

**HEALTH CONSULTATION**

**TABERNACLE DRUM DUMP**

**TABERNACLE TOWNSHIP, BURLINGTON COUNTY, NEW JERSEY**

**CERCLIS NO. NJD980761357**

**September 19, 1995**

**Prepared by:**

**New Jersey Department of Health  
Environmental Health Service**

**Under Cooperative Agreement with the  
Agency for Toxic Substances and Disease Registry**

## **BACKGROUND AND STATEMENT OF ISSUES**

This health consultation is being performed to evaluate the possible exposure to lead through the pathway of ingestion of contaminated private potable well water in the vicinity of Tabernacle Drum Dump (TDD) site. The exposure to lead contamination evaluated in this consultation was considered potentially significant by the New Jersey Department Of Health (NJDOH) and the Agency for Toxic Substances and Disease Registry (ATSDR) in the Site Review and Update report of 1993. However, it could not be determined whether ongoing lead exposure via ingestion pathway in the vicinity of TDD is site-related or not.

ATSDR completed a Preliminary Health Assessment for the TDD site in October 1988, which categorized the site as a potential public health concern based on the possibility of human exposure pathways associated with exposure to contaminated groundwater and soil. Contaminants of concern at the TDD site consisted of 1,1,1-trichloroethane (TCA), 1,1-dichloroethene (DCE), chromium, cadmium, and lead in the groundwater. Residents had expressed concern about the impact of the site on their private potable well water.

In July 1993, NJDOH conducted a site visit and completed a SRU report. Based on current site conditions, the report categorized the site as an indeterminate public health hazard. While no current human exposures to TCA and DCE were occurring via ingestion pathway above health-based criteria, it was noted that the lead was detected in one well above USEPA's Action Level of 15 ug/l. Lead was detected in seven out of twenty two samples collected from private potable well waters, however, it could not be determined whether ongoing lead exposure via ingestion pathway is site-related or not.

The 1993 SRU report recommended that a Public Health Consultation should be conducted to evaluate the ongoing lead exposure via ingestion of contaminated groundwater from private potable wells in the vicinity of TDD site when additional information becomes available. The human exposure pathway of concern identified in the 1993 SRU report was the ingestion of contaminated private potable well water.

The TDD site originated on a wooded, one-acre parcel of undeveloped land located on Carranza Road in Tabernacle Township, Burlington County, New Jersey (Figure 1). The site is bordered to the northwest by farmland and to the south and east by residential properties. In a one-time dumping incident in the summer of 1976 or 1977, approximately 200 containers of solvents, paint, and paint sludges were deposited on a 2,000 square foot portion of the property (Figure 2). Land use in the area consists mainly of woodland, bogs, agriculture (including cranberry and blueberry farming). In August 1982, the Burlington County Health Department (BCHD) conducted a site visit of Tabernacle Drum Dump in response to a referral from Tabernacle Township officials, discovering abandoned drums.

The New Jersey Department of Environmental Protection (NJDEP) conducted a site investigation of the site in October 1982. Soil sampling detected carbon tetrachloride, benzene, toluene, ethylbenzene, xylenes, chromium, and lead.

In November 1982, the BCHD sampled private potable water wells in the area (approximately 25). Levels of contamination were measured below the drinking water standard at that time.

The site was placed on the National Priorities List (NPL) in 1984 by the U.S. Environmental Protection Agency (EPA). The USEPA issued, in February 1984, an Administrative Order (AO) to perform a surface cleanup of the site, to install monitoring wells, and to sample and analyze surface and subsurface soil. In July 1984, one of the potentially responsible parties (PRPs) removed the containers, 40 yards of drummed materials, 8 truckloads of excavated soil, and approximately 3,000 gallons of liquid material.

In July 1985, the USEPA conducted a Remedial Investigation (RI) at the Tabernacle Drum Dump site. The Remedial Investigation and Feasibility Study was completed in June 1988. The RI report identified contamination of soil and groundwater at the site. The contaminants of concern in groundwater were identified as cadmium, chromium, lead, 1,1,1-trichloroethane (TCA) and 1,1-dichloroethene (DCE). Subsequent to the RI, there has been additional residential well sampling in October 1989, June 1990, November 1990, and August 1991. An additional groundwater and soil investigation was conducted in 1991.

In May 1992, the Remedial Design Investigation Report for the Tabernacle Drum Dump site was completed. The remediation system design was approved by the EPA in September 1992. In February 1993, the construction of the air stripper system was initiated and was completed by July 1993.

On August 30, 1993, the groundwater extraction, treatment, and injection system was turned-on. The most recent private potable well water sampling was conducted on March 22, 1994. Thirteen well water samples were collected from resident's homes and analyzed for organic and inorganic compounds. Lead was detected in four well water samples (3.2, 4.2, 4.9 and 5.4 ppb). Only one well showed 1,1,1-trichloroethane (TCA), a known site related contaminant at a concentration of 0.6 ppb, substantially below the State of New Jersey drinking water standard for TCA; 26 ppb.

On September 8, 1994, James Pasqualo and N.P. Singh of the New Jersey Department of Health (NJDOH) visited the Tabernacle Drum Dump site accompanied by a representative of the Burlington County Health Department. The following observations were made and information obtained during the site visit:

1. The legal boundary of the site now extends onto Block 1402, Lot 5 from the original site of drum dumping Block 1202, Lot 22. The groundwater contaminant plume traveled from the original dump location to Block 1402, Lot 5.
2. The wooded area has been partially cleared for installation of an air stripper system. At the time of the site visit, the construction of the air stripping system was complete. The air stripper system was also fenced and posted with signs reading "No Trespassing" and "Hazardous Site".

3. Several groundwater extraction pumps were also seen at this location. The air-striper was in operation.

Conditions at the site, since the 1993 SRU, have not changed physically. Additional site data is now available, further characterizing the contamination at the site. The most recent sampling of residential water wells was done in March 1994. The samples were analyzed for organic and inorganic compounds.

## DISCUSSION

Based on the RI and Remedial Design Investigation, site-related contamination is present in groundwater. Groundwater remains as the primary medium of concern because groundwater in the area is the only viable source of drinking water for the local community. Contaminated groundwater (the plume) was found to be migrating southeast of the original dump location, in the direction of private potable wells utilized by residents on Carranza Road. The plume is predominantly comprised of TCA and DCE. The present plume location is approximately 3,000 feet southeast of the original dump location. Plume migration has been stopped by a hydraulic barrier created by the remediation system's extraction and injection wells. The plume is being extracted and treated by air stripping, which removes the volatile organic compounds.

Land in the area is used primarily for agriculture and recreation. Approximately 75 to 100 residents living within a one-mile radius of the site are dependent on groundwater wells for potable and agricultural purposes.

Private potable wells in the vicinity of the TDD site have been periodically sampled for site related contamination by various agencies: BCHD in 1982, NJDEPE in 1982, USEPA in 1989, 1990, 1991 and most recently in March 1994.

On August 26 and 27, 1991 twenty-two well water samples were collected from resident's homes and analyzed for organic and inorganic compounds. Each organic compound detected in well water was below the Federal as well as New Jersey drinking water standards. Lead was detected in seven out of twenty two samples collected, only one well showed contamination with lead above USEPA's Action Level of 15 ug/l which were in place at the time. However, it could not be determined at that time whether this lead contamination of well water was site-related.

The most recent private potable well water sampling was conducted on March 22, 1994. Thirteen well water samples were collected from resident's homes and analyzed for organic and inorganic compounds. Lead was detected in four out of thirteen samples collected at concentrations of 3.2, 4.2, 4.9 and 5.4 ppb which were all below USEPA's Action Level of 15 ug/l. However, currently an Maximum Contaminant Level Goal (MCLG) of 0 ppb has been established for lead in drinking water. The MCLG is the concentration of a contaminant that

a person can drink safely over a lifetime. It is based entirely on health considerations and, as a health goal, is set at a level where no adverse health effects should occur. Based on the results of this well water sampling, human exposure to lead is occurring via ingestion of well water.

Based upon the continued monitoring, the contaminated groundwater plume was found to be migrating southeast of the original dump location, in the direction of private potable wells utilized by residents on Carranza Road. The plume is predominantly comprised of 1,1,1-trichloroethane (TCA) and 1,1-dichloroethene (DCE). The present plume location is approximately 3,000 feet southeast of the original dump location. The lead contamination could not be site related as the plume migration towards the direction of private potable wells utilized by residents on Carranza Road has been stopped by a hydraulic barrier created by the remediation system's extraction and injection wells. Furthermore, the exposure to lead contamination evaluated in this consultation could not be site related as contaminated groundwater plume has never reached the private potable wells utilized by residents on Carranza Road.

To determine whether residents are exposed to contaminants, NJDOH evaluates the environmental and human components that lead to human exposure. This pathways analysis consists of five elements:(1) a source of contamination;(2) transport through an environmental medium;(3) a point of human exposure;(4) route of human exposure; and (5) an exposed population.

NJDOH classifies exposure pathways into three groups: (1) "completed pathways", that is, those in which exposure has occurred, is occurring, or will occur; (2) "potential pathways", that is, those in which exposure might have occurred, may be occurring, or may yet occur; and (3) "eliminated pathways", that is, those that can be eliminated from further analysis because one of the five elements is missing and will never be present, or in which no contaminants of concern can be identified. There is a completed exposure pathway at TDD site via ingestion of contaminated private potable well water. However, it is not site related based upon the continued monitoring of the contaminated groundwater plume.

In this section, NJDOH will discuss the health effects in persons exposed to specific contaminants. To evaluate health effects, ATSDR has developed a Minimal Risk Level (MRL) for contaminants commonly found at hazardous waste sites. The MRL is an estimate of daily human exposure to a contaminant below which non-cancer, adverse health effects are unlikely to occur. MRLs are developed for each route of exposure, such as ingestion and inhalation, and for the length of exposure, such as acute (less than 14 days), intermediate (15 to 364 days), and chronic (greater than 365 days). ATSDR presents these MRLs in the Toxicological Profiles. These chemical-specific profiles provide information on health effects, environmental transport, human exposure, and regulatory status. In the following discussion, NJDOH used ATSDR Toxicological Profiles for the contaminants of concern at the site. The NJDOH will use a USEPA Reference Dose (RfD) as a health guideline, when a MRL is not available. The RfD is an estimate of daily human exposure of a contaminant for a lifetime below which (non-cancer) health effects are unlikely to occur.

## Private Potable Well Pathways

The toxicological evaluation of the completed exposure pathway at the TDD site is based upon private potable well sampling and analysis for lead in 1991 and 1994 for the ingestion pathway. Exposure to most residents near the TDD site would likely have occurred during the period from 1977 to 1994. Exposure dose calculations are based upon the maximum concentrations detected, thus representing a worse case exposure scenario. Table #1 reports the maximum concentration detected in private potable wells in 1991 and 1994.

Table #1 - Potable Well Contamination (lead); TDD Site.

Year	Frequency	Maximum Conc.	EED mg/kg/day	MRL/RfD mg/kg/day
1991	7/22	17 ppb	.0003	N/A
1994	4/13	5.4 ppb	.0001	N/A

EED = Estimated exposure dose; 1 liter/day per 10 kg child.

MRL = Minimal Risk Level; chronic exposure.

N/A = Not Available

## LEAD

Site data indicate that exposure to lead may have occurred among residents in the vicinity of TDD site through the groundwater ingestion pathway. There is no current chronic oral MRL or RfD available for lead to evaluate the potential for non-cancer health effects. However, Estimated Exposure Doses (EED) calculated from the maximum reported concentration of lead in private potable wells near the site were below the No Observed Adverse Effects Level (NOAEL) for animal studies presented in the ATSDR Toxicological Profile for lead. At such concentrations, it is unlikely that non-carcinogenic adverse health effects would occur. Lead is considered a probable human carcinogen (inadequate human, sufficient animal studies) by USEPA. Currently, no cancer slope factor exists to determine the lifetime excess cancer risks associated with lead ingestion exposures.

The ATSDR/NJDOH have not identified any additional community health concerns associated with site related contaminants.

## CONCLUSIONS

1. Based on the Remedial Investigation, site-related contamination is present only in groundwater. Based upon current data and information, the TDD site is evaluated by the ATSDR and the NJDOH to present no apparent public health concern. The former

conclusion that the site presents an indeterminate public health concern has been reevaluated and revised. Currently, ingestion of contaminated groundwater remains a completed and potential human exposure pathway associated with the TDD site, however, the most recent private potable well water sampling results showed the presence of site related contaminants at levels which does not constitute a public health concern.

2. Current data indicate that at least four potable wells may be experiencing lead contamination. It has been clearly established that the lead contamination is not site related. Maximum concentration of lead detected by USEPA in private potable well water in the vicinity of TDD site represents exposure doses for children and adults, that were below levels where adverse health effects would be likely. It should be noted that exposure dose calculations were based upon the maximum reported concentration of lead in residential well water, and thus represent a worst case exposure scenario. Estimated exposure doses for lead are below the No Observed Adverse Effect Level (NOAEL) cited in the ATSDR Toxicological Profile for Lead. Currently, no cancer slope factor exists to determine the lifetime excess cancer risks associated with lead ingestion exposures.
3. In the past, residents raised concerns regarding exposure to contaminated private potable well water. These community concerns have been alleviated by the installation of the air stripper system and periodic monitoring of the private potable wells in the vicinity of the TDD site.

## **RECOMMENDATIONS**

After a review of the most recent documents and the current site conditions for the Tabernacle Drum Dump, the ATSDR and the NJDOH have determined that exposure to the contaminated groundwater at the levels most recently detected do not constitute a public health concern. However, monitoring of the private residential wells should continue as it does show other site related contaminants at low levels, that may increase to a level of public health concern.

Those residences where potable well contamination has been identified in past or future sampling events should receive health education identifying the potential health risk associated with continued use.

New environmental, toxicological, health outcome data, may determine the need for additional actions at Tabernacle Drum Dump site.

## **RECOMMENDATIONS OF THE HEALTH ACTIVITIES RECOMMENDATIONS PANEL**

The data and information developed in this Public Health Consultation have been evaluated to determine whether HARP follow-up actions may be indicated by ATSDR's Health Activities Recommendation Panel (HARP). No HARP evaluation is indicated at this time.

## **PUBLIC HEALTH ACTION PLAN (PHAP)**

The Public Health Action Plan (PHAP) for the Tabernacle Drum Dump site contains a description of the actions to be taken by ATSDR and/or NJDOH at or in the vicinity of the site subsequent to the completion of this Consultation. The purpose of the PHAP is to ensure that this consultation not only identifies public health hazards, but provides a plan of action designed to mitigate and prevent adverse human health effects resulting from exposure to hazardous substances in the environment. Included, is a commitment on the part of ATSDR/NJDOH to follow up on this plan to ensure that it is implemented. The public health actions to be implemented by ATSDR/NJDOH are as follows:

### **Public Health Actions Taken:**

1. Environmental data and proposed remedial activities have been evaluated within the context of human exposure pathways and relevant public health issues.

### **Public Health Actions Planned:**

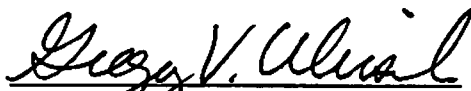
1. The NJDOH will contact the Burlington County Health Department and provide a copy of this Consultation. In addition, the NJDOH will recommend that residents showing elevated levels of lead in their private wells receive educational materials regarding the risks of ingesting lead in drinking water.
2. ATSDR will provide an annual follow up to this PHAP, outlining the actions completed and those in progress. This report will be placed in repositories that contain copies of this health consultation, and will be provided to persons who request it.

ATSDR will reevaluate and expand the Public Health Action Plan (PHAP) when needed. New environmental, toxicological, health outcome data, or the results of implementing the above proposed actions may determine the need for additional actions at this site.



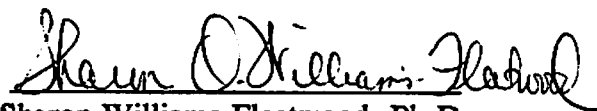
## CERTIFICATION

This Health Consultation was prepared by the New Jersey Department of Health under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures existing at the time the health consultation was begun.



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Division of Health Assessment and Consultation (DHAC)  
ATSDR

The Division of Health Assessment and Consultation, ATSDR, has reviewed this health consultation, and concurs with its findings.



Sharon Williams-Fleetwood, Ph.D.  
Chief, SSAB, DHAC, ATSDR

## **DOCUMENTS REVIEWED**

1. **Tabernacle Drum Dump Residential Well Sampling Report, Tabernacle Township, Burlington County, New Jersey. USEPA. June 1992.**
2. **Waste Technology, Inc., Remedial Design Investigation Report for the Tabernacle Drum Dump Site, Tabernacle Township, Burlington County, New Jersey. May 1992.**
3. **Health Assessment for the Tabernacle Drum Dump Site, Tabernacle Township, Burlington County, New Jersey. ATSDR. October 1988.**
4. **Record of Decision, Tabernacle Drum Dump Site, Tabernacle Township, Burlington County, New Jersey. USEPA. June 30, 1988.**
5. **CDM, Inc., Draft Remedial Investigation Report for the Tabernacle Drum Dump Site, Tabernacle Township, Burlington County, New Jersey. May 1987.**
6. **Tabernacle Drum Dump Residential Well Sampling Report, Tabernacle Drum Dump Site, Tabernacle Township, Burlington County, New Jersey. USEPA. July 1994.**
7. **USEPA, Remedial Action Report, Tabernacle Drum Dump Site, Tabernacle Township, Burlington County, New Jersey. March 1994.**

## **INTERVIEWS/PERSONAL COMMUNICATIONS:**

1. **Emergency & Remedial Response Division/USEPA:  
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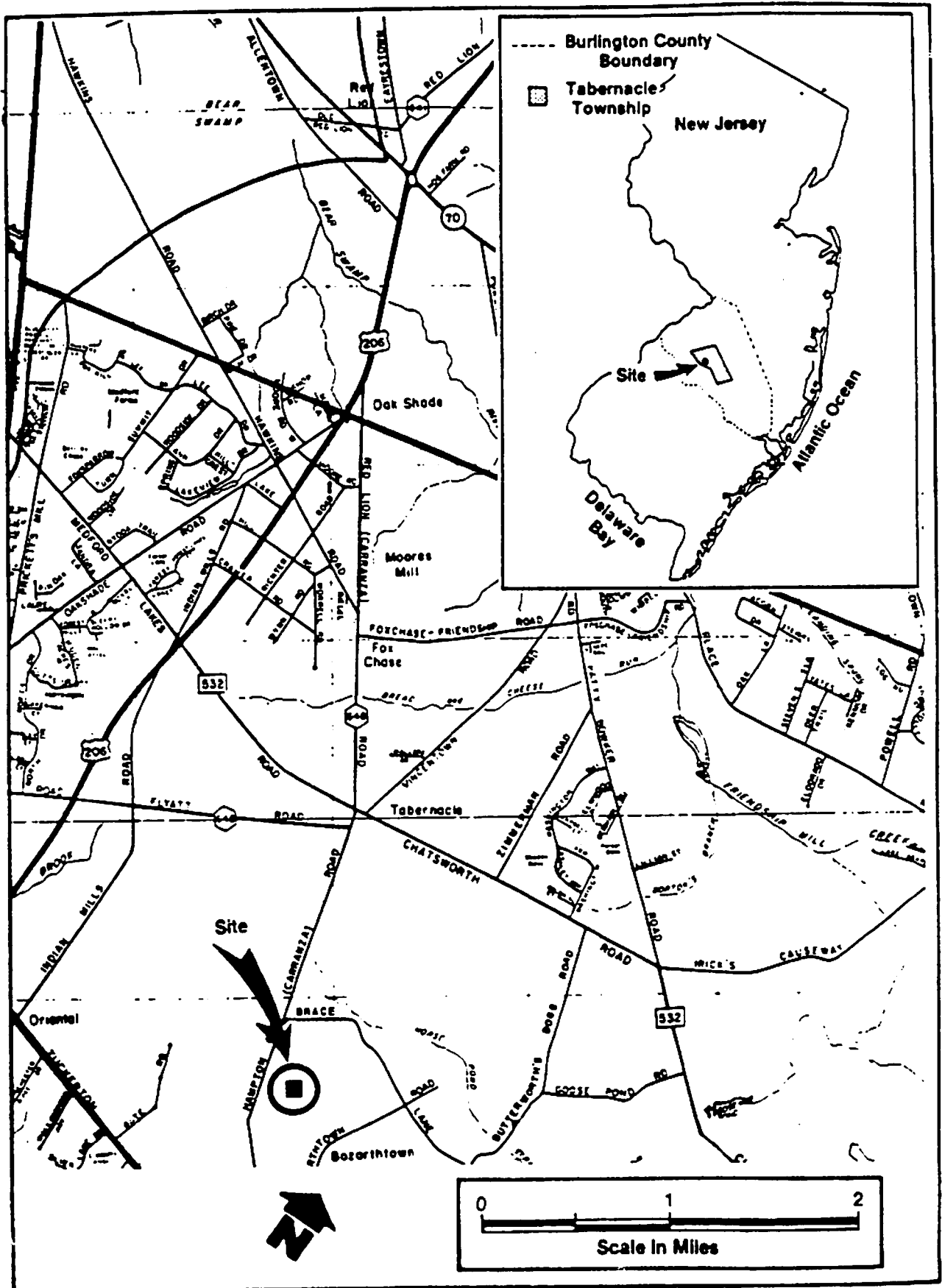


FIGURE 1 SITE LOCATION MAP- TABERNALE DRUM DUMP SITE

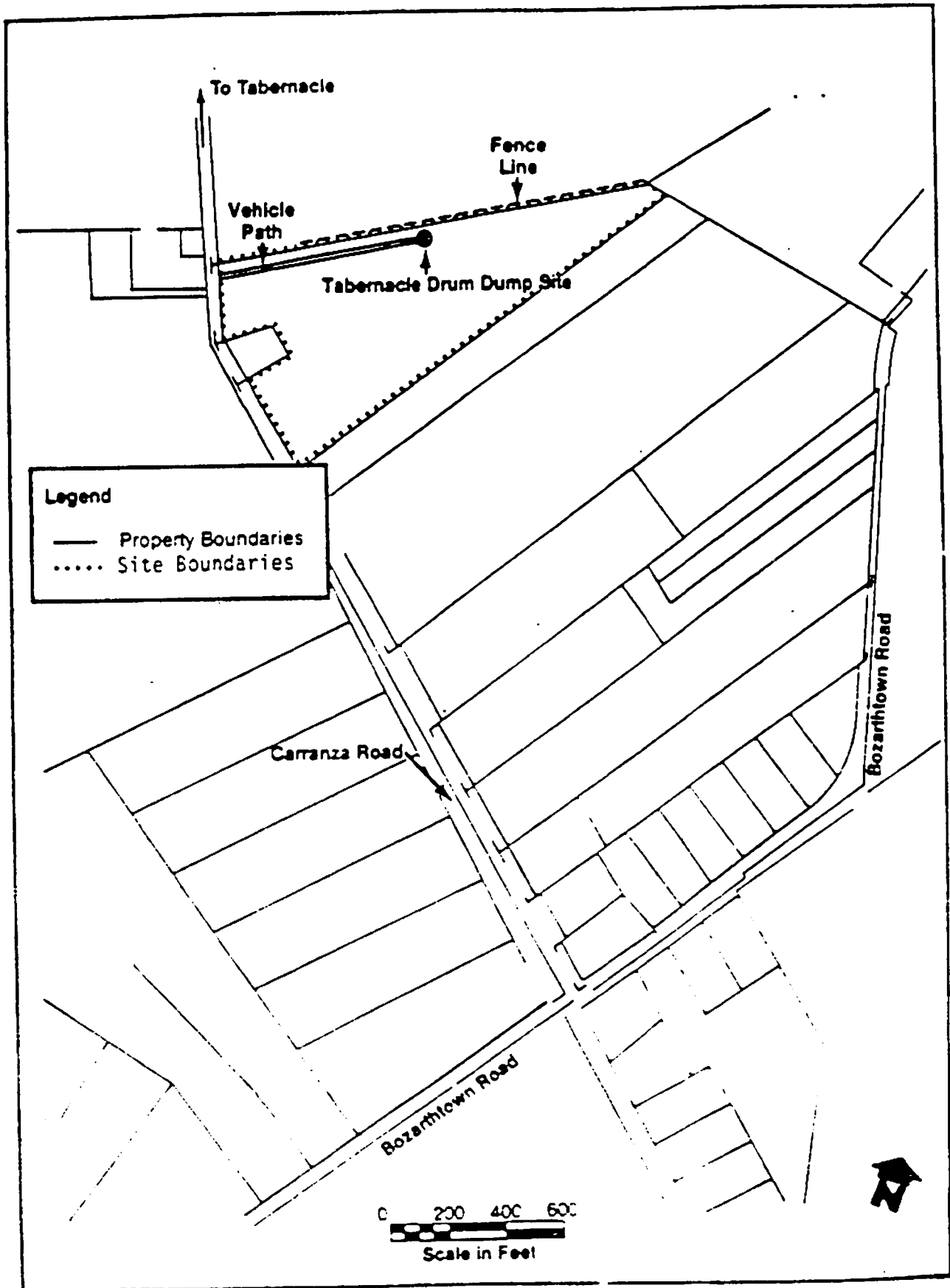


FIGURE 2 LOCATION OF TABERNACLE DRUM DUMP SITE