

ALISO CANYON STORAGE FACILITY

HEALTH ISSUES QUESTIONS AND ANSWERS



SoCalGas® is working with an expert specializing in environmental health issues and we've asked her to speak to some of the concerns our neighbors have expressed. Mary McDaniel is board-certified in occupational and environmental medicine and is the medical director of Intrinsic Environmental Sciences. She has more than 20 years of experience in environmental health assessment, risk communication, risk management, crisis response, and occupational and environmental medicine. She serves on the Board of the Southern California NIOSH Education and Research Center housed at UCLA's Fielding School of Public Health.

COMMON QUESTIONS AND CONCERNS:

What are the symptoms of breathing in methane?

Methane, the major ingredient in natural gas (up to 99%), is classified as a simple asphyxiant. That means that in an enclosed space at high concentrations it will displace the oxygen in air. The lack of oxygen in an enclosed space may result in symptoms that can progress from dizziness to loss of consciousness and ultimately death if the oxygen levels fall too low. Breathing some methane when there is plenty of oxygen in the air is not harmful to people.

What about the odorant? Is it harmful?

Natural gas is odorless. The California Public Utilities Commission requires that an odorant be added to natural gas to help make leaks more easily detected. The product SoCalGas uses to scent natural gas contains the sulfur compounds tetrahydrothiophene and tertiary-butyl mercaptan. These chemicals have very distinct and unpleasant odors that can be smelled at very, very low concentrations - about two parts per billion in air. Two parts per billion is roughly equivalent to two teaspoons of water in an Olympic-sized swimming pool. This makes these chemicals good choices to identify natural gas leaks which we otherwise wouldn't

be able to smell. The natural gas at Aliso Canyon is odorized before it is injected underground for storage and again when it is extracted and sent to households.

The potential symptoms of these sulfur compounds, like all chemicals, depend on the dose. At low levels, such as the small amount of odorant added to natural gas, these compounds are harmless, although at very high levels they can be fatal. Low levels of mercaptan occur naturally in our bodies - it is a major contributor to bad breath. It also is found in foods like nuts, cheese, onions, and garlic. Mercaptan is responsible for the distinctive odor in urine produced when we eat asparagus.

What if the exposure is intermittent but prolonged like in this situation?

The concentration of odorant in the air around the facility and in the community is too low to cause symptoms, whether the exposure is intermittent or continuous. However, sensitivity to odors varies greatly from person to person and there are scientific studies showing that unpleasant odors themselves can make some people feel ill. Their potential to do so depends on a variety of factors including the odor frequency, duration, and strength and individual sensitivity. Being exposed to methane when there is plenty of oxygen in the atmosphere is not harmful to people, no matter how long it lasts.

I've read that natural gas can contain other gases that might be harmful, like butane, ethane, or propane. What about those?

Natural gas is comprised mostly of methane (80-99%), but includes other constituents: ethane (0.1-12%), propane (0-5%), n-butane (0-1.5%), and carbon dioxide (0-3%). These constituents also are classified as simple asphyxiants, meaning that in enclosed spaces that they can displace oxygen. The lack of oxygen can result in a variety of symptoms, progressing from sleepiness to lack of coordination, dizziness and confusion, and escalating to coma and death if the absence of oxygen is prolonged.

A copy of the natural gas Safety Data Sheet can be found at: <https://socalgas.com/documents/safety/safety-data-sheet-natural-gas.pdf>

Are there other harmful compounds in natural gas?

Trace levels of benzene (below .1%) may be present in natural gas. When present, it will dissipate rapidly in outdoor air. Monitoring for benzene has been conducted around the facility itself and at several schools and other locations in the community and no levels above normal background levels for the Los Angeles area have been detected.

Didn't LA County Dept. of Health issue a warning about the long term effects of the gas leak because of the presence of other chemicals, especially benzene?

Yes, on December 1, 2015 the LA County Department of Public Health noted that long term exposure to carcinogens such as benzene can cause health effects and stated that, due to the longer time frame required to stop the leak, monitoring

for benzene and other chemicals should continue. Twice daily outdoor air monitoring for benzene and dozens of other chemicals near the leaking gas well and at numerous locations in the community has been ongoing since October 30th. Thus far the air results have shown benzene levels in the community consistent with concentrations expected for the area.

When detected, benzene is present at levels that are consistent with background concentrations in the area. Of all the samples taken in the community since October 30, two samples were slightly higher than background levels but returned to levels below background concentrations the next day.

The LA County Department of Public Health emphasized that the "levels examined so far in Porter Ranch are not believed to be associated with long-term health problems."

What about for pregnant women or children? Would the effects be harmful to them?

No, the concentrations of odorants are too low to affect even pregnant women or children. However, about two-thirds of pregnant women report a heightened sense of smell particularly during the first trimester which may make them more sensitive to unpleasant odors. As for methane, as long as there is plenty of oxygen in the air, methane is not harmful to a pregnant woman or a developing fetus.

What about pets? Dogs' sense of smell is much more keen than humans.

Dogs do have a much keener sense of smell than humans. In fact it is estimated that a dog's sense of smell is one thousand to ten thousand more sensitive than ours. However, that fact would not make them more likely to become ill from the very low concentrations of the odorant in the air around the facility and community. Also, dogs, cats, and other pets have no special sensitivity to methane. Just like humans, the pet would be in danger only if methane were displacing most of the oxygen in the air in an enclosed space.



ENVIRONMENTAL HEALTH EXPERT

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