
Additional Questions for the Record

From The Honorable Lois Capps

The following questions from Representative Capps all relate to underground gas storage issues, many of them quite technical. We appreciate these important questions, but the Pipeline Safety Trust has not previously been involved in the underground aspects of gas storage and lacks experience and expertise in these issues. To assist us we reached out to experts in gas storage at the Environmental Defense Fund (EDF) to help formulate the answers to these questions.

1. In your opinion, what federal regulations of gas storage facilities are needed?

Gas storage regulation in the United States has historically been undertaken by states as part of their oil and gas regulatory programs. Often, states' general well construction regulations apply to gas storage wells, along with state provisions for underground injection control (though in many states, gas storage wells receive special exemptions from underground injection control requirements). Though gas storage has been within the jurisdictional authority of the Pipeline and Hazardous Materials Safety Administration (PHMSA) for decades, the agency has declined to act, on grounds that industry guidelines and state regulations were sufficient.

State regulations on gas storage have lagged other oil and gas regulatory spheres like production wells and underground injection control – often, gas storage-specific regulations have only been revisited in a state following a disaster. This pattern is born out in California, which is engaged in a series of rulemakings to update its gas storage regulations following the Aliso Canyon incident.

Clearly, gas storage regulations around the country need to be revisited and in many, perhaps most cases, considerably improved. To that end, the Interstate Oil and Gas Compact Commission and the Ground Water Protection Council (two leading state oil and gas regulatory associations) are preparing guidance for states on gas storage regulations, which should be ready within the year.

Federal regulation could play a role in ensuring a uniform minimum standard for safety and environmental protection at gas storage facilities. States remain the locus of expertise and experience on gas storage, particularly the subsurface aspects. Local variation in geology and other factors means that appropriate regulation for gas storage will vary state to state. But federal

regulation could provide key principles that ensure that state regulations are responsive to the full range of gas storage issues.

It is particularly important that any federal regulations act as a floor and not a ceiling on state regulation of gas storage facilities – both intrastate and interstate, which tend to have the same environmental and safety considerations. In particular, state regulations should apply to both intrastate and interstate facilities when it is possible to comply with both state and federal standards.

Further, as PHMSA considers a regulatory response, in addition to reviewing consensus industry standards, it is imperative that the agency conduct its own independent analysis of regulatory needs in consultation with other federal agencies and the states.

2. In regard to the Aliso Canyon Facility, were there sufficient state and federal regulations in place?

California's gas storage regulations were outdated and insufficient, and their enforcement was lax. Few, if any, federal regulations applied, and certainly none pertaining to the subsurface aspects of Aliso Canyon, where the problem was located. California is currently overhauling its regulatory framework to respond to the Aliso Canyon incident and to modernize its approach to both gas storage and the closely related practice of underground injection control.

A. What more could the federal government have done to provide adequate oversight and regulation for the Aliso Canyon Facility?

As discussed above, PHMSA can consider minimum uniform standards addressing safety and the environment, after conducting an independent examination of regulatory needs in consultation with other federal agencies and the states. Any PHMSA regulatory framework should act as a floor that states are encouraged to exceed as they customize rules to be relevant to the states' geologies and other particularities.

3. Are there safety measures that could be put in place to improve safety of storage facilities and can you provide any examples of what these would be?

In order to ensure well integrity (i.e. that wells do not leak) proper regulation of gas storage must cover well permitting construction, testing, maintenance, repair, and ultimately decommissioning at the end of a well's useful life. The details for each of these phases are technical and complex, with multiple possible approaches to achieve good outcomes.

Any gas storage regulatory framework should address, at a minimum, the following dozen issues:

Permitting

1. Area of Review around gas storage wells and facilities to ensure that gas storage zones are adequately confined and no conduits will allow gas to migrate to protected water or the surface
2. Maintenance, safety, and emergency planning protocols developed by operators and approved by regulators

Well Construction

3. Basic well construction rules in place (including drilling, casing, cementing, completion, and evaluation)
4. Tubing and packer requirement – wells should be equipped with tubing and packer, which provides an additional layer of isolation and allows for more robust leak monitoring
5. Wellhead design – wellheads should be designed with appropriate redundancies and ability to perform maintenance activities under pressure
6. Safety devices – all wells should be equipped with automatic fail safe shut-off systems appropriate for the well's geology, condition, and operating parameters

Maintenance/Testing

7. Internal/External Mechanical Integrity Testing – wells should be regularly tested for ability to hold pressure and for cement integrity, both of which are critical to preventing leaks inside and adjacent to the well
8. Continuous annular pressure monitoring – this is a critical early warning system for leaks
9. Corrosion testing – this allows operators to discover potential leak sites before leaks occur
10. Surface equipment testing – this makes sure that the wellhead is functioning properly and not leaking
11. Leak detection – in addition to monitoring the subsurface aspects of the well for leaks, regular surface leak detection using best available technology

Plugging and abandonment

12. Timelines and standards for plugging wells when they do not meet safety or environmental standards, after a certain period of being idle, or at the end of their useful lives

4. What would be the effect of requiring the installation of subsurface safety valves for all wells, vintage wells, and/or wells whose depth is longer than a pre-determined threshold?

All gas storage wells should be equipped with automatic fail-safe shut off valves. However, the safety valve solution appropriate to any particular well will depend on the well's characteristics, the operating parameters and the surrounding geology. Operators should work with regulators to determine the appropriate safety valve solution for each well in a gas storage project. In any case the safety valves should be regularly calibrated and tested per the manufacturers' recommended practices.