

Five plumes containing the hazardous chemicals trichloroethylene, hexavalent chromium and cyanide, are flowing in the groundwater underneath Ludington's north side, remnants of metal plating operations from the past at Ludington Plating, Handy Things and Straits Steel & Wire Co. The companies and the Michigan Department of Environmental Quality are working to clean up that contamination, but it is a long and slow process. The DEQ started the process in 1991 and expects to continue in 2001 and beyond.

In the meantime, the few residents who may have water wells in the area should not use them even for sprinkling their lawns, said Jim Skipper, a project manager at the DEQ's Cadillac office. The area in question is west of the 800 block of North Rowe Street to William Street and north of Lowell Street to Bryant Road.

Since most city residents have city-supplied water piped into their homes, not well water, the drinking water supply is safe from these contaminants. However, the state has concerns about residents who have water wells they may be using for watering their lawns. The hexavalent chromium in the groundwater is debatably a carcinogen and the water also contains some chlorinated solvents, Skipper said. Sprinkling releases the solvents into the air and those solvents shouldn't be inhaled, he said.

There shouldn't be any water well use in that area, he said. Residents to the east are not at risk from these plumes because of the way the groundwater flows, he said.

The company that used to be known as Handy Things is now owned by TRW Inc., a Fortune 500 company. TRW is trying to speed up the process of cleaning the Handy Things TCE contamination by putting in an extra purge well. Purge wells bring groundwater to the surface so that it can be treated, usually with carbon, and brought to what the DEQ determines is a safe level. Then it is expelled into the stormwater sewer that flows into the Lincoln River or into the sanitary sewer that

further cleans contaminants before expelling them into the Pere Marquette River.

This latest Handy Things-related project, approved by the DEQ, can be seen along North Rath Avenue from Lowell Street to Bryant Road. Stearns Drilling Co. of Dutton is installing a new purge well on Rath Avenue at the Lowell Street intersection and putting down a pipeline to transport the contaminated water from that site to its treatment building on Bryant Road near the William Street intersection.

The effort is an attempt to clean up the plume of TCE that appears to have spread from Rowe Street, the site of the original plating operation, to William Street, about six city blocks.

In addition to the Handy Things project, the DEQ recently sank eight wells on city property in the Bryant Road woods near William Street to monitor the plume from the former Ludington Plating business. The DEQ considers this hexavalent chromium-contaminated groundwater to be an orphan plume since Ludington Plating went bankrupt. In this case it means taxpayers foot the bill.

Skipper said the state is doing the best it can to keep costs down. Installation of the eight wells cost just under \$30,000.

The DEQ did find some high levels of chromium contamination in the ground and sank the wells in an effort to track the plume and protect the nearby Lincoln River waters. State workers checked their new wells here last week but do not yet have results from the testing. We had tracked contamination to south of Bryant, Skipper said. These wells are to make sure it hasn't gone beyond Bryant.

If the state finds that the plume is contaminating groundwater beyond the level the DEQ deems acceptable, it will pump out the contaminants so that they don't spread to the river, Skipper said. The contaminated water would be treated then sent to the sanitary or storm sewer, depending on how clean it was.

The City of Ludington does accept some hazardous chemicals through its wastewater treatment plant, but only at low levels. The chemical-

laden groundwater has to be at a low level from the start or has to be pretreated with carbon before it goes through the Ludington wastewater system, said Doug Beadle, superintendent of the plant. The system helps filter out any of the remaining chemicals so that they settle into the lagoons or are treated through aeration and brought down to a state-determined safe level before being expelled into the Pere Marquette River.

Straits Steel has been pumping its own plumes at the Bryant Road woods east of Lakeview Cemetery in an effort to remove hexavalent chromium and cyanide from the groundwater using DEQ approved procedures. Straits Steel has its own contamination to clean, but it also has some involvement with a portion of Ludington's Plating's contamination. Straits took over an old Ludington Plating building at the 900 block of North Harrison Street, which contains an area of hexavalent chromium contamination from Ludington Plating's operations. The dirt containing hazardous chemicals has been covered with concrete, but DEQ officials said it should be removed to keep it from the groundwater.

Skipper said he expects that removal to happen sometime within the next year through the Clean Michigan Initiative, if there's enough state bond money left in 2001. He estimated it would cost several hundred thousand dollars to complete the cleanup inside the building. If the cleanup does occur, the dirt will be removed then put in a hazardous materials truck, which will haul it to a landfill approved to take in hazardous wastes.

The idea is to remove the contaminants from the highly residential areas they flow under. How did the chemicals make it into the groundwater? We don't have a shortage of sources, Skipper said.

DEQ files show chemicals were allowed to be dumped into the sewer system, but the corrosive chemicals collapsed the pipes and contaminated the ground.

And Ludington Plating ran fluids into holes in the ground and the chemical fluids are heavy and sink toward the groundwater. The

company was not authorized to dump chemicals in that way, □ it was just something they did, Skipper said. The DEQ began investigating the chemical contamination in 1970 and tried to force Ludington Plating to take some measures to stop contaminating and clean up its messes, Skipper said, but failed after the company filed for bankruptcy. The state started its own remediation of the site in 1991. In the former Ludington Plating building now owned by Straits, drums of chemicals were pushed over and concrete was poured over them. The soil there is the color of ink, which Skipper said he believes is from chromium contamination. Also, there was a fire in the building, which may have spread the chemicals, and some of the drums that held chemicals were corroded by the solutions. Some of those drums were plastic lined, but Skipper believes the plastic failed.

A nearby site, the former Handy Things building, later caught fire in 1995. Before the fire the DEQ found 3,000 or 4,000 parts per billion of TCE in the groundwater at the west edge of the property. After the fire, the DEQ measured 17,000 ppb at the same site, which Skipper said may have been related to containers rupturing during the fire.

At Ludington Plating there was improper storage of chrome wastes and cyanide, in pits in the ground, as well as accidental releases.

Chemical contamination of groundwater is somewhat common throughout the state, Skipper said. If an area was home to a metal plating operation in the 1970s it is likely to have toxic chemicals in the ground.

Most water wells aren't tested for heavy metals such as hexavalent chromium, said Marc Soles, environmental health sanitarian with District Health Dept. No. 10. The testing is expensive, he said, and most water wells don't need it.

However, anyone in the area near the plating plumes who has a well and would like to have their well water tested may call Soles at 845-7381. The DEQ does work with the health department and in some cases provides testing for free. Anyone can have their water wells tested for heavy metals or other contaminants, but those outside

areas of known contamination would have to hire a private firm at their own expense.

TCE, Cyanide and Hexavalent Chromium Trichloroethylene (TCE) was developed in the 1950s to be used as a cleaning solvent. It was widely used in the industrial painting or welding of metal because it cleans the surface so well the paint adheres to the metal. At the time it was developed it was considered a wonderful advance in the industry since it did not pose an explosion hazard, according to Dr. Jeff Harwell of Oklahoma University.

However, TCE was later found to be highly toxic, and studies show it can interfere with the body's nerve sheets and can damage the liver and the kidneys, cause lung damage and an abnormal heart beat, even at low levels, Harwell said. It is debatable whether TCE is a carcinogen. He estimated half of the federal Superfund sites have TCE in the groundwater.

It's a really difficult problem, Harwell said. Harwell is a chemical engineering professor and president of Surbec Environmental, one of the nation's leading environmental management firms. The company has pioneered technology that can transform contaminated groundwater into usable groundwater. The firm will be featured in an upcoming TIME Magazine article. Cyanide is useful in the electroplating industry. However, when improperly disposed of, the chemical can get into the groundwater. If ingested, cyanide can be fatal in high enough concentrations. It has been associated with brain and heart damage, including coma and death at high levels, Harwell said. At low levels it has been associated with breathing difficulties, heart pains, vomiting, blood changes and an enlarged thyroid.

Cyanide is considered fairly toxic in high levels but is soluble in water. Michael Karmin, professor emeritus of the Institute for Environmental Toxicity at Michigan State University, said he doubts it would cause much of a problem if it made it to a large body of water because it would be so diluted. Chromium is often combined with other metals in the plating process and helps provide a bright, shiny surface that is

corrosion-free, and resistant to wear. It is used to coat over plastics, steel, brass, zinc and aluminum. It can be found in a variety of products such as car parts and metallic decorations.

The hexavalent form of chromium, which is the form often used in plating, is the one that can be hazardous if ingested, and it is also dangerous to have it spread from the groundwater to a larger body of water. Chromium accumulates in aquatic organisms so that people who eat fish from that body of water might end up with the metal in their systems, Harwell said. Hex chrome, as it is sometimes called, has been associated with lung damage, stomach ulcers, convulsions, kidney and liver damage. In mice it was shown to produce birth defects, he said. If the skin contacts dirt containing the chemical, there is a chance of suffering from skin ulcers. Hexavalent chromium is the more toxic form of the metal. It became widely talked about after the movie Erin Brockovich. Obviously you don't want the stuff in your drinking water," Karmin said.

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