Redfield Site

Answers to Health Questions About 1,1-DCE and TCE

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Scott Phillips, MD, FACP, FACMT, a Denver physician in private practice, prepared the following answers to health-related questions that may be of interest to residents living near the Redfield site. Dr. Phillips is an associate clinical professor of medicine in the Division of Pharmacology and Toxicology, Department of Medicine and the Department of Surgery, Division of Emergency Medicine, Section of Toxicology, at the University of Colorado Health Sciences Center. Dr. Phillips is also the Editor-in-Chief of the Internet Journal of Medical Toxicology and has authored several textbooks on occupational and environmental toxicology. He also is an attending physician at a number of local hospitals and medical clinics including: the University of Colorado Health Sciences Center, Denver Health Medical Center, The Children's Hospital, Porter Adventist Hospital, Swedish Medical Center and the Rocky Mountain Poison and Drug Center and Clinical Toxicology Service and others.

What are the health effects from 1,1-DCE at the Redfield site?

No human clinical health effects have ever been observed at the concentration levels of 1,1-DCE or TCE measured in the homes near the site. A cancer incidence study and birth defects incidence study completed by the Colorado Department of Public Health and Environment in December 2002 concluded the incidences of both cancer and birth defects in the neighborhood was no different than neighborhoods outside the Redfield test area and did not find any excess cancer attributable to the solvents in the groundwater.

What are the health effects from TCE at the Redfield site?

At the levels seen in the Redfield area attributable to groundwater, we anticipate no clinical health effects.

Is there an increased risk of getting cancer from exposure to these chemicals?

There is no clinical evidence in human studies that 1,1-DCE or TCE causes cancer, at the levels found in the Cook Park and Virginia Village neighborhoods. CDPHE established its action levels for these chemicals based on the hypothetical risk that someone is exposed to 1,1-DCE or TCE by living in the home 24 hours a day, 7 days a week for 30 years. For TCE, the CDPHE calculation of 0.8 µg/m3 would lead to a hypothetical increased risk of five excess cases of cancer in 100,000 people exposed at that level. Similarly, the CDPHE action level of 1.6 µg/m3 would lead to a potential increased risk of 1 excess cancer in 10,000 people.

However, at the levels of TCE seen in the Redfield area attributable to groundwater, we anticipate no clinical health effects, including cancer.

According to the Colorado Cancer Registry, it is estimated that 1 in 2 males and 1 in 3 females in Colorado will develop cancer at some time in their lives from everyday living. Based on these statistics, the average Colorado resident faces a 45 percent (0.45) chance of developing cancer at some point in their lifetime. A number of genetic, dietary, environmental and lifestyle factors contribute to cancer development.

Someone who lived in my home died or became ill recently, was this the cause?

It is extremely unlikely that exposure to these chemicals was the cause. At the levels that have been found in homes near the Redfield site, we do not anticipate any health effects.

Should we be using our basement?

Based on the homes that have been tested, we do not anticipate health effects from working or living in the basement.

Is my drinking water safe?

Yes, the drinking water in Cook Park and Virginia Village is supplied by the City of Denver, which is piped into the area.

I'm trying to have a baby and I'm worried about the effect on fertility and/or impact on the unborn child.

There are no fertility or adverse reproductive effects from exposure to the levels of these chemicals that have been found in the indoor air of homes near the Redfield site.

What is the amount of these chemicals that people can smell in the air?

A few people can detect the odor of 1,1-DCE at concentrations in the air between 753,000 and 1,982,000 µg/m3 (Amoore 1983; Ruth 1986). These are between 5,748 and 15,130 times higher than the highest level (131 µg/m3) of 1,1-DCE detected in any unmitigated home near the Redfield site. Similarly, the average person smells TCE at concentrations of 440,340 µg/m3, over 20,000 times higher than the highest concentration of TCE, attributable at least in part to groundwater, measured in the indoor air of an unmitigated home near the Redfield site (22 µg/m3) (EPA Haz-Map http://hazmap.nlm.nih.gov/cgi-bin/hazmap_generic?tbl=TblAgents&id=93).

Is it safe to eat homegrown vegetables?

Yes. Since residents are using water supplied by Denver Water, gardens are not affected. In addition, the groundwater is located 5 to 30 feet below the ground and most plants do not have a root zone that deep.

Are there any special risks to children, pregnant women, or people with respiratory problems or immune system problems?

No. There is no evidence to support the idea that being exposed to these chemicals at these levels would cause any health problems for any person with special health issues.

Are the chemicals dangerous to my pets?

No. Not at these very low levels.

If these chemicals evaporate up through the soil, is it safe for my children to play in our yard and in the dirt?

There is no medical risk from these chemicals at the concentrations found. If these chemicals were found in nearby soil, it would quickly evaporate into the atmosphere. Moreover, 1,1-DCE and TCE do not readily bind onto soil. Because the air space outdoors is not confined like it is inside a home, concentrations of these chemicals are even lower outside than indoors.

Can I anticipate long-term health effects related to these chemicals based on levels that have been detected in the indoor air of homes near the Redfield site?

There are no anticipated long-term health effects to people from exposure to low levels of these chemicals at the levels found in the indoor air of homes near the Redfield site to date. Area residents should continue with their routine periodic physical examinations just as they normally would. No additional health testing is necessary due to exposure at these levels.

Should I be tested by a doctor to see if these chemicals are in my body?

Air sampling in homes is the preferred test, because it directly measures the concentration to which individuals are exposed. There are tests to detect 1,1-DCE and TCE in the body, but they are not useful with exposure levels as small as those found in the indoor air in homes near the Redfield site. Furthermore, 1,1-DCE and TCE are eliminated from the body rapidly.

I've lived here 30 years, should I be tested for cancer?

Since cancer is a common illness, we feel that you should discuss this with your doctor.

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Are there other, non-cancer health effects from the other chemicals that may be detected in my home?

There should be no health effects due to exposure to any of the other chemicals Brown Retail is required to test for at the levels those chemicals have been measured in the indoor air of homes near the Redfield site. At higher levels, some can have central nervous system effects, such as dizziness, drowsiness, and loss of coordination, or they can cause irritation of the eyes, nose and throat (HSDB National Library of Medicine). These effects generally persist for only a short time after exposure.

Of the other chemicals tested for, 1,2-DCA and tetrachloroethylene are classified as probable human carcinogens, and vinyl chloride is classified as a known carcinogen in humans. These other chemicals may be found in common household products.

This document has been reviewed by the Colorado Department of Public Health and Environment Rev. 9/06