Mercury Photo by Tom Kelly

WATER SCOOP — Mercury reporter Bob Montgomery uses a laboratory bottle to scoop a sample of river water from the Schuylkill River at a spot in North Coventry Township, near the mouth of Manatawny Creek. Small traces of trichloroethylene (TCE) were found in the river samples, but higher amounts of TCE and other hazardous chemicals were found in several other localities. Montgomery, over the past three months, conducted an intense investigation into the municipal water we drink. Today, The Mercury looks at the chemicals in your public water and what they can do to you.

But element of risk exists

Monday 3-10-86

Water analysis: No need to panic

EDITOR'S NOTE: The following analysis was provided by Rick Stump, laboratory director and vice president of Suburban Water Testing Laboratories, a state certified firm contracted by The Mercury to test and analyze municipal water samples.

By RICK STUMP
Special to The Mercury

The difficulty that an analytical chemist has with the recommended maximum contaminant levels (RMCL) of the current Safe Drinking Water Act is that zero is, in actuality, something we can never absolutely determine.

When we are analyzing for parts per billion of a substance, we are literally looking for a piece of a needle in a haystack.

A part per billion is difficult to imagine. Consider these analogies: one part per billion (ppb) equals one inch in 16,000 miles, or one second in 32 years, or one cent in $10,000,000.00 or one bad apple in 2,000,000 barrels.

As the reports show, many of the volatile organic compound (VOC) levels listed are in tenths or hundredths of a part per billion. Analytically speaking, it is difficult to say whether a VOC level detected at less than 0.1 ppb came from the water, and VOC levels detected at less than 1 ppb should be considered only a trace.

Of the 13 samples that showed the presence of at least one volatile with an existing recommended level, only four of these were samples that showed greater than 1 ppb (Collegeville, Trappe, Bally, Exeter-2). Only two of these samples exceeded the proposed maximum level (Collegeville and Exeter-2).

The one thing that most of us find distressing is the fact that we found any of these man-made compounds in our water systems at all. They do not occur naturally in a concentrated form, and did not even exist until man started producing them in the 1920s.

The questions to be asked are: Where did they come from? How did they get there? Are the levels going to increase? At what level do they become truly dangerous?

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An element of risk but no need to panic

WATER ANALYSIS

(Continued from page one)

Unfortunately, most of these questions remain unanswered and will likely be unanswered for a long time.

The one question we do have the ability to answer is whether or not these levels are going to go up. Unfortunately, the wheels of government turn slowly, and it is likely to be several years before public water supplies will even be required to test for TCE and related compounds, let alone be forced to control the level of them.

Another concern that comes to mind is a person's total exposure to volatile organic chemicals. Most all of the defined "safe" levels of exposure are based on drinking two liters of water each day.

But most of the volatiles are not only absorbed through ingestion, but are also readily absorbed through the skin and lungs upon contact. One may only **drink** two liters of water per day, but may shower with **several hundred** liters per day.

In the shower environment, volatiles will vaporize from hot shower water and travel into the surrounding air, which typically is a very confined area, and it will be absorbed via the lungs through breathing them in.

There is no doubt that it would be a wise precaution to ventilate the shower area if one knows he has appreciable levels of volatile compounds or total trihalomethanes (TTHMs) in his water supply.

Research is needed to answer many of these currently unresolved questions. I would like to see more research done on the effects these substances have on human beings rather than on animals.

Just such a humanistic study was conducted in the Woburn, Mass., area. There are many geographic areas which contain VOC contamination and, although it would be a time-consuming and expensive job, research could be conducted by comparing surveys and medical records of those populations using contaminated supplies, with similar populations using non-contaminated water supplies to be used as a control group.

The Woburn study did just that, and found a positive correlation between VOC contamination, childhood leukemia, and central nervous system and kidney disorders, while using a portion of the town that did not have VOC contamination as a control group.

Of the samples we took, three of the public water systems and one of the private wells stand out as potential problem sources.

The Collegeville sample showed a substantial amount of trichloroethylene (TCE). Assuming that the proposed MCL becomes an MCL, this system will then be in violation, providing this sample is a representative of the normal TCE level.

The one sample for Trappe showed two coliform colonies, which may indicate that the disinfection equipment is not functioning properly.

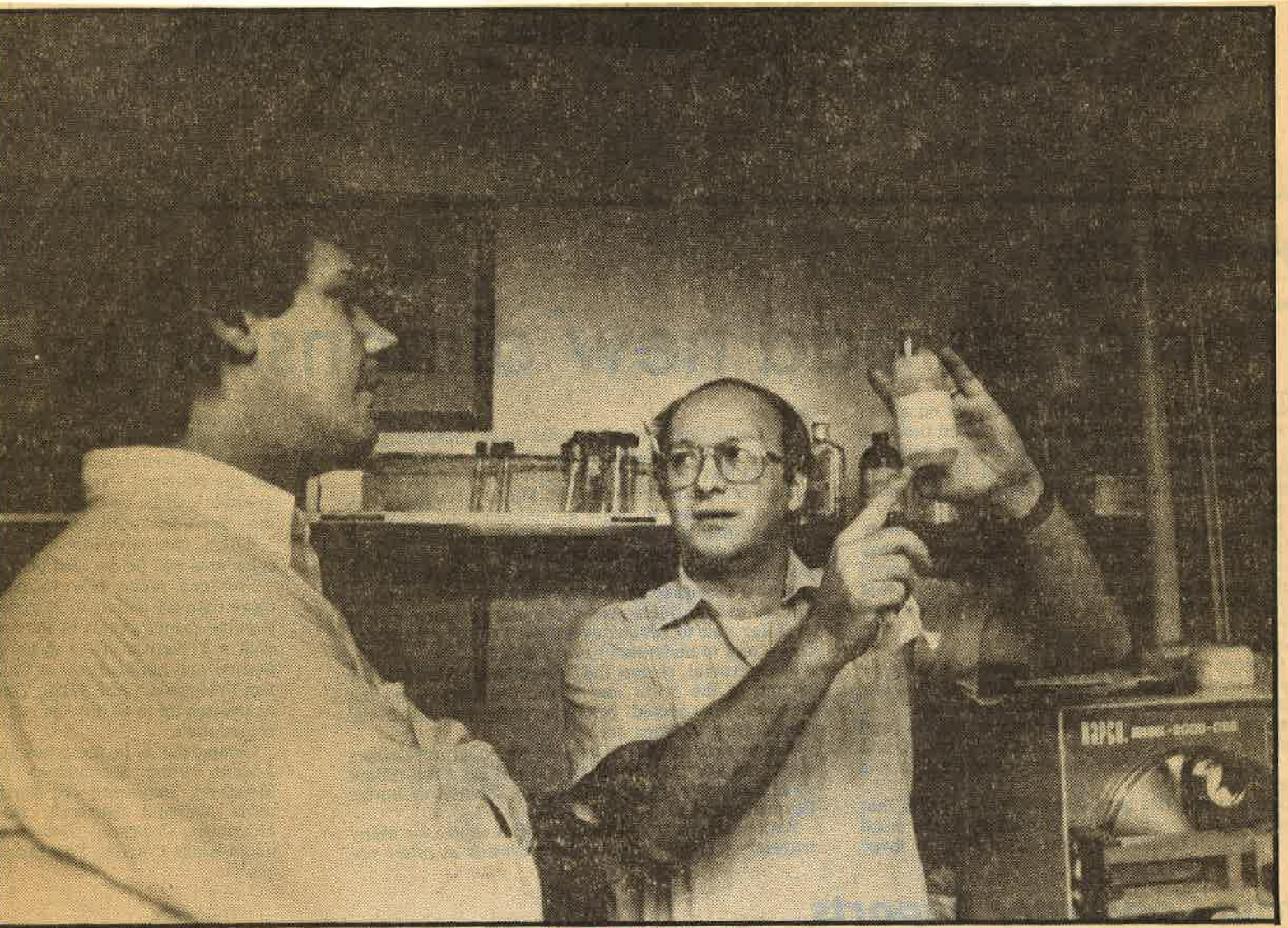
The samples Exeter-2 (Fairview Chapel Road between Route 422 and Lincoln Road) and Exeter-3 (Crestwood) showed an array of chemicals. The Crestwood sample contains some of the components of gasoline and may indicate possible gasoline or other petroleum product contamination.

Finally, the East Coventry sample, from a private well, showed two coliform colonies, which may indicate surface water or waste water is entering that well. This well should be checked and possibly disinfected. Certainly, additional tests should be performed in the near future.

An interesting story about chlorine can be seen by comparing the coliform bacteria levels of the river samples, which ranged between 18,000 and 34,000 (per 100 milliliters), to the water supplies that draw water from the river.

The highest coliform count we found in the drinking water has 2. We can, therefore, say that they are doing a good job of disinfection for the most part. Chlorine is responsible for doing this great service for us, as it has been doing since the 1920s. Chlorine, however, has a bad side effect.

After being used for 50 years, its undesirable effect was finally discovered. In the 1970s, it was discovered that when chlorine was



Mercury Photo by Tom Kelly

TESTING THE WATER — Rick Stump (right), laboratory director at Suburban Water Testing Laboratories, Frederick, discuss with Mercury reporter Bob Montgomery how water samples are analyzed to determine chemical and bacteria content. Stump's firm was contracted by The Mercury to test the public drinking water in Berks, Chester and Montgomery counties. In general, Stump found the water to be safe.

added to water, it reacted with natural organics in the water and produced trihalomethanes, primarily chloroform (a known carcinogen).

Chlorine was found to be like a two-edged sword, cutting down bacterial levels with the foreward swing and then swinging back with a cancer risk and the possibility of some unknown side effects.

In the samples we examined, 15 showed total trihalomethanes (TTHM) of greater than 1 ppb; 10 of them ranged between 11.9 and 48.6 ppb. All were within the maximum level of 100 ppb.

That level of 100 ppb was again calculated on the basis of drinking two liters of water per day. It does not take into account exposure through showering or bathing.

Some European countries have set their maximum at 25 ppb. Perhaps we need to rethink some of our risk calculations and tighten the regulations.

I think as a bottom line, we could draw a few basic conclusions:

- There is no need to panic.
- There appears to be no immediate health threat.
- The larger systems drawing from surface water have more TTHMs, while the smaller systems drawing from groundwater are more likely to have VOC contamination.
- Drinking tap water does pose an element of risk either from TTHMs or VOCs.

The two bottled water samples fared relatively well, though one had 0.83 ppb of TCE and the other 0.12 ppb of 1,1,1-Trichloroethane.

If these samples came from a plastic bottle, the volatiles may have come from the plastic bottle itself, the cap liner, or the surrounding area where the bottle was stored. In any event, it was better than most of the public supplies. (The Diamond Spring Water sample came from a plastic bottle, and the Rockwood Spring Water sample from a bottle.)

Since we only samples two private wells, we didn't really get enough data to draw any real conclusions. However, from our experience, public water even with TTHMs is safer than private well or spring water that is seldom, if ever, analyzed.

Ironically, the well near FR&S Landfill (owned by Eugene Tobolski, 336 S. Center Road), fared quite well, showing no coliform, volatiles, or trihalomethanes present.

Chemical-free water hard to find

By BOB MONTGOMERY
Mercury Staff Writer

Your water may look clear, smell and taste just fine. But it doesn't mean your water is chemical-free.

Although your municipal water supplier tests for dangerous solvents every one to three years, a lot can go through the plant undetected in the meantime.

For example, Collegeville knows it has TCE (trichloroethylene), a cancer-causing chemical, in its municipal water. It was discovered in Collegeville and Trappe municipal wells in 1979. One of the system's 10 wells was shut down because of high TCE levels, up to 32.9 parts per billion.

But TCE is still there. A hefty 28 parts per billion of TCE was found in The Mercury's sample of water taken from a back room faucet at Community Counseling Services, 363 Main St., Collegeville — right next door to borough hall.

In Exeter Township, four chemicals that are components of gasoline were found in a sample of water taken from the Harold Olson residence, 20 Ironstone Drive, Crestwood. But the levels detected are so low that there is no threat to the family's safety, according to water company officials.

Suburban Water Testing Laboratories of Frederick was contracted by The Mercury to test and analyze the results of water samples from over 25 locations in three counties that receive municipal water.

In Trappe, 1.7 ppb of TCE was detected in a sample from Paul Sharayko's kitchen faucet, 93 W. Third St.

Lloyd Sassaman, water plant superintendent for the Collegeville-Trappe Joint Water System, said he gets high TCE readings once in a while, but most tests show from 1 to 3 ppb.

"People fearful of it (TCE) are buying spring water," Sassaman said. "I'm drinking Collegeville water and my grandchildren are drinking it. If it would be unsafe, DER (Department of Environmental Resources) would not let us supply the people with it."

Bally, which also shut down wells four years ago because high levels of TCE were discovered, had a reading of 2.7 ppb at the Carl Eddinger residence, 125 N. Seventh St., when tested by The Mercury.

And 0.83 ppb of TCE was found in the sample of Rockwood Spring Water, according to results from Suburban Water Testing Laboratories.

The U.S. Environmental Protection Agency says that any amount of TCE, even 0.83 ppb, is not recommended. But since traces of the chemical are found in so many water supplies — making zero TCE a near impossibility — the EPA has proposed a limit of 5 ppb.

When the new limit is adopted, possibly this year, water suppliers will have to comply or spend whatever's necessary to filter out the TCE and bring the water into compliance.

EDITOR'S NOTE: Mercury reporter Bob Montgomery has spent three months in an extensive sampling of the municipal water systems in the Greater Pottstown Area.

We have taken water samples from 25 locales in the three-county area and sent them to Suburban Water Testing Laboratories in Frederick. One round of samples was tested for industrial solvents and volatiles such as chloroform, TCE and PCE and a second round of samples was tested for bacteria and coliform levels — which measures the effect of chlorine purification efforts.

While The Mercury survey found several locales with specific problems — TCE, a carcinogen, in high levels in Collegeville and Trappe; elements of gasoline in Exeter — the general finding was that municpal water systems in our area are providing their customers with safe, if not pure, drinking water.

But what is TCE? What are some of the other chemicals for which The Mercury tested?

TCE is a common chemical used as a solvent in vapor degreasing. Most metal processing plants use TCE to clean the parts before they ship them out. It was also used for extracting caffeine from coffee before being discontinued. And homeowners have used it for many years in cleaning their septic systems. Boroughs even used to to clean out water lines at one time.

But how does it get into our water?

Environmental officials say that landfills and small dumps are among the biggest contributors of TCE contamination.

The chemical seeps through the ground and into the groundwater supply. From there it can spread in any direction toward wells.

The same holds true with most of

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Chemical-free

water hard to find

(Continued from page one)

the other chemicals that turn up in our water.

Industry uses all types of chemicals. While these chemicals can play a positive role in progress, the chemical residue is often disposed of improperly. Much is dumped at unlined landfills, some is stored improperly at industrial plants, and some is even disposed of illegally. Tanker trucks have been known to pull off a rural road late at night and release the waste by opening a valve and allowing it to spill on a field or in a stream.

The fertilization of farm fields with pesticides and herbicides also contributes to groundwater contamination, according to Jerry Centofanti, supervising sanitarian for DER in Norristown. But landfills and old dump sites still remain the chief sources.

Chemicals used in pesticides come under the classification of organic — having properties associated with living organisms. TCE is considered a volatile organic — volatile, meaning it evaporates quickly.

Volatile organics are more dangerous in groundwater supplies than in streams, reservoirs, or rivers because they come in contact with little air — where they could evaporate — before reaching the faucet. TCE is rarely found in moving streams, where the chemical would quickly evaporate.

Belonging to the inorganic class are minerals such as lead, iron, magnesium, mercury, and silver. Although The Mercury did not test for those items, you may want to have your water tested for minerals at a laboratory if you have any doubts.

Rick Stump, laboratory director at Suburban Water Testing Laboratories, said a simple test is available if you notice a constant stain in your sink. It could be caused by a mineral in too high a concentration. Another sign would be a low pH number, signifying acidic water. The pH doesn't indicate the presence of minerals. But if you have minerals, Stump said a low pH means whatever minerals you have on your pipes — lead for example — are more likely to flake off due to the acidic water and travel through the pipes into your faucet.

If your water has a high pH factor — meaning it is high in alkalinity — and you have minerals in your water, the odds are higher that the minerals could clog your pipes instead of ending up in your tap. Water high in alkalinity leaves the minerals alone, opposite of acidic water, which loosens the minerals and carries it with it to the tap.

In the sample taken from the Olson residence, Stump found 8.1 ppb of toluene, 1.8 ppb of ethyl benzene; 7.9 ppb of M & P xylene; and 2.3 ppb of 0-xylene — all components found in gasoline.

But the EPA has come out with proposed recommended maximum contaminant levels of 2,000 ppb for toluene; 440 ppb for xylene; and 680 ppb for ethyl benzene. When the Olson levels are compared to the EPA's proposed levels, they are extremely low, according to William Evans, assistant manager for Glen Alsace Water Co., which provides water to several thousand residents in the Crestwood-Reiffton areas.

"Our major concern is we hope it does not scare the public," Evans said. "It (the levels found) virtually has no impact on these consumers."

The water company took its own sample from the Olson residence and sent it to a laboratory for testing. The same chemicals were found, but in lower concentrations.

"You can find these traces in common foods we have every day," Evans said. "They have no impact on the health and welfare of the consumer public."

In addition to TCE, another chemical found in many samples was 1,1,1 trichloroethane, found in many household cleaners. According to Stump, it is the most commonly found chemical in area water, especially in private wells.

The chemical is not considered carcinogenic. But it can cause heart

damage and central nervous system damage if you are exposed to levels around 200 parts per billion for a long period of time.

Fortunately, the levels of 1,1,1 trichloroethane found by The Mercury, measured in parts per billion, are extremely low — 0.40, 0.47 and 0.37 in the three Pottstown samples; 0.05 in Royersford and 0.07 in Spring City; 0.27 in Collegeville; 2.5 in Trappe; and 0.08, 0.10, 0.09 in the three river samples. The highest amount — 18.0, was found in the Bally sample. That level is still considered low.

Another chemical — 1,1 dichloroethene — was found in Trappe (0.37 ppb) and in Bally (6.9 ppb). The substance is a biproduct of TCE, and can cause a weakening of the heart and liver and kidney damage in high levels of exposure. The EPA recommended maxium level is 7 ppb.

One with a similar name, but a different chemical, is 1,1 dichloroethane. Traces of this substance were found in Collegeville (0.06 ppb) and in Trappe (0.03). A more significant amount was found in the AVW Inc. water system in Exeter Township. In the sample taken from the Charles Douglas residence on Fairview Chapel Road, Exeter, 13 ppb of 1,1 dichloroethane was found.

Used as a degreasing agent, 1,1 dichloroethane can cause central nervous system damage from large amounts of exposure. It also causes dizziness, drousiness, unconsciousness, and liver and kidney damage. But long-term data on this chemical, as with most, is unavailable.

Other chemicals found in relatively small quanities were 1,2 dichloroethane — 2.9 ppb in the AVW Inc. supply, Exeter Township and 3.5 ppb in the Amity Gardens sample; and methylene chloride — 0.99 ppb found in one of the three Pottstown samples.

The 1,2 dichloroethane is commonly used in the manufaccture of antifreeze, nylon, rayon, rubber, and plastics. But it shouldn't be in your water. In the Amity Gardens sample, taken from the Kenneth and Janice Arnt residence, 402 Laurelwood Drive, 3.5 ppb of 1,2 dichloroethane was found.

The 3.5 is high when you consider it is 350 percent higher than the recommended allowable level of zero. But it is just shy of the proposed maximum level of 5 ppb.

It is a known carcinogenic, based on experiments with rats and mice. Symptoms of too much 1,2 dichloroethane include dizziness, mental confusion, nausea and vomitting.

The methylene chloride found in Pottstown, at the residence of Michael Sangiacomo, 454 Spruce St., is not any healthier for you. It is a potential carcinogen, and can produce headaches, irritability, numbness and tingling in the limbs. It can enter your system through drinking it, or through your nose, eyes or skin if in a vaporized state.

A chemical commonly found in paint removers, methylene chloride's recommended level is zero.

The trihalomethanes found in several samples, due to the addition of chlorine to the water to kill bacteria, will be covered in the article on bacteria to run Wednesday.

Accompanying this story (see page 5) is a listing of each chemical tested for by the laboratory. It tells where the chemical comes from, how bad it is, and what it can do to you in large amounts over a long period of time.

Breakdown of

chemicals tested for

The 23 industrial solvents tested by Suburban Water Testing Laboratories Inc., Frederick, are among the most common industrial solvents. Ideally, there should be no compounds detected in residential water supplies.

If some are found, further testing is generally advised. Many of these are carcinogenic and do not occur naturally.

Much of this information was obtained from "The Handbook of Toxic and Hazardous Chemicals and Carcinogens," by Marshall Sittig.

Here is a breakdown of each chemical tested for, how it is, or was, commonly used, its dangers, and recommended guidelines, if any:

By Bob Montgomery

Carbon Tetrachloride — A once-used cleaning solvent, degreasing agent. Not regulated by law. Recommended maximum level is 0; proposed federal maximum level is 5 parts per billion. Side effects are nervous system depression (similar to a drunken state), liver and kidney damage. Acute exposure causes nausea, vomiting, diarrhea, and jaundice. It causes cancer in rats and mice, producing liver tumors.

1,2-Dichloroethane — A compound formed by decomposition of other chemicals. Used in manufacture of anti-freeze, nylon, rayon, rubber, and various plastics. Recommended level is O; proposed federal maximum level is 5 parts per billion. Side effects: Drying of skin after physical contact of raw material; inhalation may cause nausea, vomitting, dizziness, mental confusion, liver and kidney damage; respiratory and circulatory failure in high levels; neurological changes. A known carcinogenic, based on experiments with mice and rats.

1,1,1-Trichloroethane — Most commonly used of all compounds and least hazardous, it is currenlty used in household cleaners. Accute exposure causes dizziness, central nervous sytem damage, damage to the cardiovascular system. It is not considered cancer causing. EPA recommends a maximum level of 200 parts per billion; proposed federal maximum level is 200 parts per billion.

1,1-Dichlroethane — Very similar to 1,2-Dichloroethane. Used as a degreasing agent, also in producing other organic compounds. Not currently regulated. Exposure in large amounts affects central nervous system, and causes dizziness, drousiness, unconsciousness, liver and kidney damage. Long-term exposures to this compound, as well as most others, is unknown. Not listed as carcinogenic.

1,1,2-Trichloroethane — Similar to 1,1,1 Trichloroethane. Not regulated. Risk of contracting cancer is 1-in-100,000 from prolonged exposure to 6 parts per billion. Little is known on its toxicity. In animal experiments, exposure caused depression of the central nervous system. It is also carcinogenic. Points of attack are eyes, nose, liver, kidneys.

1,1,2,2,-Tetrachloroethane — Used as a dry cleaning agent and fumugant in cement and in lacquers. Also used in manufacture of artificial silk, artificial leather and artificial pearls. Also used as a solvent for furs. Recommended level is 0, and the risk of contracting cancer from prolonged exposure to 1.7 parts per billion in 1-in-100,000. Harmful effects include body tremors, headaches, numbness of limbs, loss of kneejerk, excessive sweating. Points of attact are liver, kidney, and central nervous system. Carcinogenic.

Chloroethane — Little information available, no guidelines. Very volatile, it is a gas usually not found in water.

2-Chloroethyl vinyl ether — Used in industries that fabricate metal products, also in wholesale trade of leather, rubber and plastics, and chemical products. Little data available on health effects. Very toxic to laboratory animals.

Chloroform — Called a "trihalomethane," its primary source is chlorine. More commonly found in public water supplies where chlorine is added. Also was used as an anasthetic at one time, and known to have toxic effects. Still used as a solvent in lacquer indus-

try, extratction and purification of penicillum and other pharmaceuticals, manufacture of artificial silk, plastics, floor polishes, and fluorocarbons. Cancer risk is 1-in-100,000 for prolonged contact with 1.9 parts per billion. Environmental Protection Agency allows in public water supplies up to 100 parts per billion of all four trihalomethanes combined — chloroform, bromoform, chlorodibromoethane and bromodichloromethane. Side effects from exposure to large amounts include digestive distrubances, dizziness, mental dullness and coma. Alcoholics are affected sooner and more severely. Points of attack are liver, kidney, heart, eyes and skin. Carcinogenic.

1,2-Dichlorobenzene — Uncommon, it is used in manufacture of toluene. No recommended levels have been established. Harmful effects from exposure to large doses include hemolytic anemia, liver necrosis. Points of attack are kidney, skin, eyes, respiratory system.

1,3-Dichlorobenzene — Very similar to 1,2 Dichlorobenzene. The numbers before the name indicate the position of chlorine in the molecule.

1,4-Dichlorobenzene — Used as an air deodorant and insecticide. Maximum allowable limit is 750 parts per billion. Not carcinogenic. Similar side effects as previous two compounds.

1,1-Dichloroethene — A biproduct of TCE. Causes liver and kidney damage, depression of the central nervous system, weakening of the heart. Most studies indicate it is not cancer causing. EPA recommends a maximum level of 7 parts per billion, and is proposing the same under law.

Trans-1,2-Dichloroethene — Used as a sovlent for waxes, resins, extraction of rubber, refrigerant and in the manufacture of pharmaceuticals and artifical pearls. No limits established. Harmful effects include depression of the central nervous system, dizziness, vomitting, nausea. Points of attack in concentrated forms are the respiratory system, eyes, and nervous system.

1,2-Dichloropropane — Used as a chemical intermediate in PCE (see below). Also as a lead scavenger in gasoline for anti-knock fluids. Also used as a scouring compound and metal degreasing agent. No guidelines established due to insufficient data. Points of attack are skin, eyes, respiratory system, liver kidneys.

1,3-Dichloropropene — Used as a soil fumugant, nematocide for crops. Maximum level commonly used in industry is 87 parts per billion. Tests have shown it to be mutagenic (causing mutations), and to have a low tumor causing potential. It also causes liver and kidney injury in laboratory animals.

Methylene chloride — A common chemical found in paint removers. Also used as a solvent for oils, fats, waxes, cellulose acitate, esters. Also used as a degreaser. A potential carcinogen. Recommended level is 0. One-in-100,000 people who is exposed to 1.9 parts per billion over a long period of time will develop cancer. If inhaled, it produces stupor, headaches, irritability, numbness, tingling in limbs. Points of attack are skin, cardiovascular system, central nervous system, eyes.

Before using paint removers or other products, read the label. Often the skin is not a barrier that will shield against exposure to chemicals.

Bromoform — One of the four trihalomethanes caused by the addition of chlorine to drinking water supplies. Boromoform is also used in pharmaceutical manufacturing, ingredient in fire resistent chemicals, as a solvent for waxes, greases and oils. Lifetime cancer risk is 1 in 100,000 for exposure of 1.9 parts per billion, or 1 in 10,000 for exposure to 19 parts per billion. A common filter at the tap can remove trihalomethanes. Points of attack are skin, liver, kidneys, respiratory system, central nervous system. Potentially carcinogenic.

Bromodichloromethane — Another trihalomethane, same cancer risk as bromoform. Accutely toxic to mice in large doses. Also mutagenic in salmanella bacteria tests. Further details not available.

Trichlorofluoromethane — Commonly known as Freon 11, used as a refrigerant, an aeresol propellant, foaming agent. Also used as a flush in refrigerant systems. Very volatile. Recommended level is 0. Side effects include incoherence, tremors, dermatitis (drying of skin), frostbite, cardiac arrythmis, cardiac arrest.

Chlorodibromomethane — Also a trihalomethane. Used as a chemical intermediate in manufacture of fire extinguishing agents, aerosol propellants, refrigerants and pesticides. Not carcinogenic. More information not available.

Tetrachloroethylene — Commonly known as **PCE** (also known as perchloroethylene). Used as dry cleaning agent, a degreaser, chemical intermediate, textile and dry cleaning industries. Very common chemical, used by dry cleaners to clean clothes. Lifetime

risk of contracting cancer is 1 in 100,000 for long-time exposure to 8 parts per billion. The rule of thumb threshold is 3.5 parts per billion. A definite carcinogenic. Points of attack include liver, kidneys, central nervous system, eyes, upper respiratory system.

Trichloroethylene: Commonly known as **TCE**. Most commonly found of all. Used as a solvent in vapor degreasing. Most metal processing plants which manufacture metal parts will use this to clean the parts before they ship them out. It had also been used for extracting caffeine from coffee before being discontinued and replaced by methylene chloride. Also used as a dry cleaning agent, as a chemical intermediate in production of gums, chemicals, pesticides, resins, tars, paints, varnishes, and certain chemicals. Recommended level is 0. Proposed federal maximum level is 5 parts per billion. Lifetime risk of contracting cancer is 1 in 100,000 people for exposure to 27 parts per billion. Laboratories use 4.5 parts per billion as the safety threshold. Accute exposure to trichloroethylene depresses the central nervous system exhibiting such symptoms as headache, dizziness, vertigo, tremors, nausea and vomiting, irregular heart beat, sleepiness, fatigue, blurred vision, and intoxication similar to that of alcohol. Unconsciousness and death have been reported.

In addition to these, some other compounds were discovered in two samples, both of which originated in Exeter Township. At the Charles Douglas residence on Fairview Chapel Road, benzene — 7 parts per billion of it — was found. Here is what benzene is, and what it can do to you in high concentrations over a period of time.

Benzene — A known carcinogen, benzene is listed as a hazardous substance with EPA. It is a clear, volatile, colorless, highly flammable liquid with a characteristic odor. Benzene is used as a constituent in motor fuels, as a solvent for fats, inks, oils, paints, plastics and rubber, in the extraction of oils from seeds and nuts, and in photogravure printing. It is also used in the manufacture of detergents, explosives, pharmaceuticals and dyestuffs. EPA recommended level, 0 parts per billion. EPA's proposed limit is 5 parts per billion. Exposure to liquid and vapor may produce irritation to skin, eyes and upper respiratory tract. Acute exposure to benzene results in central nervous system depression. Headache, dizziness, nausea, convulsions, coma and death may result. Also, chronic exposure causes blood changes. Points of attack: blood, central nervous system, skin, bone marrow, eyes, respiratory system.

Also found, in a sample from the home of Richard and Susan Olson, 20 Ironstone Drive, Crestwood, Exeter Township, was toluene, ethyl benzene, M&P xylene, and O-xylene. Here are brief explanations of those compounds:

Toluene — It is a clear, colorless liquid with a sweet, pungent odor. It may be encountered in the manufacture of benzene. It is also used as a chemical feed; as a solvent for paints and coatings; or as a component of automobile and aviation fuels. Toluene may cause irritation of the eyes, respiratory tract, and skin. Repeated or prolonged contact with the liquid may cause removal of natural lipids from the skin, resulting in dry, fissured dermatitis. Symptoms from accute exposure include headache, dizziness, fatique, muscular weakness, drowsiness, incoordination, collapse and coma. Points of attack: central nervous system, liver, kidneys, skin. The EPA recommended maximum contaminant level is 2,000 ppb.

Ethyl benzene — Also clear, colorless liquid with a pungent aromatic odor. Ethyl benzene is used in the manufacture of cellulose acetate, styrene, and synthetic rubber. It is also used as a solvent and as a component of automotive and aviation gasoline. Harmful effects includ e kidney disease, liver disease, chronic respiratory disease, skin disease; irritation of the eyes and mucous membranes, headaches, dermatitis, narcosis, coma. The EPA recommended maximum contaminant level is 680 ppb.

Xylenes — The two xylenes are colorless, flammable liquids. Xylene is used as a solvent; as a constituent of paint, lacquers, varnishes, inks, dyes, adhesives, cements, cleaning fluids, and aviation fuels; and is also used in the manufacture of quartz crystal oscillators, hydrogen peroxide, perfumes, insect repellants, epoxy resins, pharmaceuticals, and in the leather industry. Xylene vapor may cause irritation of the eyes, nose and throat. Repeated or prolonged skin contact with xylene may cause drying and defatting of the skin. Liquid xylene is irritating to the eyes and mucous membranes, and aspiration of a few milliliters may cause chemical pneumonitis, pulmonary edema, and hemmorrhage. Acute exposure may cause minor reversible effects upon the liver and kidneys. High concentrations of the vapor may cause dizziness, staggering, drowsiness and unconsciousness. The EPA recommended maximum contaminant level is 440 ppb.