Maryland Department of the Environment

FACTS ABOUT:

Chlorinated Solvents in Severn, MD Area Residential Wells

Sampling results have shown levels of contamination in a number of residential wells in and around the Twin Oaks Road and Minnetonka Road area, near Severn, Maryland. This fact sheet provides information about the primary contaminants of concern (COCs), 1,1-dichloroethene (DCE), 1,4-dioxane (dioxane), and 1,1,1-trichloroethane (TCA), and potential health risks. It also includes information on steps being taken to address this issue. Additional information about the investigation will be posted at the Maryland Department of the Environment's website http://www.mde.state.md.us/programs/Land/MarylandBrownfieldVCP/ERRP_Superfund/Pages/index.aspx.

What is being done to investigate and address the contamination of residential wells in the area?

The Maryland Department of the Environment (MDE) is working in consultation with the Anne Arundel County Department of Health, the Maryland Department of Health and Mental Hygiene, and Emerson Electric, Inc. (Emerson) to investigate and address the contamination.

MDE and Emerson will continue to sample wells to ensure that all affected and at-risk wells are identified. These results will be provided to the property owners and to the Anne Arundel County Department of Health.

Emerson is providing the affected residents with alternative water sources. At the same time, Emerson continues to conduct assessment activities to determine the extent of contamination under MDE's oversight. Concurrently, the County and State are evaluating a long-term solution, which could include the extension of the municipal water line.

What is 1,1-Dichloroethene?

1,1-Dichloroethene, or DCE, is an industrial chemical that is not found naturally in the environment. It is a colorless liquid with a mild, sweet smell. . DCE is used to make certain plastics, such as flexible films like food wrap, and in packaging materials. It is

also used to make flame retardant coatings for fiber and carpet backings, and in piping, coating for steel pipes, and in adhesive applications. [Source: ATSDR]

What is 1,4-Dioxane?

1,4-Dioxane, or dioxane, is a clear liquid that easily dissolves in water. It is used primarily as a solvent in the manufacture of chemicals and as a laboratory reagent; dioxane also has various other uses that take advantage of its solvent properties. For example, dioxane is a trace contaminant of some chemicals used in cosmetics, detergents, and shampoos. However, manufacturers now reduce dioxane from these chemicals to low levels before these chemicals are made into products used in the home. [Source: ATSDR]

What is 1,1,1-Trichloroethane?

1,1,1-Trichloroethane, or TCA, is a synthetic chemical that does not occur naturally in the environment. It also is known as methylchloroform, methyltrichloromethane, trichloromethylmethane, and á−trichloromethane. Its registered trade names are chloroethene NU® and Aerothene TT®. No TCA is supposed to be manufactured for domestic use in the United States after January 1, 2002 because it affects the ozone layer. TCA had many industrial and household uses, including use as a solvent to dissolve other substances, such as glues and paints; to remove oil or grease from manufactured metal parts; and as an ingredient of household products such as spot cleaners, glues, and aerosol sprays. [Source: ATSDR]

Where is DCE, Dioxane, or TCA found in the environment?

DCE is an industrial solvent not normally found in the natural environment. When DCE is found in the environment, it often is as a result of the use and disposal of DCE or products containing DCE. When DCE is found in the environment, it evaporates very quickly from water and soil to the air. In the air, it takes about four (4) days for it to break down. However, when DCE is in the water it breaks down very slowly. It does not accumulate very much in fish or birds.

Dioxane can be released into the air, water, and soil at places where it is produced or used as a solvent. In air, dioxane is present as a vapor. In water, dioxane is stable and does not degrade. As for soil, dioxane does not stick to soil particles, so it can move from soil into groundwater. Fish and plants will not accumulate dioxane in their tissues.

Most of the TCA released into the environment enters the air, where it lasts for about 6 years. Once in the air, it can travel to the ozone layer where sunlight can break it down into chemicals that may reduce the ozone layer. Contaminated water from landfills and hazardous waste sites can contaminate surrounding soil and nearby surface water or groundwater. From lakes and rivers, most of the TCA evaporates quickly into the air. Water can carry TCA through the soil and into the groundwater where it can evaporate and pass through the soil as a gas, then be released to the air. Organisms living in soil or water may also break down TCA. It will not build up in plants or animals. [Source: ATSDR]

What levels of DCE, Dioxane or TCA have been found in the Severn area?

For the Kop-Flex property, the current levels of DCE, dioxane and TCA in groundwater at the facility range from non-detect to 14,000 parts per billion (ppb) for DCE. For dioxane, the concentrations have ranged from non-detect to 1,740 ppb while the levels of TCA have ranged from non-detect to 30,000 ppb. The onsite contamination is subject to an ongoing remedial effort. These remedial measures are intended to reduce the source areas and prevent further contamination from leaving the site.

For the offsite areas, the current reported levels of DCE from 133 residential wells in the Severn area have ranged from non-detectable to 225 parts per billion (ppb). For dioxane, the reported levels from 133 residential wells have ranged from non-detectable to 70.9 ppb. The reported levels of TCA from 133 residential wells have ranged from non-detect to 29.1 ppb.

What are the harmful effects of DCE, Dioxane or TCA?

Health risks from exposure to any hazardous substance depends on how the substance enters the body (by eating or drinking, by breathing, or through the skin), how much of the substance enters the body, how long the exposure lasts, and how often the exposure happens. Other factors include a person's age, health history, lifestyle, inherited traits, and exposure to other environmental hazards.

Long-term exposure to DCE may pose risks to the liver, kidneys and lungs. The U.S. Environmental Protection Agency (EPA) has characterized DCE as a "possible human carcinogen". However, there is not enough evidence to reach a more definite conclusion to date.

Long-term exposure to dioxane may pose risks to the liver and kidneys, and increase the risk of cancer. The EPA has characterized dioxane as "likely to be carcinogenic to humans".

In animals, long-term exposure to TCA caused some nervous system effects and mild liver effects. It has not been determined whether long-term exposure in humans poses health risks. There is not enough information to determine whether TCA could be a carcinogen.

How can families reduce their exposure to DCE, Dioxane or TCA?

If elevated levels of these COCs are found in your well water, or if your well water has not been tested but you live close to wells with elevated levels of these COCs, you can reduce your potential exposure by using bottled water for drinking and cooking.

Are medical tests available to measure my exposure to DCE, Dioxane or TCA?

Specialized laboratories can measure DCE, dioxane, and TCA in your body using samples such as blood and urine. However, testing for these or other substances may not provide useful information about individual health risks. Finding measurable levels of these substances in your body does not mean there are health effects because of those levels. Also, if these substances are not detected in your body, it does not mean you have no health risks or effects from exposure.

What about other substances in my groundwater?

MDE has identified a number of other substances in the drinking water samples that are not associated with the Kop-Flex investigation. Many of these drinking water wells are shallow wells. Shallow wells are more prone to impacts from surface spills of petroleum products or other products that contain chlorinated solvents. While these substances are below established action levels, the substances in combination may represent a long-term health concern. If you received results for your well and some of these substances are present, please contact MDE at (410) 537-3493 if you want to discuss your specific results.

What if I have additional questions about health and DCE, Dioxane, TCA or other substances?

If you or your health care provider has general questions about health risks related to the primary COCs or other concerns related to the issue of contamination in this area, please contact the Anne Arundel County Health Department at 410-222-7398.

There are also healthcare providers who specialize in environmental and occupational medicine, who can provide additional clinical information or guidance. The Association of Occupational and Environmental Clinics (AOEC) keeps a directory of these providers which can be accessed at http://www.aoec.org/directory.htm or by calling 888-347-2632 (toll-free). The AOEC also has resources for questions about children, including the Pediatric Environmental Health Specialty Units (PEHSUs), listed on their web site.

Sources:

Agency for Toxic Substances and Disease Registry (ATSDR), U.S. Department of Health and Human Services. ToxFAQs for 1,1-dichloroethene (1995); 1,4-dioxane (2007); and 1,1,1-trichloroethane (2006). Available at: http://www.atsdr.cdc.gov

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