Pennsylvania Department of Health

Well Water Contamination, Upper Makefield Township, Bucks County

Background

On January 31, 2025, Energy Transfer identified a leak in the Twin Oaks-Newark pipeline. The Twin Oaks-Newark pipeline, located along Glenwood Drive of the Mount Eyre Manor neighborhood, is used to transport fuels. Potential fuels released from the leak were "Jet A" fuel, diesel, and gasoline. At this time, we are aware that release of these fuels into the environment resulted in contamination of some private water wells in nearby neighborhoods.

The main contaminants of concern are diesel, "Jet A" fuel, and gasoline. These contaminants are complex mixtures that have many different chemicals present. They are primarily composed of hydrocarbons. Hydrocarbons are naturally occurring compounds that contain only hydrogen and carbon atoms. Diesel, "Jet A" fuel, and gasoline differ from each other in their hydrocarbon composition (Table 1). People in households with contaminated well water can be exposed to the contaminants by ingestion (drinking water, cooking with water), breathing vapors when using the water (such as washing dishes, showering, or bathing), or touching the water when in use.

Table 1: Fuel Type and Use Among Fuels

Fuel Name	Fuel Type	Primary Use
***Crude Oil**	Unprocessed liquid petroleum	Crude oil is extracted from the Earth's crust and can be processed into different types of fuels, including fuel oils and gasoline
Diesel	Fuel oil	Engine fuel for large vehicles (such as tractor trailers) or heavy operating equipment in construction, mining, and farming
"Jet A" Fuel	Fuel oil	Engine fuel for commercial jet and turbines
***Kerosene**	Fuel oil	Fuel for domestic lamps and furnaces, may also be used as a component of jet fuel
Gasoline	Light weight fuel	Engine fuel for vehicles

*Crude oil was not released from the pipeline leak as determined by Energy Transfer. Crude oil is the raw product that is used to make fuel oils and gasoline. *Kerosene was not released from the pipeline leak as determined by Energy Transfer. However, kerosene is the most studied fuel oil regarding exposure and related health effects. It is similar in composition to diesel and jet fuels.

FUEL OIL

WHAT ARE FUEL OILS?

In general, fuel oils consist of kerosene, diesel, jet fuel, home heating oil, and range fuel. Fuel oils come from crude oil. Fuel oils differ from each other in their hydrocarbon composition. Some chemicals that are in fuel oils include, but are not limited to, benzenes, toluene, ethylbenzene, xylenes, naphthalene, and others. How these chemicals interact with water, air, and soil varies. Some of the chemicals that make up fuel oils can evaporate from water or soil. For fuel oils specifically in water, some of these chemicals can dissolve in water and some can stick to particles in water and settle to bottom sediment. Other chemicals in fuel oils may break down slowly in air, water, and soil by organisms or sunlight.

WHAT HEALTH EFFECTS ARE RELATED TO FUEL OIL EXPOSURE?

There is little known about how fuel oils affect people's health. Possible health effects related to fuel oil exposure depends on how long and how often someone was exposed, how much someone was exposed to, personal factors such as age, sex, genetics, underlying health conditions, and other factors like smoking and diet.

While there is little known about how fuel oil (specifically diesel and "Jet A" fuel) affects people's health, some studies found that drinking or ingesting small amounts of kerosene, which has a similar chemical profile to diesel and other fuel oils, can cause harmful effects on the gastrointestinal tract, respiratory tract, and nervous system. Symptoms can include vomiting, diarrhea, stomach swelling and cramps, coughing, painful breathing, drowsiness, restlessness, and irritability. Drinking large amounts of kerosene may cause convulsions, coma, or death. Breathing some fuel oils for short periods of time may cause eye irritation, nausea, headache, light headedness, increased blood pressure, loss of appetite, poor coordination, and difficulty concentrating. Touching fuel oils for short periods of time may cause itchy, sore, red, or peeling skin. One study specific to diesel found that breathing diesel vapors for long periods of time can cause kidney damage and decrease your blood's ability to clot. There are a few studies related to jet fuel used by military aircraft and exposure to this jet fuel can affect the nervous system. There is inconclusive evidence regarding the association between fuel oils and cancer.

GASOLINE

WHAT IS GASOLINE?

Gasoline differs from other fuels in its composition. Gasoline is a flammable liquid used as fuel for engines in cars and other machinery. Some of the chemicals that are in gasoline include, but are not limited to, benzene, toluene, and xylene. The concentration of contaminants present in gasoline depends upon its blend or grade (e.g., 87 vs 89 octane gasoline), the source of crude petroleum used to make gasoline, and the manufacturer. When in water, some compounds in gasoline may dissolve and be broken down into smaller chemicals. Some of these chemicals may evaporate.

WHAT HEALTH EFFECTS ARE RELATED TO GASOLINE EXPOSURE?

Most studies exploring the health effects of gasoline are from short-term (acute) high-level exposures. Ingesting large quantities or breathing in high concentrations of gasoline may cause harmful effects to the nervous system. Depending on the concentration, these effects may be minor, such as dizziness and headaches or more severe such as difficulty breathing or coma. It may also irritate the stomach, causing gastrointestinal upset. Gasoline may cause skin irritation when bathing in contaminated water. Inhaling high concentrations of gasoline may cause irritation to the respiratory tract. Acute exposure to lower concentrations may cause slurred speech, confusion, difficulty walking, and a flushed face.

Studies of long-term (chronic) exposure to gasoline in humans and animals are limited and are often from long term high-level exposures (such as intentional sniffing or swallowing of gasoline for long periods of time) and may not reflect health outcomes of chronic low-level exposures. These studies found that chronic exposure to gasoline may result in changes in weight, adverse neurological effects, respiratory and gastrointestinal irritation, blood disorders, kidney disease, as well as behavioral and intellectual changes. Many of the effects found in these studies are speculated to be due to lead. Leaded gasoline was phased out in the United States beginning in 1973, except for small piston-engine aircraft that still use leaded aviation gasoline. There is limited and/or incomplete evidence in humans and animals that gasoline exposure causes cancer.

HOW DO I KNOW IF MY WELL WATER IS CONTAMINATED?

Residents with wells that may have been impacted by the leak in the Twin Oaks-Newark pipeline should have their well water tested to determine if it is contaminated. Tests are unable to measure the concentration of complex mixtures such as fuels but can measure chemicals commonly found in fuels. Concentrations of these chemicals will provide some insight on the extent of contamination. The chemicals that are being measured in resident well water by Energy Transfer include: Benzene, Toluene, Ethylbenzene, Total Xylenes, MTBE, Isopropyl Benzene (Cumene), Naphthalene, 1,2,4-Trimethylbenzene, 1,3,5-Trimethylbenzene, 1,2-Dichloroethane (EDC), 1,2-Dibromoethane (EDB), and lead. These chemicals do not represent all chemicals that are present in fuels.

I HAVE WELL WATER TEST RESULTS, BUT WHAT DO THEY MEAN?

Well water is not regulated in Pennsylvania. Residents who have well water testing results available and need assistance interpreting the laboratory results can contact the Pennsylvania Department of Health (PA DOH) at dehe@pa.gov or 717-787-3350. PA DOH can provide guidance on health risks for different water usage scenarios of the tested chemicals. It is important to note that PA DOH can only provide water usage recommendations based on the specific chemicals tested. Additionally, results provide information for a snapshot in time. Currently, we do not know the extent of the groundwater and soil contamination or movement of the leaked products through groundwater and soil. Therefore, we recommend installing and maintaining an effective water treatment system. Treatment systems can help protect you from exposure to chemicals from the leak or other chemicals that may be present in the groundwater supply. Having your water tested regularly will confirm that your treatment system is working.

SHOULD I USE MY WELL WATER?

If you are:

- waiting for test results,
- have received results confirming that your well water is contaminated,
- or are waiting to have a filtration system installed and tested,

only drink and cook with bottled water. Bottled water is currently being provided by Energy Transfer for residents in the potentially affected area. If you have received results and need assistance interpreting them, please follow the guidance provided in the previous question, “I have well water test results, but what do they mean?” Energy Transfer is also conducting remedial actions to reduce exposures, including the installation of filtration systems to remove contaminants. For more information on getting your water tested and/or an installation of a filtration system, contact Energy Transfer at 877-397-3383 or visit its website for this incident. After filtration system installation, water should be tested post-filtration to confirm the system was installed properly and that contaminants are being removed. Regular follow up testing should be conducted (for homes **with or without** a treatment system) to ensure that additional contamination is not occurring and that filtration systems, if in place, are effective.

MY WATER HAS A STRANGE ODOR, WHAT SHOULD I DO?

Some chemical additives in fuels have strong odors. You may notice odors when using water from the faucet after a filtration system is installed. The presence of odors does not necessarily mean there are harmful chemicals present, but this should be confirmed with testing. If you notice a new or different odor, it is recommended to have your water

tested again (or if not yet tested, please request testing). For individuals sensitive to the odors, it is recommended that you limit the time running the faucet or taking a shower.

IS THERE LEAD IN MY WELL WATER?

Lead is a naturally occurring element in the Earth's crust. It is a bluish-gray metal with no smell or taste. It can be found in all parts of our environment – air, soil, and water – and it does not break down. Manmade sources of lead include current or past emissions from industries that use lead, historical use of leaded gasoline and lead paint, and more. We do not know the source of lead contamination for your water. It is also possible that lead solder was used in water pipes that transport water from your well to your home. Lead from solder can leach into your water as it travels.

Lead can be removed from your water by installing a specialized filtration system. For more information on the types of filtration systems available and the contaminants they remove, please view the PA DOH How to Interpret Water Test Results: A Guide for Public Health. Please see the section above, "How Do I Know If My Well Water Is Contaminated?", for more information on well water testing being conducted by Energy Transfer for lead.

Due to its harmful effects, there is no established safe level of lead in blood. Children and pregnant women are at greater risk for the health effects of lead exposure. If you are concerned that you or your family have been exposed to lead in drinking water, contact your health care provider to schedule a blood lead test. This is a common test used to measure the amount of lead in blood. Your health care provider will provide medical management recommendations based upon your blood lead level. For more information on lead exposure view the PA DOH Lead fact sheet or PA DOH Non-Occupational Lead Exposure fact sheet. For more information on testing and health effects of lead exposure, view the CDC Childhood Lead Poisoning Prevention webpage.

IS THERE A MEDICAL TEST TO DETERMINE IF I WAS EXPOSED TO FUELS?

Your doctor can check your blood or urine for signs of chemical exposure. Chemicals that are present in fuel oils and gasoline, and their breakdown products, can be measured in blood and urine. Also, some chemical exposures may result in biological changes (e.g., changes in your white blood cell count) that can be measured. Together, these tests can be used by your doctor to better understand if an exposure occurred and are often referred to as biomarkers. However, many of these chemicals are present in other products that someone encounters regularly, such as exposure while pumping gas, using paints or paint thinners, and others. Many breakdown products are not specific to a single chemical. Additionally, many of these chemicals leave the body quickly (within 48 hours), meaning that tests will only capture very recent exposures and cannot determine long-term exposures. Biological changes are often non-specific and experienced from long-term, high-level occupational exposures and may not represent changes from low to moderate level environmental exposures. The table below provides detailed information on the medical tests that can be conducted to determine if exposure has occurred to the chemicals that are being tested for in well water (Table 2). Most of these tests are not routine or commonly ordered by health care providers. It may require specially ordered testing from commercial laboratories. These tests cannot predict whether you will have health problems from exposure to these chemicals. If you have any concern about a symptom you are feeling, always consult your medical provider. **You can bring this informational sheet and Table 2 to an appointment or consultation with your medical provider.**

Table 2: Measurable chemical product, the type of sample it is measured in, and measurable biological changes among well water contaminants

Chemical	Measurable product, Sample type (Blood or Urine)	Measurable biological change
Benzene	• Benzene, Urine # • S-phenyl mercapturic acid (PhMA), Urine # • trans,trans-muconic acid, Urine	Decrease in leukocytes (white blood cells).
Toluene	• Toluene, Blood, Urine # • Ortho-cresol, Urine # • Hippuric acid, Urine	There are general health effects potentially associated with toluene exposure, but there are no specific tests available at this time.
Ethylbenzene	• Ethylbenzene, Urine # • Mandelic acid, Urine • Penyglyoxylic acid, Urine	There are general health effects potentially associated with ethylbenzene exposure, but there are no specific tests available at this time.
Total Xylenes	• Xylene, Blood # • Methylhippuric acid, Urine #	There are general health effects potentially associated with xylene exposure, but there are no specific tests available at this time.
MTBE	• MTBE, Blood # • Tert-butanol, Blood • 2-hydroxyisobutyric acid, Urine	Liver enzyme tests including elevated levels of alanine transferase (ALT), aspartate aminotransferase (AST), or lactate dehydrogenase (LDH). Change in blood urea nitrogen (BUN) levels.
Isopropyl Benzene (Cumene)	• Cumene, Blood # • Dimethylphenylcarbinol (DMPC), Urine	There are general health effects potentially associated with cumene exposure, but there are no specific tests available at this time.
Naphthalene	• 1-naphthol, Urine	Hemolytic anemia (abnormal breakdown of red blood cells).
Trimethylbenzenes	• Trimethylbenzenes, Urine # • Dimethylbenzoic acids, Urine	Increase in monocytes (type of white blood cell).
1,2-Dichloroethane (EDC)	• EDC, Blood, Urine # • Thioethers, Urine • Thiodiglycolic acid, Urine • Mercapturic acid, Urine • Chloroacetic acid, Urine	There are general health effects potentially associated with EDC exposure, but there are no specific tests available at this time.
1,2 Dibromoethane (EDB)	• EDB, Blood, Urine # • 2-hydroxyethyl mercapturic acid, Urine	There are general health effects potentially associated with EDB exposure, but there are no specific tests available at this time.

Measurable product and biological change test result that is specific to the chemical of interest. All others are non-specific meaning the product or biological change tested may be present due to other exposures or underlying health conditions.

If you are concerned that you may have been exposed to diesel, jet fuel, or gasoline or are experiencing symptoms, contact your health care provider.

CONTACT US

Upper Makefield Township residents who have questions and concerns regarding their well water contamination can contact the agencies below. Please indicate in your message that your concern is related to **Mt. Eyre Project**.

Energy Transfer

- Phone: 877-397-3383
- Webpage: Upper Makefield Response
  Email: uppermakefieldresponse@energytransfer.com

Upper Makefield Township

- Phone: 215-968-3340
- Webpage: Mt. Eyre Neighborhood Wells
- Email: Info@uppermakefield.org

Bucks County Health Department

- Phone: 215-345-3318
- Webpage: Bucks County

Pennsylvania Department of Environmental Protection Southeast Regional Office

- Phone: 484-250-5991 or 866-255-5158
- Webpage: Southeast Regional Office
- Email: RA-EP-SEROECB@pa.gov
- Submit an online complaint using the Complaint Form

Pennsylvania Department of Health

- Phone: 717-787-3350
- Webpage: Environmental Health
- Email: dehe@pa.gov
- Submit an online complaint using the Environmental Health Concern Form

Philadelphia Poison Control Center

- Phone: 1-800-222-1222
- Webpage: Poison Control Center

ADDITIONAL RESOURCES

Energy Transfer - Upper Makefield Incident Updates

ATSDR ToxFAQs - Diesel/Fuel Oils

ATSDR ToxFAQs - Jet A fuel

ATSDR ToxFAQs - Gasoline

ATSDR ToxFAQs - Benzene

ATSDR ToxFAQs - 1,2-Dibromoethane

ATSDR ToxFAQs - Ethylbenzene

ATSDR ToxFAQs - Methyl *tert*-butyl ether (MTBE)

ATSDR ToxFAQs - Lead

PA DOH – Lead factsheet

ATSDR ToxFAQs - Naphthalene

ATSDR ToxFAQs - Toluene

ATSDR ToxFAQs - Xylene

EPA Hazard Summary - Cumene (isopropyl benzene)

New Jersey DHS Hazardous Substance Fact Sheet - Trimethyl Benzene