

At this point, the danger of spontaneous eruptions has passed, a KDHE spokesman told OGJ Online. As more shallow pockets of gas within the town have been drilled and flared, he said, the volume and pressure of new gas discoveries have decreased. We're confident that the explosion and fire hazard has passed.

So far, 49 sites have been or are being drilled in and around Hutchinson in search of deposits of migrating gas primarily 285-400 ft underground. Officials reported low flows of gas are still being flared at nine of those sites, while two others encountered gas but are not flaring.

The city very much wants to know that all of the escaped gas has been found and flared. The people of Hutchinson will not be confident unless they know all of the migration paths between the city and Yaggy have been determined and are monitored or plugged, said Lee Allison, state geologist and director of the Kansas Geological Survey.

Migration pattern unknown

However, geologists still don't know along what route the escaping gas migrated. Members of the Kansas Geological Survey said two seismic surveys in early February at first indicated a possible subsurface sand channel through which the escaping gas could flow up from the storage facility.

But that hasn't been borne out by a study of area well logs or the 22% success rate in drilling for suspected gas pockets, Allison told OGJ Online.

Survey members are now looking for possibly extensive fractures in silt deposits on top of the Wellington Shale that overlies and is mixed with the Hutchinson bedded salt that housed the Yaggy storage caverns.

Geologists hope to collect more information soon. They're now drilling a fourth well along our earlier seismic line and we hope to core down to the Hutchinson salt through the interval that we think carried the gas, Allison said.

There are more than 600 NGL/LPG salt storage caverns in Kansas, the most of any state. Kansas also has more natural gas storage caverns, although Gulf Coast salt dome caverns are 10-20 times bigger than the typical Kansas unit, Ratigan said.

Unlike the salt domes in Alabama, Mississippi, and Louisiana, the only salt formations in Kansas, Oklahoma, Ohio, Michigan, New York, and Pennsylvania are bedded salt layers of salt intermixed with layers of other rocks. Texas is the only state with both bedded salt and salt domes at useable depths for underground storage, said Ratigan.

Regulation problems

The mix of bedded salt and permeable rock formations around Hutchinson one of the first US sites for solution salt mining in the late 1800s is just one of the problems the KDHE did not address in its regulation of underground storage facilities, Ratigan told state legislators Tuesday.

Some of the many unplugged brine wells that were long ago drilled and abandoned within Hutchinson apparently helped route the escaping gas to the surface. Moreover, Ratigan said, the fracture gradient of the nonsalt rock must be determined to establish a safe pressure for a gas storage cavern.

But KDHE's rules were promulgated before there were any gas storage caverns in Kansas. As a result, he said, the Kansas rules do not:

- Require a mechanical integrity test (MIT) for injection wells at salt storage facilities, although it does require such tests for brine mining wells. Most states require MITs of storage wells on a 5-year frequency, and many require testing when wellheads or cemented casings are modified, said Ratigan.

- Require any casing inspection log, nor does it address reentry or drilling out plugged and abandoned wells.

- Address how close storage caverns can be to each other. This is perhaps not a major issue with liquid wells but is important for gas storage caverns, Ratigan said.

- Require emergency shutdown valves at the wellhead, as is common in other states.

- Require cathodic protection for wells.

- Require as much information to be reported by storage cavern operators as to other states.

Although Kansas has more storage wells and caverns than any other state, it does not have the largest regulatory and enforcement staff or the largest budget. Clearly, that may be the biggest change required at KDHE, Ratigan told legislators.

Louisiana's regulatory agency employs nine professional engineers to police some 4,500 underground storage wells, while the Texas agency has two professionals regulated 950. It is my understanding that KDHE employs two professionals who are responsible for regulating more than 6,000 wells, Ratigan said.

Kansas should develop three separate sets of regulations for solution mining of salt, for NGL/LPG storage, and for natural gas storage as they do in Texas, Ratigan said. There is an uniqueness to each industry that needs to be addressed.

A KDHE spokesman told OGJ Online that agency is already looking at strengthening its regulations and is considering possible action against Kansas Gas Service. He said some civil suits have already been filed against the company as a result of the mishap.

Meanwhile, he said, We are still working on a plan to relocate some residents.

Contact Sam Fletcher at Samf@ogjonline.com



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Transportation**Effects of Hutchinson, Kan., gas leak can be worldwide**

A January uncontrolled escape of natural gas and brine from an underground salt storage cavern is having worldwide consequences for underground hydrocarbon storage operations, OGJ Online reported last month.

The gas apparently escaped from underground storage and erupted in Hutchinson, Kan., killing two residents. The incident put a solution mining operation on hold in the UK and prompted German regulators to seek more information on such activity, according to Joe L. Ratigan, of Sofregaz US Inc., Houston. He spoke as representative of Hutchinson at a hearing by the Kansas Senate Utilities Committee in March.

"This really catches a lot of people's attention. There has never been a failure of a gas storage cavern before," said Ratigan.

It should prompt the Kansas Department of Health and Environment (KDHE) to toughen its "lax" regulation of underground storage facilities in that state and may prompt other states to rework theirs.

New York and Louisiana have each been working for 3 years or longer on a state regulation for hydrocarbons storage caverns, but [it] is "not yet complete," said Ratigan.

New York's proposed regulation is still in draft form, while Louisiana issued a statewide order governing storage caverns, following a fire at the West Hackberry site of the Strategic Petroleum Reserve that was finally quelled by the Boots & Coots Inc. wild well control firm.

Although it has hydrocarbon storage caverns, Oklahoma has no rule specifically regulating gas storage, Ratigan said.

Hutchinson background

The "working assumption," as of mid- March, was that the Jan. 17-18 eruptions of gas and brine in 30-ft geysers in Hutchinson resulted from the loss of 73 MMcf of gas from the Yaggy storage facility 7 miles down from the central Kansas community of 40,000 people (OGJ Online, Feb. 21, 2001).

Oneok Inc., Tulsa, owns and operates the Yaggy field.

The gas likely escaped through "a fist-size hole" in the casing of an injection well that was drilled out in 1992 to convert the former propane storage facility into a gas storage unit.

KDHE officials earlier reported the "fingerprint" of gas venting in Hutchinson matched the gas in storage at Yaggy. That facility is operated by Kansas Gas Service Co., a division of Oneok Inc., Tulsa, which provides gas to 660,000 customers in Kansas and northeast Oklahoma.

By mid-March, 49 sites had been or were being drilled in and around Hutchinson in search of deposits of migrating gas primarily 285-400 ft underground. Officials reported "low flows" of gas are still being flared at nine of those sites, while two others encountered gas but are not flaring.

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Migration pattern

Geologists still don't know, however, along which route the escaping gas migrated. Members of the Kansas Geological Survey said two seismic surveys in early February at first indicated a possible subsurface sand channel through which the escaping gas could flow up from the storage facility.

But that hasn't been borne out by a study of area well logs or the 22% success rate in drilling for suspected gas pockets, Allison told OGJ Online.

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