

# Health Assessment for

DOVER MUNICIPAL WELL 4

CERCLIS NO. NJD980654131

DOVER, NEW JERSEY

JUN 20 1990

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

## THE ATSDR HEALTH ASSESSMENT: A NOTE OF EXPLANATION

Section 104(1)(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, this Health Assessment has been conducted using available data. Additional Health Assessments may be conducted for this site as more information becomes available.

The conclusions and recommendations presented in this Health Assessment are the result of site specific analyses and are not to be cited or quoted for other evaluations or Health Assessments.

**HEALTH ASSESSMENT  
DOVER MUNICIPAL WELL 4  
MORRIS COUNTY  
DOVER, NEW JERSEY**

Prepared by:  
Division of Science and Research  
New Jersey Department of Environmental Protection (NJDEP)  
and  
Environmental Health Service  
New Jersey Department of Health (NJDOH)

Prepared for:  
Agency for Toxic Substances and Disease Registry (ATSDR)

**BACKGROUND**

Dover Municipal Well 4 (DMW 4) is listed by the United States Environmental Protection Agency (EPA) on the National Priorities List (NPL). DMW 4 was one of the town's primary water supply wells, and was shut down in September 1980 after groundwater samplings showed elevated concentrations of volatile organic compounds (VOCs). The town now uses three other wells which have been routinely monitored. DMW 4 is located on Rutan Drive, Dover Township, Morris County, New Jersey. It is situated in the Rockaway River Valley, approximately 450 feet north of the River. The well served a population of 22,000 within a 3-mile radius. There are residences and commercial and industrial operations closely surrounding the site.

NJDEP undertook a Remedial Investigation/Feasibility Study (RI/FS) in 1986. The RI initially identified 54 commercial operations surrounding the site as potentially responsible parties (PRPs) for sources of contamination.

**COMMUNITY CONCERNS**

Contact with the Health Officer of the Town of Dover, the NJDEP Community Relations Coordinator, and review of the NJDEP Community Relations Plan revealed a limited level of community concern regarding this site. A public meeting addressing water quality was conducted in adjoining Rockaway Township with Dover municipal officials representing the community. Research failed to identify any community or civic groups concerned with site mitigation.

## ENVIRONMENTAL CONTAMINATION AND PHYSICAL HAZARDS

### A. On-site Contamination

The VOCs are the only contaminants detected at the site to date. NJDEP performed two groundwater samplings from DMW 4 in 1980 (7/14/80 and 9/3/80). The levels of VOCs detected from 1980 samplings are presented in Table I.

Table I. VOC Levels in Groundwater Taken from DMW #4 (in ppb)

	Sampling Dates	
	7/14/80	9/3/80
Methylene Chloride	N.D.	6.0
Trichloroethylene	2.0	2.0
Tetrachloroethylene	115.0	122.0
1,1,1-Trichloroethane	86.0	118.0
1,2-Dichloroethylene	N.D.	9.4

N.D. = Not detected

Prior to 1985, any single VOC level exceeding 50 ppb or the total VOC levels exceeding 100 ppb was considered unacceptable. Based on this standard, the well was closed in 1980. The New Jersey Maximum Contaminant Levels (MCLs) for trichloroethylene, tetrachloroethylene, 1,1,1-trichloroethane, and 1,2-dichloroethylene are 1, 1, 26, and 10 ug/l, respectively (New Jersey Safe Drinking Water Act, 1989). The DMW 4 remains closed based on these new standards.

Methylene chloride is commonly associated with laboratory and sampling procedures. The presence of methylene chloride in the groundwater sample taken in September, 1980 might have been a laboratory artifact (NJDEP Technical Coordinator, 1988).

Soil and air sampling data for the area surrounding the DMW 4 are not available. However, based on the site visit as well as the information provided by the site technical coordinator (NJDEP Technical Coordinator, 1988), there does not appear to be any indication of soil or air contamination near Well #4. Soil and air samples may be needed after the source of the contamination is identified.

## B. Off-site Contamination

The Rockaway River flows through the area and is located about 450 feet south of DMW 4. Groundwater in the upper aquifer flows towards the Rockaway River. Since DMW 4 contamination is in the lower aquifer which does not discharge to the River, contamination detected in DMW 4 does not have any direct impact on the River. It is possible that the source of the contamination impacts the quality of the River. However, due to the volatile nature of the contaminants of concern and the dilution by the River, river contamination is not likely to be a major concern.

## C. Quality Assurance/Quality Control

Since the groundwater samples from DWM 4 were taken in 1980, quality assurance/quality control (QA/QC) guidelines that are used today probably were not employed. Since much of the health assessment is based on this data, the quality of the data impacts upon the confidence that one has in the health assessment. Information regarding QA/QC reviews that may have taken place in the past is being sought. If such information exists and is found, it will be added to the health assessment.

## D. Physical Hazards

There do not appear to be any physical hazards present at this site based on the site visit.

## **POTENTIAL ENVIRONMENTAL AND HUMAN EXPOSURE PATHWAYS**

### A. Environmental Pathways

Groundwater is the primary medium in which the contamination has been detected. To date, exposure pathways relating to groundwater use are the only identifiable pathways. When and if a source of the contamination is identified, other potential environmental and human exposure pathways will be addressed.

### B. Human Exposure Pathways

DMW 4 began service in 1965 and was closed in 1980. However, the opportunity for human exposure to contaminated groundwater may have occurred between 1965 and 1980. Potential human exposures may have included ingestion of the VOC-contaminated well water, dermal absorption and/or inhalation from activities such as cleaning or showering which can result in inhalation exposure to contaminants secondary to contaminant volatilization from well water during such uses.

In the past, other human exposure could have resulted from using contaminated well water for home garden irrigation. Possible exposure routes could have included ingestion of contaminated crops and ingestion of contaminated soils by children. However, using well water which contained low levels of VOCs for irrigation is unlikely to result in VOCs in the soil at levels of health concern.

#### **DEMOGRAPHICS**

The Town of Dover currently has three wells which serve a population of 22,000. A Conrail railroad spur, which terminates in Rockaway Township, passes 30 feet to the south of DMW 4. The nearest school is 2,000 feet northwest of the site. In addition, there are nursing homes, hospitals, parks, and playgrounds in the area.

Most of the Town of Dover is residential. However, DMW 4 is located in the middle of a mixed commercial and industrial section of the town. Fifty-four industries which might use chlorinated solvents are located within a 3,000 foot radius of DMW 4.

#### **PUBLIC HEALTH IMPLICATIONS**

The groundwater sampling from DMW 4 revealed that the well had been contaminated with trichloroethylene, tetrachloroethylene, and 1,1,1-trichloroethane (NJDEP, 1987). These three compounds are widely used industrial solvents in dry cleaning and vapor degreasing of metals.

Sampling data on VOCs from DMW 4 prior to 1980 is not available. Although there is a potential for human exposure to VOCs prior to 1980, health effects are difficult to assess because of the lack of monitoring and exposure data. Currently, Well #4 will not be of a concern as long as it remains closed.

The town now uses three other wells which are upgradient from the study area and have been routinely monitored pursuant to the New Jersey Safe Drinking Water Act. Tetrachloroethylene, trichloroethylene and 1,1,1-trichloroethane have been detected in the water samples. Concentrations of tetrachloroethylene and trichloroethylene have exceeded the New Jersey MCLs (1 ppb) for these compounds. Concentrations that have been detected are presented in Table II. Although the wells are upgradient from DMW 4, the source of the contamination has not been clearly identified.

**Table II - VOC Concentrations in Public Supply Well & at Taps**

Compound	Concentration (in ppb)	Date	Location of Sample
Tetrachloroethylene	2.6	8/17/89	Tap
	6	6/19/86	Well #5
	1	6/19/86	Well #3
	8	4/11/86	Well #5
Trichloroethylene	1.1	8/17/89	Tap
	9	11/17/88	Tap
1,1,1-Tetrachloroethane	3.8	8/17/89	Tap
	9	11/17/88	Tap

### **CONCLUSIONS AND RECOMMENDATIONS**

On the basis of the information reviewed, the Dover Municipal Well 4 site is a potential public health concern because people have been exposed and may be exposed to halogenated organic volatile compounds at concentrations that may result in adverse health effects. As noted in the potential environmental and human exposure pathways section, human exposure has occurred via use of contaminated ground water. The DMW 4 was shown to have been contaminated with trichloroethylene, tetrachloroethylene and 1,1,1-trichloroethane and was closed in 1980. Since the well is out of service, it does not currently pose a threat to the Dover residents. However, the possibility exists that Dover residents had previously been exposed to these halogenated organic volatile compounds. It is unlikely that exposure resulted in any acute health effects. However, chronic health effects of VOC exposures include central nervous system depression, cardiovascular disease sensitization, neurobehavioral deficits, liver damage, and a possibility of carcinogenesis. The appearance and intensity of these effects are dependent upon dose and duration of exposure.

Until the groundwater aquifer is remediated, DMW 4 should remain closed. The three other wells providing drinking water sources for the Dover residents have been routinely monitored, as required by NJDEP. The monitoring data revealed levels of tetrachloroethylene and trichloroethylene exceeding the New Jersey MCLs. Periodic monitoring of these wells is recommended to insure that contaminant concentrations are not increasing.

NJDEP is currently investigating the neighboring industrial and commercial operations as the potential sources of contamination. To fill in environmental data gaps, the source of the contamination needs to be identified and sampled.

In accordance with CERCLA as amended, the Dover Municipal Well 4 site has been evaluated for appropriate follow-up with respect to health effects studies. Since human exposure to on-site and off-site contaminants has occurred in the past, this site is being considered for follow-up health studies. The site will be considered by NJDOH for inclusion in a larger scale epidemiological study of VOC's in drinking water. After consultation with Regional EPA staff and State and Local Health and Environmental Officials, the Division of Health Studies, ATSDR and NJDOH, will determine if the inclusion of Dover Municipal Well 4 site in a larger scale epidemiological study or any other follow-up public health actions or studies are appropriate for this site.

This Health Assessment was prepared by the State of New Jersey, Departments of Health and Environmental Protection, under a Cooperative Agreement with the Agency for Toxic Substances and Disease Registry. The Division of Health Assessment and Consultation and the Division of Health Studies of ATSDR have reviewed this Health Assessment and concurred with its findings.



## REFERENCES

A-280 Sampling. 1986. NJDEP, Division of Water Resources.

NJDEP. 1987. Phase I of Remedial Investigation Report. Dover Municipal Well #4, Dover, New Jersey. NJDEP, Hazardous Site Mitigation.

NJDEP Technical Coordinator, 1988. Personal Communication. NJDEP, Division of Hazardous Site Mitigation.

New Jersey Safe Drinking Water Act (N.J.A.C. 7:10-16.7), 1987.