
HEALTH

CARE

PROVIDER

UPDATE No. 8

Dover Township

Childhood Cancer Investigation

November 2001

Environmental Health Investigations in Dover Township, New Jersey: Reich Farm, Ciba-Geigy, the Dover Township Municipal Landfill, and the Community Water Supply Testing

Background

A Public Health Response Plan was developed in June 1996 to investigate a statistically significant increased rate of certain childhood cancers in Dover Township, Ocean County, New Jersey. This plan delineated the actions that would be taken by the New Jersey Department of Health and Senior Services (NJDHSS) and the federal Agency for Toxic Substances and Disease Registry (ATSDR) to investigate childhood cancers and environmental concerns in the community (please see Update #1, August 1996, at

www.state.nj.us/health/eoh/hhazweb/doverwp.htm). The scope of work greatly expanded over time, and eventually included three site-related Public Health Assessments, an extensive study of the quality of the community water supply, and a case-control epidemiologic study of cancers in children in Dover Township. This Update reviews the findings of the Public Health Assessments of the Reich Farm and Ciba-Geigy Superfund sites and the Dover Township Municipal Landfill, and a Public Health Consultation summarizing the results of the community water supply testing.

Inside

This **Health Care Provider Update** summarizes three Public Health Assessments and one Public Health Consultation which investigated the community's potential exposures to three contaminated sites, as well as the public water supply. These documents are:

- *The Reich Farm Public Health Assessment*
- *The Dover Township Municipal Landfill Public Health Assessment*
- *The Ciba-Geigy Public Health Assessment*
- *The Drinking Water Quality Analyses, March 1996 to June 1999 United Water Toms River Public Health Consultation*

Reich Farm Public Health Assessment

The Reich Farm Public Health Assessment examined site-related contaminant data, collected by state and federal environmental agencies as well as by the NJDHSS and the ATSDR, and evaluated actual and potential human exposures to those contaminants. The final document was released in March 2001.

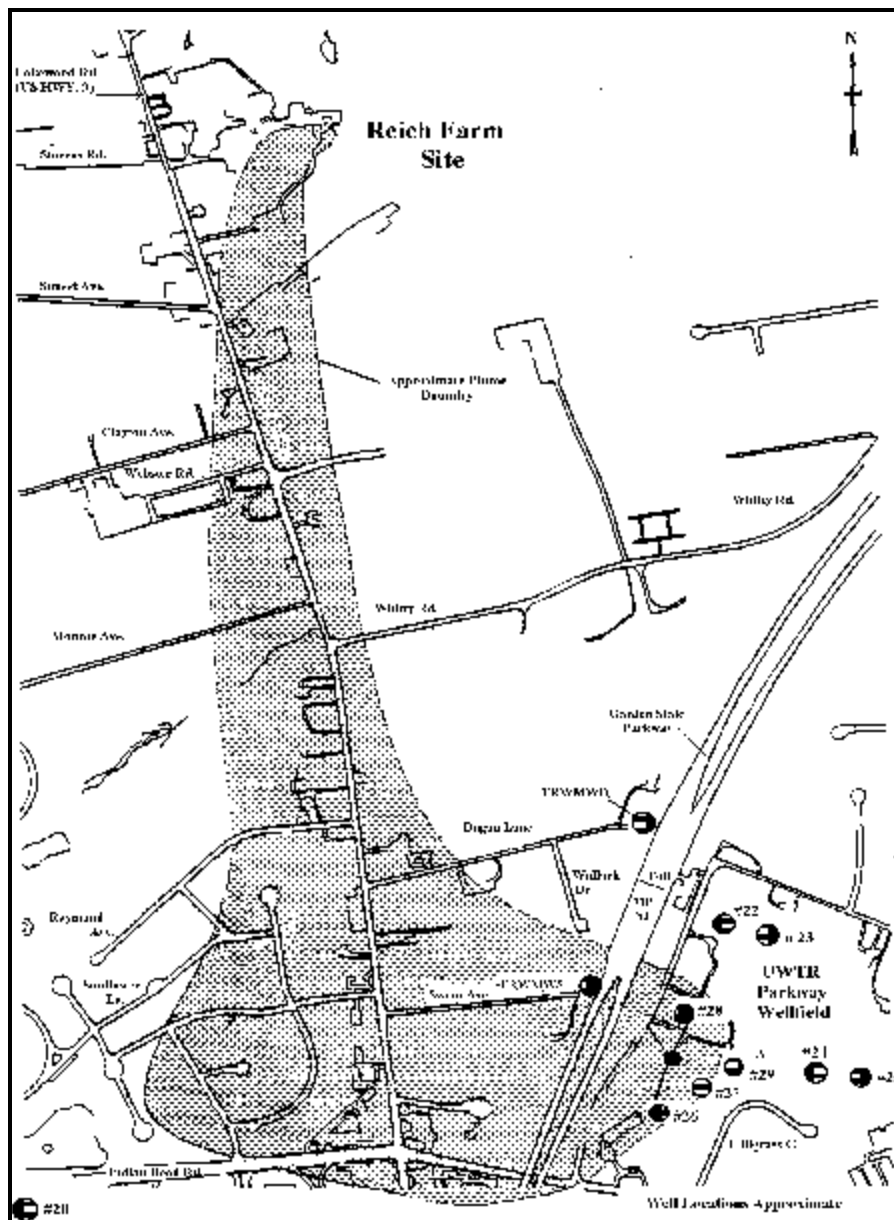
In 1971, over 4,500 drums of chemical waste were illegally dumped at the Reich Farm. This led to local soil contamination and subsequent discharge to groundwater. As early as 1974, organic chemicals were found in water from private wells in Pleasant Plains near the Reich Farm site, as contamination spread away from the site. In 1986, additional private wells in Pleasant Plains and certain community water supply wells about one mile from the site (at the Parkway well field) were found to be contaminated with volatile organic compounds. Contaminants included trichloroethylene, tetrachloroethylene, and others. It is not known with certainty when contaminants from the Reich Farm may have first impacted the Parkway well field.

In 1996, testing of the community water supply revealed the presence of a previously undiscovered contaminant, styrene-acrylonitrile trimer, in several of the wells in the Parkway well field. This compound, which had been present but unidentified in earlier water

quality tests, was one of the chemicals dumped at the Reich Farm site in 1971.

Exposure to Reich Farm-related contaminants has been eliminated or reduced between 1974 and the present through a number of actions required by local, state and federal environmental agencies, including:

- the removal of the 4,500 drums on the Reich Farm property in 1972 and 1974, preventing any additional materials in the drums from entering into the environment;
- the removal of contaminated soil from the site in 1974, and removal and



Reich Farm Groundwater Plume; Adapted From Malcolm Pirnie, 1993.

treatment of additional soils in 1995;

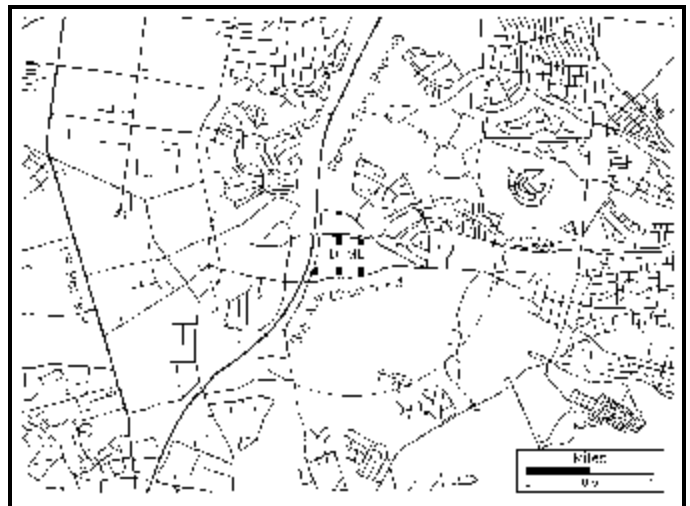
- the sealing of many private wells in the area in 1974 and 1976, and the establishment of a well restriction zone, creating an area in which no new wells could be installed;
- the installation of air strippers on two community water supply wells to remove volatile organic compounds in 1988;
- treatment of water from two Parkway well field wells (#26 and #28) with activated carbon to remove styrene-acrylonitrile trimer beginning in 1996, and treatment of water from two additional wells at the Parkway well field (#22 and #29) beginning in 1999;
- installation of a new well (#26b) which, along with wells #26 and #28, controls the Reich Farm groundwater plume by preventing contaminated water from spreading to other wells.

The Reich Farm Public Health Assessment concluded that the site represented a public health hazard because of past exposures to organic compounds in drinking water. It also concluded that, because of actions taken to interrupt human exposure to site-related contaminants, the site represents no apparent public health hazard at the present time. The NJDHSS and the ATSDR recommended that exposure related to the site be considered in the epidemiologic investigation of childhood cancer, and that monitoring of the groundwater and the effectiveness of treatment systems should be continued.

Dover Township Municipal Landfill Public Health Assessment

The Dover Township Municipal Landfill (DTML) Public Health Assessment examined environmental data related to the landfill. The landfill had accepted municipal and other wastes from 1956 to 1981. In addition, drums of waste from Union Carbide, also dumped at Reich Farm, were deposited at the DTML. Based on community concerns, the DTML Public Health Assessment also reviewed data from an investigation of private wells in the Silverton area of Dover Township (more than one mile east of the landfill). The final document was released in March 2001.

The DTML site contaminated nearby private wells on Silverton Road with volatile organic compounds and lead. The NJDHSS and the ATSDR concluded that residents were exposed in the past to contaminants through use of these wells; for this reason, the DTML represented a public health hazard in the past. In the late 1980s, these wells were sealed. The DTML is considered to represent no apparent public health hazard at present, because there are no known current exposures to contaminated ground water. Groundwater investigations currently



**Dover Township Municipal Landfill (DTML)
and surrounding area**

being conducted by Dover Township will help determine the nature and extent of site-related contamination.

The Silverton area private well contamination is considered to have represented a public health hazard because of past exposures. Water samples from many of the wells contained more than one volatile organic compound at levels well above health comparison levels. Since these wells are no longer in use (as of the early 1980s), the area poses no public health hazard at the present time. A source of the environmental contamination in the Silverton area was never established by the New Jersey Department of Environmental Protection (NJDEP).

The Dover Township Municipal Landfill Public Health Assessment supports the need to consider the potential for exposures discussed in the document in the epidemiologic study of childhood cancer in Dover Township.

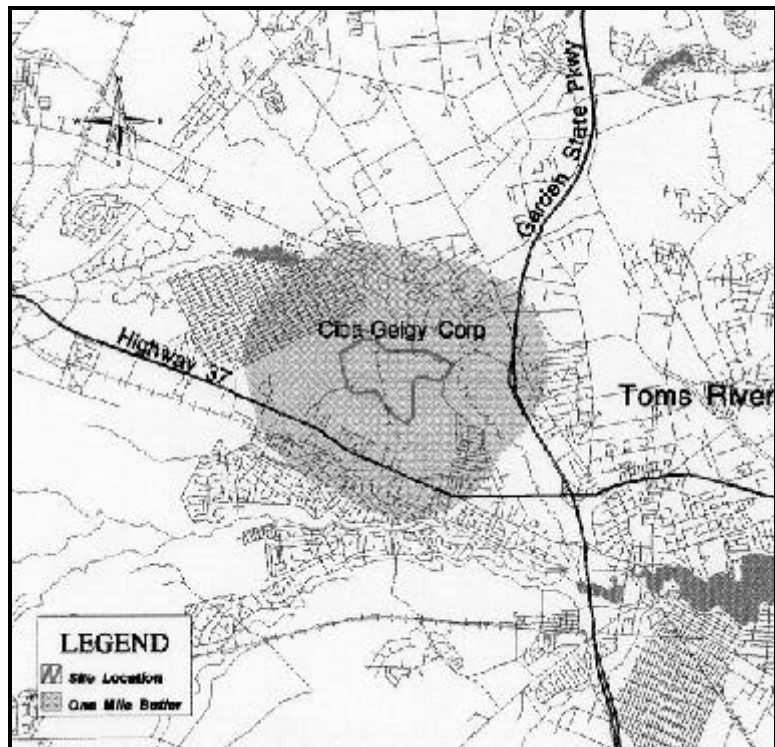
Ciba-Geigy Public Health Assessment

The Ciba-Geigy Public Health Assessment examines the potential for human exposure to contaminants in multiple environmental media. The final document was released in March 2001.

Three shallow wells (of the Holly Street Well Field) were located adjacent to the Toms River downstream from the site. In 1965 and 1966, contaminants relating to the site, including dyes, were detected in water from these wells. These wells were eventually sealed. Community supply wells currently in use are not impacted by the site. In the mid-1980s, volatile organic compounds (VOCs) were found in water samples from several private residential wells

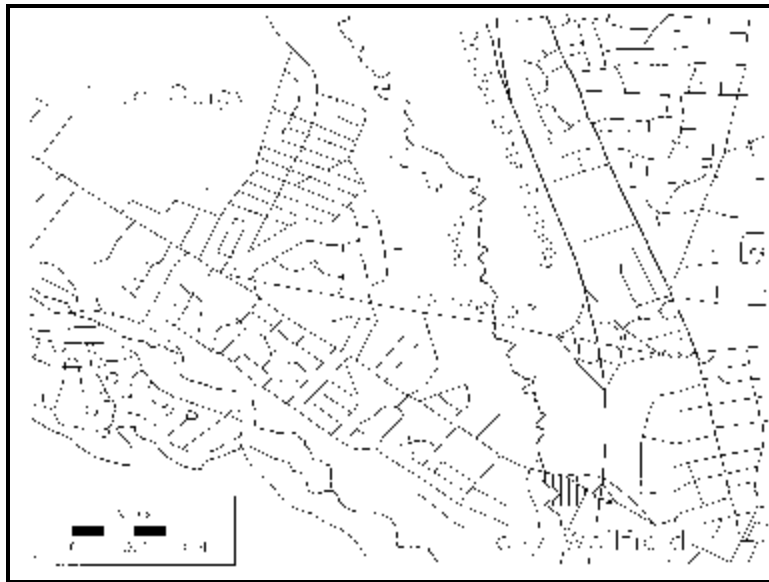
used for irrigation in the vicinity of Cardinal Drive and Oak Ridge Parkway. These wells have been sealed. Presently, no private wells in use are known to be impacted by the site.

From 1966 to 1991, treated wastewater from the Ciba-Geigy plant was discharged to the Atlantic Ocean by way of a ten-mile long pipeline which ran through Dover Township (mostly along Mapletree and Bay Avenues), beneath the Barnegat Bay, and through Ortley Beach, ending approximately 3,500 feet into the ocean. Several pipeline breaks were reported in the mid to late-1980s, resulting in uncontrolled discharges of treated wastewater. Potentially contaminated soils were removed and replaced with clean soils when pipeline breaks were repaired. Samples from private wells along the pipeline were



Ciba-Geigy site and surrounding area

tested for VOCs and heavy metals between 1987 and 1993. No pipeline-related contamination was found, although lead, mercury, and low levels of VOCs were found in several wells. The sources of these substances are uncertain, but they are unlikely



Holly Street wells and Ciba-Geigy site

to be related to pipeline spills.

Off-site air (in the marshlands of Winding River Park) was sampled in 1986. Several VOCs used at Ciba-Geigy were detected at levels above background, including benzene, chlorobenzene, and chloroform.

The NJDHSS and the ATSDR have determined that there was a completed exposure pathway to dyes and other chemicals from the Holly Street well field of the community water supply in the mid-1960s. Although the nature and length of exposures is not known, there is evidence that groundwater from these wells was contaminated with dyes and nitrobenzene. Dye production involved the use of a number of chemicals, including known and probable human carcinogens.

VOCs, including benzene, chloroform, trichloroethylene (TCE), and tetrachloroethylene (PCE) were found in private irrigation wells in the Cardinal Drive/Oak Ridge Parkway area. The health risks associated with these compounds are dependent upon the degree of exposure from these private wells. The contaminants include probable human carcinogens.

The NJDHSS and the ATSDR conclude that the Ciba-Geigy site was a public

health hazard because of past exposures. Current conditions indicate that, although groundwater remains contaminated, exposure through drinking water has been interrupted. With the closure of operations at the plant, the air pathway is interrupted. Also, plant security measures have likely interrupted potential exposures of trespassers to on-site soils. Therefore, the site represents no apparent public health hazard under present conditions. Because on-site source areas remain contaminated, access restriction and remediation of these areas is essential to prevent further contamination of groundwater

and the potential for future human exposure pathways to site-related contaminants.

The Ciba-Geigy Public Health Assessment supports the need to consider the potential for site-related exposures in the epidemiologic study of childhood cancer in this community.

Drinking Water Quality Analyses Public Health Consultation

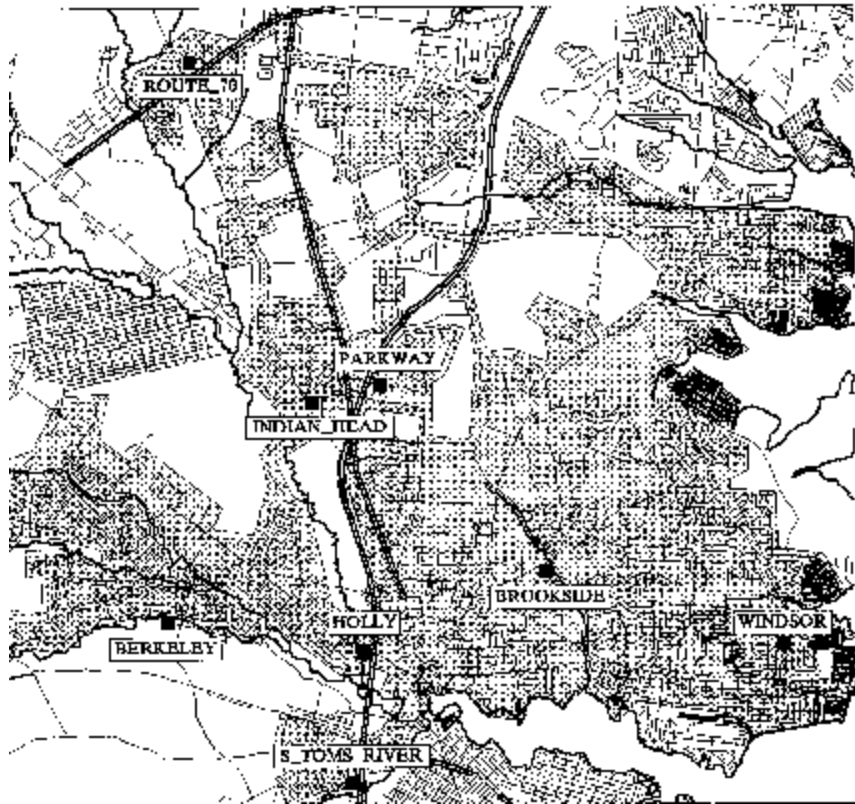
The Drinking Water Quality Analyses Public Health Consultation reviews and summarizes water quality data collected by the NJDHSS, NJDEP and ATSDR during March 1996 to June 1999 from the community water supply. This Public Health Consultation was developed jointly by the NJDHSS, the ATSDR and the New Jersey Department of Environmental Protection. The final document was released in March 2001.

Water was sampled and tested for over 250 chemical and radiological contaminants from 23 wells in the community supply system, 8 points of entry from the wells to the distribution system, and more than 20 locations in the distribution system, including public and private schools in the Toms River area. The

purpose of the evaluation of drinking water quality of the community water supply was to identify whether there are any chemical or radiological characteristics of the water supply that are unique to this system, and, if so, whether these characteristics should be considered in the investigation of childhood cancer in Dover Township.

Several contaminants were detected, including:

- *trichloroethylene, or TCE*, a volatile organic compound, in three supply wells (# 26, #28 and #29 at levels of less than 10 parts per billion) and the point of entry at the Parkway well field. It was also found in several locations in the distribution system at levels of up to 1 part per billion. The Maximum Contaminant Level (MCL) for TCE in drinking water is 1 part per billion. Water from wells #26 and #28 had been treated (by an air stripper) to remove volatile organic compounds during the time these samples were taken. As a result of these analyses, water from well #29 was temporarily diverted through the air stripper. TCE is considered a probable human carcinogen. Epidemiologic studies in other communities have linked TCE in drinking water (at levels many times higher than those found here) to increased incidence of leukemia, but the studies are not conclusive.
- *styrene-acrylonitrile (SAN) trimer*, found in two of the three wells that had TCE (#26 and #28), and sporadically detected in the third (#29). This



Well fields, United Water Toms River system

chemical was characterized in late 1996, and had never before been identified as a contaminant in drinking water. It was also found in several of the distribution system samples. The toxicity of this compound is unknown. Tests are ongoing to learn about its potential health risk. Water from wells #26 and #28 is now being treated and pumped to waste. Water from well #29 and another nearby well (#22) is being treated for this contaminant as a precautionary measure.

- *lead and copper*, found in a number of the first draw school samples (that is, water which is taken from the tap after it has been in contact with the plumbing overnight). Flushed samples (samples taken after the water has been run for a few minutes) are not contaminated. This indicates that the water entering the building is free of lead and copper, but leaches these metals from the plumbing system as the water remains

in contact with the pipes, solder and fixtures. Lead is harmful to a child's developing nervous system. Copper can cause gastrointestinal effects. School officials have been advised to run water for a few minutes each morning before allowing consumption.

- *radiological activity*, detected in a number of distribution samples, four points of entry, and several wells that draw from the shallow Kirkwood-Cohansey aquifer. This naturally occurring radioactivity comes from the decay of radium. Epidemiologic studies have linked exposure to radium in water with increased risk of leukemia in adults, but not children, and with bone cancer in adolescents, although these studies alone do not prove a causal connection.

SAN trimer is a by-product of plastics manufacturing, and is a known contaminant from the Reich Farm site. This unusual chemical is a distinctive characteristic of this water supply. TCE is a contaminant that has been frequently found in water supplies across the country. Lead and copper are often found in first draw samples in buildings with lead solder and copper pipes, particularly in areas where water is naturally corrosive. The natural radiological activity has been found to be widespread in southern New Jersey.

The NJDHSS, the NJDEP and the ATSDR recommend that treatment of water from wells impacted by the Reich Farm contamination be continued until the plume no longer threatens the wells; that the use of wells with higher radiological activity should be minimized; and that schools with elevated lead and copper levels should continue to run water at fountains each morning for a minute or two. The Public Health Consultation also recommends that the NJDHSS consider use of water from specific points of entry in the case-control epidemiologic study of childhood

cancer in Dover Township, as a measure of possible exposure.

Coming in December 2001: Scheduled release of the Public Comment Draft of the *Case-Control Study of Childhood Cancers in Dover Township (Ocean County), New Jersey*

If you would like to read the complete Public Health Assessments or Consultation for these sites, please visit our web site at

www.state.nj.us/health/eoh/hhazweb/dovertwp.htm

Citizens' guides to the documents are also available here, as are the Interim Report on the epidemiologic study, and all previous issues of the Health Care Provider Update series.

Dover Township Childhood Cancer Investigation

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