

**Preliminary**

**Health  
Assessment  
for**

**E.I. DuPont de Nemours and Co., Inc.  
(Montague Plant)  
Muskegon County, Michigan  
CERCLIS No. MID000809640  
March 10, 1989**

Agency for Toxic Substances and Disease Registry  
U.S. Public Health Service

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E.I. DuPont de Nemours and Co., Inc. (Montague Plant)  
Muskegon County, Michigan  
MID000809640  
March 10, 1989**

**Prepared by:  
Center for Environmental Health Sciences (CEHS)  
Michigan Department of Public Health (MDPH)**

**Prepared for:  
Office of Health Assessment  
Agency for Toxic Substances and Disease Registry (ATSDR)**

## **Background**

The E.I. DuPont de Nemours Co., Inc., also known as DuPont, is currently listed on the U.S. Environmental Protection Agency (U.S. EPA) National Priorities List (NPL).

The DuPont site, a petrochemical manufacturing plant, is located in Muskegon County, southwest of the City of Montague. The DuPont company purchased the 1,325 acre property from Union Carbide in 1962. Three main sources of contamination are present: 1) a 15 acre lime waste impoundment, 2) a bury pit and northeast dump area, and 3) a bulk storage and unloading area. The first indication of contamination occurred in 1961 when thiocyanate was discovered in private wells near the site. Fifteen residents were supplied with clean drinking water through replacement wells or connection to the municipal water supply. In 1963 chemical seeps occurred on White Lake Beach (south of the site). Sands became stained due to contact with contaminated groundwater. The company removed the contaminated sands and installed an interceptor well south of the lime pile. In 1964, and on three occasions in 1965, settling ponds overflowed because of a temporary loss of pump capacity. This resulted in the ponding of wastes and staining of surficial soils. The stained soils were removed.

Later in 1965, sludges from a sludge pit spilled into Pierson Creek (west of the site). In 1967, 10,000 pounds of diethylene glycolmonobutylether (DGMB) were spilled. Groundwater was purged following the spill. In 1978, 3,340 gallons of trifluorotrchloroethane were spilled. The affected area was excavated. Groundwater sampling in 1979 revealed carbon tetrachloride, perchloroethylene (PCE), and methyl chloroform at depths of 40-80 feet. A second interceptor well system (two purge wells) was installed south of the organic feedstock unloading area in 1982.

A Consent Agreement was signed between the State and DuPont in May 1986. Extensive hydrogeological investigations have been undertaken by DuPont. Fifty monitoring wells have been installed which are sampled on a quarterly basis. Two purge systems with associated treatment have been installed to capture and treat contaminated groundwater. These wells are sampled and analyzed by DuPont weekly and submitted to the Michigan Department of Natural Resources (MDNR). A removal plan for the lime impoundment has been submitted. The lime removed from the impoundment is being commercially sold and recycled. No state or federal cleanup funds have been allocated to this site.



## **Environmental Contamination and Physical Hazards**

The lime waste impoundment contains approximately 1 million tons of ammonia thiocyanate resulting from the impoundment of a by-product from the manufacture of acetylene. A plume of contaminated groundwater extends southeast of the lime impoundment and has been found to contain a maximum of 900 parts per billion (ppb) thiocyanate, 23 ppb arsenic, and 95 ppb copper.

The bury pit and northeast dump area were historically used for the disposal of waste materials including neoprene tars and latexes in steel drums, copper chloride salts, potassium and ammonium rosinate, potassium hydroxide and inert refuse. The tars and latexes have been slowly decomposing, releasing hydrogen chloride. The bulk storage and unloading area was contaminated with chlorinated solvents such as tetrachloroethylene (TCE), carbon tetrachloride, PCE, and methyl chloroform. Contaminated soils associated with the bury pit and northeast dump area and the bulk storage and unloading area have been removed.

In 1981, as high as 100 ppb carbon tetrachloride were found in a monitoring well and three domestic wells located 1,200 feet from the site. Maximum levels in ppb of the following compounds were detected in downgradient monitoring wells: antimony, 43; arsenic, 31,000; and thiocyanate, 8,700. Effluent samples taken in 1981 revealed 660 ppb thiocyanate discharging to Lake Michigan, exceeding the National Pollution Discharge Elimination System (NPDES) limit of 600 ppb set by the State. Samples taken from groundwater monitoring wells in 1983 revealed a maximum in ppb of the following: arsenic, 44,000; antimony, 30; copper, 180; thiocyanate, 8,700; and carbon tetrachloride, 1,000. This site presents no physical hazards. It is adequately restricted.

## **Potential Environmental and Human Exposure Pathways**

Potential human exposure pathways include ingestion of contaminated groundwater surface water, and biota, dermal contact with contaminated groundwater, surface waters and sediments, and direct contact with contaminated soils, and inhalation of airborne volatiles or particulates.

The site is underlain by lacustrine sand, silt and clay. Depth to groundwater is 40 feet and depth to bedrock is 300 feet. Groundwater flows in a southeast direction from the site. White Lake, which intercepts the groundwater, is located approximately 2,000 feet south of the site and 450 feet from the lime impoundment. It is used for recreational activities including fishing and swimming. Pierson Creek is located approximately 1.4 miles west of the site. Lake Michigan is 1.6 miles west of the site. The City of Montague relies solely on groundwater for its public water supply. The nearest municipal well is located approximately 2.8 miles northeast of the site, but is used only for emergencies. Other municipal wells are located approximately 8 miles upgradient from the site. The nearest private well is approximately 700 feet upgradient from the site.

## **Demographics**

The population within one mile of the DuPont site is approximately 300 persons. The site is located in a rural area with another NPL site (Hooker Chemical) located nearby. Land use surrounding the area consists of recreational, agricultural and residential. The nearest residence is 1,200 feet south of the site. Approximately 3,000 residents receive water from the municipal water supply and 760 residents obtain water from private wells. All private wells within the area are located upgradient from the site.

## **Evaluation and Discussion**

The DuPont site has undergone extensive remedial action. Two purge well systems are currently operating and a plan for the removal of the lime impoundment has been submitted. The lime removed from the impoundment is being commercially sold and recycled. All soils associated with the sources of contamination (other than the lime impoundment) have been removed. Residents along White Lake have been supplied with municipal water and no further contamination of private wells has been reported since 1961. Fifty monitoring wells are currently sampled by DuPont on a quarterly basis and purge wells are sampled weekly. These sample data are submitted to MDNR.

Current data for this site indicate a serious potential health threat is not present at this time. However, should new data become available suggesting a threat to human health is occurring, immediate action will be required. This site has been nominated to be delisted from the NPL.

## **Conclusions and Recommendations**

This site is of potential public health concern because of the risk to human health that could result from possible exposure to hazardous substances at levels that may result in adverse health effects over time. As noted above in the **Environmental Contamination and Physical Hazards and Potential Environmental and Human Exposure Pathways** sections, human exposure to the contaminants mentioned have occurred in the past and may occur via ingestion, direct contact, and inhalation.

It is strongly recommended that all private wells within one mile of the DuPont site be identified and monitored continuously to determine the potential for exposure through ingestion, inhalation and direct contact with contaminated groundwater. It is also recommended that surface water and sediment sampling of White Lake and Pierson Creek be conducted to determine the potential for exposure to contaminants in the water, sediments, and biota. Further characterization of the size and movement of the contaminant plume is recommended to assess future potential exposure pathways. Continued monitoring of groundwater contaminants is recommended to determine the effectiveness of the groundwater treatment system.

In accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as amended, the DuPont site has been evaluated for appropriate follow-up with respect to health effects studies. Although there are indications that human exposure to on-site and off-site contaminants has previously occurred, this site is not being considered for follow-up studies at this time because documented exposures were few and considered of short-term duration.

### **Sources:**

DuPont-montague Works, Hydrogeological Survey, 1981  
Preliminary Assessment 3/83  
Site Inspection 9/83  
Hazard Ranking Sheet 6/84  
Roger Pryzbyz, MDNR Site Manager  
Ted Baran, Muskegon County Health Department

Prepared by: Connie K. Jendralski, Student Aide IV



## **THE ATSDR HEALTH ASSESSMENT: A NOTE OF EXPLANATION**

Section 104(i)(7)(A) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended, states "...the term 'health assessment' shall include preliminary assessments of potential risks to human health posed by individual sites and facilities, based on such factors as the nature and extent of contamination, the existence of potential pathways of human exposure (including ground or surface water contamination, air emissions, and food chain contamination), the size and potential susceptibility of the community within the likely pathways of exposure, the comparison of expected human exposure levels to the short-term and long-term health effects associated with identified hazardous substances and any available recommended exposure or tolerance limits for such hazardous substances, and the comparison of existing morbidity and mortality data on diseases that may be associated with the observed levels of exposure. The Administrator of ATSDR shall use appropriate data, risk assessments, risk evaluations and studies available from the Administrator of EPA."

In accordance with the CERCLA section cited, ATSDR has conducted this preliminary health assessment on the data in site summary form. Additional health assessments may be conducted for this site as more information becomes available to ATSDR.

### **Introduction**

An ATSDR Health Assessment is an evaluation of data and information on the release of hazardous substances into the environment. These assessments, one for each of the National Priorities List toxic waste sites, have been mandated by the Superfund law in order to accomplish several objectives. Among these objectives are: 1.) To assess any current or future impacts on public health, 2.) To develop health advisories or other health recommendations and 3.) To identify actions, including studies, that are needed to either mitigate and evaluate human health effects, or to prevent them from occurring.

A health assessment for a facility or a particular release of substances consists of the evaluation and interpretation of available information and analytical data. The process is iterative, that is, the assessment constantly builds upon existing material and is subject to change as more information and data become available. The assessment process does not wait for completion of all possible studies relevant to a site but instead builds a report based on the best available information from all relevant sources and distributes it in a timely manner.

New information provided by the public following their review of this document will be taken into consideration during preparation of any subsequent updated assessments for the site. Such information can be sent to:

**Michigan Department of Public Health  
Center for Environmental Health Sciences  
3500 N. Logan, P.O. Box 30035  
Lansing, Michigan 48909**

Note: The sentence on the second page, "The lime waste impoundment contains approximately 1 million tons of ammonia thiocyanate resulting from the impoundment of a by-product from the manufacture of acetylene", was later determined by Chemours/DuPont to be in error. Rather, the "1 million tons" is said to refer to the entire lime pile, within which trace amounts of thiocyanate were present..