SCANNED

GENERAL ELECTRIC

AIRCRAFT INSTRUMENTS DEPARTMENT
GENERAL ELECTRIC COMPANY • 50 FORDHAM ROAD • WILMINGTON, MASSACHUSETTS 01887 • (617) 937-4101

October 19, 1987

Mr. Dennis D'Amore
The Commonwealth of Massachusetts
DEQE/DSHW
1 Winter Street - 10th Floor
Boston, MA 02108

Dear Mr. D'Amore:

In response to a recent request from I. Davis, DEQE, Woburn, MA, I am forwarding to you:

1. Interim Phase II Site Investigation, General Electric Company, dated June 30, 1987.

2. Scope of Work, Completion of Investigation Required to Design Remedial Actions to Alleviate On-Site Contamination.

Please note that this report contains confidential and proprietary information in accordance with the provisions of Massachusettts General Law, Chapter 21E, Section 12. G.E. requests that the contents of the report be protected in the manner outlined in the referenced section of the law.

The Scope of Work, Item 2 above, incorporates all the tasks that were identified during a DEQE/GE meeting held in Woburn on August 27, 1987. When this scope was sent to Ms. Davis at DEQE on October 6, 1987, we requested approval or comments prior to October 30, 1987. I realize that this provides very little time for your review, but I would like to proceed on this vital work with DEQE's concurrence.

Please call me if you have any questions on any of this material.

Sincerely,

GENERAL ELECTRIC

A R Gamache

A.R. Gamache, P.E.

dc: I. Davis, DEQE, Woburn

E. Bradley
C. Milmoe

dh

SCOPE OF WORK

COMPLETION OF INVESTIGATIONS REQUIRED TO DESIGN

REMEDIAL ACTIONS TO ALLEVIATE ON-SITE CONTAMINATION

OVERVIEW

This Scope of Work describes tasks that will be implemented to complete investigations required to design remedial actions for alleviating on-site contamination. These investigations are designed to provide an adequate data base for designing a cost-effective on-site remedial program. The potential remedial actions required to alleviate off-site contamination are not addressed in this Scope of Work, although they may have favorable off-site effects. These investigations focus on characterizing on-site contamination only to the extent that such characterization is needed for remedial design purposes. In addition to investigative tasks, this Scope of Work also describes the proposed plan for removing contaminated soil in the rear of the G.E. facility. This Scope of Work will involve the following tasks:

Task 1 <u>Define Sources of Contamination</u>

Task 2 <u>Conduct Soil and Ground Water Investigation</u>

Task 3 <u>Remove Contaminated Soil</u>

Task 4 <u>Prepare Phase III Report</u>

A brief description of these tasks is presented in the following section:

TASK DESCRIPTIONS

Task 1 Define On-Site Sources of Contamination

G.E. and its technical consultant will identify all sources of soil and ground water contamination to facilitate clean-up and prevent further contaminant releases. We will first assess available contamination data to obtain an understanding of contaminant characteristics. Next, we will evaluate operations and characteristics of potential contamination sources including:

- o underground storage tanks;
- o chemical and waste storage areas;
- o plant drainage and spill control system
- o miscellaneous plant processes and operations.

Results of the source investigation will be considered in finalizing specifications of the soil and ground water investigation program. If past, current or potential contamination sources are identified, a plan will be developed during the next phase of investigation for source elimination or corrective action.

Task 2 Conduct Supplementary Soil and Ground Water Investigations

G.E. and its technical consultant will design and implement a plan for investigating the concentration and extent of contamination in the oils, soil gas and ground water. The investigation will focus on the contaminated area in the rear of the G.E. facility, since this is the area of immediate concern requiring remedial action.

A concentrated soil sampling program will be implemented by installing a series of soil borings around the tank excavation area to provide data for estimating the volume of contaminated soil that must be removed. Soil samples taken from these borings will be analyzed to determine the concentrations and characteristics of contaminated materials. Data will be used in determining appropriate disposal methods, and the extent of soil requiring excavation.

A soil gas monitoring program will also be designed and implemented to delineate the source, concentration and extent of hazardous vapors in the vicinity of the tank excavation area near monitoring wells GZA 7 and 15. The results of this survey will be used to optimize the locations of additional monitoring wells, and to evaluate the appropriateness of remediation using soil ventilation/vacuum extraction. The soil gas monitoring program may be expanded to encompass a larger area, depending on results of testing at initial monitoring points.

One or more additional monitoring wells will also be installed in the localized study area near monitoring wells GZA 7 and 15. These monitoring wells will be designed to more accurately define the vertical and areal distribution of contaminants in the aquifer. Data concerning ground water contamination will be gathered to the extent required for the design of a cost-effective ground water recovery system i the area affected by on-site contamination sources.

Appropriate health and safety procedures will be followed during all investigation activities.

Task 3 Remove Contaminated Soil

Estimates will be provided of the characteristics and extent of contaminated soil requiring removal, based on data gathered from soil borings. The soil removal process will be observed and documented to assure that contaminated soil has been removed to a level acceptable to DEQE. Appropriate health and safety procedures will be followed during soil removal.

Task 4 Prepare Phase III Report

- Report results
- Identify any necessary further actions/alternatives
- Proposal for further actions

Groundwater recovery & Treatment

INTERIM PHASE II
SITE INVESTIGATION
GENERAL ELECTRIC COMPANY
STICKNEY WELL

PREPARED FOR:

GENERAL ELECTRIC COMPANY
WILMINGTON, MASSACHUSETTS

PREPARED BY:

ERM-NEW ENGLAND, INC.
BOSTON, MASSACHUSETTS

JUNE 30, 1987

TABLE OF CONTENTS

SECTION 1.0
INTRODUCTION

1.1 Background

Contamination of the Stickney Well

In December 1978, Camp, Dresser and McKee, Inc. (CDM) working under contract for the Town of North Reading to test ground water sources in the Stickney Well area, revealed what was then described as a low level (62 parts per billion (ppb)) of trichloroethylene (TCE) in the water from the town well. A second sample taken from the Stickney Well showed a TCE concentration of 6.0 ppb. Although the results of these two tests varied considerably (10:1), The Department of Environmental Quality Engineering (DEQE) advised the Town of North Reading that water from the Stickney Well should not be used for public water supply purposes, and it was shut down on December 28, 1978.

Several test wells were installed in the Stickney area and results from samples collected at each test well varied considerably from the others. Specifically, the seven wells which were sampled on January 2, 1979 revealed TCE concentrations from 0 to 937 ppb, while those collected from nearby test wells on January 10, 1979 did not contain any detectable amounts of TCE.

The General Electric Company (GE) operates an aircraft instruments production facility in the Town of Wilmington, MA, which abuts the border of North Reading.

General Electric Facility and Other Industrial Facilities

On January 10, 1979, DEQE and North Reading officials met with GE personnel to discuss the Stickney Well situation. Samples were drawn from various locations on and around the GE facility. Results varied. In cooperation with DEQE, GE initiated several environmental projects, including a Spill Containment area, a drain survey to determine the discharge point of each drain, underground holding tank leak testing and recycling of halogenated solvents. Additionally, a drilling contractor was retained to bore three holes on GE property in Wilmington for soil and water exploration purposes, but in a phone conversation with DEQE on February 27, 1979, GE was advised to hold on this work.

In May 1979, nine industries located in the Wilmington Industrial Park were visited by DEQE to determine which industries were using degreasing agents, specifically trichloroethylene. Between October 30, 1985 and December 4, 1985, six facilities in the Wilmington Industrial Park were visited by DEQE for the purpose of a site investigation pertaining to the contamination of the Stickney Well in North Reading.

General Electric's Investigations

On June 11, 1986, DEQE issued GE a Notice of Responsibility (NOR) pursuant to Massachusetts General Law (MGL) Chapter 21E citing that a condition of groundwater contamination by chlorinated hydrocarbons had been documented. On June 17, 1986, GE advised DEQE that it would comply with the notice so as to reach a speedy and conclusive decision concerning this matter.

In fulfilment of this responsibility, GE retained Goldberg-Zoino & Associates (GZA) to complete a Phase I study and submit it to DEQE on September 15, 1986. After DEQE's review of the Phase I study and GE's proposal for Phase II, GE and DEQE agreed that a Phase II Hydrogeologic Investigation report would be submitted in the week of June 29, 1987, and GZA initiated work on Phase II in November 1986.

In May 1987, GE retained ERM-New England (Environmental Resources Management) to sample the GZA wells and analyze resulting data. Since complete laboratory data were not scheduled to be received until June 19, this allowed only three working days for completion of the initial draft of this interim Phase II report.

This report is ERM's Interim Phase II report. Since limited time was available, this report does not address all of the tasks outlined in GZA's Phase II scope of work, and should be considered an Interim Report. Additional investigations required to complete requirements of the NOR are addressed in the conclusions and recommendations of this report.

1.2 Scope and Purpose

The DEQE Notice of Responsibility (NOR) issued June 11, 1986, directed GE to perform the following actions in order to adequately define and evaluate site conditions and to determine what remedial/clean-up actions, if any, are warranted at the site:

1. Hire "a professional environmental consulting firm to assess the site and prepare and submit a 'Phase I' site history/utilization report. This report must adequately investigate and delineate past storage, usage, and disposal of hazardous materials at the subject site."

2. Conduct "a complete hyrogeologic study. This will include a number of drilled monitoring wells. These should include multilevel wells, with water level measurements taken to establish the hydraulic gradient at the site."

3. "A Phase II report of the hydrogeologic study should be prepared by your environmental consultant and, upon completion, submitted to the Department for review. The Phase II report should include recommendations for remedial actions that will be taken at the subject site."

GZA's scope of services to address the requirements of the NOR dated September 15, 1986 were submitted to and approved by DEQE. These are set forth in Exhibit 1, Appendix C. On May 18, 1987, GE retained ERM to complete the investigations initiated by GZA, and to address the requirements of the NOR.

As described in this report, data obtained by ERM relating to possible contaminant sources and sampling of GZA wells indicated that there may be a number of independent contaminant sources of the Stickney Well. Therefore, this interim Phase II report considers the ground water contamination in the vicinity of the GE facility by means of a two-site approach. The two sites consist of: 1) GE property referred to as "the GE site" any other PRP's?

and 2) The Stickney Well area as a whole, including the GE property; this is referred to as the "study area." It is unclear whether or to what extent contamination of the GE site is related to other contamination in the study area or in the Stickney Well. New information acquired by ERM has shown that there may have been multiple sources of contamination of the Stickney Well. New information on on-site contamination at GE is considered separately from Stickney Well contamination.

This report presents sampling results from monitoring wells installed by GZA, and makes a preliminary assessment of the extent and sources of contamination. However, available data obtained during this sampling was not adequate to fully characterize the extent of contamination or to definitively establish all contaminant sources.

Does the new scope of work address this issue?

This report also presents a conceptual discussion of alternative remedial measures, including source control, control of contaminant migration and treatment of recovered ground water. However, because of data limitations and lack of adequate time for analyzing data, this report cannot specify the recommended remedial measures at this time. In order to develop data for determining recommended remedial measures, this report provides general recommendations concerning additional data needs and analyses that should be conducted to determine the most cost-effective remedial program. Collection of this additional data and performance of recommended analyses will be conducted in subsequent phases of this investigation.

1.3 Overview

This report first describes existing site conditions and the methods for conducting the investigation, including the drilling performed by GZA and the sampling subsequently conducted by ERM. Next, results of the sampling and analyses are presented, including appropriate maps and tables. In addition, results of desk-top calculations for determining the zone of influence of the Stickney Well and the travel times of groundwater and contaminants are presented and evaluated. Next, the report identifies and evaluates various potential contamination sources surrounding the Stickney Well, including several local industries. Finally, the report presents a conceptual discussion of remedial alternatives and provides recommendations regarding additional data and analyses required to select the most cost-effective remedial alternative.

check this

1.4 Confidentiality

Because of the nature of the information in this report prepared under contract with GE, the contents of this Interim Phase II Report on the Investigation of Stickney Well Contamination should be considered confidential pursuant to

Massachusetts General Law, Chapter 21E, Section 12.

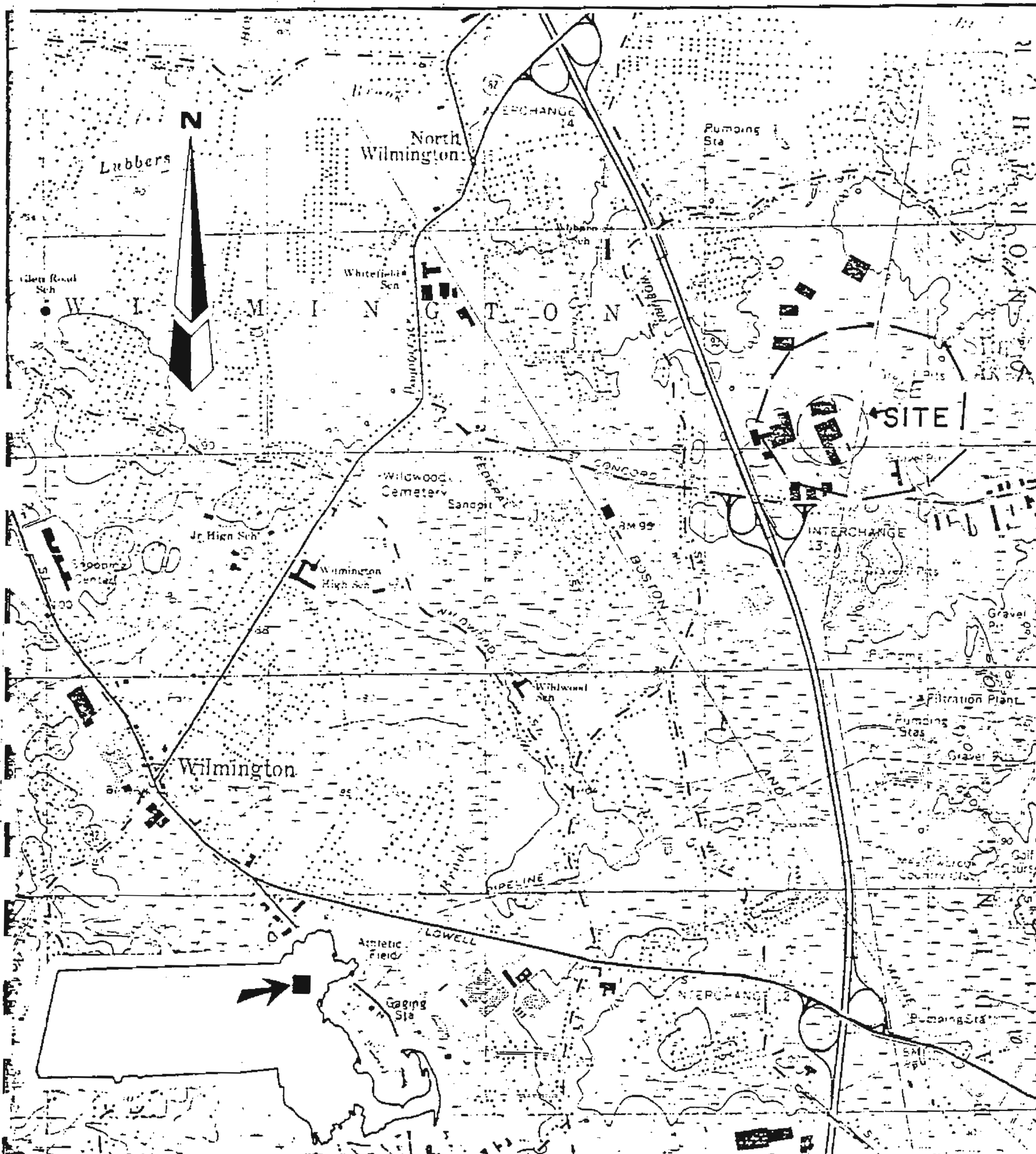
SECTION 2.0
EXISTING CONDITIONS

2.1 Description of the Study Area

General

The Stickney Well is located in the southwestern section of North Reading approximately 2,500 feet east of Route 93, 400 feet east of the Wilmington/North Reading town line and 2,000 feet north of Concord Street (see Figure 2-1). The GE Aircraft Instruments Department is located on Fordham Road within the Wilmington Industrial Park in the Town of Wilmington on a site abutting the Wilmington-North Reading border.

Industrial development exists along Fordham Road (the Wilmington Industrial Park) and along Concord Street between Route 93 and Park Street. This area includes numerous industries and businesses all located within a half mile radius of the well. About one third of these industries are located in Wilmington. The remainder are located in North Reading. The development north of the well along Park Street, and east of the well along Redmond Avenue and Park Street, is residential.



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0' 1000' 2000' 4000'

FROM USGS WILMINGTON, MASS
QUADRANGLE MAP-1979

9A

	G E SITE WILMINGTON MASS.	FIGURE 2-1 LOCUS PLAN

Topography and Land Type

The Wilmington Industrial Park located on Fordham Road and the industrial development along Concord Street are located in a relatively flat, low-lying area on the North Reading/Wilmington town line. The Stickney Well is situated in this same low area. The ground surface elevation rises from about 78 feet above mean sea level (MSL) near the well to greater than 100 feet above MSL along topographic ridges northeast and southwest of the well. The remainder of the study area is primarily forest or wetlands except for the previously described industrial development. The closest surface water bodies are Furbish Pond, adjacent to the Stickney Well, and the Ipswich River, which runs along the southern side of Concord Street. Most of the study area is located within the watershed which recharges the Stickney Well under pumping conditions. A large number of industries identified are located within the zone of influence of the well during normal pumping conditions. ?

Historical Development in Study Area

Nearly all of the industrial development within the study area occurred after the Stickney Well was constructed in 1965. Prior to the industrial development, much of the area was used for gravel and sand mining. About one quarter of the companies located in the area were present before 1970, more than half moved into the area between 1970 and 1979, and the remaining businesses were established after 1979. Over 80% of the companies in this area were established in the study area prior to the discovery of contamination in the Stickney Well in 1978.

2.2 Major Industrial/Commercial Facilities

As part of the overall study, ERM conducted an investigation of all major industrial facilities in the vicinity of the GE and the Stickney Well. This study was intended to develop baseline data on all facilities which may have some role as sources of contamination. The study included a visual inspection of the area, and study of maps, aerial photos and regulatory agencies' files. It should be noted that information on chemical usage is based on current practices, and may not be representative of those in the past around the time of the original Stickney Well contamination.

A total of 47 industries were identified occupying 54 different sites within a half-mile radius of Stickney Well. Of the 47 industries studied, approximately 33 were present prior to the discovery of Stickney Well contamination in late 1978. All of the industries have septic tanks and sanitary leaching fields. One facility uses an industrial leaching field. Of the 47 total industries, 27 are known solvent users, 29 are hazardous waste generators, and 18 own underground storage tanks; 14 companies

Any more PA's to follow?

report no activities involving hazardous substances. Twenty-seven chemical storage areas were identified (It should be noted that these are not RCRA storage areas).

Thirteen hazardous substance spills, including four known to involve solvents or waste oil, have been reported in the study area since 1979. There was no data on spills accumulated before 1979.

The methods and results of this study are described in more detail in Sections 3.0 and 4.0, respectively.

2.3 GE Facility Description

2.3.1 GE Site Layout

GE is situated on Fordham Road, Wilmington, Massachusetts. Present employment numbers approximately 1,600. It is one of many facilities located in the Wilmington Industrial Park, which was developed in the late 1960's on approximately 300 acres of land east of Interstate Route 93 and north of Concord Street (see Figure 2-1 Locus Plan). The GE site consists of approximately 36 acres. A small portion of GE's parking area is in North Reading, while the major area, including all buildings and improvements, is located in Wilmington (see Figure 2-2 Building Directory). The absence of public sewers throughout the Industrial Park

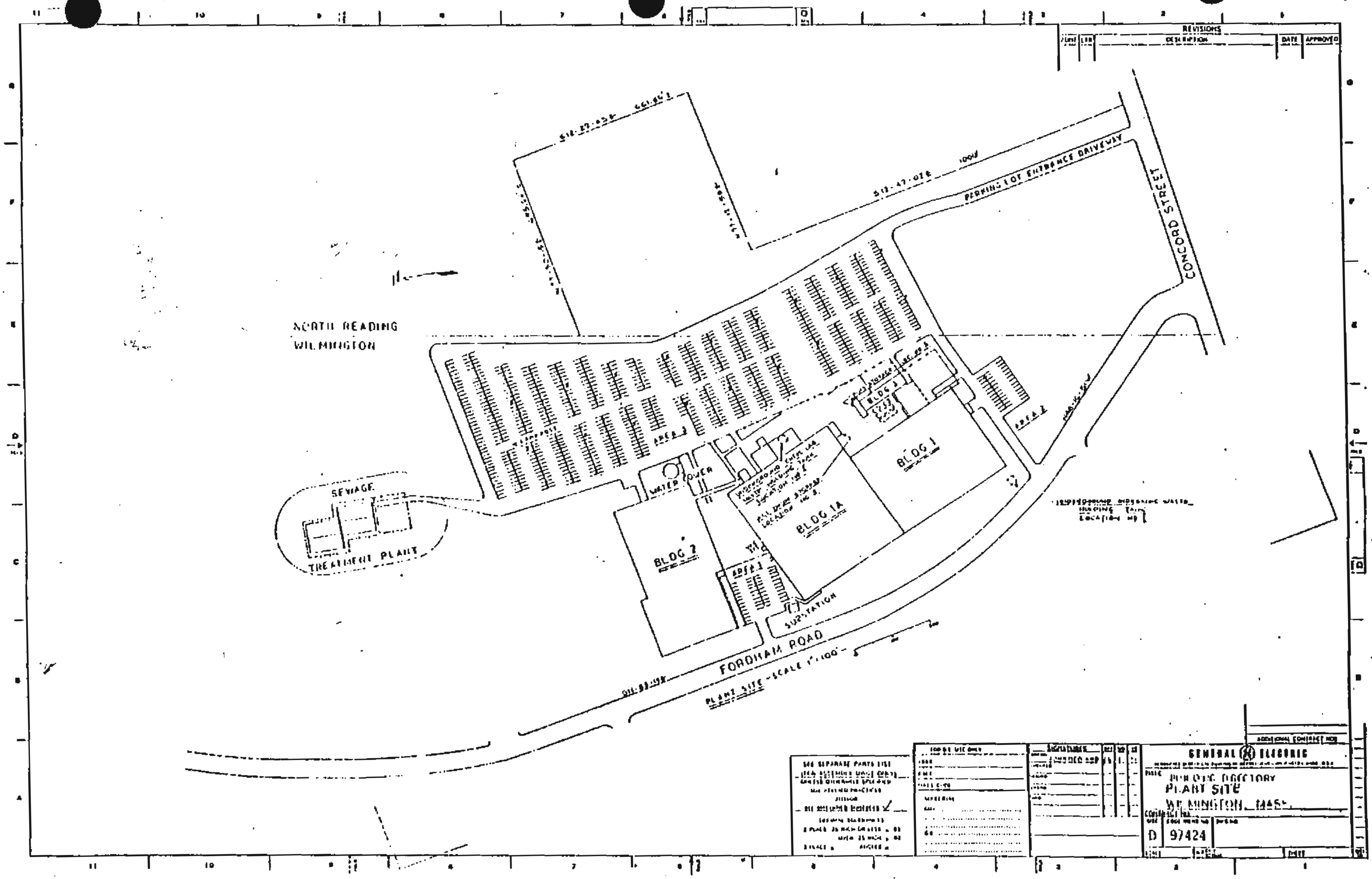

CONCORD STREET
PARKING LOT ENTRANCE DRIVEWAY
NORTH READING
WILMINGTON
BLDG 1
BLDG 1A
BLDG 2
BLDG 3
WATER TOWER
SUBSTATION
FORDHAM ROAD
PLANT SITE - SCALE 1"=100'
SEWAGE
TREATMENT PLANT
AREA 1
AREA 2
AREA 3
REVISIONS
GENERAL ELECTRIC
PLANT SITE
D
97424

FIGURE 2-2

necessitates all businesses in this area to maintain private systems for sewage disposal. GE operates a privately-owned activated sludge sewage disposal system for this purpose. Only sanitary wastes are treated in this facility. This sanitary waste water treatment plant was built in 1969 and is permitted by DEQE Division of Water Pollution Control Permit #0-34.

The GE site is bounded by undeveloped land owned by North Reading and a private land owner to the east, two trucking terminals to the southeast, Converse Corporation to the south, Volkswagen to the west and undeveloped property to the north. A drainage ditch is located along the eastern edge of GE parking lot (in North Reading). Flow in the ditch is a northerly direction. This drainage area receives storm water runoff from the paved parking areas and the GE non-contact cooling water discharges labeled "Outfall 001 and 002" in the US EPA National Pollutant Discharge Elimination System (NPDES) Permit No. MA 0001635. At the south end of the ditch, near the GE/Converse property line, an additional culvert drains from Converse's property. The Stickney Well is located approximately 1,000 feet northeast of GE's facilities.

2.3.2 Basic Manufacturing Processes

The GE Aircraft Instruments Department provides advanced technology to commercial, military, foreign and domestic markets in the areas of aircraft instrument, engine sensors, displays and monitoring systems. The instruments are used aboard aircraft to measure and display engine performance parameters such as temperature, pressure, fuel flow and engine speeds.

A variety of light manufacturing processes are used in producing these instruments. They include:

Machining - raw materials, metal and non-metallic, are formed and shaped to the desired end product, ranging from simple covers and enclosures to complex and delicate components used in gyros where accuracy is measured in thousandths of inches.

Finishing - fabricated parts are cleaned and coated to provide the desired finish for functional and aesthetic purposes.

Assembly - individual parts are integrated into complete assemblies per customer-approved drawings.

Testing - the instruments are tested at various stages of production as well as when complete, in accordance with specifications. Testing includes a variety of mechanical and electrical tests ranging from simple electrical continuity to tests of function while operating under extreme environmental conditions.

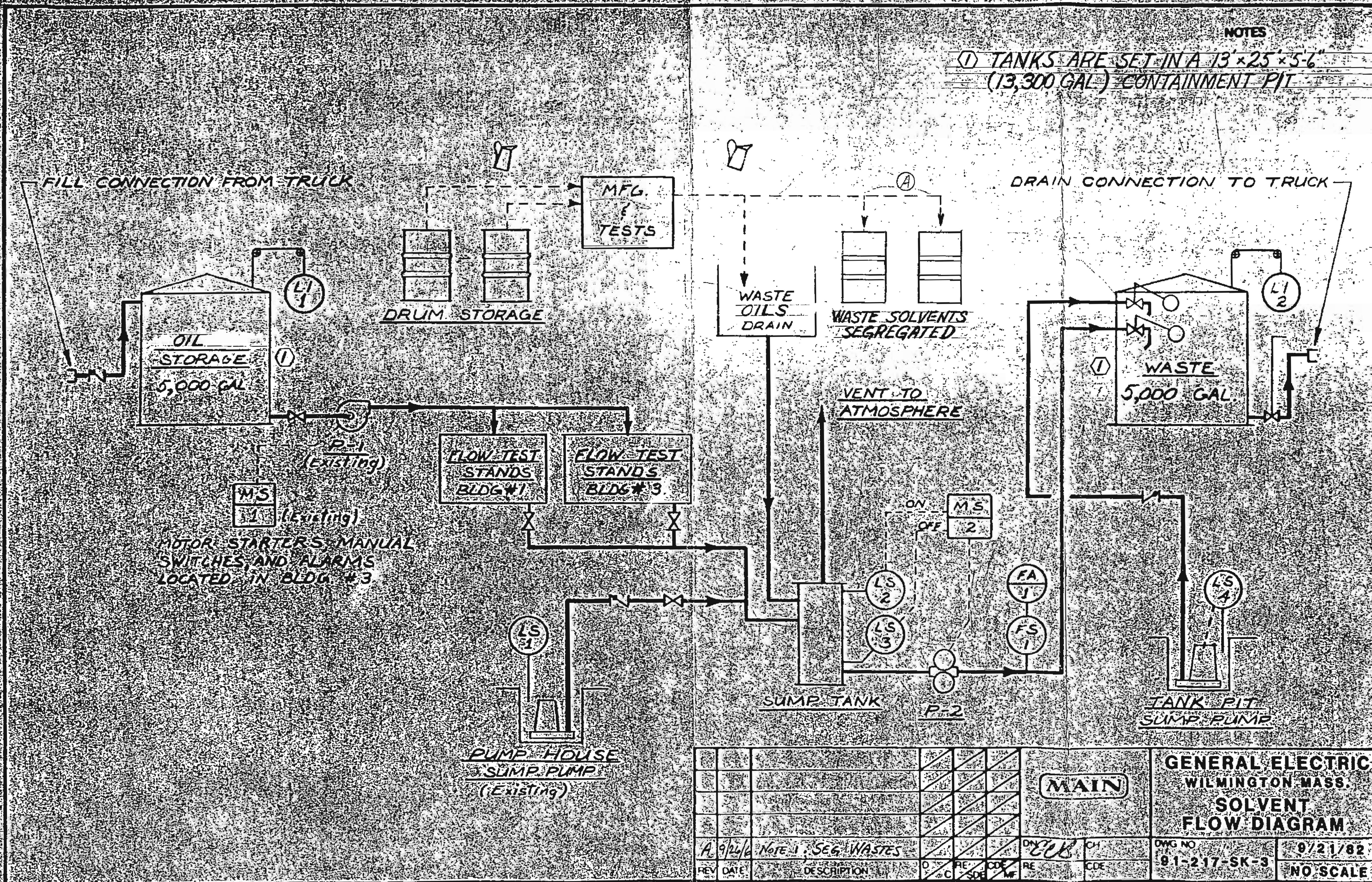
2.3.3 Oil, Solvent, Acid and Coolant-Handling Procedures

Materials used at the Wilmington GE facility of interest to this study include oils of various types, solvents, coolant oils, and acid solutions. The use of these materials and their handling procedures are described in this section. It should be noted that these are descriptions of current practices and may not be the same as those which occurred in the past or at the time of the Stickney Well shutdown.

Oil is received at this facility in bulk tank trucks and individual containers ranging in size from 55-gallon drums to one and five-gallon containers. Solvents and coolants are received in containers only. The most common size is the 55-gallon drum. However, some lesser-used products are procured in smaller containers. Acids are received in carboys, containers specifically made for acids.

Flowmeter test oil is received in bulk quantities and is pumped into the 5,000-gallon oil storage tank located in the "Flammable Substance Storage Facility," commonly called the "Oil

House" (see Figure 2-3). The circulating system conveys the oil to the Flow Test Stands in Buildings 1 and 3. All wastes from these test stands are drained to the pump house pump and accumulated in the 5,000-gallon waste oil tank which is located in the Oil House.


NOTES
① TANKS ARE SET IN A 13'×25'×5'-6" (13,300 GAL.) CONTAINMENT PIT
FILL CONNECTION FROM TRUCK
MFG. & TESTS
A
DRAIN CONNECTION TO TRUCK
LI 1
OIL STORAGE 5,000 GAL
①
DRUM STORAGE
WASTE OILS DRAIN
WASTE SOLVENTS SEGREGATED
LI 2
①
WASTE 5,000 GAL.
VENT TO ATMOSPHERE
P-1 (Existing)
FLOW TEST STANDS BLDG #1
FLOW TEST STANDS BLDG # 3
MS 1 (Existing)
MOTOR STARTERS, MANUAL SWITCHES, AND ALARMS LOCATED IN BLDG. #3
ON
OFF
MS 2
LS 2
LS 3
FA 1
FS 1
LS 4
LS 1
SUMP TANK
P-2
TANK PIT SUMP PUMP
PUMP HOUSE SUMP PUMP (Existing)
MAIN
GENERAL ELECTRIC
WILMINGTON MASS.
SOLVENT FLOW DIAGRAM
A 9/24/6 NOTE 1; SEG. WASTES
REV DATE DESCRIPTION
DN ECK
CH
RE
CDE
DWG NO 91-217-SK-3
9/21/82
NO SCALE

Oil and coolant drums are received and stored in the Spill Containment Area (see Paragraph 2.3.4) in the as-received and closed condition. When required, a full drum is moved to the Oil House and placed in the rack for dispensing. Safety cans are filled from this area and the materials are brought into the manufacturing areas for use. All wastes are accumulated from the plant in containers and taken to the oil house to be pumped into the Waste Oil tank.

The waste oil tank is monitored daily and each quarter or sooner if needed. The contents are pumped into a tank truck, manifested and transported via a licensed transporter to a licensed waste disposal facility.

All solvents used in this facility are received, stored and dispensed in a similar manner to the oil and coolants which are received in drums.

Waste solvents are segregated in various categories and collected in 55-gallon drums for recycling and/or disposal. Specifically, Freon is collected independently of all other solvents and is sent offsite for reclamation and credit. All high BTU wastes are segregated from those with lower values and shipped offsite to be used as a fuel in approved facilities. The remaining low BTU wastes are also shipped offsite and disposed of in approved incinerators.

Acids are used in the finishing room and to a lesser degree in the laboratories. All hazardous waste from the laboratories is deposited in a rubber-lined accumulation tank (Tank No. 4), either by direct piping to the tank or by containers transported to the tank by the Hazardous Waste Handler.

The Finishing Room is an operation where parts and assemblies are dipped in acid or caustic solutions to produce a desired finish and "set" by rinsing in water. The rinsewater, which cascades through the rinse tanks, is accumulated in Holding Tank #1. Both tanks, No. 1 and No. 4 are pumped and hauled to a treatment facility several times a week. In 1986, 531,800 gallons of this waste were shipped from this facility.

2.3.4 Drum Storage

There are two drum storage areas at this plant (see Figure 2), one located north of Building 3 designated as "Drum Storage Location 3" and the other is located at the southeast corner of Building 1A. It is designated as "Alternative Drum Storage Location No. 5."

Location No. 5 is used for 1) temporary storage of returnable empty containers prior to pick up, 2) empty containers which are periodically returned for reconditioning or disposal and 3) containers which are accumulating scrap metal and metal turnings which are also periodically transported to recycling facilities. No liquid hazardous wastes are kept at Location No. 5.

Location No. 3 is also labeled "Spill Containment Area." This area was constructed in June 1979 after the plans were reviewed and approved by DEQE. This area consist of a concrete pad encircled by a drain trough which is piped to a 1,000-gallon precast concrete grease trap.

All incoming drums of solvents and oils are off-loaded at this location and remain there until needed. When the material is to be drawn off for production use, the sealed drum is moved to the Oil House and placed in a storage rack ready for dispensing. Dispensing is done in the Oil House and not at Drum Storage Location No. 3.

The Spill Containment Area is also the accumulation area for spent liquids, such as thinner, alcohol, flux, paints, degreasers and waste acids. As outlined in Section 2.3.3, these wastes are accumulated according to chemical and recycling or disposal procedures established to minimize risks and maximize the usefulness of each product, even in its hazardous waste stage.

Locations are illegible on figure 2-2
Solvent tanks

2.3.5 Tanks

There are five tanks presently in service. (See Figure 2-2) Two are above ground and the remaining three are below ground. Six other tanks, all below ground, are also located at this facility; these six tanks will be removed this summer during factory shutdown.

Above-ground Tanks are as follows:

One 5,000-gallon steel tank for oil storage used in Flowmeter testing.

One 5,000-gallon steel tank for waste oil accumulation prior to disposal.

Both tanks are encircled by a common concrete containment pit.

Underground Tanks in Service

One 1,000-gallon precast concrete grease pit is located at the east end of the spill containment area, Location #3. This area is the accumulation area for waste liquids other than oil.

The tank (grease pit) receives waste liquid drippings which have been washed into the drain trough by precipitation. The tank contents are pumped and shipped offsite for disposal. This tank was installed in June 1979.

Two 3,500-gallon holding tanks, Location No. 1 and 4. These tanks are constructed of 1/4" steel plate with 3/16" hard rubber lining inside and PVC coated on the outside. These tanks are set in concrete vaults and the manhole access is locked at all times, except for inspection and service. The liquid level and condition is checked daily. The tank at Location No. 1 receives waste from the Finishing Room which generates large volumes of waste water, and consequently, it is equipped with an upper limit volume alarm and shut down. These tanks and vaults were installed in 1979.

fig 18

Underground Tanks Out of Service

locate on 22

Six underground steel tanks, scheduled to be removed this summer, are located at this facility. All these tanks have been emptied of their contents. They include:

we should [illegible] this

Number	Size (gallons)	Former Contents
2	10,000	1) waste solvents, used oils
		2) virgin kerosene
1	1,000	kerosene
1	500	methanol
2	3,500 (estimated)	acid/caustic wastes

Underground Tanks Previously Removed

One underground steel storage tank was removed from the east end of Building No. 2. This tank was used by the then leasee, Converse Corporation, for gasoline storage for its fleet vehicles. The tank was removed in 1984.

2.3.6 Hazardous Waste

All hazardous waste generated at this facility is accumulated and disposed of in accordance with Massachusetts DEQE Regulations. Specific procedures have been outlined in previous sections. Employees are trained in the proper handling of these materials.

2.3.7 Sanitary Wastewater Treatment Plant

GE operates an activated sludge waste water treatment plant for disposal of sanitary (human) waste only.

No process water of any kind is connected to this system. The treatment effluent is discharged to the groundwater via four sand filter beds. Operation is authorized by DWPC Permit No. 0-34.

2.3.8 NPDES Discharge

USEPA National Pollutant Discharge Elimination System (NPDES) Permit No. MA 0001635 has been issued to GE to discharge non-contact cooling water daily to outfalls No. 001 and 002. This water (Wilmington Town Water) is used to cool test equipment, heat exchangers, air compressors and ovens without contact with the process itself and is then discharged through the area storm drainage system.

SECTION 3.0
METHODS OF INVESTIGATION

3.1 Review of Previous Data and Investigations

In order to provide a better understanding of the nature and extent of the Stickney Well contamination, ERM conducted a comprehensive review of all previous studies on the area. ERM reviewed previous studies conducted by GE's consultant, GZA, and the Massachusestts DEQE. ERM received a copy of the Town of North Reading's consultant's report (CDM, November 1986) during the preparation of this report. A quick review of CDM's activities was conducted; however, time did not permit a thorough evaluation of the report. ERM conducted a review of all available laboratory analytical data and drilling logs in order to evaluate the nature of both the aquifer and the contamination. Additionally, ERM met with GE representative, Arthur Gamache, to discuss plant history and general practices.

This section will attempt to summarize important aspects of the previous investigations of the Stickney Well contamination.

Previous Investigations

Trichloroethylene (TCE) contamination was first detected in the Stickney Well during a 1976 DEQE sampling event. Following the discovery of the well contamination, the DEQE conducted site inspections in the Wilmington Industrial Park in order to determine which facilities, if any, used or stored TCE. These preliminary inspections determined that only two facilities, GE and Datametrics, had ever used or stored TCE. GE had discontinued the use of TCE in 1975.

In 1978, the DEQE notified the Town of North Reading, Massachusetts that the Stickney Well was potentially contaminated with volatile organics. Samples from the well, collected on December 20, 1978, identified the presence of TCE and a second unknown halogenated compound (later identified as tetrachloroethylene (PCE)). The Stickney Well was shut down on December 28, 1978, and has since been used only for the collection of samples for laboratory analysis.

Following closure of the Stickney Well, the Town of North Reading collected additional water samples from nearby test wells. Contaminants found in the Stickney Well and in adjacent monitoring wells included: TCE (Stickney Well, MW-1, MW-4, MW-4A, MW-5, MW-6A, MW-7, 7A-1, DLM-1), PCE (Stickney Well, MW-4, MW-4A, MW-5, MW-7, 7A-1, DLM-1), acetone (Well No. 3), 1,1,1-trichloroethane (Stickney Well, MW-1, MW-6A), toluene (MW-3, MW-5, MW-7), 1,2-dichloroethane (Wells 7A-1, 7A-2, 7A-3, 3), 1,1-dichloroethylene (Stickney Well, MW-7), 1,1-

dichloroethane(Stickney Well, 3, MW-4, MW-5, MW-7), 1,2-dichloroethylene (Wells 3, MW-4, MW-5, MW-7, DLM-1), and vinyl chloride (Well MW-7). TCE concentrations in the samples ranged from non-detectable levels to 937 ug/l (ppb). Results of these sampling events are summarized in Table 3-1.

In February 1978, the DEQE made another series of site inspections in the Wilmington Industrial Park. The purpose of these inspections was to determine which industries used or stored degreasing solvents, including TCE and PCE. Five industries (GE, Datametrics, Dynamics Research, Compugraphics and Converse) reported using degreasing solvents in varying amounts. At this time, the DEQE recommended the installation of monitoring wells to delineate the source and extent of the Stickney Well contamination.

In January 1979, a GE consultant collected a series of water samples from locations in the vicinity of the GE Facility. The results of the sampling program are summarized as follows:

TABLE 3-1

RESULTS OF VOLATILE ORGANIC ANALYSES
(1978 - 1982)

(FROM CDM REPORT, NOVEMBER 1986)

SAMPLING DATE	SAMPLING LOCATION	Trichloroethylene	Tetrachloroethylene	1,2-Dichloroethane	1,1-Dichloroethylene	Chloroform	1,1,1-Trichloroethane	1,1-Dichloroethane	Chlorobenzene	1,2-Dichloroethylene	Acetone
12-20-78	Stickney Well	62									
1-10-79	Well No. 1	ND									
	Well No. 2	0.2	ND								
	Well No. 3	937	95.5								
	Well No. 4	T	ND								
	Well No. 5	ND									
	Well No. 6	ND									
	Stickney Well	141.9	20.9	ND							
1-10-79	GE-6[1]	ND									
2-1-79	Furbish Pond	34.6	11.0	ND							
	Well No. 2	1.5	4.0	ND							
	Well No. 3	1340	188.6	ND							
	Stickney Well[2]	100.2	23.8	ND							
4-11-79	7A-1	850	216	6.0	ND						
	7A-2	1300	380	11.2	ND						
	7A-3	490	144	4.0	ND						
	Well No. 3	1300	490	10	ND						
8-12-80	Stickney Well	98.6	69.5	ND	0.4	2.3	1	1.6			
11-18-80	Stickney Well	65.6	25.8	ND				0.2	0.3	ND	ND
7-15-82	Well No. 4	ND									
7-29-82	Well No. 3	26	12	ND				2.2	ND	2.7	ND
	Well No. 5	ND									
8-4-82	GE-6[3]	ND				3.4	ND				
	Well No. 2[4]	3.4	6.2	ND							
	Stickney Well[5]	18.0	6.7	ND							
8-6-82	Stickney Well	15	5.4	ND							
	Furbish Pond	ND									
	Well No. 2[4]	2.7	7.5	ND							
	Well No. 3	9.6	5.1	ND							
8-11-82	Well No. 4	ND									
	Well No. 1	ND									
	Well No. 3	ND	3.4	ND				2.0	ND	2.7	23

NOTES:

1 Other samples collected from test holes, standing water, and cooling water discharge on General Electric property on same day and on 1-18-79 contained no volatile organic chemicals.
2 Sample was analyzed one day after it had been opened.
3 Reported as GE-1, results shown are average of two samples.
4 Reported as GE-2, results shown are average of two samples.
5 Results shown are average of two samples.

ND: Not detected at detection limit.
T: Trace
All results are reported in micrograms per liter (ug/l).
All samples, with the exception of those collected by CDM on 12-20-78 and 4-11-79, were collected and analyzed by DEQE.

TABLE 3-1

(FROM CDM REPORT, NOVEMBER 1986)

RESULTS OF VOLATILE ORGANIC ANALYSES
(1985 - 1986)

SAMPLING DATE	SAMPLING LOCATION	Trichloroethylene	Tetrachloroethylene	Chloroform	1,1-Dichloroethane	1,2-Dichloroethylene	Xylenes	1,1,1-Trichloroethane	1,1-Dichloroethylene	Vinyl Chloride	Toluene	Chlorobenzene
11-20-85	Well No. 3	21	8.4	ND								
	Well No. 5	5.9	P	ND								
	7A-1	18	41	ND								
	GE-6	ND	ND	P	ND							
	DLM-1	40	27	ND								

NOTES:

ND: Not detected at detection limit
P: Present but below detection limit
All results are reported in micrograms per liter (ug/l)

*Analysis by Method 624 (Remaining samples analyzed by Method 601/602)
**n-propyl benzene and trimethyl benzene were also detected at concentrations of greater than 500 ug/l.

Results of January 1979 Sampling

Sample Location	PCE (ppb)	TCE (ppb)
Five Waste Holding Tanks	6 to 968,000	<4 to 81,700
GE non-contact cooling water discharge 001	1100	<50
GE non-contact cooling water discharge 002	10	<50
Stormwater drain located 2000 Feet East of Fordham Road, Concord Street intersection	8	ND
Raw sewage entering GE treatment plant	30	ND
Treated effluent, prior to discharge to sand filter beds	6	ND
Water entering GE facility	10	ND

All results in ppb
ND = non-detectable

Results from volatile organic analyses of the Stickney Well in January 1979, showed 28 ppb PCE and 110 ppb TCE.

In April 1979, the Town of North Reading's consultant, CDM, sampled four test wells around the Stickney Well. Well locations are shown on Figure 3-1. The results are as follows:

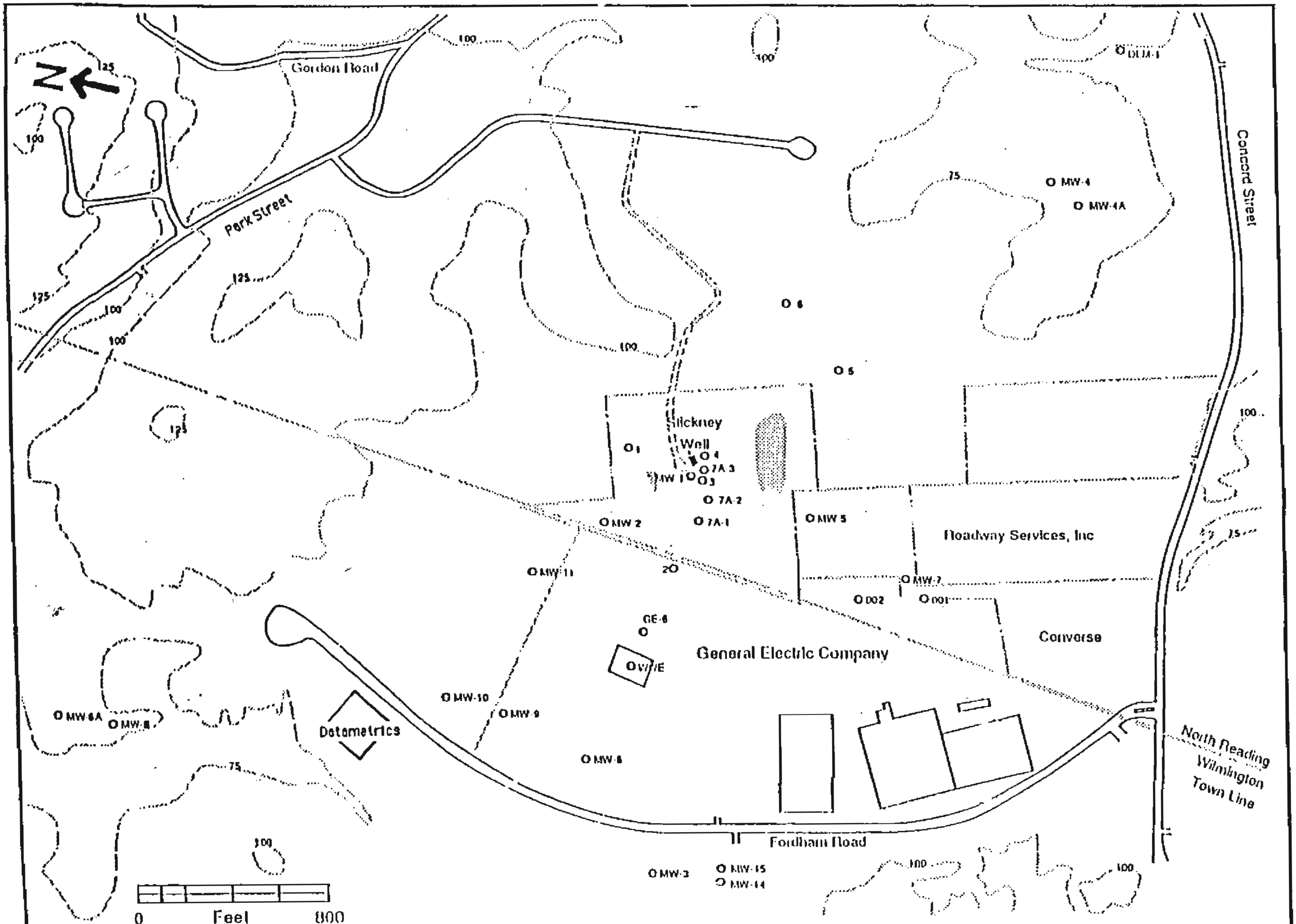


FIGURE 3-1: LOCATION OF MONITORING WELLS IN STUDY AREA
AT TIME OF CDM SAMPLING
GENERAL ELECTRIC, WILMINGTON, MASSACHUSETTS

Specify which are
GEA wells & CDM wells

Results of April 1979 CDM Sampling

Well No.	TCE	PCE	1,2-Dichloroethane
7A-1	850	216	6
7A-2	1300	380	11.2
7A-3	490	144	4
No. 3	1300	490	10

(all results in ppb)

All the wells are located immediately southwest of the Stickney Well. As shown, the ground water in the vicinity of the Stickney Well contained elevated levels of chlorinated organics.

Table 3-1, from CDM's November 1986 report on the Stickney Well, shows the results of a number of sampling events, conducted by CDM and DEQE between 1978 and 1985. As shown, contamination has consistently been identified in the Stickney Well and test Well No. 2 and No. 3. Concentrations of TCE and PCE appear to have decreased with time. As previously discussed, the April 1979 sampling event identified elevated levels of TCE and PCE in Wells 7A-1, 2 and 3.

In July and August of 1983, DEQE conducted a series of site inspections at 24 facilities on Concord Street in North Reading.

The facilities were visited for information on industrial and hazardous waste generation. Facility representatives were interviewed to determine what chemicals were used or stored, what type of operation was involved, how wastes were handled and the location of underground storage of holding tanks. The results of these site visits revealed that several facilities, in particular the trucking terminals on Fordham Road, used various degreasers and had large underground storage tank (UST) capacities.

On October 25, 1985, the Town of North Reading, DEQE and CDM met to discuss the Stickney Well contamination investigation and to coordinate field activities. Between October 1985 and January 1986, the DEQE visited seven industries on Fordham Road for the purpose of conducting site investigations pertaining to the contamination of the Stickney Well in North Reading. The industries visited included: GE, Dynamics Research Corporation, Converse Rubber Corporation, Compugraphics Corporation, E.I. Dupont DeNemours Company, Honeywell Corporation and Datametrics Corporation. As a result of these additional site inspections, the DEQE concluded that:

- No industries reported that they were currently using TCE

- Because Dupont has had to pump water out of their two 500-gallon underground concrete spill containment tanks it is possible that these tanks are not leak-free. DEQE reports stated that the water in the tanks could possibly be ground water and if indeed ground water was leaking in, the potential would exist for any contaminants from spills contained in the tanks to leak out.

- o Honeywell, which began operating in 1981, used solvents including isopropanol, acetone, PCE and petroleum naphtha.

- o Converse removed two underground gasoline storage tanks in the Spring of 1984.

- o Dynamics Research stored and used 1,1,1-trichloroethane, hydrofluoric acid, isopropyl alcohol and acetone.

- o Datametrics stored and used 1,1,1-trichloroethane in large quantities. Additionally, a 7000-gallon UST was present on site to store photochemical waste.

Concurrent with DEQE 1985 site inspections, CDM conducted an investigation of the nature and extent of contamination at the Stickney Well to determine if the well could be reclaimed as a viable water supply source. This investigation was funded by the

Massachusetts DEQE through its Water Supply Contamination Correction Program (Section 18 and 19 of Chapter 286 of the Acts of 1982). CDM reviewed available data and reports, installed 18 monitoring wells and conducted water quality sampling and analysis to identify contaminant plumes and potential sources.

Figure 3-1 shows the locations of the CDM wells. Well MW-1 is a bedrock well, installed first to determine if the solvent contamination was present in area bedrock. The well showed some trace contamination, but CDM concluded that it was a result of contamination in overlying sediments. All subsequent monitoring wells were installed in the unconsolidated deposits.

Table 3-2 is a summary of CDM's sampling of monitoring wells and other related sampling events; the results of those analyses are included in Appendix C in tabular form. As shown, contamination was only detected in CDM wells MW-4, MW-4A, MW-1, MW-5, MW-7 and MW-6A. Contaminant levels ranged from 1.6 to 170 ppb of total volatile organics. Additionally, wells DLM-1 (installed by D.L. Maher behind their Fordham Street facility), test wells No. 5, No. 3 and No. 7A-1 all showed levels of organic contaminants ranging from trace to 67 ppb.

CDM's draft "Report on Contamination of the Stickney Well" released in November 1986 identifies three separate contaminant "plumes." The major plume emanates from a source or sources

Table 3-2: SUMMARY OF SAMPLING ROUNDS

Sampled By	Date	EPA Method	Items Sampled	Reason for Sampling
CDM	11-20-85 11-21-85	601-602	DLM-1 3,5,7A-1, GE-6	Identify types and concentration of contaminants that still exist in water near Stickney Well. Organic and inorganic analysis.
CDM	1-3-86	624	Stickney Well	Organic and inorganic chemical analyses of municipal water. (inorganic data not in appendix).
CDM	2-4-86	624	MW-1, MW-11A	Check for contaminants, varify HNU readings
CDM	3-5-86	601-602	All MW and GE-6	Chemical analysis of volatile organics
CDM	5-16-86	601-602	GZA 1, GZA 4	
CDM	6-20-86	601-601	MW-1 - MW-11 MW-12 - MW-15 SW-1 - SW-4	Organic Chemical Analysis
CDM	7-31-86	624	MW-1-MW-15 SW 1-SW4	
ERM	6-3-87 6-6-87	624	GZA 1-15	Chemical analysis of volatile organics, check concentration and location of contaminants.

southwest of the Stickney Well and contains concentrations of TCE and PCE. The second contaminant area is north of Fordham Road and south of Park Street, located on property owned by Aleppo Temple about 1200 feet north of Datametrics. Levels of volatile organics were detected in ground water samples from a monitoring well in this area. The third contaminant area is located on property leased by Honeywell, where very high concentrations of xylenes and other hydrocarbons were detected in a ground water sample from a monitoring well in this area.

CDM's draft report recommends that the Town pursue reclamation of the Stickney Well and estimates a late 1991 on-line date. The work required to bring the well on-line would include treatment of the contaminated ground water and other well refurbishing which would be required regardless of the contamination. CDM also recommends installation of additional monitoring wells to assess the presence or absence of any contamination along Concord Street and Hallberg Park and to determine the nature and extent of the xylenes contamination on Honeywell property.

In June 1986 General Electric Company initiated their own site investigation in response to a letter from DEQE, dated June 11, 1986, titled "Notice of Responsibility," Pursuant of Massachusetts General Law Chapter 21E. GE retained a hydrogeologic consultant, GZA, to conduct a preliminary site investigation assessing the possible contributions of GE to the contamination of the Stickney Well and the GE property. GZA completed Phase I of the investigation in September 1986 and submitted a report to DEQE which recommended the installation of 13 additional monitoring wells to investigate the extent of TCE and PCE contamination at the GE site.

As part of Phase I, GZA sampled several existing wells and locations in the vicinity of GE and the Stickney Well. The results of GZA's first round of water quality sampling are included in Appendix C. As shown, volatile organic contamination, specifically TCE, PCE, and related by-products (1,1-dichloroethylene and trans-1,2-dichloroethylene) were identified in the two CDM wells sampled (MW-5 and MW-7). Additionally, traces of toluene were seen in the catch basin along the 002 outfall and in the effluent from GE's wastewater treatment plant. Two other volatile organic compounds, chloroform and bromodichloromethane, were seen in the wastewater effluent; however, GZA believes that these are related to the treatment/chlorination process.

Based on the recommendations of Phase I, GZA installed 16 additional monitoring wells in the vicinity of the GE Wilmington facility. The locations of the monitoring wells are shown on Figure 3-1. GZA boring logs are included in Appendix D. All the wells were installed in the overburden, or to the

32

See comment on FIG 3-1

GZA wells are not located on 3-1

bedrock/overburden interface. No wells were completed in the bedrock. What were the results of the GZA study?

3.2 ERM Phase I Investigations

Beginning in February 1987, ERM-New England, Inc. conducted a two-phase study to further identify possible sources of the Stickney Well contamination. The first phase of ERM's investigation was conducted over an eight-week period between February and April 1987. The study culminated in a May 1987 report entitled "Possible Sources of Contamination at the Stickney Well, North Reading, Massachusetts." This report, which is included as Appendix A, concluded that there are a number of possible sources of contamination of the Stickney Well.

The study was not designed to locate specific sources of contamination, but to identify possible contamination sources. A report entitled "Possible Sources of Contamination at the Stickney Well, North Reading, Massachusetts" was presented to G.E. in May 1987.

ERM conducted their investigation into the possible sources of well contamination as follows:

1. ERM visited the study area and conducted a "windshield survey" which included a visual inspection of the area,

a compilation of photographs of area industries and notations on current operations and correct locations of facilities.

2. ERM reviewed topographic maps, aerial photographs and town property maps of the study area.

3. ERM reviewed available relevant information on area industrial practices and hazardous substance activities. The information was collected from federal, state and local sources.

4. ERM visited the GE Wilmington plant and interviewed the Plant Engineer responsible for environmental compliance activities at the site. The history of the well contamination problem, previous site investigations and past and present waste management practices at GE were discussed. A site inspection of the facility and adjacent wetlands was conducted and photographs were taken at relevant locations.

5. ERM compiled and summarized all the information and identified potential contaminant sources.

As part of the investigation, ERM checked a variety of public information sources for relevant information on industrial practices and hazardous substances used at facilities in the vicinity of the Stickney Well. These sources include federal and state environmental agency files, local maps and permits, aerial photographs and other studies on the Stickney Well.

A summary of the companies identified during the investigation is included in Table 3-3. This summary matrix presents general information on each facility in the study area. Some of the industries identified are no longer in the area and a few of the facilities were constructed after the first Stickney Well contamination was identified. For the purposes of identifying all possible sources of well contamination, both former industrial occupants and firms established since 1974 were included in the study.

3.3 ERM Phase II Investigation

The second phase of ERM's Stickney Well Contamination Study included a comprehensive sampling round of the 16 monitoring wells installed by GZA in 1986. The results of the sampling for selected metals and volatile organic compounds will be discussed in Section 4.3.

In June 1987, ERM hydrogeologists and GE representative Arthur Gamache located all the GZA monitoring wells. The locations of the 16 wells are shown on Figure 3-2. ERM gauged

Table 3-3 POTENTIAL CONTRIBUTORS TO THE STICKNEY WELL CONTAMINATION

	Company Name	Number of Employees	Product/Service	Address	Year Building Permit Issued	Date of Occupancy	Proximity to Stickney Well	H.W. Generator	DEQE Facility File	Data in DEQE Town File	Underground Tank	NPDES Permit	Subsurface Discharge Permit	Spills	CERCLIS	Comments/Remarks
1)	Honeywell Corp.	1500	Electronic parts assembly & testing Photo processing	110 Fordham Rd.	1979	1981-present	3/8 mile	LQG	Y	Y	N	N	N	N	N	Uses solvents including isopropanol acetone, tetrachlorethylene & petroleum naptha. Possible disposal in septic leaching field.
2)	Volkswagen Corp.	75	Parts Distribution and Regional Admin.	100 Fordham Rd.	1968	1968-present	3/8 mile	N	N	Y		N	N	N	N	Parts Distribution and Office Building only.
3)	K.E.V. Electronics		Semiconductor Research	260 Fordham Rd.	1968	1969-1972	5/16 mile	Y	Y	Y	15,000-G holding tank for acid-neutral.sys.	N	N	N	N	Used solvents incl. 1,1,1-TCA & TCE
4)	Compugraphics Corp.		Computer Assembly	260 Fordham Rd.	1968	1972-1982	5/16 mile	LQG	N	Y	Not used onsite.	N	N	N	N	
5)	Pixel Computer		Microcomputers	260 Fordham Rd.	1968	c.1984-85	5/16 mile	?	N	N		N	N	N	N	
6)	Keytek Instrument			260 Fordham Rd.	1968	1986-present	5/16 mile	N	N	N		N	N	N	N	Moved into building in July, 1986.
7)	Datametrics Co. Div. Dresser Indus.	180	Encoders/Pressure Vacuum Measurement Systems	340 Fordham Rd.	1969	1970-present	5/16 mile	LQG	Y	Y	7000-G concrete holding tank photo-chem. waste.	N	N	N	N	Uses large quant. of 1,1,1-TCA. Used TCE in the past.
8)	General Electric Co.	1500	Aircraft Instruments	50 Fordham Rd.	1969	1971-present	3/16 mile	LQG	Y	Y	3-UST In-use (T=8,000G) 1-UST Temp. OOU (10,000G) 5-UST Per.OOU (T=17,500G)	Y	Y	N	N	Used TCE until 1975. NPDES outfalls 3/16 mile from well.
9)	Converse Corp.	300	Rubber & Sportswear R & D Laboratory	55 Fordham Rd. (now located at 1 Fordham Rd.)	1969	1973-1986	3/16 mile	SQG	N	Y	2 USTs (gas) removed 1984	N	N	N	N	Uses solvents in lab.
10)	Aleppo Temple	9	Fraternal Organization (Carnival Equip.)	99 Fordham Rd.			1/4 mile	N	N	Y		N	N	11/3/86-20 g. waste oil; cleaned up.	N	Owns adjacent property - site of rock crushing operation.
11)	E.I. Dupont Co.	14	Automotive Paint Distribution Center	One Cornell Pl.		1971-present	5/16 mile	LQG	N	Y	Two 500-G concrete holding tanks for spills	N	N	Y	Y	Possible onsite release of paint thinners investigated by DEQE 1985.
12)	Computervision		Interactive Graphics Automated Systems	5 Cornell Pl.	1981		3/8 mile	Y	N	N		N	N	N	N	Building currently vacant.
13)	Federal Express	110	Overnight Delivery Truck Center	10 Cornell Pl.			3/8 mile	N	N	N		N	N	N	N	Non-Mfg. Gas Pumps onsite.
14)	Travenol Inc.		Home Respiratory Therapy	10 Cornell Pl.		1986	3/8 mile	N	N	N		N	N	N	N	Non-manufacturing

Table 3-3 POTENTIAL CONTRIBUTORS TO THE STICKNEY WELL CONTAMINATION

	Company Name	Number of Employees	Product/Service	Address	Year Building Permit Issued	Date of Occupancy	Proximity to Stickney Well	H.W. Generator	DEQE Facility File	Data in DEQE Town File	Underground Tank	NPDES Permit	Subsurface Discharge Permit	Spills	CERCLIS	Comments/Remarks
15)	Dynamics Research Corp.	900	Encoders, Precision Patterns on Substrates	44 Concord St. 50 Concord St. 60 Concord St. 100 Fordham Rd. 350 Fordham Rd.	1968 " " " 1979	1969-present " " " 1979-present	3/8 mile " " " 5/16 mile	N LQG N N N	Y	Y		N	Y	Y	Y	Uses 1,1,1-TCA. Under DEQE invest. for onsite release. Onsite leaching fields for sanitary and industrial wastewater.
16)	Compugraphics Corp.	1500	Computerized Photo-Typesetting Equip.	66 Concord St. 55 Concord St. 35 Concord St. (N. Reading)	?	?	5/16 mile 7/16 mile 7/16 mile	LQG LQG LQG	Y Y Y	Y Y Y	 N N	Y N N	N N N	N N N	N N N	Photochem. waste (acid & NaOH) Waste paint & thinners (1,1,1-TCA) Photochemical waste.
17)	Roadway Express		Trucking Terminal	95 Concord St.	1966	1966-present	1/4 mile	SQG	N	Y	3 UST-90,000 gal. total	N	N	9/24/84 Unknown qty. gas & oil.	N	Opening in fence at back of lot. Waste oil stored in barrels onsite.
18)	Coles Express (Central Transport)		Trucking Terminal	93 Concord St.	1965	1965-present	1/4 mile	SQG	N	Y	1 - 10,000 UST	N	N	8/28/86 40-100 G diesel	N	Routine truck maintenance potential use of degreasers. Mason-Dixon possible former tenant.
19)	Riley Truck Leasing		Trucking Terminal	90 Concord St.			3/8 mile		N	Y	N	N	N	5/22/85-10G dies. fu.	N	
20)	C.R. Bard Inc.	55	Sheet Metal Welding (Medsystems Div.)	87 Concord St.	1981	1981-present	5/16 mile	LQG	N	Y	N	N	N	N	N	Waste solvents (from degreasing) collected in drums for recycling.
21)	Lily Trucking		Trucking Terminal	84 Concord St.	1955	c.1960-present	3/8 mile	SQG	N	Y	5 UST-27,000 gal. total	N	N	1-2 gal. diesel spill into pond	N	Degreasers used. Lease to Reading Trucking.
22)	St. Johnsbury		Trucking Terminal	90 Concord St.	1955	c.1960-present	3/8 mile	SQG	N	Y	2 UST-20,000 gal. total	N	N	8/28/80 55-gal. unk. 5/6/81 55-g thinner.	N	Degreasers used. Unknown disposal from maintenance drains.
23)	Sanborn's Express		Trucking Terminal	80 Concord St.	1955	c.1960-present	7/16 mile	SQG	N	Y	7 UST-41,000 gal. total	N	N	1/27/85 55-g. drum unk. white chemical	N	On-site drilling observed 2/26/87 Degreasers used onsite. Truckwash connected to septic tank.
24)	Centre Trucking Co.		Trucking Terminal	81 Concord St.	1974	1974-present	5/16 mile	SQG	N	Y	5 UST-8000 gal. total.	N	N	1/14/79 55-G kero & 80-100G canvas trmt. oil disch. wetland.	N	
25)	Service System Co.		Food Service	77 Concord St.	1970	c.1970-present	3/8 mile	N	N	Y	N	N	N	N	N	No chemicals onsite.
26)	Dyar Sales and Machinery		Highway Equipment Distributor	75 Concord St.	1974	c.1974-present	3/8 mile	SQG	N	Y	N	N	N	N	N	Solvent degreaser used. Solvent & waste oil stored in abovegd. tanks.
27)	Drake Baking Co.		Transfer Station and Cake Distribution Ctr.	74 Concord St.	1955	1976-present	7/16 mile	SQG	N	Y	1-4000G UST (gas) 1-500G UST (waste oil)	N	N	N	N	Trucks maintained & washed onsite. Closed sys./water recycled. Waste solvent collected in drums.

Table 3-3 POTENTIAL CONTRIBUTORS TO THE STICKNEY WELL CONTAMINATION

	Company Name	Number of Employees	Product/Service	Address	Year Building Permit Issued	Date of Occupancy	Proximity to Stickney Well	H.W. Generator	DEQE Facility File	Data in DEQE Town File	Underground Tank	NPDES Permit	Subsurface Discharge Permit	Spills	CERCLIS	Comments/Remarks
28)	Dependable Masonry Construction			73 Concord St.	1975	1975-present	3/8 mile	N	N	N	N	N	N	N	N	
29)	Data Processing Systems Co.		Offices and Computer Showroom	72 Concord St.	1950		7/16 mile	N	N	Y	Septic	N	N	N	N	No waste generated onsite.
30)	D.L. Maher Corp.		Groundwater Development	71 Concord St.	1968	1970-present	3/8 mile	SQG	N	Y	2 USTs (fuel & diesel) - removed -	N	N	7/19/85 - Release Pesticide (dursban)	N	Waste oil generated. TCE hotspot behind site. Onsite truck maint.
31)	Craig Laundry Supply		Supplier of Dry Cleaning and Laundry Products	70 Concord St.	1966	c.1984-present	7/16 mile	N	N	N	N	N	N	N	N	May use chlorinated solv. onsite.
32)	Contour Chemical Co.		Manufacture Mould Release Agents	70 Concord St.	1966	1979-1984	7/16 mile	LQG	N	Y	4-5 USTs-unknown content	N	N	4/84 - CDM invest. black soil stain.	N	4/83 DEQE inspect. reveals site not properly closed, g.w. contam. poten
33)	Empire Adhesives Co.		Manufacture Water-based Adhesives	70 Concord St.	1966	1965-1979	7/16 mile	Y	N	Y	?	N	N	?	N	Periodically discharged white liq. back of prop. (CDM classify nonhaz)
34)	Undercoverwear Inc.		Marketing Womens' Wear	66 Concord St.	c.1984	c.1985-present	7/16 mile	N	N	Y	N	N	N	N	N	No chemicals onsite.
35)	C.M. Ironworks		Distribute Manhole and Catch Basin Covers	62 Concord St.	1972	c.1972-present	7/16 mile	N	N	Y	Septic	N	N	N	N	No manufacturing/no solvents used.
36)	New England Concrete			62 Concord St.	1972	c.1972-present	7/16 mile	SQG	N	Y	Septic	N	N	8/2/83-Stains noted from antifreeze, oil and resin spillage.	N	Drums with resin & hydraulic oil stored onsite.
37)	Annette's Restaurant		Restaurant	62 Concord St.	1972	c.1972-present	7/16 mile	N	N	Y	Septic with leachfield	N	N	N	N	No chemicals onsite.
38)	MSM Industries	70	Precision Metalwork	60 Concord St.	1968	c.1968-present	7/16 mile	LQG	Y	Y	N	Y	N	N	N	Generates waste solvents (1983 DEQE Annual Rpt.)
39)	CHF Products Inc.		Manufacture Metal Parts for Computer & Defense	5 Hallberg Pk.	1970	c.1970-present	7/16 mile	SQG	N	Y	5500-g. UST (htg. oil)	N	N	8/4/83-Surface stain of cutting oil noted	N	Solvents/oils used. Stored in 3 abovegd. tanks. Previous site owner dumped onsite (metal contamination)
40)	Pacetti Corp.		Engraving & Embossing	4 Hallberg Pk.	1969	c.1969-present	7/16 mile	SQG	N	Y	N	N	N	N	N	Uses solvents/cut. oils. Mixed w/ metal chips, discard in dumpster.

Table 3-3 POTENTIAL CONTRIBUTORS TO THE STICKNEY WELL CONTAMINATION

	Company Name	Number of Employees	Product/Service	Address	Year Building Permit Issued	Date of Occupancy	Proximity to Stickney Well	H.W. Generator	DEQE Facility File	Data in DEQE Town File	Underground Tank	NPDES Permit	Subsurface Discharge Permit	Spills	CERCLIS	Comments/Remarks
41)	Val-Ken Machine Products		Machine Shop	4 Hallberg Pk.	1969	c.1969-present	7/16 mile	SQG	N	Y	N	N	N	N	N	Solvents used in degreasing. Solv. formerly dumped on grd. now put in drums w/metal chips.
42)	Columbia Construction		Offices	58 Concord St.			7/16 mile	N	N	Y	Septic	N	N	N	N	No waste generated onsite.
43)	J. Sanford & Sons		Manufactures Steel Panels	50 Concord St.			7/16 mile	SQG	N	Y	N	N	N	8/83 DEQE noted improper wst. oil disp.	N	Diesel fuel stored in abovegd. tanks. Waste oil stored in drums-poor cond
44)	ML Transfer		Shoe Warehouse	44 Concord St.			7/16 mile	N	N	Y	N	N	N	N	N	No chemicals onsite.
45)	United Parcel Service (UPS)		Distribution Center for Parcel Delivery	23 Concord St.			1/2 mile	N	N	N	1-5000 G. UST	N	N	N	N	UST probably for gas/fuel.
46)	Bobcat of Boston		Sales/Service/Parts Construction Equipment	20 Concord St.			1/2 mile	SQG	N	Y	3-2000 G USTs	N	N	8/8/83-Oil stains noted on ground.	N	Generated 100g/month waste oil Collect in abvgrd. tanks & recycle.
47)	N.W. Carr Corp.		Distributor of Picture Frames	__ Fordham Rd.		c.1979		N	N	Y	N	N	N	N	N	Visited by DEQE in 1979 for Stickney Well investigation.
48)	K-2 Corp.		Distributor of Ski Equipment	__ Fordham Rd.		c.1979		N	N	Y	N	N	N	N	N	Visited by DEQE in 1979 for Stickney Well investigation.

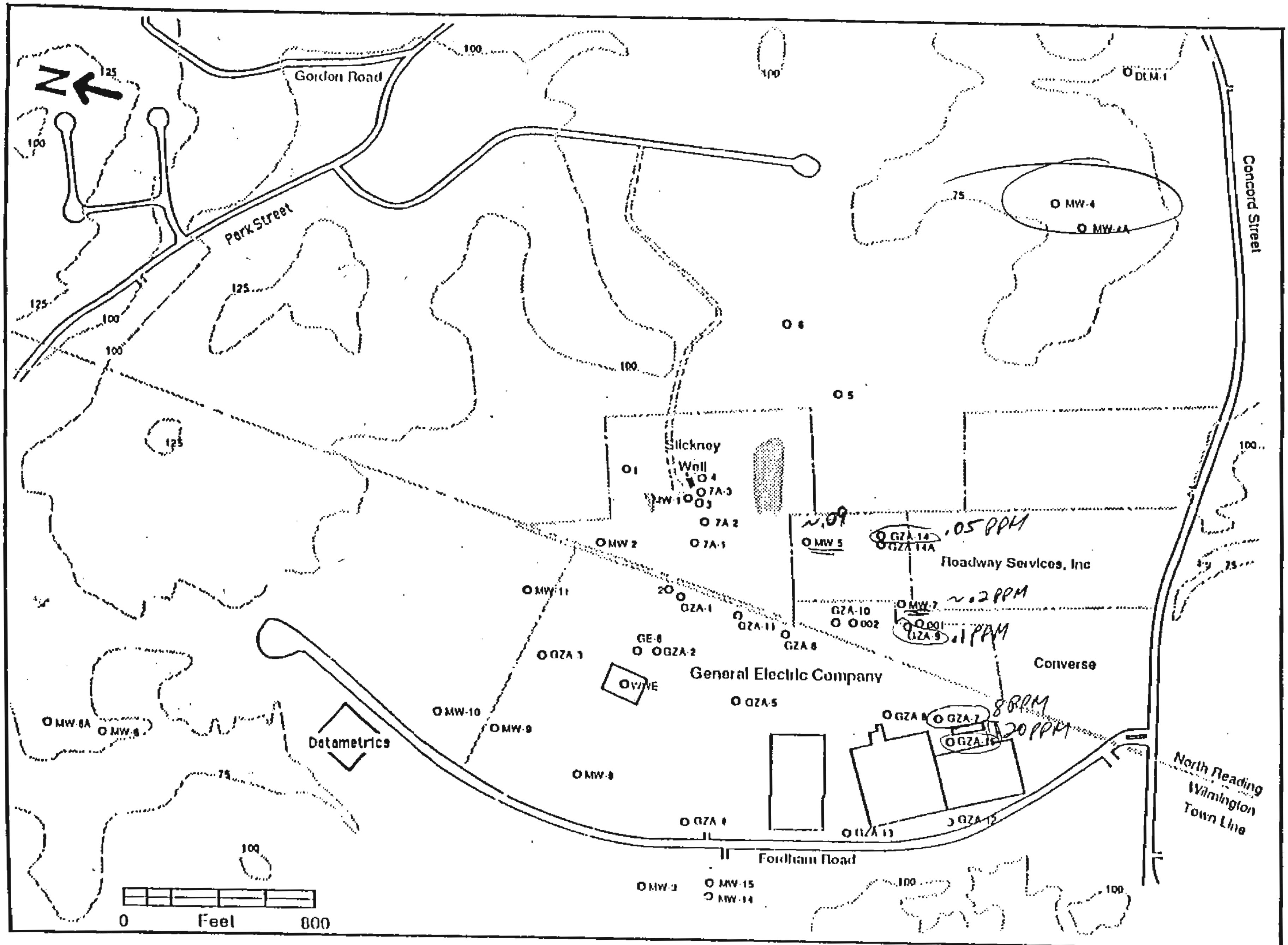


FIGURE 3-2: LOCATION OF ALL MONITORING WELLS IN STUDY AREA
GENERAL ELECTRIC, WILMINGTON, MASSACHUSETTS

each well relative to the fixed measuring points previously surveyed. Ground water samples to be analyzed for total volatile organics (EPA method 624) and eight RCRA metals were collected from each well. Samples were collected on Tuesday, June 3 and Friday, June 6 using the procedure outlined below.

- Using an optical interface probe, determine total volume of standing water in the well.

- Evacuate three well volumes using a dedicated PVC bailer. The dedicated bailer was used to ensure a representative sample and to prevent cross contamination between wells.

- Collect the ground water sample from the well using a dedicated bailer.

- Place water samples for total volatile organic analysis in 40 ml glass vials with teflon septa. Completely fill each vial to avoid any headspace and potential loss of volatile organics.

- Collect duplicate samples to ensure proper quality control.

- Collect metal samples in 1-liter plastic bottles preserved with nitric acid.

- Pack all samples on ice immediately after collection.

- Ship all samples to EnviroTest Laboratories in Newburgh, New York, within 24 hours of collection.

- Follow chain of custody procedures and file the forms.

SECTION 4.0
RESULTS OF INVESTIGATION

4.1 Geology

The Study Area lies within the New England Physiographic Province. The area is underlain by Pleistocene glacial till and outwash and older crystalline bedrock. The site is located in a deep northwest-southeast trending, sediment-filled valley that extends from Wilmington to the Boston Harbor. The valley was filled with glacial outwash material during the end of the Pleistocene epoch. The outwash is generally composed of unconsolidated, highly to moderately permeable, medium to coarse-grained sand and gravel. The outwash material is underlain and laterally bound by dense glacial till and metamorphic bedrock.

Sediments encountered during drilling at the GE site consist of three main types: till, stratified drift and swamp/alluvial deposits. The bedrock surface at the site is generally overlain by till deposits. These sediments tend to be more compact and much finer grained than the overlying outwash. Much of the material encountered at the site consists of medium to fine-grained sand. There does not appear to be a great amount of lateral homogeneity between wells. Alluvial and swamp deposits were encountered in a number of wells across the site. These sediments generally consist of thin clay units and peat deposits, respectively.

The thickness of the unconsolidated deposits varies across the study area from 20 to greater than 60 feet, due to the undulating bedrock surface (i.e., bedrock is from 20 to 60 feet below the surface). The saturated thickness of the aquifer deposits is estimated to average 40 feet.

4.2 Hydrogeologic Characteristics of the Aquifer

The configuration of the water table in the vicinity of the Stickney Well was originally mapped by CDM as part of their 1986 investigation. The configuration of the water table under non-pumping conditions (June 1986), as interpreted by CDM in their 1986 report to the town of North Reading, is included in Appendix C. Under non-pumping conditions, the general ground water flow direction south of the Cornell Place and the Aleppo Temple is to the east-southeast, toward the Ipswich River. Ground water flow north of the Datametrics facility and the Aleppo Temple is to the north, toward a small unnamed tributary of Martins Brook.

As shown in the water table configuration map in Appendix C, a mounding of the water table is noted in the vicinity of GE's treatment plant and non-contact cooling water outfalls. This ground water divide extends to a location directly north of the

Stickney Well. This divide is postulated to be a result of the high volume of discharge from the two non-contact cooling water outfalls (001 and 002) and the waste water treatment plant. Approximately 132,200 gallons per day (gpd) of treated and non-contact water is discharged in this zone. The actual permitted discharges are as follows: 30,000 gpd from the treatment plant, 68,000 and 34,200 gpd from non-contact cooling water outfalls M001 and M002, respectively. It is probable that this divide would be located further north of the well under conditions of no discharge or Stickney Well pumping.

Depth to ground water in the vicinity of the GE facility and the Stickney Well ranges from approximately 1 to 10 feet below grade. The general hydraulic gradient across the GE site is approximately 0.001 feet/foot (based on ground water data collected in June 1986 by CDM).

The aquifer in the area around the Stickney Well is composed of unconsolidated sand and gravel. The aquifer deposits overlay the relatively impervious metamorphic bedrock and/or low permeability glacial till. Neither the bedrock nor the till have any significant primary or secondary porosity. Hydraulic conductivity in the till has been estimated by the DEQE at 1.5 gallons per day/square foot (gpd/sf). The DEQE has estimated the permeability of the stratified drift aquifer in the vicinity of the Stickney Well to be 1500 gpd/sf (200 ft/day). This value is within the range of permeability values reported for clean sand and gravel aquifers.

The average velocity of ground water flow in the unconsolidated aquifer was calculated using the equation:

$$V = ki/n$$

Where: V = average velocity (ft/day)
k = permeability (ft/day)
i = hydraulic gradient (ft/ft)
n = porosity (dimensionless)

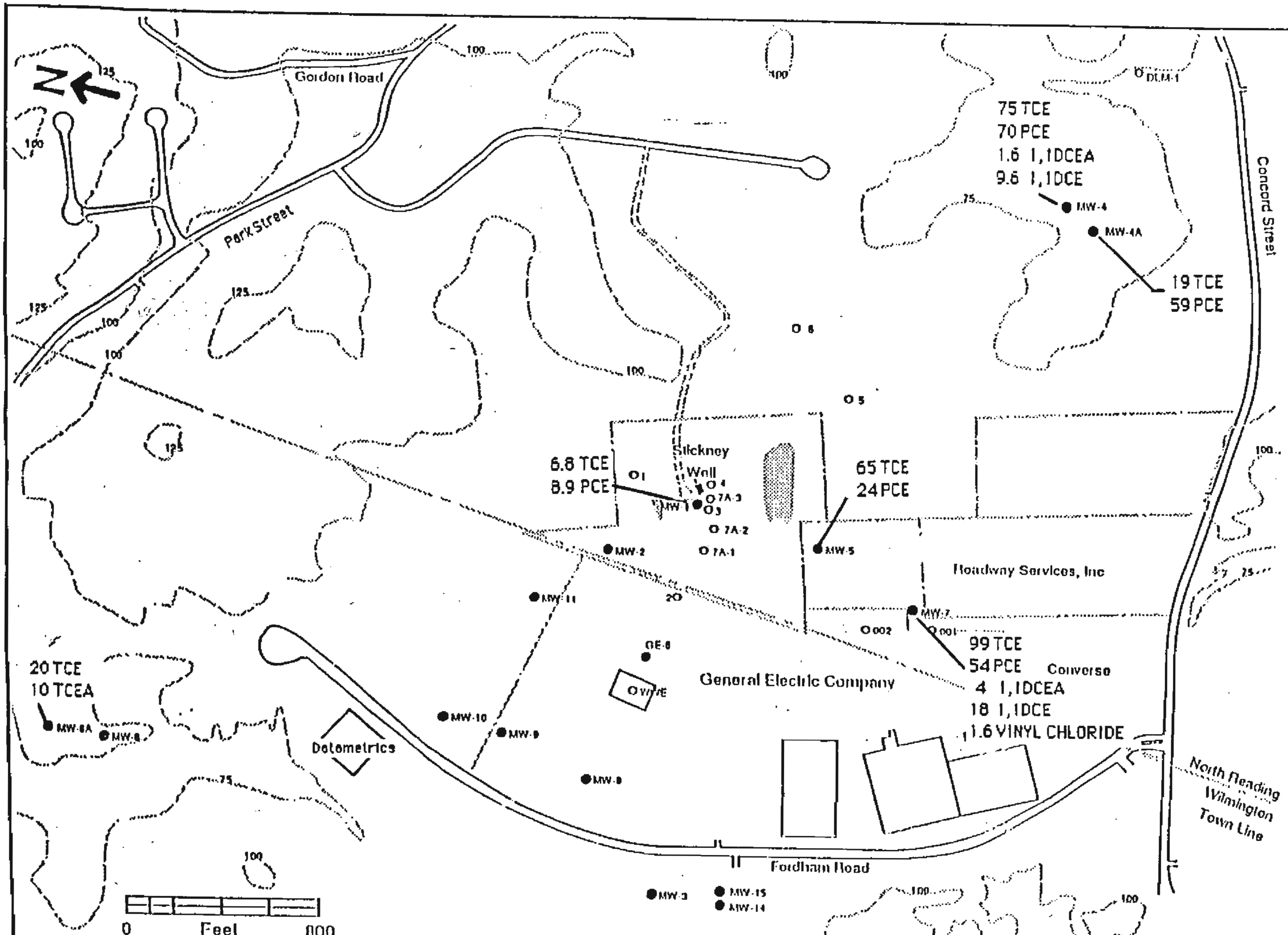
This equation assumes that the aquifer is homogeneous and isotropic. The resultant velocity is the theoretical calculation of ground water velocity (note that contaminants within the ground water move at different velocities, section 4.2.4). In order to determine the actual velocity of ground water, local field tests would have to be conducted. Using a hydraulic conductivity of 200 ft/day, a value of 0.25 for porosity and a hydraulic gradient of 0.001 ft/ft, an average ground water flow velocity of 0.8 ft/day was calculated for non-pumping conditions.

4.3 Nature and Extent of the Contamination

4.3.1 Review of CDM Ground Water Quality Data

CDM's sampling and analysis of ground water in the vicinity of the Stickney Well were discussed briefly in Section 3.1. Full analytical results are included in tabular form in Appendix C. Table 4-1 shows all data reported by CDM. As noted in Section 3-1, CDM installed 16 monitoring wells in early 1986. As part of the 1987 Stickney Well investigation conducted by ERM, contaminant concentration based on CDM data were mapped. The contaminant concentration map is shown in Figure 4-1. The figure shows data for TCE, PCE and total volatile organics, based on CDM's March 1986 sampling event, which almost exclusively involved the new monitoring wells, MW-1 through MW-14. As shown in the figure, there appears to be three separate areas of contamination: 1- the area adjacent to the GE, Converse and Roadway facilities, 2-the area north of the Datametrics facility near Park Street and 3-the area northwest of the D.L. Maher building on Concord Street. These three areas of contamination were discussed generally by CDM.

Although a number of wells were sampled during the March monitoring event, it should be noted that there are large areas where no monitoring wells exist. Wells were not placed in a complete grid pattern, nor in a complete pattern to monitor all areas upgradient of the well, nor with equal areal coverage. One area with no monitoring wells is the area between Roadway Services Inc. and D.L. Maher. These data are obviously biased toward the location of the existing monitoring wells.



● WELLS SAMPLED FOR ANALYSIS

19 TCE
59 PCE Concentration in Ground Water (ppb)

(WELLS WITH NO DATA SHOWN INDICATE NO VOCS DETECTED)

FIGURE 4-1: VOLATILE ORGANICS DETECTED IN GROUND WATER
CDM SAMPLING, MARCH 1986
GENERAL ELECTRIC, WILMINGTON, MASSACHUSETTS

TABLE 4-1

(FROM CDM REPORT, NOVEMBER 1986)

RESULTS OF VOLATILE ORGANIC ANALYSES
(1985 - 1986)

SAMPLING DATE	SAMPLING LOCATION	Trichloroethylene	Tetrachloroethylene	Chloroform	1,1-Dichloroethane	1,2-Dichloroethylene	Xylenes	1,1,1-Trichloroethane	1,1-Dichloroethylene	Vinyl Chloride	Toluene	Chlorobenzene
1-3-86	Stickney Well*	P	P	ND								
2-4-86	MW-1	9.3	11	ND								
3-3-86	MW-1	6.8	8.9	ND								
	MW-2	ND										
	MW-3*	ND					>100	ND				
	MW-4	75	70	ND	1.6	9.6	ND					
	MW-4A	19	59	ND								
	MW-5	65	24	ND								
	MW-6	ND										
	MW-6A	20	ND					10	ND			
	MW-7	99	54	ND	4.0	ND			18	1.6	ND	ND
	MW-8	ND										
	MW-9	ND										
	MW-10	ND										
	MW-11	ND										
	MW-11A	ND										
	GE-6	ND										
5-15-86	GZA-1	ND										
	GZA-4	ND										
6-20-86	MW-1	7.8	ND					P	ND			
	MW-2	ND										
	MW-3	ND					250	ND				
	MW-4A	ND										
	MW-5	85	24	ND								
	MW-6A	14	ND					7.3	ND			
	MW-7	130	66	ND	ND	17	ND					
	MW-9	ND										
	MW-11A	ND										
	MW-12	ND										
	MW-13	ND										
	MW-14	ND										
	MW-15	ND										
	DLM-1	30	23	ND		1.6	ND					
	7A-1	23	41	ND								
	SW-1	ND										
	SW-2	ND										
	SW-3	ND										
	SW-4	ND										
7-31-86	MW-3*	ND					>500**	P	ND	ND	P	80
	MW-4*	240	91	ND								
	MW-4A*	130	55	ND								
	SW-5*	P	ND	P	ND		P	P	ND			

NOTES:

ND: Not detected at detection limit
P: Present but below detection limit
All results are reported in micrograms per liter (ug/l)

*Analysis by Method 624 (Remaining samples analyzed by Method 601/602)
**n-propyl benzene and trimethyl benzene were also detected at concentrations of greater than 500 ug/l.

4.3.2 Results of ERM's Ground Water Quality Analysis

The results of ERM's ground water quality analysis of samples collected from the 16 GZA wells are presented in Tables 4-2 and 4-3. The laboratory data are included in Appendix B.

The locations of the monitoring wells were shown on Figure 3-2. It should be noted that this sampling event is the first time the GZA wells have been sampled, and therefore, there is no verifying or comparative data. However, ERM is presently conducting additional sampling to verify the June 1987 results. The locations of the GZA wells were shown on Figure 3-2. As shown in Table 4-2, volatile organics were detected at varying levels in five of the GZA monitoring wells. No volatile organic compounds (VOCs) were detected in the other 11 wells sampled. Concentrations of the total of the volatile organic compounds for which the samples were analyzed (tvocs) ranged from 34 ug/l (ppb) in well GZA-8,(located in the rear parking lot of the GE facility), to 19,968 ppb in well GZA-15,(located adjacent to the barrel storage area.) The other monitoring wells showing concentrations of volatile organics were: GZA-7 (7828 ppb tvocs), GZA-9 (119 ppb tvocs) and GZA-14 (47 ppb tvocs).

Ten volatile organic compounds were identified in the laboratory analysis of the ground water samples: tetrachloroethylene (PCE), trichloroethylene (TCE), trans-1,2-

Table 4-2: SUMMARY OF RESULTS OF VOLATILE ORGANICS ANALYSIS OF ERM SAMPLES
EPA Method 624 General Electric Company, Wilmington, MA

Sample Date: June 3 & 6

Parameter	Detection Limit	GZA-1	GZA-2	GZA-3	GZA-4	GZA-5	GZA-6	*GZA-7
1,2-dichlorobenzene	10 ug/l (*50 ug/l)	ND	ND	ND	ND	ND	ND	ND
1,3-dichlorobenzene	10 ug/l (*50 ug/l)	ND	ND	ND	ND	ND	ND	ND
1,4-dichlorobenzene	10 ug/l (*50 ug/l)	ND	ND	ND	ND	ND	ND	ND
tetrachloroethylene (PCE)	1 ug/l (*5 ug/l)	ND	ND	ND	ND	ND	ND	ND
trichloroethylene (TCE)	1 ug/l (*5 ug/l)	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	1 ug/l	ND	ND	ND	ND	ND	ND	760
Toluene	1 ug/l	ND	ND	ND	ND	ND	ND	1600
Trans 1,2-dichloroethylene	1 ug/l	ND	ND	ND	ND	ND	ND	3620
1,1,1-trichlorethane	1 ug/l	ND	ND	ND	ND	ND	ND	140
Vinyl Chloride	1 ug/l	ND	ND	ND	ND	ND	ND	1670
[illegible]hyl Benzene	1 ug/l *(5 ug/l)	ND	ND	ND	ND	ND	ND	<5
1,1-dichloroethane	1 ug/l *(5 ug/l)	ND	ND	ND	ND	ND	ND	38
1,1-dichloroethylene	1 ug/l *(5 ug/l)	ND	ND	ND	ND	ND	ND	<5
Totals		ND	ND	ND	ND	ND	ND	7,828

* detection limit for GZA-7 sample only.

All results in ug/l (ppb)

2. Screened at top of saturated zone.

Table 4-2 (continued)

Parameter	Detection Limit	GZA-8	GZA-9	GZA-10	GZA-11	GZA-12	GZA-13	GZA-14	GZA-14A	GZA-15
1,2-dichlorobenzene	10 ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-dichlorobenzene	10 ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-dichlorobenzene	10 ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND
tetrachloroethylene	1 ug/l	18	16	ND	ND	ND	ND	11	ND	19
trichloroethylene	1 ug/l	16	28	ND	ND	ND	ND	36	ND	18
Methylene Chloride	1 ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	1 ug/l	ND	ND	ND	ND	ND	ND	ND	ND	350
Trans 1,2-dichloroethylene	1 ug/l	ND	69	ND	ND	ND	ND	ND	ND	5770
1,1,1-trichlorethane	1 ug/l	ND	ND	ND	ND	ND	ND	ND	ND	43
Vinyl Chloride	1 ug/l	ND	5.6	ND	ND	ND	ND	ND	ND	13,700
Ethyl Benzene	1 ug/l *(5 ug/l)	ND	ND	ND	ND	ND	ND	ND	ND	12
1,1-dichloroethane	1 ug/l *(5 ug/l)	ND	ND	ND	ND	ND	ND	ND	ND	51
1,1-dichloroethylene	1 ug/l *(5 ug/l)	ND	ND	ND	ND	ND	ND	ND	ND	4.7
Totals		34	118.6	ND	ND	ND	ND	47	ND	19,967.7

* detection limit for GZA-7

All results in ug/l (ppb)

Table 4-3: RESULTS OF ANALYSIS OF GROUND WATER SAMPLES FOR RCRA METALS
General Electric Company, Wilmington, MA June 1987

		GZA-1	GZA-2	GZA-3	GZA-4	GZA-5	GZA-6	GZA-7	GZA-8
As	ppb	13	<5.0	19	58	23	6.5	37	27
Ba	ppm	0.07	0.26	0.21	1.2	0.25	0.11	0.06	0.26
Cd	ppm	ND	0.006	ND	0.009	0.01	ND	ND	0.006
Cr	ppm	0.06	0.06	0.06	0.16	0.07	0.05	0.03	0.04
Pb	ppm	0.02	0.03	0.18	0.59	0.28	0.15	ND	ND
Hg	ppb	ND	ND	ND	ND	ND	ND	ND	ND
Se	ppb	ND	ND	ND	ND	ND	ND	ND	ND
Ag	ppm	ND	ND	ND	ND	ND	ND	ND	ND

		GZA-9	GZA-10	GZA-11	GZA-12	GZA-13	GZA-14	GZA-15
As	ppb	43	43	37	20	ND	ND	36
	ppm	0.07	0.21	ND	.72	0.32	0.22	ND
Cd	ppm	0.007	ND	ND	ND	ND	ND	ND
Cr	ppm	ND	ND	ND	0.04	0.07	ND	ND
Pb	ppm	ND	ND	ND	0.06	0.05	ND	ND
Hg	ppb	ND	ND	ND	ND	ND	ND	ND
Se	ppb	ND	ND	ND	ND	ND	ND	ND
Ag	ppm	ND	ND	ND	ND	ND	ND	ND

Were these samples filtered prior to acidifying? Some values appear high.

Cannot read the well ID #5 on GZA logs

dichloroethylene, 1,1,1-trichloroethane (TCEA), 1,1-dichloroethylene, 1,1-dichloroethane, vinyl chloride, methylene chloride, ethyl benzene and toluene. The compounds with the highest concentrations were vinyl chloride, 13,700 ppb (GZA-15), trans-1,2-dichloroethylene, 5770 ppb (GZA-15), toluene, 1600 ppb (GZA-7) and methylene chloride, 760 ppb (GZA-7).

In general, the highest tvoc concentration was detected in monitoring well GZA-15 (TVO 19,968 ppb). A high tvoc concentration was also detected in GZA-7 (7828 ppb). Several compounds, specifically, methylene chloride and toluene, were detected in much higher concentrations in GZA-7, as compared to GZA-15. Methylene chloride was detected at 760 ppb in GZA-7 and was not present above the minimum detection level in GZA-15.

As shown in Table 4-2, a comparison of contaminant levels in GZA-14 (screened between 39 and 49 feet below grade; about 20 feet above bedrock) and GZA-14A (screened between zero and 15 feet below grade) shows that VOC contamination is present in the deep well and not present in the shallow well. The deep well (GZA-14) contained 11 ppb PCE and 36 ppb TCE. Since these denser compounds sink in the aquifer, it is possible that greater contaminant levels could exist at the bedrock/overburden interface. All contaminants tested below the detection limits in well GZA-14A. The difference between the two wells is probably related to the fact that both chlorinated compounds have ?

densities greater than water. The higher density compounds tend to sink to the bottom of the aquifer as they migrate through ground water. An additional possible explanation for the presence of VOC's at depth may be that no current releases are occurring from the property, since denser materials would be found in shallower wells if releases were ongoing. This hypothesis will require further investigation.

The results of the metals analysis conducted on the 16 GZA monitoring wells are shown in Table 4-3. Metals, specifically, arsenic, barium, cadmium, chromium and lead, were detected at varying concentrations in 12 of the 16 wells sampled. Arsenic was detected in 12 of the 16 monitoring well samples in concentrations of <5.0 to 58 ppb. Barium was detected in 13 well samples in concentrations varying from 0.06 to 1.2 ppm (60 to 1,200 ppb) Chromium was also detected at a number of locations (10).

What does this mean?

4.3.3 The Nature of the Contamination

As shown in Tables 4-2 and 4-3 the contaminants of concern in the vicinity of the Stickney Well include volatile organics, for the most part, chlorinated hydrocarbons, and some metals. The two compounds identified in previous investigations as contaminants of concern are PCE and TCE. Both compounds were identified at levels ranging from 11 to 36 ppb in four wells during ERM's investigation. In addition, a number of other VOCs were identified. The levels of PCE and TCE are lower than those of the other VOCs identified in the June 1987 sampling event.

PCE & TCE degrade to vinyl chloride

Concerning the compounds identified by the ERM sampling event, several of the chemicals are presently used or were formerly used by GE. According to GZA's 1986 report, GE currently uses trichlorofluoromethane, methylene chloride, trichlorotrifluoroethane, acetone, 1,1,1-trichloroethane and nitromethane in plant processes. DEQE records show that TCE and PCE were formerly used at the GE facility and identified in environmental samples. Toluene is a common solvent and along with ethyl benzene, an integral part of petroleum fuel. Four of the compounds identified during ERM's sampling were not reported as having ever been used at GE. These compounds are: trans-1,2-dichloroethylene, 1,1-dichloroethylene, 1,1-dichloroethene and vinyl chloride. All these compounds are common breakdown products of TCE and PCE.

4.3.4 Comparison of Data to Ground Water Quality Standards, Criteria and Guidelines

Ground water quality in the Commonwealth of Massachusetts is regulated under a variety of state and federal standards, criteria and guidelines. At the federal level, the regulations most applicable to ground water quality are established by the Safe Drinking Water Act and by the Clean Water Act. In Massachusetts, ground water standards and guidelines are contained in CMR 314 Section 6.06 "Minimum Ground Water Quality Criteria."

Table 4-4 summarizes the applicable guidelines and criteria for the volatile organic compounds of concern. For the organic contaminants of concern, the most stringent guidelines presented in Table 4-4 are the Safe Drinking Water Act Proposed Maximum Contaminant Levels Guidelines (MCLGs) and the Clean Water Act Ambient Water Quality Criteria. At the present time, both sets of numbers are "guidelines" for ground water as opposed to enforceable standards. However, when finalized, the MCLGs become the health-based values upon which Maximum Contaminant Levels (MCLs) are based. MCLs are the enforceable primary drinking water standards. "Proposed MCLs" are maximum contaminant concentrations allowable in drinking water that are being proposed by EPA for inclusion in the enforceable Primary Drinking

Table 4-4: GROUND WATER QUALITY STANDARDS, CRITERIA AND GUIDELINES FOR VOLATILE ORGANIC CONTAMINANTS OF CONCERN

	Safe Drinking Water Act EPA Primary Drinking Water Standards (a)			Clean Water Act Ambient Water Quality Criteria	Massachusetts Guidelines
	Proposed MCLGs (b)	Final MCLGs (b)	Proposed MCLs (b)	(For Human Health, Adjusted for Drinking Water Only) (c)	Class I & II Ground Waters (d)
trichloroethylene	--	0.0	0.005	(2.8 ug/l)	None in such concentrations which in the opinion of the Director would inpair the waters forever as a source of potable water or to cause or contribute to a condition contravention of standards for other Class I & II waters of the Commonwealth
tetrachlorethylene	0.0	--	0.007	(0.88 ug/l)	
1,1,1-trichloroethane	--	0.20	0.20	19.0	
trans-1,2 dichloroethylene	0.07	--	--	insufficient data	
vinyl chloride	--	0.0	0.001		
toluene	2.0	--	--		
methylene chloride					
1,1-dichloroethane					
ethyl benzene	0.68	--	--		
1,1-dichloroethylene	--	0.007	0.007		

(a) All standards and criteria are expressed in mg/l (ppm) unless other-wise noted.

(b) From Federal Register, Volume 50, No. 219, November 13, 1985.

(c) These are non-enforceable criteria based solely on scientific evidence (not economical or technical feasibility of attainment).
In many cases the value is zero, in this case the value given parenthesis represents a 10-6 lifetime cancer risk from consuming water contaminantd with the compound. These criteria, originally published in 45FR7918-79379 November 28, 1986 and have been adjusted to account for the injestion of contaminated water.

(d) (314 CMR 6.06) Massachusetts General Law

Water standards. "Proposed Maximum Contaminant Levels" (Proposed MCLs) have been published for a number of the contaminants of concern.

Currently, Massachusetts has no concentration guidelines or standards for the chlorinated hydrocarbon compounds found at the Wilmington site. Not True

Table 4-4 lists several criteria and/or guidelines for each included volatile organic compound. In general, the criteria are applied by choosing the most stringent criteria. The practice of choosing the most stringent criteria is the same method described in the Superfund Amendments and Reauthorization Act (SARA).

Comparison of VO Contaminant Levels and Standards

The results of the ground water analyses for volatile organic compounds were summarized in Table 4-1. Several of the contaminants detected during the June 1987 sampling event were present in concentrations greater than the EPA Proposed MCLs or MCLG's. Vinyl Chloride, which was detected at a maximum concentration of 13,700 ppb (GZA-13) has a Proposed MCL of 1 ppb. Trichloroethylene, detected at concentrations ranging from 16 to 36 ppb in four wells (GZA-8,9,14 and 14A) has a proposed MCL of 5 ppb. Trans-1,2-dichloroethylene was detected at a maximum concentration of 5770 ppb (GZA-15) and has a proposed MCLG of 70 ppb. Additionally, tetrachloroethylene, deleted at concentrations of 16 to 18 ppb, has a proposed MCLG of zero.

Concentrations of 1,1-dichloroethylene, toluene, ethyl benzene and 1,1,1-trichloroethane were detected at levels below proposed MCLs or MCLGs. The other two compounds detected in wells at the GE site, methylene chloride and 1,1-dichlorethane do not have any proposed or final MCLs or MCLGs. Based on the analyses and the comparisons to Proposed MCLs and MCLGs, ERM considers the volatile organic compounds noted above to be a primary contaminant of concern.

Metals

The levels of the metals analyzed by ERM are regulated by both Federal and State drinking water regulations. Maximum contaminant levels (MCLs) for these metals have been promulgated under Interim Primary Drinking Water Standards (Federal) and MA Drinking Water Regulations (310 CMR 22.06). These levels are the same. Table 4- 4 shows the results of the metals analysis of wells at the GE facility. In several cases, the levels of the eight metals tested exceeded USEPA and Massachusetts MCLs (total filtered ground water concentrations). The MCLs for the eight metals in question are shown in Table 4-4 A

TABLE 4-4 A

MAXIMUM CONTAMINANT LEVELS FOR METALS

Contaminant	MCL (ppm)	Highest Level Detected (ppm)
Arsenic	0.05	.058 (GZA-4)
Barium	1.0	.72 (GZA-12)
Cadmium	0.01	.01 (GZA-5)
Chromium	0.05	.16 (GZA-4)
Lead	0.05	.18 (GZA-3)
Mercury	0.002	<.0004 12 wells
Selenium	0.01	<.002 13 wells
Silver	0.05	<.4 (GZA-10)

As shown, the highest detected levels of silver, chromium and lead are above the stated MCLs. The level of arsenic detected in GZA-4 is slightly above the standard and the level of cadmium in GZA-5 is equal to the MCL for cadmium.

The ground water samples for metals analyses were preserved (with acid) but not filtered, in order to establish, in the initial sampling round, gross concentrations of metals to determine if any were of concern. Concentrations of metals may be affected by the presence of suspended sediment in the samples, but this is not certain. Based on the levels detected in the ERM monitoring round, some of the metals, notably arsenic, chromium and lead, are considered contaminants of concern, because total metal values measured exceeded applicable MCLs. Therefore, they must be the subject of further study and potential remedial evaluation.

4.4 Possible Contaminant Transport Mechanisms

4.4.1 Primary Mechanisms for Well Contamination

Ground water contamination in the study area is most probably caused by the spillage or leakage of contaminants at or near the surface. There is also the possibility of contamination through the infiltration of contaminated surface water in the

 Coming from where?

wetlands surrounding the well. Contaminants can be deposited in the soil and water by three primary mechanisms:

- o controlled or regulated waste disposal
- o uncontrolled disposal and dumping, and
- o leaking tanks and accidental spillage.

The remainder of this section presents examples of the three mechanisms for contamination.

Controlled or regulated waste disposal includes such things as septic systems, sanitary wastes leaching fields, permitted industrial leaching fields and NPDES outfalls. All four types of controlled disposal are present in the study area. In fact, since the area is not sewered, all facilities use septic systems that could impact the Stickney Well if they are located within its zone of influence.

Uncontrolled waste disposal and dumping includes unpermitted leaching fields, unpermitted dry wells, discharge of hazardous substances into septic systems, and "midnight dumping." "Midnight dumping" is the practice of dumping or discharging solid waste or hazardous substances into the environment without knowledge or consent of a regulatory agency. This category includes the disposal of solvents or other chemicals by discharging or dumping them on the ground or by routing laboratory, garage or roof drains into the ground.

The third mechanism by which contaminants are discharged into the environment is through the release of substances from leaking above-ground tanks, underground storage tanks, product lines or by accidental spillage of chemicals during transport or container transfer.

4.4.2 Contaminant Migration

In order to judge the extent of the contamination, the possible ways that the contamination may have spread and the possible locations from which the contamination may have emanated, ERM briefly evaluated contaminated transport/ migration. This analysis, presented in this subsection, is based on available data and hand calculations with many idealized assumptions. The analysis should therefore be considered to provide very preliminary approximations of actual conditions. However, the analysis is presented to give preliminary order-of-magnitude estimates of contaminant behavior to provide insight into contamination mechanisms.

The rate of transport of an organic contaminant through an aquifer will be slower than the natural ground water flow rate. This is due to adsorption of contaminants to the soils of the aquifer and is known as the "retardation factor." The mobility of volatile organics has been shown to be a function of soil type (particle size and surface area) and the organic content of the soil. The velocity of organic contaminants in ground water, taking into account the "retardation factor" is given by Mutch (1983, "Conjunctive Use of Subsurface Cut-off Walls and Ground Water Recovery Systems in Ground Water Pollution Control," from the EPA seminar on Ground Water Compliance: Designing, Installing and Operating Ground Water Wells) as:

$$Vs = \frac{V}{(1 + p/n\ Kd)}$$

Vs = Contaminant flow velocity

Where, V = Ground water flow velocity

p = Bulk density of the aquifer, g/ml

Kd = Soil/water distribution coefficient, ml/g

n = Porosity (Dimensionless)

This relationship assumes the following: a homogeneous and isotropic aquifer, no local variations in ground water velocity and no effects of pumping or recharge. The relationship does not account for adsorption of contaminants onto soil particles or contaminant plume dispersion.

The term (1 + p/n Kd) is the retardation factor, R of any given organic compound. Obviously, the term p/n is dependent on aquifer properties; it will generally vary over the narrow range of 2 to 8. Kd is the critical value in determining the retardation factor. Kd is a measure of how a given organic compound will "partition" itself between the water and the soil in a particular ground water/soil matrix. It is given by the relationship:

$$(foc)\ (Koc) = \underline{Kd}$$

Where, Koc = The soil/water distribution coefficient normalized for organic content

foc = The organic content of the soil, as a fraction.

The following correlation has been established between Koc and Kow (Karickhoff, 1978), the octanol/water partition coefficient, for any given organic compound:

$$Koc = 0.63\ Kow$$

Kow is a measure of how an organic compound "partitions" itself between octanol and water in an octanal/water solution. The following table presents the published values of Kow, and the calculated values of Koc, Kd and the retardation factor, R, for the eight volatile organics with the highest concentrations at the GE site.

TABLE 4-5: DEVELOPMENT OF RETARDATION FACTORS, R, FOR CONTAMINANTS OF CONCERN

Contaminant	Kow	Koc	Kd	R
Vinyl Chloride	90.5	57	0.57	4.99
Trans-1,2-dichloroethylene	94	59	0.59	5.13
1,1,1-trichloroethane	241	152	0.152	2.06
Trichloroethylene	200	126	0.126	1.88
Tetrachloroethylene	578	364	0.364	3.55
Toluene	476	300	0.3	3.1
Methylene Chloride	14	8.8	0.009	1.06
1,1-dichloroethane	47.6	30	0.03	1.21

These values were calculated based on an estimated aquifer porosity (n) = 0.25, and an assumed bulk density of (p) = 1.35. The soil organic content (foc) was assumed to be equal to 0.001, a value generally cited for sandy aquifers.

As shown by the variation in retardation factors, individual halogenated and oxygenated hydrocarbons tend to migrate at different rates through the same aquifer. This differential migration would be seen at the GE site. However, due to the fact that TCE was the major compound detected in the Stickney Well, a retardation factor of 1.88, the value calculated for TCE, was used to determine an order-of-magnitude rate of plume migration off the site. Using a value of R = 1.88, the general rate of migration is approximately 0.3 feet/day, as shown below:

$$V_s \text{ (Contaminant Velocity)} = \frac{V_{natural}}{R} = \frac{0.8 \text{ ft/day}}{1.88} = 0.43 \text{ ft/day}$$

Based on a contaminant flow rate of 0.43 ft/day, the time required for TCE contamination to travel approximately 1000 feet from the GE facility to the Stickney Well, under non-pumping conditions, would be 6.4 years from the time of entrance into the local flow system. Therefore, since contamination was first discovered in the Stickney Well in 1978, this analysis implies that release at the GE property would have had to recur before 1972 to have caused this contamination. (Again, the uncertainties in this analysis should be recognized here.)

The well was Pumping

Other factors not considered in this analysis affect transport of contaminants in ground water. Under natural flow conditions the concentrations of individual contaminants and the three dimensional configuration of the plume will change over time and distance. Several natural processes are responsible. These processes include hydrodynamic dispersion and dilution and volatilization of the organic compound; in addition, adsorption may be a factor in contaminant transport, due to the presence of fine grained material in upper alluvial and swamp deposits.

Dispersion in both the longitudinal and transverse directions is the primary mechanism that spreads the plume as it moves downgradient. Lateral dispersion is caused by the meandering of individual flow paths around sand grains and the diffusion of contaminants between adjoining streamlines within aquifer pore spaces. Small scale variations in grain size, sorting and permeability within the aquifer act to increase the lateral dispersion by preferentially diverting the flow lines toward zones of increased permeability. Dilution is the natural result of the mining of the contaminant-laden ground water with clean ground water; the resultant mixture will have a lower concentration. The mixing of ground water is limited, however, by the laminar flow conditions which primarily exist in ground water.

The tendency of a volatile organic compound to migrate or "volatilize" from water to air can also decrease concentrations of such contaminants in ground water over time and distance of travel.

Detailed consideration of these other factors would require use of a ground water model. The need for this type of modeling analysis will be evaluated in the next phase of this investigation.

4.4.3 Influence of the Pumping Well on Contaminant Migration

The Stickney Well was constructed in 1964. The well was constructed as an 18-inch by 24-inch gravel packed well, 52 feet deep with ten feet of 18-inch diameter continuous slot screen. The installed pumping capacity of the well was 450 gpm or 0.648 mgd. Between 1970 and 1978, the pumpage from the Stickney Well averaged 0.258 mgd, with the highest yearly average rate of 0.39 mgd occurring in 1976 and the highest monthly average rate of 0.54 mgd occurring in June 1976.

The 1986 CDM report states that during the 1970 - 1978 period, the Stickney Well provided 40% of the Town of North Reading's water supply. The well was cleaned and redeveloped in February 1978 in an attempt to correct the problem of excessive sand pumping that the well was experiencing. The redevelopment program was unsuccessful in reducing the amount of sand pumpage and, following the redevelopment (but prior to the discovery of TCE contamination), CDM recommended that the Town construct a new well near the Stickney Well to be used either in place or in conjunction with the Stickney Well.

Bear (1979, p. 368) and Keely and Tsang (1983) have shown that the portion of an aquifer that actually contributes water to a pumping well (the capture zone), is dependent on the location of a stagnation point downgradient from the well. The stagnation point, also known as the velocity divide, is the point at which the velocity of the ground water flowing back toward the pumping well is equal to the natural flow velocity. The distance to the stagnation point can be determined using the equation cited by Keely and Tsang (1983, p. 703):

$$r = Q/2\pi bn\,(V_{natural})$$

where:

r = distance to the stagnation point (feet)
Q = pumping rate (cubic ft/day)
b = aquifer thickness (feet)
n = porosity (dimensionless)
Vnatural = natural ground water flow velocity in the vicinity of the pumping well (ft/day)

This relationship assumes that the aquifer is both homogeneous and isotrophic with a constant saturated thickness throughout the area in question. Additionally, the equation assumes a constant pumping rate and ground water velocity.

In the case of the Stickney Well, the distance to the stagnation point (r) was calculated for three different well pumping rates:

Case 1: Q = 0.258 mgd = 35,832 cu ft/day (Average well pumping rate 1970 - 1978)

Case 2: Q = 0.39 mgd = 52,143 cu ft/day (Highest yearly average pumping rate recorded, 1976)

Case 3: Q = 0.54 mgd = 72,198 cu ft/day (Highest monthly average pumping rate recorded, June 1976)

The distance to the stagnation point for each case was calculated to be:

Case 1: 713 feet

Case 2: 1037 feet

Case 3: 1436 feet

The parameters used in the calculation are given below:

b = 40 feet (based on CDM data)
n = 0.25
Vnatural = 0.80 ft/day

The effective width of the pumping well capture zone is equal to 2π times the distance to the stagnation point (Keely and Tsang, 1983, p. 703).

Based on the three calculated stagnation points, the width of the capture zone in each case is as follows:

Case I: 4480 feet

Case 2: 6516 feet

Case 3: 9022 feet

Figure 4-2 graphically illustrates the locations of the three calculated stagnation points, and the zones of influence of the pumping well. As shown in the figure, the inner arc represents Case 1, the middle represents Case 2, and the outer arc represents Case 3.

4-2

Limitations in Analysis

It should be noted that these calculations are based on estimated values for aquifer characteristics. These estimates could vary significantly depending on local changes in aquifer characteristics. In order to calculate the actual zone of influence of the Stickney Well at any one time, a pumping test would have to be conducted. As shown in the study area base map, presented in ERM's Phase I Report and in Figure 4-3, there are numerous facilities located within the zone of influence of the Stickney Well. Any facility located within this zone that presently uses or stores solvents or has done so in the past is a potential source of Stickney Well contamination.

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4.5 Identification and Evaluation of Possible Sources of Contamination

During Phase I of their investigation, ERM sought to identify all possible sources of the Stickney Well contamination.

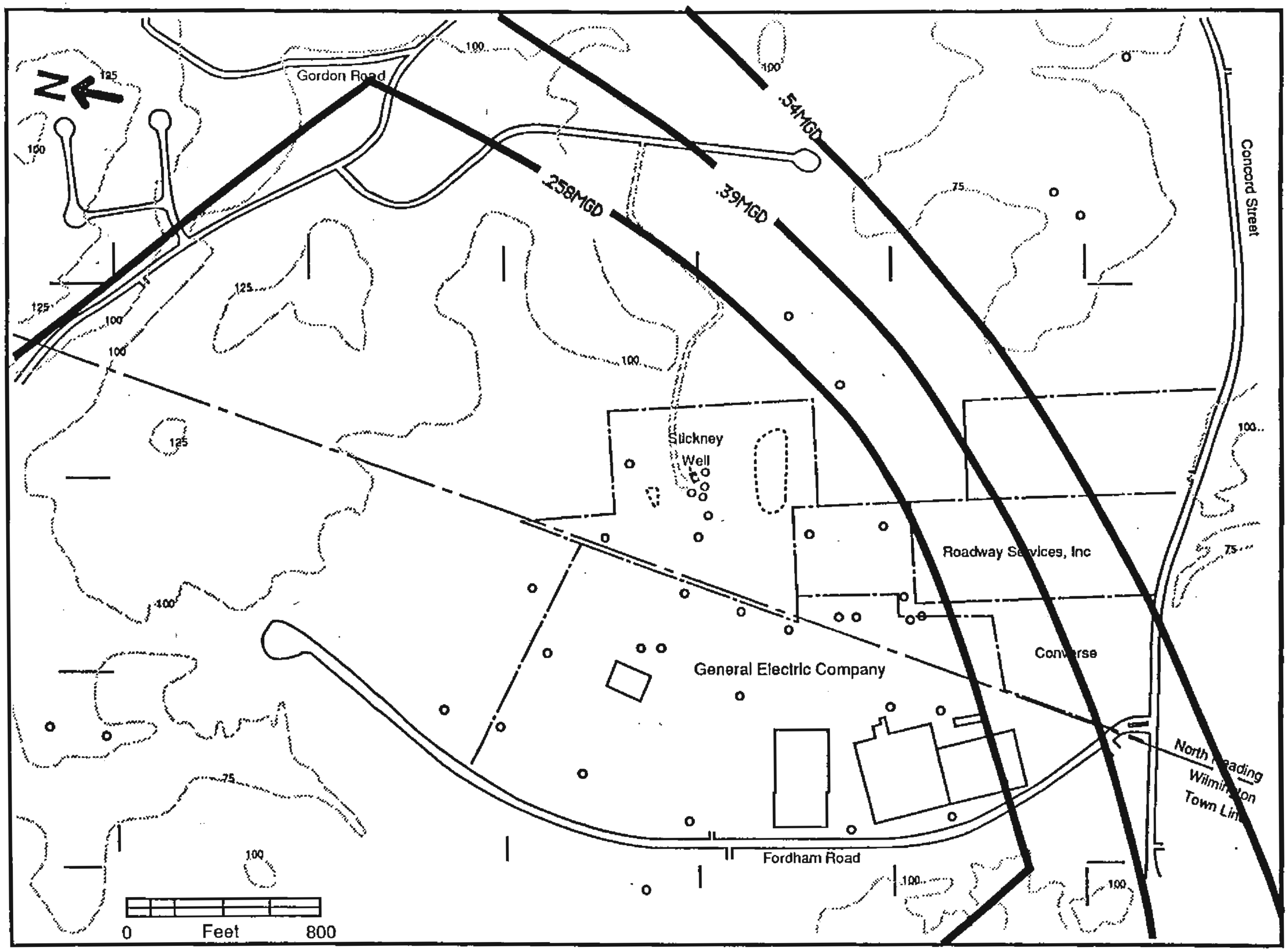


FIGURE 4-2 ZONE OF INFLUENCE OF STICKNEY WELL DURING PUMPING CONDITIONS

Section 4.4.1 discussed the general mechanisms by which a possible source may have contributed contamination to the area and ultimately, the Stickney Well:

- o controlled or regulated waste disposal
- o uncontrolled disposal and dumping, and
- o leaking tanks and spillage

By its nature, uncontrolled disposal and "midnight dumping" is most difficult to discover and study. ERM's Phase I work focused on obtaining and analyzing all data which would relate to remaining mechanisms of contamination. These include:

- o septic systems (which may improperly receive hazardous wastes),
- o industrial waste leaching fields,
- o outfalls,
- o unpermitted leaching fields,
- o above and below ground tanks (which principally store hazardous materials or fuels), and
- o spill incidents.

Due to the nature of the contamination and the land use in the area of the Stickney Well, the Phase I investigation focused primarily on industry within the study area.

For the purposes of Phase I, the study included all of the area within a reasonable distance (approximately one-half mile) of the Stickney Well. This distance logically incorporates all of the industrial/commercial activities surrounding the well.

This distance also relates well to the theoretical and approximate calculation of the influence of the Stickney Well on the ground water flow.

Table 4-6 presents a summary of all current and former industries in the study area, based on the information shown on the matrix (Table 3-3). A total of 47 industries were identified occupying 54 different sites. Of the 47 industries studied, approximately 33 were present prior to the discovery of Stickney well contamination in late 1978.

In general, all of the industries in the study area have septic tanks and sanitary leaching fields. Only one industrial leaching field was identified in the vicinity of the Stickney Well. The leaching field is an unpermitted discharge site belonging to Dynamics Research Corporation. Of the 47 total industries, 27 are known solvent users. Fourteen companies report no activities involving hazardous substances. Check w/ M. Pare

The following seven conclusions were drawn as a result of the current investigation:

Active Industrial Area Refer to figure 4

The Stickney Well is surrounded by 47 industries within a 1/2 mile radius. There are 29 hazardous waste generators and 18

TABLE 4-6: SUMMARY OF CURRENT AND FORMER INDUSTRIAL IN STUDY AREA

	Total
Number of Companies	47
Number of Sites Occupied	54
Hazardous Substance Users	33
Hazardous Waste Generators	29
Large Quantity Hazardous Waste Generators	10
Known Solvent Users	27
Chemical Storage Areas	27
Waste Oil Generator	19
Underground Storage Tanks	18
Underground Waste Oil or Solvent Tanks	10
Above Ground Tanks	6
Reported Spill or Unlicensed Release	19
Truckwash Areas	5
NPDES Outfalls	4
Known Solvent "Hotspot"	2
Industrial Leaching Fields	1

Where's the figure depicting these sites?

underground storage tanks for chemicals or fuel. Nineteen hazardous substance spills have been reported. Ten of the hazardous waste generators are large quantity generators producing more than 1,000 kilograms of waste per month. Twenty-seven chemical storage areas were identified in the study area. Underground storage or holding tanks in the study area have a total capacity of at least 221,500 gallons. All of these industrial activities are possible contributing sources to the contamination in the Stickney Well.

Hazardous Substance Users

Over 70 percent of the industries in the study area use solvents, chemicals and/or fuels. Many of these hazardous substances have constituents that have been identified in the well. Therefore, these industries should be considered possible sources of contamination.

Solvent Users

There are approximately 27 known solvent users in the study area including two documented TCE users. Twenty-one of these solvent users were operating in the study area prior to 1979. Current solvent users may have used TCE or PCE in the past. These solvent users are possible sources of TCE or PCE contamination in the well. Most of these solvent users are located within the well's zone of influence and, therefore, are possible sources of contamination.

Waste Oil Generators

Nineteen industries in the study area are known to generate waste oil which is stored in underground tanks or above ground, outside storage areas. "Waste oil" is a catch-all category and often contains miscellaneous wastes including solvents and degreasers. Waste oil is considered hazardous by the Massachusetts DEQE. Thus, these waste oil generators are possible sources of a variety of contaminants.

Historic Industrial Development

The area around the Stickney Well began to develop industrially at a rapid pace in the late 1960's and early 1970's. Of the 48 facilities investigated, approximately 39 were occupied prior to 1979 when the Stickney Well was shut down due to contamination. These 39 facilities include 21 solvent users and 10 waste oil generators. Additionally, these pre-1979 industries account for 26 chemical storage areas and 15 underground tanks. Thus, all these operations are possible sources of the original contamination found in the well.

Hazardous Substance Spills

Thirteen hazardous substance spills, including four known to involve solvents or waste oil, have been reported in the study area since 1979. These and other unreported spills have a potential impact on the well. There was no data kept on spills before 1979.

SECTION 5.0
EVALUATION OF REMEDIAL ALTERNATIVES

5.1 Introduction

This section identifies and evaluates remedial alternatives for alleviating soil and ground water contamination affecting the Stickney Well. This section also discusses factors affecting the selection of alternatives. However, because of limitations in available data and timing of submittal of this report, it was not possible to definitively establish the most cost-effective remedial alternative for the G & O site. In order to develop the data requirements for selection of remedial measures, this section provides general conclusions, limitations and recommendations which can be reached at this time. Additional data gathering and evaluation will be conducted in the subsequent phase of this investigation.

Alternatives addressed in this section may be grouped into three general categories, as follows:

1. Source Control
2. Control of Contaminant Migration (i.e. Ground Water Recovery)
3. Treatment of Recovered Ground Water

5.2 Source Control

Data presented in Section 4.0 indicated moderate to high levels of various volatile materials surrounding a number of the monitoring wells. These data suggest that there may have been one or more discreet sources of contamination that could have caused contamination of the aquifer. The data indicate that there may have been discreet contamination sources around GZA wells 7 and 15 east of the GE facility, around MW-7 north of the Roadway facility, near MW-4A located southeast of the Stickney Well and around MW-6A located northeast of the Stickney Well. The extent of contamination in the area between Stickney Well and MW-4 is unclear. The need for determining the extent of source control at any of these locations depends on the type, location and extent of the contamination and on determining if a source, in fact, exists.

The source control measures may be broadly grouped into three categories: (1) excavation/removal, (2) in-situ treatment, (3) source elimination. Generally, excavation/removal is more cost effective than in-site treatment where contamination is of relatively high concentration, localized and removable by conventional means. In-site treatment is generally more cost effective than excavation/removal where organic materials are of relatively low concentrations and dispersed over a wider area. Alternative in-site treatment measures include soil venting and biological treatment.

Available data indicate that there may be a source of contamination in the vicinity of GZA wells 7 and 15. It is not known whether or not the contamination in this area results from soils that had been previously saturated from a contaminant spill or from liquids currently contained in drums or underground storage tanks. Nonetheless, it is apparent that source control involving excavation/removal of contaminant materials may be required in this area. However, additional sampling in this vicinity is required to determine if there is now a source of the contamination and the type of control measures, if required. This sampling should involve analysis of soil samples as well as analyses of any materials residing in nearby tanks or drums. The investigation should also address the plant facilities, processes, operation and history. Once the contamination source or sources have been identified, these sources should be remediated.

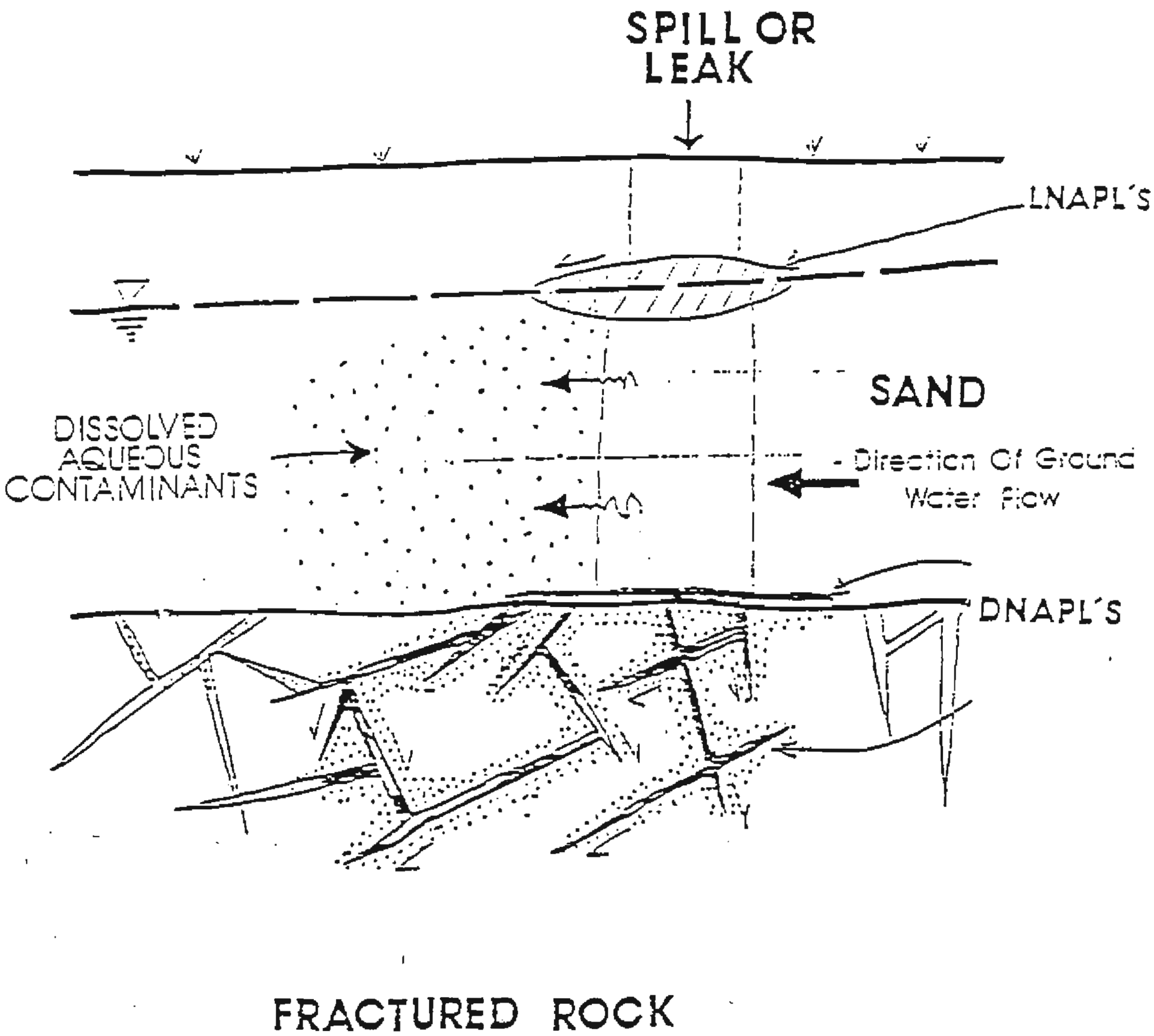
It is also recommended that soil cores in the vicinity of MW-6A and MW-4 be obtained and analyzed to determine whether there may be continuing sources of contamination at those locations. The need for and type of source control in these areas may be determined after soil samples have been analyzed.

If adequate data are not obtained to properly characterize the extent and nature of contamination sources, it is possible that unnecessary expenditures would be made to alleviate apparent contamination sources unnecessarily or that actual contamination sources will not be fully alleviated, thus negating the effectiveness the overall remedial program.

5.3 Control of Contaminant Migration

Remediation of underlying ground water to achieve background water quality conditions will require some type of ground water recovery and treatment system. The recovery system would consist of one or more recovery wells installed to a depth that would maximize efficiency in removing contaminated ground water. The pumping rate and design of the recovery wells would be established to efficiently capture contamination within the designated zone of interest for a particular well.

A diagram illustrating the vertical distribution of different types of contaminants appears on Figure 5-1. A shown, lighter contaminants (LNAPLs) float on the surface of the ground water whereas denser materials (DNAPLs) sink to the bottom of the aquifer and may penetrate fractures in the bedrock. Other contaminants may be distributed throughout the depth of the



from, Cherry, 1986

Figure 5-1

MIGRATION PATHWAYS OF VARIOUS
TYPES OF CHEMICAL LIQUIDS

aquifer. Thus, it may be important that the vertical profile of the contaminant plume be carefully defined to effectively delineate the true extent of any contamination.

As discussed in Section 4.0, there is evidence of contamination in the rear of the GE facility. However, there are several significant uncertainties regarding the nature and extent of contamination in other areas. First, there may be separate or connected contamination plumes at three or more other locations around the Stickney Well. In addition, since only one bedrock well has been drilled and sampled, it is possible that there may be other pockets of DNAPLs in lower portions of the aquifer. It is also unclear whether the contamination around MW-4 is a separate contaminant source or whether it is an extension of the contamination found around Stickney Well and adjacent to MW-7.

locate on a map.

Additional data concerning the vertical and aerial distribution of the contamination plumes must be established before the number, design, depth and locations of recovery wells can be determined. It may also be necessary and advantageous to conduct ground water modeling to simulate alternative recovery schemes to assure the most cost-effective recovery system. If additional data are not obtained prior to design of the recovery system, contaminant recovery may be inefficient or ineffective, and significant excessive costs for recovery may be expended.

5.4 Treatment of Recovered Ground Water

The cost effectiveness of alternative treatment systems depends on the characteristics and volume of water requiring treatment and the treatment level requirements. Treatment of volatiles found in the vicinity of the Stickney Well will likely require some type of air stripping and/or carbon absorption system. In addition, it may also be necessary to provide pre-treatment to remove suspended or dissolved inorganics, and to provide treatment of air emissions.

The number and locations of individual ground water treatment systems must also be carefully evaluated. This number will depend on the locations and pumping rates of recovery wells and the location of the discharge point. If more than one recovery well is installed, it would be necessary to evaluate the relative cost-effectiveness of providing individual treatment systems for each recovery well, versus providing a centralized treatment system to accommodate flows from all of the wells.

In order to determine the most cost-effective treatment system, it will first be necessary to establish the required treatment level, which will depend on the point of discharge. Alternative discharge points could include surface water discharge, ground water injection, discharge to nearby sewers, or industrial reuse. The water quality requirements for each of these alternatives should be established in order to determine the desired means for disposing of treated water.

After the appropriate treatment means and level are determined, treatability studies should be conducted to provide data for designing the most cost-effective system. This study will involve bench-scale analyses of contaminated ground water samples to determine treatabilities. Once these analyses are completed, cost estimates for various treatment alternatives should be made to establish the most cost effective design.

SECTION 6.0
CONCLUSIONS

This section presents major conclusions drawn from analyses presented in previous sections of this report. Details and background concerning these conclusions may be found in preceding sections. These conclusions are as follows:

1. There are 27 known current solvent users within a 1/2 mile radius of the Stickney Well. Of these facilities, 21 were operating prior to 1979. Companies currently using solvents other than TCE or PCE in general operating procedures may have used TCE or PCE in the past, since these substances were commonly used as industrial solvents, but now have been eliminated in many cases. Many of these solvent users may be located within the well's zone of influence and, therefore, are possible sources of contamination.

2. Volatile organic compounds (VOCs) exist behind the GE facility around monitoring wells GZA-7 and 15. The source and extent of this contamination as well as its impact on Stickney Well are presently uncertain.

3. VOCs were found around monitoring wells MW-4 and 6A, and around the Stickney Well. The sources and extent of this

contamination is also uncertain. There are no data concerning contamination levels in the area between the Stickney Well and MW-4. In addition, only limited data are available defining the vertical profile of contamination, particularly immediately above bedrock. Therefore, the effectiveness of actions at the GE facility is not determinable based on presently available data.

4. Various alternative actions exist for improving ground water quality, such as source control, and recovery and treatment of contaminated ground water. Additional data concerning the extent, trends, and impacts of ground water contamination in the areas of uncertainty are required to determine the optimal remedial method. Data should be also obtained to definitely establish all sources of contamination, since remedial measures would not be effective if contamination sources are accurately defined. Finally, analyses are required to determine the best approach.

SECTION 7.0
RECOMMENDATIONS

Since this is an interim report based on limited available data, ERM recommends that appropriate and agreed upon investigations needed to obtain data for selecting and designing cost-effective remedial measures proceed.

REFERENCES

Bear, Jacob, 1979; Hydraulics of Ground Water. McGraw-Hill Book Company, New York, New York.

Camp, Dresser & McKee, Inc., 1986; Report on Contamination at the Stickney Well. Prepared in November 1986, for the Town of North Reading, Massachusetts.

Fetter, C.W., 1980; Applied Hydrogeology. Charles E. Merrill Publishing Company, Columbus, Ohio.

Goldberg-Zoino & Associates, Inc., 1986; Preliminary Site Investigation Report, September 1986, File No. A-7650. Prepared for General Electric Company.

Keely, J.F. and Tsang, Chin Fu, 1983; Velocity Plots and Capture Zones of Pumping Centers for Ground Water Investigations. Ground Water, Volume 21, No. 6, page 701.

McKown, G.L., et. al., 1987; Ground-Water Monitoring Seminar Series, Technical Papers, USEPA-CERI-87-7.

APPENDIX A

ERM - PHASE I REPORT

CONFIDENTIAL

DRAFT

POSSIBLE SOURCES OF CONTAMINATION

AT THE STICKNEY WELL

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May, 1987

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INTRODUCTION

The following report presents the results of an investigation to identify possible contamination sources in the vicinity of the Stickney Well in North Reading, Massachusetts. The investigation was conducted by ERM-New England, Inc. over an eight week period between February and April of 1987. The objective of this investigation was to identify companies that are possible sources of contamination at the Stickney Well in North Reading.

1.1 Background

The Stickney Well is located in the southwestern section of North Reading, Massachusetts approximately 400 feet east of the Wilmington town line (see Figure 1). In December 1978, the wellfield, which is a public water supply for the Town of North Reading, was shut down due to contamination by two volatile organic compounds. The detected concentrations of tetrachloroethylene, also known as perchloroethylene (PCE) and trichloroethylene (TCE) in water samples collected by the Massachusetts Department of Environmental Quality Engineering (DEQE) exceeded existing water quality standards for these constituents. The well is bordered by over 40 industries located on nearby Fordham Road and Concord Street.

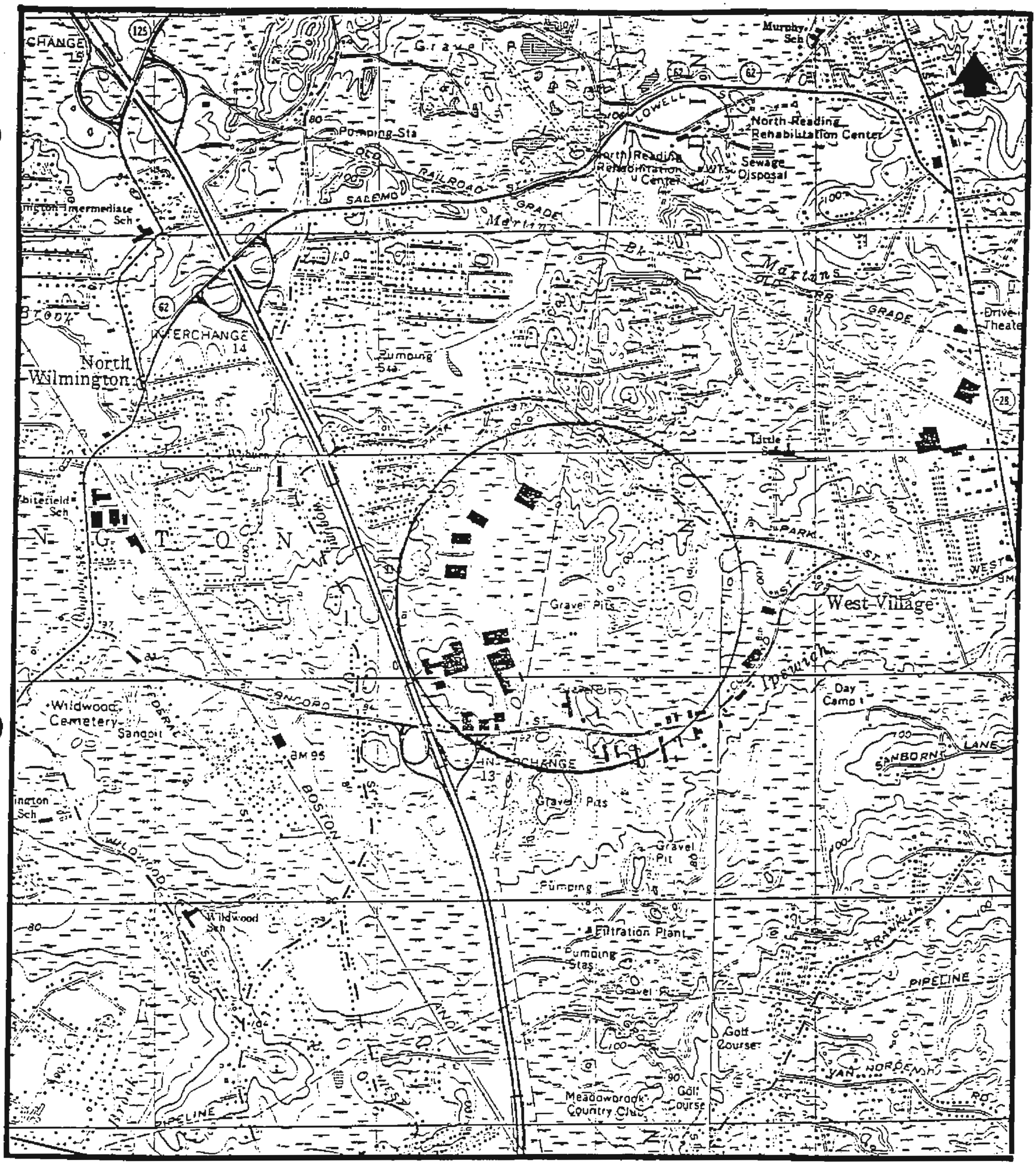

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FIGURE 1
LOCATION OF STUDY AREA

After discovering the contamination, hydrogeologic investigations and site inspections were conducted in the wellfield area by the Town of North Reading and the DEQE. The results of the investigations suggested a link between the GE property and the wellfield contamination. The investigations conducted by DEQE in 1979 indicated that at least four other area companies used degreasing solvents consisting of halogenated organic compounds in varying amounts. No conclusive evidence to indicate the contaminant source(s) location was found.

1.2 Scope and Purpose

The purpose of this investigation was to identify possible sources of contamination to the Stickney Well. The study area included all companies located within a one-half mile radius of the well. This consists of all companies on Fordham Road and Concord Street. Hydrogeologic connection between the company and the Stickney Well was not a consideration for inclusion in this investigation. The study is not intended to locate specific sources of contamination, but to raise possibilities of contamination sources.

1.3 Organization of Report

This report is organized into six sections including the introduction (Section 1.0). Section 2.0 discusses the investigation procedures followed and the information sources used. Section 3.0 presents a general overview of the study area.

Section 4.0 discusses some common solvents and the primary mechanisms for well contamination. Section 5.0 briefly discusses the history of the well contamination and various investigations conducted to date. Section 6.0 presents an overview of the results of the investigation as well as descriptions of individual facilities, called "Industry Profiles," in the study area. Section 7.0 presents our conclusions regarding the involvement of area companies in the wellfield contamination.

The base map (Figure 2) identifies the companies with known locations included in the study area. Figure 2, entitled "Location of Industries in Study Area," can be found in a map pocket in the back of this report. The number identifying each company on the base map correlates with the number on the matrix (Table 1) and the Industry Profile Sheets presented in Section 6.0.

INVESTIGATION PROCEDURES AND SOURCES OF INFORMATION

2.1 Investigation Procedures

ERM conducted the Stickney Well investigation as follows:

1. ERM visited the study area and conducted a "windshield survey" which included a visual inspection of the area, a compilation of photographs of area industries and notations on current operations and correct locations of facilities.

2. ERM reviewed topographic maps, aerial photographs and town property maps of the study area and a constructed basemap.

3. ERM reviewed available relevant information on area industrial practices and hazardous substance activities. The information, which was collected from federal, state and local sources, is described in Section 2.2.

4. ERM visited the GE Wilmington plant and interviewed the Plant Engineer responsible for environmental compliance activities at the site. The history of the well contamination problem, previous site investigations and past and present waste management practices at GE were discussed. A site inspection of the facility and adjacent wetlands was conducted and photographs were taken at relevant locations.

This information is incorporated in the industry profile on GE in Section 6.0.

5. ERM compiled and summarized all the information and identified potential contaminant sources. This information is presented in Table 1 and Figure 4.

2.2 Information Sources

A variety of information sources were checked for relevant information on industrial practices and hazardous substances used during this investigation. These sources include federal and state environmental agency files, local maps and permits, aerial photographs and other studies on the Stickney Well. A breakdown of the specific information sources is presented below:

U. S. Environmental Protection Agency

- CERCLIS (March, 1987)
- 103C Reports (incorporated into CERCLIS)
- Massachusetts TSDF Permit Status Printout (April, 1987)

Massachusetts Department of Environmental Quality Engineering

- Hazardous Waste Activity Printout (February, 1987)
- Individual Facility Files (LQG's and TSDF's)
- LQG Annual Reports
- Town Files (North Reading and Wilmington)

- o Water Supply Protection Atlas (WSPA) Overlays
- o NPDES Permit Files
- o Subsurface Discharge Permit Files
- o Sites and Spills Database (February, 1987)

Wilmington and North Reading Sources

- o Fire Department - Underground Storage Tank Permits
- o Building Department - Building Permit Data
- o Assessors Office - Tax Maps

Additional Information Sources

- o U.S.G.S. topographic maps of the study area (Wilmington and North Reading 7.5 minute quadrangle).

- o Aerial photographs of the study area taken in March 1970, May 1978 and June 1979. (Aerial photographs are included in Appendix A).

- o Two consultant reports concerning the Stickney Well contamination (referenced in the bibliography):

  Camp, Dresser and McKee, November 1986.

  Goldberg, Zoino Associates, September 1986.

- o Massachusetts Directory of Manufacturers, 1986 - 1987.

The information obtained from these sources is presented in the Individual Industry Profiles found in Section 6.0. Table 1, entitled "Potential Contributors to the Stickney Well Contamination," summarizes the key information obtained from these sources.

GENERAL DESCRIPTION OF THE AREA

3.1 Description of Study Area

The Stickney Well is located in the southwestern section of North Reading approximately 2,500 feet east of Route 93, 400 feet east of the Wilmington/North Reading town line and 2,000 feet north of Concord Street (see Figure 1). The study area includes the industrial development along Fordham Road (Wilmington Industrial Park) and along Concord Street between Route 93 and Park Street. This consists primarily of the industries and businesses located within a half mile radius of the well. About one third of the industries included in this investigation are located in Wilmington. The remainder are located in North Reading. The development north of the well along Park Street, and east of the well along Redmond Avenue and Park Street, is residential.

3.2 Topography

The Wilmington Industrial Park located on Fordham Road and the industrial development along Concord Street are located in a relatively flat, low-lying area on the North Reading/Wilmington town line. The Stickney Well is situated in a northwest-southeast trending valley with the ground surface elevation rising from about 78 feet above mean sea level (MSL) near the well to greater than 100 feet above MSL along topographic ridges northeast and southwest of the well. Aside from the development along Concord Street, Fordham Road and Park Street, the land within the boundaries of the study area is largely undeveloped wetlands. The closest surface water bodies are Furbish Pond, adjacent to the Stickney Well, and the Ipswich River, which runs along the southern side of Concord Street. Most of the study area is located within the watershed which recharges the Stickney Well under pumping conditions. A large number of industries identified are located within the zone of influence of the well during normal pumping conditions.

3.3 Historical Development in Study Area

Nearly all of the industrial development within the study area occurred after the Stickney Well was constructed in 1965. About one quarter of the 47 companies located in the study area were present before 1970. About 26 of the 47 companies moved into the study area between 1970 and 1979. Nine of the 47 companies included in this investigation were established after 1979. Over 80% of the companies (39 out of 47) included in this investigation were established in the study area prior to the discovery of contamination in the Stickney Well in 1979.

Prior to the industrial development, much of the area was used for gravel and sand mining. Some of the roadways used for the mining operations are evident in aerial photos taken in the early 1970's. See photos in Appendix A. A 1979 aerial photo of the study area shows an expanse of land south of the Fordham Road/Concord Street intersection in Wilmington which appears to be a gravel pit. This area may still be used for extractive purposes. The North Reading Fire Chief reported that plans for developing and sewering this gravel pit area are underway. Recent aerial photos also show an area north of the Aleppo Temple and south of Park Street which is used for extractive purposes. During a site visit, it was determined that the site is actually a rock-crushing operation.

A 1970 aerial photo of the study area shows an unpaved gravel road extending east from GE's parking lot to an open area adjacent to Furbish Pond and curving around to the Stickney Well. According to GE personnel and U.S. Geological Survey topographic maps (photorevised in 1979), this area was used for gravel mining. All vehicles historically had unrestricted access to this gravel road via GE's entrance roadway off Concord Street next to the Roadway Trucking Terminal. This road has been overgrown and is no longer in use. The date after which this roadway ceased to be used is uncertain.

OVERVIEW OF SOLVENTS AND PATHWAYS FOR WELL CONTAMINATION

4.1 Description of Common Solvents

Tetrachloroethylene (PCE), 1,1,1-trichloroethane (TCA) and trichloroethylene (TCE) are common chlorinated hydrocarbons. They have a variety of uses as solvents, metal and fabric cleaners and degreasers. TCE is also used extensively in lacquers, paint thinners, printing inks and refrigeration products. Four other hydrocarbons commonly used for the same industrial applications are toluene, xylene, 1,2-dichloroethylene and dichloroethylene.

Because of their wide use as metal degreasers and solvents, PCE, TCE, TCA, 1,2-dichloroethylene and dichloroethylene are commonly found in industrial and motor waste oils. Additionally, toluene and xylene are major components of gasoline and motor and fuel oils.

Under certain conditions in soil and ground water, PCE, TCE and other chlorinated hydrocarbons have been shown to undergo extensive biodegradation, generally:

PCE **TCE** **cis 1,2 dichloroethylene**
trans 1,2 dichloroethylene
1,1 dichloroethylene **vinyl chloride**

AND

1,1,1-trichloroethane **1,1-dichloroethane** **chloroethane**

The ERM Group

Because of these chemical degradations it is not unusual to find one or more of the lighter compounds associated with TCE and PCE in a spill area.

All the seven above mentioned compounds are currently and have historically been produced in large quantities (millions of gallons and pounds) in the United States. The products are widely available as commercial grade solvents and degreasers, and are sold in a variety of forms and amounts. The commercial grade products rarely contain pure compounds and often have significant percentages of impurities. The impurities generally consist of the lighter chlorinated hydrocarbons and the breakdown products mentioned above.

4.2 Primary Mechanisms for Well Contamination

The contamination in the Stickney Well is a result of contaminated ground water. Ground water contamination in the study area is primarily caused by the leaching of contaminants down through the overlying soil. There is the additional possibility of contamination through the infiltration of contaminated surface water in the wetlands surrounding the well. Contaminants are deposited in the soil and water by three primary mechanisms:

- controlled or regulated waste disposal,
- uncontrolled disposal and dumping, and
- leaking tanks and accidental spillage.

The remainder of this section will present examples of the three mechanisms for contamination.

Controlled or regulated waste disposal includes such things as septic systems, sanitary and permitted industrial leach fields and NPDES outfalls. All four types of controlled disposal are present in the study area. In fact, since the area is not sewered, all facilities use septic systems that could impact the well if they are located within the zone of influence.

Uncontrolled waste disposal and dumping includes unpermitted leaching fields, unpermitted dry wells, discharge of hazardous substances into septic systems, and "midnight dumping." "Midnight dumping" is the practice of dumping or discharging solid waste or hazardous substances into the environment without knowledge or consent of a regulatory agency. This category includes the disposal of solvents or other chemicals by discharging or dumping them on the ground or by routing laboratory, garage or roof drains into the ground.

The third mechanism by which contaminants are discharged into the environment is through the release of substances from leaking above ground tanks, underground storage tanks, product lines or by accidental spillage of chemicals during transport or container transfer.

REGULATORY ACTIVITIES AND INVESTIGATIONS

5.1 History of The Stickney Well and Contamination

The Stickney Well

The Stickney Well was constructed in 1964 with an installed pumping capacity of 450 gallons per minute (gpm) or 0.648 million gallons per day (mgd). Between 1970 and 1978, the pumpage from the Stickney Well averaged 0.258 mgd. A redevelopment program was attempted in February 1978 to correct a problem with excessive sand pumping. Following this unsuccessful attempt, the Town of North Reading's consultant, Camp, Dresser and McKee (CDM) recommended the construction of a new well near the Stickney Well.

Review of Well Contamination

DEQE analyses of water samples collected in 1976 from the Stickney Well showed detectable concentrations of TCE. Following the discovery of the well contamination, the DEQE conducted at least two site inspections at the Wilmington Industrial Park. In August and September 1976, DEQE conducted an inspection of the Industrial Park to determine which facilities stored or used TCE. These inspections revealed that General Electric and Datametrics had used or stored TCE in the past. Solvents purchased by Datametrics in 1975 included TCE and chlorothane-NU. DEQE indicated that solvents stored by Dynamics Research in 1975 included acetone, alcohol, methyl ethyl ketone, xylene, freon and unknown acids. Compugraphics Corporation stored and used chlorothane-VG in 1975.

The Town of North Reading first learned of the contamination of the Stickney Well in December, 1978. Water quality analyses conducted by the Town and DEQE indicated the presence of TCE and a second unidentified halogenated compound in significant amounts. The second contaminant was subsequently identified as PCE. The well was shut down on December 28, 1978 at DEQE's advisement, and has since been used only for collection of water samples for laboratory analysis.

Following closure of the Stickney Well, the Town of North Reading collected additional water samples from nearby test wells. Contaminants found in the Stickney Well and in adjacent monitoring wells included: TCE, PCE, acetone, 1,1,1-trichloroethane, toluene, 1,2-dichloroethane, 1,1-dichloroethylene, 1,1-dichloroethane, 1,2-dichloroethylene and vinyl chloride. TCE concentrations in the samples ranged from non-detectable levels to 937 micrograms per liter (ug/l), which is equivalent to parts per billion (ppb). DEQE contacted GE officials in January 1979 and quality samples from various locations around the plant were collected and analyzed. The resulting analytical data are summarized below (all concentrations in ppb):

January 1979

Sample Location	PCE	TCE
Five Waste Holding Tanks	6 to 968,000	<4 to 81,700
GE non-contact cooling water 001	1100	ND
GE non contact cooling water 002	10	ND
Stormwater Drain located 2000 Feet East of Fordham Road, Concord Street intersection	8	ND

ND = non-detectable

In February of 1979, DEQE made site visits to nine of the industries located in the Wilmington Industrial Park on Fordham Road. These were as follows:

- Datametrics Company
- M. W. Carr
- Volkswagen Corporation
- K-Z Corporation
- Compugraphics Corporation
- E. I. Dupont DeNemours Company
- Dynamics Research Corporation
- General Electric Company
- Converse Rubber Corporation

The memorandum on the visits (Appendix B) states that "The purpose of the visits was to determine which industries were using degreasing agents, specifically, trichloroethylene." Five companies reported using degreasing agents and other chemicals in varying amounts. The memo reported that only GE used TCE, but its use was discontinued in 1975.

In July and August of 1983, DEQE made a series of site inspections at 24 facilities on Concord Street in North Reading. The facilities were visited for information on industrial and hazardous waste generation. Facility representatives were interviewed to determine what chemicals were used or stored, what type of operation was involved, how wastes were handled and the location of underground storage or holding tanks. The results of these site visits, which are summarized in the individual facility profiles in Section 6.0, reveal that several facilities, in particular the trucking terminals, used various degreasers and had large underground storage tank (UST) capacities.

On October 25, 1985, the Town of North Reading, DEQE and CDM met to discuss the Stickney Well contamination investigation and to coordinate field activities. Between October 1985 and January 1986, the DEQE visited seven industries on Fordham Road for the purpose of conducting site investigations pertaining to the contamination of the Stickney Well in North Reading. The industries visited included:

- General Electric
- Dynamics Research Corporation
- Converse Rubber Corporation
- Compugraphics Corporation
- E. I Dupont DeNemours Company
- Honeywell Corporation
- Datametrics Corporation.

The results of these site visits are summarized in the individual facility profiles in Section 6.4. Some of the key findings include the following:

- No industries currently use TCE.
- Because Dupont has had to pump water out of their two 500-gallon underground concrete spill containment tanks it is possible that these tanks are not leak-free. DEQE believes that the water in the tanks could possibly be ground water. If ground water is leaking in, the potential would exist for any contaminants from spills contained in the tanks to leak out.
- Honeywell, which began operating in 1981, uses solvents including isopropanol, acetone, PCE and petroleum naphtha.
- Converse removed two underground gasoline storage tanks in the Spring of 1984.

- o Dynamics Research stores and uses 1,1,1-trichloroethylene, hydrofluoric acid, isopropyl alcohol and acetone.
- o Datametrics stores and uses 1,1,1-trichloroethylene in large quantities. A 7,000-gallon UST is used to store photochemical waste.

Concurrent with DEQE 1985 site inspections, the Town's consultant, CDM, conducted an investigation of the nature and extent of contamination at the Stickney Well to determine if the well could be reclaimed as a viable water supply source. This investigation was funded by the Massachusetts DEQE through its Water Supply Contamination Correction Program (Section 18 and 19 of Chapter 286 of the Acts of 1982). CDM reviewed available data and reports, installed 18 monitoring wells and conducted water quality sampling and analysis to identify contaminant plumes and potential sources.

CDM's draft "Report on Contamination of the Stickney Well" released in November 1986 identifies three separate contaminant plumes. The major plume emanates from a source or sources southwest of the Stickney Well and contains high concentrations of TCE and PCE. The second contaminant area is north of Fordham Road and south of Park Street, located on property owned by Aleppo Temple about 1200 feet north of Datametrics. Low levels of volatile organics were detected in ground water samples from a monitoring well in this area. The third contaminant area is located on property leased by Honeywell, where very high concentrations of xylenes and other hydrocarbons were detected in a ground water sample from a monitoring well in this area.

CDM's draft report recommends that the Town pursue reclamation of the Stickney Well and estimates a late 1991 on-line date. The work required to bring the well on-line would include treatment of the contaminated ground water and other well refurbishing which would be required regardless of the contamination. CDM also recommends installation of additional monitoring wells to assess the presence or absence of any contamination along Concord Street and Hallberg Park and to determine the nature and extent of the xylene contamination on Honeywell property.

5.2 Current Investigations

In June 1986 General Electric Company initiated their own site investigation in response to a letter from DEQE, dated June 17, 1986, titled "Notice of Responsibility, Pursuant of Massachusetts General Law Chapter 21E." GE retained a hydrogeologic consultant, Goldberg-Zoino & Associates, Inc. (GZA) to conduct a preliminary site investigation assessing the possible contributions of GE to the contamination of the Stickney Well and the GE property. GZA completed Phase I of the investigation in September 1986 and submitted a report to DEQE which recommended the installation of 13 additional monitoring wells to investigate the extent of TCE and PCE contamination at the GE site. The results of this second phase of the investigation are pending.

RESULTS OF INVESTIGATION

6.1 Description of Summary Matrix

A summary of companies identified in this investigation is presented in matrix format in Table 1, which is entitled, "Potential Contributors to Stickney Well Contamination." The matrix is divided into 16 columns, each with a heading, and 48 rows which correspond to the companies identified. The listing of companies is based on geographics. Compugraphics appears twice (#4 and #16) because of its multiple building locations. As previously mentioned, the number on the matrix corresponds with the number on the base map, Figure 2, located in the rear pocket of this report.

General information such as the company's product or service, date of occupancy and proximity to the well is presented in the first seven columns of Table 1. The next eight columns present information obtained from various sources used during the investigation. The comments/remarks column contains pertinent information which could not be classified under the other headings.

Some of the industries included on the matrix are no longer in the area and a few of the facilities were constructed after the Stickney Well contamination was discovered. However, for purposes of identifying all possible sources of well contamination, both former industrial occupants and firms established since 1974 are included in this investigation.

6.2 Summary of Industries in the Study Area

Table 2 presents a summary of all current and former industries in the study area, based on the information shown on the matrix (Table 1). A total of 47 industries were identified occupying 54 different sites. Of the 47 industries studied, 33 were present prior to the discovery of the Stickney Well contamination in late 1978.

The information presented in Table 2 is presented visually in Figure 4, located in the rear pocket of this report. Figure 4 is color-coded to show the locations of possible sources of Stickney Well contamination, such as the locations of known solvent users and the locations of industrial leaching fields. As shown on this figure, there are numerous possible contamination sources around the Stickney Well.

In general, all of the industries in the study area have septic tanks and sanitary leaching fields. Only one industrial leaching field was identified in the vicinity of the Stickney Well. The leaching field is an unpermitted discharge site belonging to Datametrics. Of the 47 total industries, 27 are known solvent users and 14 companies report no activities involving hazardous substances.

6.3 Reported Spills in the Study Area

Table 3 is a summary of all reported spills in the study area. The information in Table 3 was taken from the DEQE Spill Files. Reported spills include both those reported at a specific site and those that occurred in the roadways. As shown, there have been a total of 13 reported spills in the study area since 1979. Since there was no spills database before 1979, there are no records of spills that occurred before this time.

6.4 Individual Industry Profiles

Each of the 47 companies are discussed separately in this section. Key information on a company is presented in outline form on an "Industry Profile Sheet." If available, photographs of that company are attached to the industry profile. For a number of industries, a narrative which discusses that company in greater detail follows the industry profile. As previously mentioned, the matrix identification number on each "Industry Profile Sheet" is keyed to the numbers on Figures 2 and 4.

Table 1 POTENTIAL CONTRIBUTORS TO THE STICKNEY WELL CONTAMINATION

	Company Name	Number of Employees	Product/Service	Address	Year Building Permit Issued	Date of Occupancy	Proximity to Stickney Well	H.W. Generator	DEQE Facility File	Data in DEQE Town File	Underground Tank	NPDES Permit	Subsurface Discharge Permit	Spills	CERCLIS	Comments/Remarks
1)	Honeywell Corp.	1500	Electronic parts assembly & testing Photo processing	110 Fordham Rd.	1979	1981-present	3/8 mile	LQG	Y	Y	N	N	N	N	N	Uses solvents including isopropanol acetone, tetrachlorethylene & petroleum naptha. Possible disposal in septic leaching field.
2)	Volkswagen Corp.	75	Parts Distribution and Regional Admin.	100 Fordham Rd.	1968	1968-present	3/8 mile	N	N	Y		N	N	N	N	Parts Distribution and Office Building only.
3)	K.E.V. Electronics		Semiconductor Research	260 Fordham Rd.	1968	1969-1972	5/16 mile	Y	Y	Y	15,000-G holding tank for acid-neutral.sys.	N	N	N	N	Used solvents incl. 1,1,1-TCA & TCE
4)	Compugraphics Corp.		Computer Assembly	260 Fordham Rd.	1968	1972-1982	5/16 mile	LQG	N	Y	Not used onsite.	N	N	N	N	
5)	Pixel Computer		Microcomputers	260 Fordham Rd.	1968	c.1984-85	5/16 mile	?	N	N		N	N	N	N	
6)	Kaytek Instrument			260 Fordham Rd.	1968	1986-present	5/16 mile	N	N	N		N	N	N	N	Moved into building in July, 1986.
7)	Datametrics Co. Div. Dresser Indus.	180	Encoders/Pressure Vacuum Measurement Systems	340 Fordham Rd.	1969	1970-present	5/16 mile	LQG	Y	Y	7000-G concrete holding tank photo-chem. waste.	N	N	N	N	Uses large quant. of 1,1,1-TCA. Used TCE in the past.
8)	General Electric Co.	1500	Aircraft Instruments	50 Fordham Rd.	1969	1971-present	3/16 mile	LQG	Y	Y	3-UST In-use (T=8,000G) 1-UST Temp. COU (10,000G) 5-UST Per.COU (T=17,500G)	Y	Y	N	N	Used TCE until 1975. NPDES outfalls 3/16 mile from well.
9)	Converse Corp.	300	Rubber & Sportswear R & D Laboratory	55 Fordham Rd. (now located at 1 Fordham Rd.)	1969	1973-1986	3/16 mile	SQG	N	Y	2 USTs (gas) removed 1984	N	N	N	N	Uses solvents in lab.
10)	Aleppo Temple	9	Fraternal Organization (Carnival Equip.)	99 Fordham Rd.			1/4 mile	N	N	Y		N	N	11/3/86-20 g. waste oil; cleaned up.	N	Owns adjacent property - site of rock crushing operation.
11)	E.I. Dupont Co.	14	Automotive Paint Distribution Center	One Cornell Pl.		1971-present	5/16 mile	LQG	N	Y	Two 500-G concrete holding tanks for spills	N	N	Y	Y	Possible onsite release of paint thinners investigated by DEQE 1985.
12)	Computervision		Interactive Graphics Automated Systems	5 Cornell Pl.	1981		3/8 mile	Y	N	N		N	N	N	N	Building currently vacant.
13)	Federal Express	110	Overnight Delivery Truck Center	10 Cornell Pl.			3/8 mile	N	N	N		N	N	N	N	Non-Mfg. Gas Pumps onsite.
14)	Travenol Inc.		Home Respiratory Therapy	10 Cornell Pl.		1986	3/8 mile	N	N	N		N	N	N	N	Non-manufacturing

Table 1 POTENTIAL CONTRIBUTORS TO THE STICKNEY WELL CONTAMINATION

Company Name	Number of Employees	Product/Service	Address	Year Building Permit Issued	Date of Occupancy	Proximity to Stickney Well	H.W. Generator	DEQE Facility File	Data in DEQE Town File	Underground Tank	NPDES Permit	Subsurface Discharge Permit	Spills	CERCLIS	Comments/Remarks
15) Dynamics Research Corp.	900	Encoders, Precision Patterns on Substrates	44 Concord St.	1968	1969-present	3/8 mile	N	Y	Y		N	Y	Y	Y	Uses 1,1,1-TCA. Under DEQE invest. for onsite release. Onsite leaching fields for sanitary and industrial wastewater.
			50 Concord St.	"	"	"	LQG								
			60 Concord St.	"	"	"	N								
			100 Fordham Rd.	"	"	"	N								
			350 Fordham Rd.	1979	1979-present	5/16 mile	N								
16) Compugraphics Corp.	1500	Computerized Photo-Typesetting Equip.	66 Concord St.	?	?	5/16 mile	LQG	Y	Y		Y	N	N	N	Photochem. waste (acid & NaOH)
			55 Concord St.			7/16 mile	LQG	Y	Y	N	N	N	N	N	Waste paint & thinners (1,1,1-TCA)
			35 Concord St. (N. Reading)			7/16 mile	LQG	Y	Y	N	N	N	N	N	Photochemical waste.
17) Roadway Express		Trucking Terminal	95 Concord St.	1966	1966-present	1/4 mile	SQG	N	Y	3 UST-90,000 gal. total	N	N	9/24/84 Unknown qty. gas & oil.	N	Opening in fence at back of lot. Waste oil stored in barrels onsite.
18) Coles Express (Central Transport)		Trucking Terminal	93 Concord St.	1965	1965-present	1/4 mile	SQG	N	Y	1 - 10,000 UST	N	N	6/28/86 40-100 G diesel	N	Routine truck maintenance potential use of degreasers. Mason-Dixon possible former tenant.
19) Riley Truck Leasing		Trucking Terminal	90 Concord St.			3/8 mile		N	Y	N	N	N	5/22/85-10G dies. fu.	N	
20) C.R. Bard Inc.	55	Sheet Metal Welding (Medsystems Div.)	87 Concord St.	1981	1981-present	5/16 mile	LQG	N	Y	N	N	N	N	N	Waste solvents (from degreasing) collected in drums for recycling.
21) Lilly Trucking		Trucking Terminal	84 Concord St.	1955	c.1960-present	3/8 mile	SQG	N	Y	5 UST-27,000 gal. total	N	N	1-2 gal. diesel spill into pond	N	Degreasers used. Lease to Reading Trucking.
22) St. Johnsbury		Trucking Terminal	90 Concord St.	1955	c.1960-present	3/8 mile	SQG	N	Y	2 UST-20,000 gal. total	N	N	8/28/80 55-gal. unk. 5/6/81 55-g thinner.	N	Degreasers used. Unknown disposal from maintenance drains.
23) Sanborn's Express		Trucking Terminal	80 Concord St.	1955	c.1960-present	7/16 mile	SQG	N	Y	7 UST-41,000 gal. total	N	N	1/27/85 55-g. drum unk. white chemical	N	On-site drilling observed 2/26/87 Degreasers used onsite. Truckwash connected to septic tank.
24) Centre Trucking Co.		Trucking Terminal	81 Concord St.	1974	1974-present	5/16 mile	SQG	N	Y	5 UST-8000 gal. total.	N	N	1/14/79 55-G karo & 80-100G canvas trmt. oil disch. wetland.	N	
25) Service System Co.		Food Service	77 Concord St.	1970	c.1970-present	3/8 mile	N	N	Y	N	N	N	N	N	No chemicals onsite.
26) Dyar Sales and Machinery		Highway Equipment Distributor	75 Concord St.	1974	c.1974-present	3/8 mile	SQG	N	Y	N	N	N	N	N	Solvent degreaser used. Solvent & waste oil stored in abovegd. tanks.
27) Drake Baking Co.		Transfer Station and Cake Distribution Ctr.	74 Concord St.	1955	1976-present	7/16 mile	SQG	N	Y	1-4000G UST (gas) 1-500G UST (waste oil)	N	N	N	N	Trucks maintained & washed onsite. Closed sys./water recycled. Waste solvent collected in drums.

Table 1 POTENTIAL CONTRIBUTORS TO THE STICKNEY WELL CONTAMINATION

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28)	Dependable Masonry Construction			73 Concord St.	1975	1975-present	3/8 mile	N	N	N	N	N	N	N	N	
29)	Data Processing Systems Co.		Offices and Computer Showroom	72 Concord St.	1950		7/16 mile	N	N	Y	Septic	N	N	N	N	No waste generated onsite.
30)	D.L. Maher Corp.		Groundwater Development	71 Concord St.	1968	1970-present	3/8 mile	SQG	N	Y	2 USTs (fuel & diesel) - removed -	N	N	7/19/85 - Release Pesticide (dursban)	N	Waste oil generated. TCE hotspot behind site. Onsite truck maint.
31)	Craig Laundry Supply		Supplier of Dry Cleaning and Laundry Products	70 Concord St.	1966	c.1984-present	7/16 mile	N	N	N	N	N	N	N	N	May use chlorinated solv. onsite.
32)	Contour Chemical Co.		Manufacture Mould Release Agents	70 Concord St.	1966	1979-1984	7/16 mile	LQG	N	Y	4-5 USTs-unknown content	N	N	4/84 - CDM invest. black soil stain.	N	4/83 DEQE inspect. reveals site not properly closed, g.w. contam. poten
33)	Empire Adhesives Co.		Manufacture Water-based Adhesives	70 Concord St.	1966	1965-1979	7/16 mile	Y	N	Y	?	N	N	?	N	Periodically discharged white liq. back of prop. (CDM classify nonhaz)
34)	Undercoverwear Inc.		Marketing Womens' Wear	66 Concord St.	c.1984	c.1985-present	7/16 mile	N	N	Y	N	N	N	N	N	No chemicals onsite.
35)	C.M. Ironworks		Distribute Manhole and Catch Basin Covers	62 Concord St.	1972	c.1972-present	7/16 mile	N	N	Y	Septic	N	N	N	N	No manufacturing/no solvents used.
36)	New England Concrete			62 Concord St.	1972	c.1972-present	7/16 mile	SQG	N	Y	Septic	N	N	8/2/83-Stains noted from antifreeze,oil and resin spillage.	N	Drums with resin & hydraulic oil stored onsite.
37)	Annette's Restaurant		Restaurant	62 Concord St.	1972	c.1972-present	7/16 mile	N	N	Y	Septic with leachfield	N	N	N	N	No chemicals onsite.
38)	MSM Industries	70	Precision Metalwork	60 Concord St.	1968	c.1968-present	7/16 mile	LQG	Y	Y	N	Y	N	N	N	Generates waste solvents (1983 DEQE Annual Rpt.)
39)	CHF Products Inc.		Manufacture Metal Parts for Computer & Defense	5 Hallberg Pk.	1970	c.1970-present	7/16 mile	SQG	N	Y	5500-g. UST (htg. oil)	N	N	8/4/83-Surface stain of cutting oil noted	N	Solvents/oils used. Stored in 3 abovegd. tanks. Previous site owner dumped onsite (metal contamination)
40)	Pacetti Corp.		Engraving & Embossing	4 Hallberg Pk.	1969	c.1969-present	7/16 mile	SQG	N	Y	N	N	N	N	N	Uses solvents/cut. oils. Mixed w/ metal chips, discard in dumpster.

Table 1 · POTENTIAL CONTRIBUTORS TO THE STICKNEY WELL CONTAMINATION

	Company Name	Number of Employees	Product/Service	Address	Year Building Permit Issued	Date of Occupancy	Proximity to Stickney Well	H.W. Generator	DEQE Facility File	Data in DEQE Town File	Underground Tank	NPDES Permit	Subsurface Discharge Permit	Spills	CERCLIS	Comments/Remarks
41)	Val-Ken Machine Products		Machine Shop	4 Hallberg Pk.	1969	c.1969-present	7/16 mile	SQG	N	Y	N	N	N	N	N	Solvents used in degreasing. Solv. formerly dumped on grd, now put in drums w/metal chips.
42)	Columbia Construction		Offices	58 Concord St.			7/16 mile	N	N	Y	Septic	N	N	N	N	No waste generated onsite.
43)	J. Sanford & Sons		Manufactures Steel Panels	50 Concord St.			7/16 mile	SQG	N	Y	N	N	N	8/83 DEQE noted improper wst. oil disp.	N	Diesel fuel stored in abovegd. tanks. Waste oil stored in drums-poor cond
44)	M. Transfer		Shoe Warehouse	44 Concord St.			7/16 mile	N	N	Y	N	N	N	N	N	No chemicals onsite.
45)	United Parcel Service (UPS)		Distribution Center for Parcel Delivery	23 Concord St.			1/2 mile	N	N	N	1-5000 G. UST	N	N	N	N	UST probably for gas/fuel.
46)	Bobcat of Boston		Sales/Service/Parts Construction Equipment	20 Concord St.			1/2 mile	SQG	N	Y	3-2000 G USTs	N	N	c/8/83-Oil stains noted on ground.	N	Generated 100g/month waste oil Collect in abvgrd. tanks & recycle.
47)	M.W. Carr Corp.		Distributor of Picture Frames	___ Fordham Rd.		c.1979		N	N	Y	N	N	N	N	N	Visited by DEQE in 1979 for Stickney Well investigation.
48)	K-2 Corp.		Distributor of Ski Equipment	___ Fordham Rd.		c.1979		N	N	Y	N	N	N	N	N	Visited by DEQE in 1979 for Stickney Well investigation.

Matrix ID #1

INDUSTRY PROFILE

Company Name: Honeywell Corporation

Number Employees: 1500

Product/Service: Electronic parts assembly and testing. Photo processing.

Address: 110 Fordham Road

Date of Occupancy: 1981 to present. No previous owner

Proximity to Well: 3/8 Mile

Hazardous Materials/Hazardous Waste Activities:

- o Large quantity generator, MAD980733828, Notification date December 17, 1982
- o Generates 2 drums hazardous waste/quarter. Waste collected and disposed by licensed hauler.
- o Solvents (isopropanal, acetone, PCE, naptha) used on-site, some disposed in septic leaching field.
- o Approximately 600 gallons waste oil, potassium hydroxide, ammonium hydroxide generated annually.

Underground Tanks: None

NPDES or Subsurface Discharge: None

Spill Events: None

Comments/Remarks:

- o Included in October 30, 1985 DEQE site visit related to the Stickney Well Investigation.

HONEYWELL CORPORATION

Overview of Facility

Honeywell Corporation is located at 110 Fordham Road in the Wilmington Industrial Park, approximately 3/8 of a mile from the Stickney Well. Operations at the Honeywell facility include electronic parts assembly and testing and some film processing and printing. Honeywell leases the property and the building but is the original and only occupant of the site since its construction in 1981.

Review of Hazardous Substance Activities

Honeywell Corporation is a large quantity hazardous waste generator, DEQE Number MAD980733828. Hazardous waste is generated in the non-chemical labs and in the photo processing area. Approximately two 55-gallon drums of waste is generated per quarter. The waste is picked up and transported by a licensed waste transporter.

Solvents are used at the Honeywell facility to clean the press room machine and the other small machinery. The solvents used include: isopropanol, acetone, PCE and petroleum naptha. No recovery of solvent waste was noted by the DEQE in their October, 1985 site inspection. DEQE noted that some of the solvent waste may be deposited into sinks and would eventually end up in the septic leaching field.

No underground or above ground fuel or waste oil tanks exist at the Honeywell site.

The DEQE stated in an October 19, 1985 memo that they do not believe that Honeywell is a major contributor the the Stickney Well contamination, but that they recommended further investigation into the site.

Matrix ID #2

INDUSTRY PROFILE SHEET

Company Name: Volkswagen Corporation

Number Employees: 75

Product/Service: Parts Distribution and Regional Adminstration

Address: 100 Fordham Road, Wilmington

Date of Occupancy: 1968-Present

Proximity to Well: 3/8 Mile

Hazardous Materials/Hazardous Waste Activities: No wet processess where degreasing agents or any other chemicals would be discharged.

Underground Tanks: None

NPDES or Subsurface Discharge: None

Spill Events: None

Comments/Remarks:

- Parts Distribution and Offices only
- Visited by DEQE during February 1979 visit of Wilmington Industrial Park.

Matrix ID #3

INDUSTRY PROFILE SHEET

Company Name: K.E.V Electronics

Number Employees: Unknown

Product/Service: Semiconductor Research

Address: 260 Fordham Rd., Wilmington

Date of Occupancy: 1969-1972

Proximity to Well: 5/16 mile

Hazardous Materials/Hazardous Waste Activities:

- o Used self-contained acid neutralization system to treat liquid industrial waste (15,000-gallon capacity)
- o Solvents used on-site include 1,1,1-trichloroethane and TCE

Underground Tanks: 15,000-gallon holding tank constructed in 1968.

NPDES or Subsurface Discharge: None

Spill Events: None

Comments/Remarks: DEQE visited site in November 1983 and sampled waste in holding tank. Results indicated presence of 56 ppb 1,1-DCA; 140 ppb 1,1,1-TCA; and 26 ppb TCE.

Matrix ID #4

INDUSTRY PROFILE SHEET

Company Name: Compugraphics Corp.

Number Employees: Unknown

Product/Service: Computer Assembly

Address: 260 Fordham Road, Wilmington

Date of Occupancy: 1972-1982

Proximity to Well: 5/16 mile

Hazardous Materials/Hazardous Waste Activities:

- DEQE Hazardous Waste Activity Printout indicates that this facility is a LQG, MAD000637983, Notification Date 8/12/80.
- No annual reports for this facility on file.

Underground Tanks: 15,000-gallon holding tank (reportedly not used)

NPDES or Subsurface Discharge: None

Spill Events: None

Comments/Remarks:

- Compugraphics stated to DEQE on their 11/83 visit that they never used the 15,000-gallon holding tank. Compugraphics also stated to DEQE that any wastes present in tank had been left.
- DEQE told Compugraphics to take care of the tank-outcome unknown.

COMPUGRAPHICS

Overview of Facility

During the period from 1972 and 1982 Compugraphic Corporation's computer assembly facility was located at 260 Fordham Road in the Wilmington Industrial Park, approximately 5/16 of a mile from the Stickney Well. Compugraphics has three other facilities in the area at 66,55 and 35 Concord Street in North Reading (5/16 to 7/16 of a mile from the Stickney Well). The Concord Street facilities are involved in the manufacture of computerized photo-typesetting equipment.

Review of Hazardous Substance Activities

Compugraphics is a large quantity generator, DEQE number MAD000637983. The hazardous waste generated at each Compugraphics facility is reported as follows:

66 Concord Street	-	Photochemical waste (acid and NaOH)
55 Concord Street	-	Paint waste and thinner (1,1,1-trichloroethane)
35 Concord Street	-	Photochemical Waste
260 Fordham Street	-	No hazardous waste reported

A 1982 annual report to DEQE stated that approximately 10,000 gallons of waste was generated annually from the facilities. DEQE inspected the three Concord Street facilities in December 1985 as part of the Stickney Well contamination investigation. A memo dated December 4, 1985 stated that "at (that) time, the writer does not believe that these sites are major contributors to the contamination of the Stickney Well".

A 1983 DEQE site inspection of the Fordham Road site noted the presence of a 15,000 gallon holding tank containing an acid-neutralization system. Compugrahics stated that the tank and chemicals were the property of the former site occupant - K.E.V. Electronics and that Compugraphics never used the tank. DEQE requested that the tank be emptied and cleaned; the outcome of the request is not known.

Matrix ID #5

INDUSTRY PROFILE SHEET

Company Name: Pixel Computer

Number Employees: Unknown

Product/Service: Microcomputers

Address: 260 Fordham Road, Wilmington

Date of Occupancy: C. 1984 - 1985

Proximity to Well: 5/16 Mile

Hazardous Materials/Hazardous Waste Activities:

- No known hazardous waste activities.
- SIC 3573 (Electronic Computing Equipment)

Underground Tanks: Not known

NPDES or Subsurface Discharge: None

Spill Events: None

Comments/Remarks: Listed in 1986-1987, Massachusetts Directory of Manufacturers, published by Commerce Register, NJ.

Matrix ID #6

INDUSTRY PROFILE SHEET

Company Name: Keytek Instruments

Number Employees: Unknown

Product/Service: Unknown

Address: 260 Fordham Road

Date of Occupancy: 1986-present

Proximity to Well: 5/16 mile

Hazardous Materials/Hazardous Waste Activities:

- No known hazardous waste activities.

Underground Tanks: Not known

NPDES or Subsurface Discharge: None

Spill Events: None

Comments/Remarks:

- Moved into building in July 1986.

Matrix ID #7

INDUSTRY PROFILE SHEET

Company Name: Datametrics Company, Division of Dresser Industries

Number Employees: 180

Product/Service: Manufacture encoders and pressure vacuum measurement systems

Address: 340 Fordham Road

Date of Occupancy: 1970-present. From 1970-1973: the front half of the building was leased to Mechanics for Electronics, a stripchart recorders company.

Proximity to Well: 5/16 Mile

Hazardous Materials/Hazardous Waste Activities:

- Large quantity generator, MAD087142824, Notification date August 1, 1980
- Generate approximately 4200 lbs, 1,1,1 trichloroethane; 2500 lbs TCE; 1800 lbs waste oil/yearly
- Chlorinated solvent waste stored inside the facility in drums and recycled by vender. Approximately 1 drum/month generated.
- Photo chemical waste stored in 7000 gallon underground holding tank, prior to 1980 some solvent waste was going into this tank.

Underground Tanks:

- 7000 gallon concrete waste-water holding tank containing photo lab. rinse effluent. The contents of the tank are periodically collected by a sewer service company and pumped into a MDC sewer. A 1980 DEQE investigation showed the presence of TCE and 1,1,1 trichloroethane in the waste water.

NPDES or Subsurface Discharge: None

Spill Events: None

Comments/Remarks:

- Included in February 1979 and November 6, 1985 DEQE site inspection, related to the Stickney Well Investigation.

DATAMETRICS COMPANY, DIVISION OF DRESSER INDUSTRIES

Comments/Remarks: (con't)

- TCE has been used extensively since 1970 at this facility.
- Discharge to sanitary leach field analyzed by DEQE in 1979. Analysis showed levels of benzene, toluene and 1,1,1 trichloroethane in the sample.
- DEQE has recommended further investigation of Datametrics to determine if the site is a contributor to the Stickney Well Contamination.

DATAMETRICS CORPORATION

Overview of Facility

Datametrics Corporation, a division of Dresser Industries, is located at 340 Fordam Road in Wilmington Industrial Park approximately 5/16 of a mile from the Stickney Well. Operations at the Datametrics facility include the production of encoders and pressure vacuum measurement systems.

Datametrics currently leases the property from the John Hancock Corporation. The building was constructed on undeveloped land in the 1960's. Originally the building was divided into two parts. The front portion of the building was leased to Mechanics for Electrons, a strip chart recorder manufacturer, the rear portion of the building was leased to Datametrics. In 1973, Mechanics for Electronics vacated the front half of the building and Datametrics assumed the lease of the complete building.

Review of Hazardous Substance Activities

Based on DEQE reports dated February 1979 and November 1985, it was determined that Datametrics has historically used large quantities of 1,1,1-Trichloroethane and Trichloroethylene (TCE) in various manufacturing and welding processes. Additionally, Prior to 1980 solvent-based cutting oils were used in the machine shop. The solvents are stored in 55 gallon drums inside the plant. Waste solvents are collected in drums and stored inside the plant until they are removed by a licensed hauler. Approximately 4200 lbs of 1,1,1 trichloroethane; 2500 lbs of TCE and 1800 lbs of waste oil are generated annually as waste. In their 1979 plant visit, DEQE noted that some of the solvent waste was being disposed of in plant sinks. A sample of discharge to the sanitary leach field detected levels of benzene, toluene and 1,1,1,-trichloroethane.

Datametrics stores photo-chemical waste, generated from the photo lab rinse effluent in a 7000 gallon concrete underground holding tank. The underground tank is emptied by a sewer service company when the volume reaches 6000 gallons. . The waste is transported off-site and discharged in to a Metropolitan District Commission Sewer. Samples of the photo lab waste were analyzed by the DEQE in 1980. The samples showed levels of TCE and 1,1,1 trichloroethane. Following this discovery, Datametrics sealed off all inflow points to the holding tank with the exception of that from the photo lab.

The 1985 DEQE site report on Datametrics concluded that further investigation of the site would be necessary to determine if Datametrics is a contributor to the Stickney Well problem.

Matrix ID #8

INDUSTRY PROFILE SHEET

Company Name: General Electric Company

Number Employees: 1500

Product/Service: Aircraft Instruments Dept.

Address: 50 Fordham Road, Wilmington, MA

Date of Occupancy: 1971-Present

Proximity to Well: 3/16 Mile

Hazardous Materials/Hazardous Waste Activities:

- LQG ID # MAD 053449393
- Uses variety of halogenated solvents and chemicals.
- Industrial Waste Waters tanked for haz. waste disposal off-site.
- Drum storage area and Regulated Substance Storage Building constructed in 1979.

Underground Tanks: Nine USTs including grease trap (1000 G) -

- Two 3500G rubber-lined, concrete vault - Currently in use
- One 10,000 G steel tank for waste oil - Temp. out of use
- Five USTs = 17,500 G total capacity - Perm. out of use

NPDES or Subsurface Discharge:

- Drum storage area and Regulated Substance Storage Building constructed in 1979.

Spill Events:

- No known prior spills or release
- Suspect magnesium chip disposal area located south of WWTP

Comments/Remarks:

- Discontinued use of TCE in 1975.

GENERAL ELECTRIC COMPANY

Overview of Facility

General Electric Company's (GE) Aircraft Instruments Department is located at 50 Fordham Road in the Wilmington Industrial Park approximately 3/16 of a mile from the Stickney Well. Operations at GE's Wilmington facility include development, design, testing, pre-production, and production of aircrafts instruments and sensors. Manufacturing processes include machining, assembly and testing.

GE presently leases the property from Wilmington Trust Co. The buildings were constructed on undeveloped land in 1969-1970. GE occupied the buildings soon after construction in 1971. In 1984 and 1985 a portion of the GE facility was subleased to Hamilton Standard, manufacturers of hydrogen generators. Until recently, a portion of the facility was subleased to Converse starting in 1979.

Aerial photographs of building construction at the site in 1970 indicated a gravel road formerly allowed traffic access from both Fordham Road and Concord Street to the Stickney Well. This road has been overgrown by wetland vegetation and is no longer in use.

Because so much of the previous research has concentrated on GE, there is considerably more information on this facility than any of the others. In an effort to present as complete a picture as possible, a summary of all existing information is presented below.

Review of Hazardous Substance Activities 1971-1979

Complete documentation of the use, storage, and disposal of chemical wastes prior to 1979 is unavailable. Based on reports from site inspections conducted by DEQE in 1976 and 1979, GE used various chemicals between 1971 and 1979 including trichloroethylene, naphtha, freon, methyl chloride, some cleaning acids and solder solvents. Subsequent to the discovery of TCE and PCE contamination at the Stickney Well, DEQE and GE's consultant Dana F. Perkins collected samples in January 1979. These samples were taken from GE's underground waste oils and solvents holding tanks in addition to GE's noncontact cooling water and wastewater treatment plant (WWTP) discharges. The analytical test data are summarized in Table 4. Tetrachloroethylene was found in both the holding tanks and the permitted discharges. Trichloroethylene was found in the holding tanks but was not detected in either the NPDES or the WWTP discharges (detection limit = 50 ppb). Based on the 1979 analytical data, tetrachloroethylene (PCE) and trichloroethylene (TCE) were present at the GE plant at the time of sampling.

TABLE 4

SUMMARY OF DANA F. PERKINS WATER QUALITY DATA (1979)

Sample	Sample Date	Sample Location Description	Concentrations in ppb (parts per billion) Tetrachloro-ethene	Trichloro-ethene
Tank d[1]	1/15/79 1/17/79	10,000-gallon underground tank 1979 contained waste oil and solvents, presently overflow tank	968,000	81,700
Tank f[1]	1/15/79 1/17/79	3,500-gallon underground tank acid & caustic wastes	12	<4
Tank g[1]	1/17/79	10,000-gallon underground tank 1979 contained fuel oil presently out of service	331,000	—
Tank h[1]	1/17/79	1,000-gallon underground tank 1979 contained JP-4, presently out of service	117,000	—
Tank j[1]	1/15/79 1/17/79	5,300-gallon "DECO" tank 1979 received wastes from DECO	6	32
Water Soluble Oil	1/17/79	Shop area	930	--
Wastewater Influent	1/17/79	Raw sewage entering treatment plant	30	--
Wastewater Effluent	1/10/79 1/17/79	Effluent leaving treatment plant	6	<50[3]
Standing Water	1/10/79	GE-6 located east of treatment plant	6	<50[3]
OGE-6				
GE-6	1/10/79	GE-6 located east of treatment plant	--	<50[3]
002	1/10/79 1/17/79	Noncontact cooling water discharge pt. 002	10	<50[3]
001	1/10/79 1/17/79	Noncontact cooling water discharge pt. 001	1,100	<50[3]
Test Pit 1	1/10/79 1/17/79	Test pit excavated in magnesium chip disposal area	52	<50[3]
Test Pit 2	1/10/79 1/17/79	Test pit excavated in magnesium chip disposal area	48	<50[3]
Test Pit 3	1/17/79	Test pit excavated in magnesium chip disposal area	24	5
Test Pit 4	1/17/79	Test pit excavated in magnesium chip disposal area	89	<5
Stickney Well	1/17/79		28	110
Hypochlorite Solution	1/17/79	Hypochlorite stock at Stickney well	8	<5
Wilmington Water Supply	1/17/79	Water entering GE facility	10	<5
Surface Water-Concord St.	1/17/79	Stormwater drain ~ 2,000 ft. east of Concord St. & Fordham Rd. intersection	8	<5
Manufactured hypochlorite	1/10/79 1/17/79	Hypochlorite stock at wastewater treatment plant. Hypochlorite used during WW treatment	51	50

NOTES:

1. ERM tank designation, refer to Figure 3.
2. Analyses conducted by Arnold Greene Testing Laboratories, Inc.
3. Detection limit = 50 ppb.
4. -- indicates specific compound analysis was not conducted.

Tetrachloroethylene was also detected in the groundwater collected from four test pits excavated south of the wastewater treatment plant at a suspect former magnesium chip disposal area. Levels in the test pit groundwater ranged from 24 ppb to 89 ppb.

The suspected former magnesium chip disposal area located south of waste water treatment plan was excavated in 1979 under DEQE's supervision to assess the area for the possible presence of liquid solvents and waste metal. During the exploratory test pits magnesium chips were uncovered. Dana Perkins collected two sets of groundwater samples from the test pits. The first set of samples, collected on the day the test pits were excavated, was analyzed for trichloroethylene. The second set of samples, collected one week late, was analyzed for tetrachloroethylene. The second set of samples was collected because the DEQE informed GE and Dana F. Perkins after the initial sampling round that tetrachloroethylene, in addition to the primary contaminant trichloroethylene, was present in the Stickney Well.

Review of Hazardous Substance Activities 1979-1987

In response to DEQE's 1979 investigations, GE implemented a Spill Prevention Control and Countermeasure Plan to mitigate the potential release of on-site chemicals to the environment. The plan included the construction of a drum storage area and a Regulated Substance Storage Building, in addition to the installation of two new brand above-ground waste oil and jet fuel storage tanks. The spill prevention and control facilities were constructed in 1983.

At present, all drummed chemcials delivered to the GE site are received and stored in the drum storage are located north of Building 3 and depicted on Figure 3. Drums in this area are set on a storage pad encircled by a drainage through. In case of a spill event, the material drains into the trough and dumps into a 1,000 gallon underground precast concrete oil and water separator, designated as Tank C on Figure 3. This device is overlain by a concrete pad. As shown on a preliminary design plan and verified by GE personnel, a 4-inch-diameter pipe connects the oil and water separator to a stormwater catch basin on line with the noncontact cooling water discharge line 001. This connection is via a vertical riser from the bottom of the slump which serves to separate the oils and drain the water which has entered the trough and collected in the bottom of the separator.

The Regulated Substances Storage Building is used for accumulation of waste oils and dispensing of hazardous materials from drums. All drums received and stored in the drum storage area are transferred to the Regulated Substance Storage Building prior to opening. Also housed in the Regulated Substance Storage Building are storage tanks containing waste oil and jet fuel designated as Tanks A and B respectively on Figure 3. These storage tanks are surrounded by concrete berms in case of overflow or spillage.

If required, overflow from the concrete berm around the waste oil accumulation tank and the jet fuel tank in a Regulated Substance Storage Building is conveyed to a 10,000 gallon underground tank located north of the building (Tank D). This underground tank is one of four tanks comprising the underground tank farm located between Building 1 and 3. Should overflow occur, waste oil which has been conveyed to the 10,000-gallon tank is removed by pumping for proper disposal. No overflow to this tank has occurred since installation of the system.

Oil spills which occur during the flowmeter testing processes in Building 1 and 3 are conveyed from perimeter through to a slump located in the pump house situated between the two buildings. The sump pump transfers the substances to the accumulation tank in the Regulated Substance Storage Building.

Existing underground tanks at the GE site are summarized in Table 5. In addition to the tanks discussed in the previous paragraphs, two 3,500-gallon underground tanks located in the tank farm area, one tank at the northeast corner of Building 1A and one tank at the southern corner of Building 1 completes the list of tanks existing at the site. One 3,500-gallon tank receives wastes from GE's metal finishing processes (Tank F) and one 3,500-gallon tank receives wastes from laboratory operations in Building 1A (Tank E). Before replacement by Tank F, Tank K received acid/caustic waste water from the metal finishing operation. Tank E was first used by subleasee Hamilton Standard for their Direct Energy Conversion Operation (DECO). The three tanks located in the tank farm area (Tanks G,H &I) have been out of service since approximately 1979.

According to the Goldberg, Zoino & Associates, Inc. (GZA) report prepared in September 1986 and GE plant personnel, trichlorofluoroethane, dichloromethane (methylene chloride), trichlorotrifluoroethane, acetone, and nitromethane comprise the degreasing products presently used by GE. In addition, 1,1,1-trichloroethane is used for atomized spray cleaning beneath hoods vented to the atmosphere.

The Annual Report submitted by GE to DEQE summarizes hazardous waste generated for the 1982 reporting year as follows:

- o Waste Magnesium
- o Dye Intermediates
- o Waste Methylene Chloride
- o Waste Oil
- o Waste Asbestos
- o Waste PCBs
- o Waste Combustible Liquid NOS

TABLE 5

INVENTORY OF GE CHEMICAL ACCUMULATION TANKS

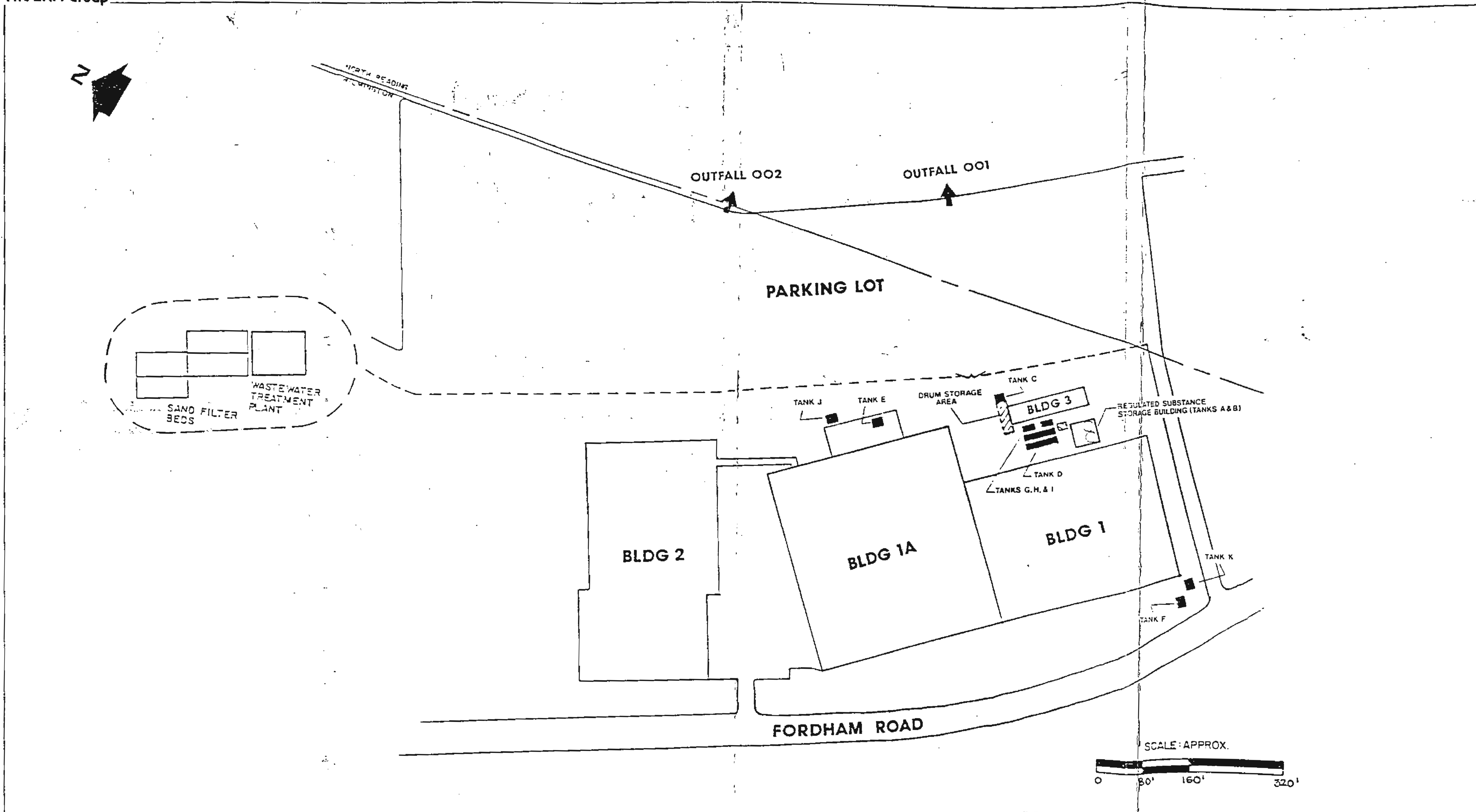
Tank Designation (as shown on Figure 3)	Tank Description
Tank A	5,000- to 6,000-gallon above-ground steel waste oil accumulation tank (located inside Regulated Substance Storage Building) installed 1983.
Tank B	5,000- to 6,000-gallon above-ground steel jet fuel storage tank (located inside Regulated Substance Storage Building) installed 1983.
Tank C	1,000-gallon underground precast concrete oil and water separator, which collects any material spilled on the drum storage pad.
Tank D	10,000-gallon underground accumulation tank. In 1979 contained waste oil and solvents, presently available for potential overflow for Tank A and Tank B bermed area.
Tank E	3,500-gallon underground accumulation tank in concrete vault. Constructed in 1981 to replace Tank J. Received wastes from DECO until 1985. Currently receives laboratory wastes from Building 1A.
Tank F	3,500-gallon underground accumulation tank in concrete vault, receives acid and caustic wastes from metal finishing processes.
Tank G	10,000-gallon underground storage tank. In 1979 contained fuel oil, presently out of service.
Tank H	1,000-gallon underground storage tank. In 1979 contained JP-4, presently out of service.
Tank I	500-gallon underground storage tank. In 1979 contained methanol, presently out of service.
Tank J	5,000-gallon tank was used prior to 1981 for the DECO operations's waste. Was taken out of service when new tank (E) was installed.
Tank K	3,000-gallon underground storage tank. In 1983 contained acid and caustic rinsewater, presently out of service.

- Waste Corrosive Liquid NOS
- Hazardous Waste Liquid NOS

Estimated volumes of water generated as industrial waste during GE operations are summarized as follows. Approximately 2,000 gpd, 50 gpd, and 250 gpd of water is wasted from the metal finishing operation, chemical laboratory, and machine shop operation, respectively. The flows are directed to the on-site waste accumulation tanks for ultimate off-site disposal transported by Suffock Services.

The balance of water utilized at the GE plant is for sanitary use and noncontact cooling water. The approximate 30,000 gpd of water used for sanitary purposes is treated at GE's on-site domestic wastewater treatment plant (Division of Water Pollution Control Permit #0-34) and discharged to the groundwater regime through sand filter beds. Approximately 68,000 gpd of noncontact cooling water is discharged from NPDES outfall 001. Approximately 34,000 gpd of noncontact cooling water is discharged from outfall 002.

The ERM Group



GENERAL ELECTRIC COMPANY - STICKNEY WELL STUDY -	LOCATION OF CHEMICAL STORAGE FACILITIES AND PERMITTED DISCHARGES
	APRIL 1987 FIGURE No. 3

ERM

Matrix ID #9

INDUSTRY PROFILE SHEET

Company Name: Converse Corporation

Number Employees: 300

Product/Service: Professional Sports and Leisure Sportswear

Address: 55 Fordham Road, Wilmington (1973-1986)
One Fordham Road, North Reading (1986-present)

Date of Occupancy: 1973-present (at 55 Fordham Road facility)

Proximity to Well: 3/16 Mile

Hazardous Materials/Hazardous Waste Activities:

- Research and development lab used rubber compounds, naptha, MEK.
- Floor drain noted by DEQE inspector in lab for non-contact steam from ovens used to form rubber.
- Waste solvents stored and picked up by transporter.

Underground Tanks: Two USTs (gasoline) removed in spring 1984.

NPDES or Subsurface Discharge: Uses GE's WWTP for sanitary waste water.

Spill Events: None

Comments/Remarks:

- Sink located in R & D Lab-Converse representative told DEQE inspector on 11/6/85 that no solvents were disposed of in the sink.

CONVERSE CORPORATION

Overview of the Facility

The Converse Corporation, a manufacturer and retailer of professional and leisure sportswear, is currently located at One Fordham Road in the Wilmington Industrial Park. They have been at this address since 1986. Prior to 1986 Converse leased a portion of the General Electric building at 55 Fordham Road. Converse occupied the General Electric building from 1973 to 1986. General Electric occupied the 55 Fordham Road site prior to leasing to Converse.

Review of Hazardous Substance Activities

Between 1976 and 1981 Converse Corporation had a small research laboratory at the 55 Fordham Road site. Rubber compounds, naptha and methyl ethyl ketones and other solvents were used in the lab. The solvents were stored in drums and were disposed of by a licensed waste transporter. During a DEQE inspection of the former lab in November 1985, one floor drain was noted. A Converse representative told DEQE that the drain was only used for non-contact cooling steam from the rubber-forming ovens.

Two underground storage tanks of unknown tankage formerly existed at the Converse site. The tanks were used to store gasoline for the company cars. The tanks were removed in the spring of 1984.

In a November 6, 1985 memo, the DEQE states that based on their preliminary site visits and investigation, they do not believe Converse Corporation is a major contributor to the Stickney Well contamination.

Matrix ID #10

INDUSTRY PROFILE SHEET

Company Name: Aleppo Temple Shriners

Number Employees: 9

Product/Service: Fraternal Organization

Address: 99 Fordham Road, Wilmington, MA

Date of Occupancy: Unknown

Proximity to Well: 1/4 Mile

Hazardous Materials/Hazardous Waste Activities: Waste oil and degreasers used in machine maintenance.

Underground Tanks: None

NPDES or Subsurface Discharge: None

Spill Events: Waste oil spill reported November 3, 1986 involving 20 gallons from a 55 gallon drum. DEQE inspection confirmed clean-up.

Comments/Remarks: The Temple has an auditorium with a seating capacity of 6,000 that is used for a variety of events. Annual spring circus (May 4-10, 1987) takes place in the auditorium. Circus equipment is kept in large trailers behind the temple. The Shiners own the adjacent rock crushing operation property.

Matrix ID #11

INDUSTRY PROFILE SHEET

Company Name: E.I. Dupont DeNemours, Co., Inc.

Number Employees: 14

Product/Service: Automotive Paint New England Distribution Center

Address: One Cornell Place

Date of Occupancy: 1971-present

Proximity to Well: 5/16 Mile

Hazardous Materials/Hazardous Waste Activities: Large Quantity Waste Generator. 15,220 lbs of paint waste and 220 gallons of waste solvent reported in one year.

Underground Tanks: Two 500 gallon concrete holding tanks for containment of spills from the thinner storage room and the mixing/blending room.

NPDES or Subsurface Discharge: None

Spill Events: Possible on-site release of paint thinners investigated by DEQE in 1985.

Comments/Remarks: DEQE conducted a preliminary assessment in October 30, 1985 recommending that the integrity of the underground tanks be tested since water has appeared in the tanks. The assessment concluded that "This site is not a major contributor of contaminants to the Stickney Well aquifer"

Matrix ID #12

INDUSTRY PROFILE SHEET

Company Name: Computervision

Number Employees: Unknown

Product/Service: Interactive Graphics Automated Systems

Address: 5 Cornwell Place, Wilmington, MA 01887

Date of Occupancy: Currently vacant

Proximity to Well: 3/8 Mile

Hazardous Materials/Hazardous Waste Activities: According to EPA files, Computervision was a small quantity generator as of June 5, 1985.

Underground Tanks: None

NPDES or Subsurface Discharge: None

Spill Events: None

Comments/Remarks:

Matrix ID#13

INDUSTRY PROFILE SHEET

Company Name: Federal Express Corporation

Number Employees: 110

Product/Service: Overnight Delivery Truck Center

Address: 10 Cornell Place

Date of Occupancy: Unknown

Proximity to Well: 3/8 Mile

Hazardous Materials/Hazardous Waste Activities:

Underground Tanks: Unknown-although if gasoline pumps exist on-site there are probably underground gasoline tanks.

NPDES or Subsurface Discharge: None

Spill Events: None

Comments/Remarks: Although this is a non-manufacturing facility, it is also a trucking center with gasoline pumps on-site. Routine truck maintenance would involve waste oil and degreasers.

Matrix ID#14

INDUSTRY PROFILE SHEET

Company Name: Travenol Inc.

Number Employees:

Product/Service: Home Respiratory Therapy

Address: 10 Cornell Place

Date of Occupancy: 1986

Proximity to Well: 3/8 Mile

Hazardous Materials/Hazardous Waste Activities: None

Underground Tanks: None

NPDES or Subsurface Discharge: None

Spill Events: None

Comments/Remarks:

- Small non-manufacturing business.

Matrix ID #15

INDUSTRY PROFILE SHEET

Company Name: Dynamics Research Corporation

Number Employees: 900

Product/Service: Encoders, Precision Patterns on Substrates (Glass Plates)

Address: 50-60 Concord St., Wilmington (main address) with buildings also located at 44 Concord St., 100 Fordham Rd., and 350 Fordham Road.

Date of Occupancy: 1969-Present
1979-Present (350 Fordham Road)

Proximity to Well: 3/8 Mile
5/16 Mile (350 Fordham Road)

Hazardous Materials/Hazardous Waste Activities:

- o Haz. Waste Activies take place primarily at Metrigraphics and Encoders Divisions, 50 Concord Street.

Waste Categories:

1) Organic Solutions (acetone, 1,1,1 trichlorethane, freon, other solvents and degreasers)
2) Oily Wastes (cutting oil, vacuum pump oil)
3) Reagents (acids, bases, salt, solutions)
4) Metallic Solutions (plating & etching)
5) Other (detegents, soaps, cenium oxide slurry, etc.)

Underground Tanks: No USTs, however two aboveground fuel tanks (capac. = 275 gal.)

NPDES or Subsurface Discharge: Pretreated industrial wastewater (primarily from photoprocessing rinsewater) discharged to six leaching galleys. DEQE has issued Notice of Non-Compliance for discharging without a permit.

Spill Events: None

Comments/Remarks: Waste in categories 1 and 2 are stored in 55-gallon drums outside in 16 square foot, diked, secured area on western side of 50 Concord Street building, prior to removal by DEQE licensed transporter. Wastes in categories 3,4 and 5 are disposed of in the industrial leachfield. DRC is currently under DEQE investigation as a potential hazardous waste site because of the unlicensed disposal of wastewater into the ground.

DYNAMICS RESEARCH COPORATION

Overview of Facility

Dynamics Research Corp. (DRC) is the original owner of this site which began operations in 1970. Hazardous waste generation at this facility results primarily from the following processes:

- o glass cutting (mineral oil sludge),
- o photographic developing (fixers, developers, denatured alcohol and a reducer containing potassium ferrocyanide,
- o applying a resist onto glass plates (acetone, 1,1,1-trichloroethane),
- o etching glass (hydrofluoric acid),
- o metal deposition onto glass (chrome/nickel alloy),
- o chrome etching (chromium),
- o metal plating (nickel and copper), and
- o vapor degreasing (1,1,1-trichloroethane and freon).

Summary of Hazardous Waste Activities

DRC is a large quantity generator (LQG) with the following DEQE indentification number - MAD001014182. The quantities of hazardous waste generated prior to 1984 is illustrated in their 1983 Annual Report:

o hydrofluoric acid	- 995 gal.
o 1,1,1-trichloroethane	- 1100 gal.
o freon	- 55 gal.
o ethylene glycol monobutyl ether	- 110 gal.
o acetone	- 110 gal.
o waste oil	- 330 gal.
o waste corrosive liquid	- 110 gal.
o isoproyl alcohol	- 110 gal.
o haz. waste liquid NOS (D006)	- 5 gal.
o haz. waste liquid NOS (F007)- Nickel sulfamate plating soln.)	- 110 gal.
o haz. waste liquid NOS (F002- solvent)	- 55 gal.
	Total 3090 gal.

Prior to removal by a licensed hauler, hazardous wastes are stored outside within a 16 square foot diked, secured area located on the western side of the 50 Concord Street building.

Due to the unpermitted discharge of pretreated industrial waste water to a leach field (total of 2000 square feet), the site has been referred to the DEQE's Groundwater Discharge Permitting Section. The unpermitted discharge has been occuring since the facility began operating in 1970. DEQE considers the facility a potential hazardous waste site. According to a DEQE staff member in the Groundwater Discharge Permitting Section, DRC has applied for a permit for their leachfield. They have been issued a Notice of Non-compliance and recently signed a consent decree agreeing to install a holding tank within 60 days to receive the industrial wastes. According to the DEQE, the wastewater includes acetone, metals, cyanide and volatile organic compounds (VOCs). Samples of the discharges to DRC's leachfield by DEQE on June 25, 1978 indicate the presence of 12.4 ppm of methylene chloride, 0.5 ppm of toluene and 3 ppm of another unidentified volatile compound.

Matrix ID #16

INDUSTRY PROFILE SHEET

Company Name: Compugraphics

Number Employees: 1500

Product/Service: Computerized Photo-Typesetting Equipment

Address: 55 Concord St., Wilmington
66 Concord St., Wilmington
35 Concord St., North Reading

Date of Occupancy: Unknown

Proximity to Well: 66 Concord St. - 5/16 Mile
55 Concord St. - 7/16 Mile
35 Concord St. - 7/16 Mile

Hazardous Materials/Hazardous Waste Activities: Large Quantity Generator

66 - Photochemical waste (acid 3 NaOH)
55 - Paint waste and thinner (1,1,1 - TCA)
35 - Photochemical waste
Total of almost 10,000 gallons waste generated in 1982 (See attached)

Underground Tanks: None

NPDES or Subsurface Discharge: None

Spill Events: None

Comments/Remarks: All three facilities are large quantity hazardous waste generators with several files at both DEQE's Boston and Woburn offices. DEQE inspected these three facilities on December 4, 1985 in connection with the Stickney Well Investigation and prepared a two-page memorandum. The memorandum desribed only the current hazardous waste activities noting a septic system at #66 Concord, solvents and a paint room at #55 Concord and portable waste barrels at #35 Concord. The memo concluded that "at this time, the writer does not believe that these sites are major contributors to the contamination of the Stickney Well Aquifer." There is no further discussion on the memo regarding what level of contribution these facilities made.

Matrix ID #17

INDUSTRY PROFILE SHEET

Company Name: Roadway Express

Number Employees: Unknown

Product/Service: Trucking Terminal

Address: 99 Concord Street

Date of Occupancy: 1966-present

Proximity to Well: 1/4 Mile

Hazardous Materials/Hazardous Waste Activities: Small Quantity Generator

Underground Tanks: DEQE files report three tanks with a 90,000 gallon total tankage. N. Reading Fire Department records show the following:

2 tanks at 10,000 gallon

1 tank at 8,000 gallon

NPDES or Subsurface Discharge:

Spill Events: On Sept. 24, 1984 a spill was reported of an unknown quantity of gas and oil.

Comments/Remarks: Site inspection revealed a gate in the perimeter fence at the rear of the property providing access to the wooded area that surrounds the well. Waste oil is stored in barrels on-site.

ROADWAY EXPRESS

Overview of Facility

Roadway Express is a trucking terminal located at 99 Concord Street, North Reading, approximately 1/4 mile from the Stickney Well. The company has occupied the building since its construction in 1966.

Review of Hazardous Substance Activities

Roadway Express maintains and repairs the company trucks on-site. Waste oil that is generated is stored in 55-gallon drums and picked up periodically by Murphy Waste Oil. Solvents are used in the routine maintenance of the trucks, however, storage and disposal procedures are not known.

DEQE files state that three underground tanks with a total tankage of 90,000 gallons exist at the Roadway Terminal. The tanks are reported to contain gasoline and diesel. The North Reading Fire Department records show permits exist for three tanks with a total tankage of 28,000 gallon. Fire Department records show 2-1000 gallon tanks and 1-8000 gallon tank, contents unknown. The reason for this discrepancy is not known.

On September 24, 1984, DEQE files show that a spill of an unknown quantity of gasoline and oil occurred at the Roadway site. No other information on the spill was available.

An 1987 ERM site inspection revealed a gate in the perimeter fence at the rear of the property. The fence provides access to the wooded area surrounding the Stickney Well.

Matrix ID #18

INDUSTRY PROFILE SHEET

Company Name: Coles Express (Central Transport)

Number Employees: Unknown

Product/Service: Trucking Terminal

Address: 93 Concord Street

Date of Occupancy: 1965 to present

Proximity to Well: 1/4 Mile

Hazardous Materials/Hazardous Waste Activities:

- May be considered a small quantity generator if waste oil is generated on-site.
- Solvents potentially used as degreasers in truck maintenance.
- Waste oil is presumably generated and stored in above ground storage.
- Unknown storage and disposal practices for solvents and waste oil.

Underground Tanks:

1-10,000 gallon underground storage tank containing diesel fuel.

NPDES or Subsurface Discharge: None

Spill Events:

- August 28, 1986: (Spill #86-796) DEQE files report a spill of 40 to 100 gallons of diesel fuel into the storm drains. The spill was from a leaking saddle tank of a truck. Jetline cleaned the parking lot and stormdrain.

Comments/Remarks:

Matrix ID #18

INDUSTRY PROFILE SHEET

Company Name: Mason Dixon

Number Employees: Unknown

Product/Service: Common Carrier Transfer-Terminal

Address: 93 Concord Street

Date of Occupancy: Unknown

Proximity to Well: 1/4 Mile

Hazardous Materials/Hazardous Waste Activities:

- No chemicals stored on-site

Underground Tanks: None

NPDES or Subsurface Discharge: None

Spill Events: None

Comments/Remarks:

- Included in August 2, 1983 DEQE site inspection
- May have formerly leased portion of Coles Express

Matrix ID #19

INDUSTRY PROFILE SHEET

Company Name: Riley Truck Leasing

Number Employees: Unknown

Product/Service: Trucking Terminal

Address: 90 Concord Street

Date of Occupancy: Unknown

Proximity to Well: 3/8 Mile

Hazardous Materials/Hazardous Waste Activities:

- o Not known whether trucks are washed or maintained on-site.

Underground Tanks: No underground tank permits exist in North Reading Fire Department Files.

NPDES or Subsurface Discharge: None

Spill Events:

- o May 22, 1985: 10 gallons of diesel fuel cleaned up by McDonald/Watson

Comments/Remarks:

- o Unlisted phone number. Phone call to St. Johnsbury (88-90 Concord Street) generated no additional information.

Matrix ID #20

INDUSTRY PROFILE SHEET

Company Name: C. R. Bard, Incorporated

Number Employees: 55

Product/Service: Medical System Division
Manufacturer of furniture; sheet metal welding

Address: 87 Concord Street

Date of Occupancy: 1981 to present
No previous site occupant

Proximity to Well: 5/16 Mile

Hazardous Materials/Hazardous Waste Activities:

- Large quantity generator, MAD001039577, Notification date, July 12, 1983
- Solvents are used as degreasers
- Waste solvents are collected in drums and picked up by Service Chemical Company for recycling.

Underground Tanks: None

NPDES or Subsurface Discharge: None

Spill Events: None

Comments/Remarks:

- Included in August 2, 1983 DEQE site inspection.

INDUSTRY PROFILE SHEET

Company Name: Lily Trucking

Number Employees: Unknown

Product/Service: Trucking Terminal

Address: 84 Concord Street

Date of Occupancy: c. 1960 to present

Proximity to Well: 3/8 Mile

Hazardous Materials/Hazardous Waste Activities:

- Small quantity generator - waste oil generated on-site.
- Repair and maintain trucks on-site
- 500 gallons waste oil generated per month. Waste oil stored in 2 underground storage tanks and picked up by a vender (Lynn Oil) once a month.
- Trucks washed on-site, truck wash system includes an oil/water separator, a water holding tank and a closed system Freon degreaser. Freon is periodically replaced.
- Solvents probably used in body shop, unknown storage and disposal.

Underground Tanks:

- 5 underground storage tanks: 1-2000 gallon (waste oil); 1-1000 gallon (waste oil); 2-10,000 gallon (diesel fuel); 1-5000 gallon (diesel fuel). Total tankage 28,000 gallons . Tanks tested tight, Fall 1982.

NPDES or Subsurface Discharge: None

Spill Events:

- DEQE files report a spill of 1-2 gallons of diesel (unknown date) spill resulted in soil contamination and oily discharge into a pond behind the site. Files state that contaminated soil was excavated and removed from the site.

Comments/Remarks:

- Included in August 1, 1983 DEQE site inspection.
- DEQE files dated August 1983 state that Lilly Trucking leases a portion of the site to Reading Trucking.

LILLY TRUCKING

Overview of the Facility

Lilly Trucking is located at 84 Concord Street in North Reading, Massachusetts approximately 3/8 of a mile from the Stickney Well. The facility is a trucking terminal that has occupied the site since 1960. There were no previous occupants of the site. DEQE files dated August 1985 state that at that time Lilly Trucking leased a portion of the site to Reading Trucking which operated a common-carrier transfer station at the facility.

Review of Hazardous Substance Activities

Lilly Trucking repairs, maintains and washes the company trucks at the Concord Street site. An August 1983 DEQE site inspection of the facility noted that approximately 500 gallons of waste oil was generated at the site per month. The waste oil is stored in two underground storage tanks and picked up by a vender (Lynn Oil) once a month. The site inspection also noted that solvents are probably used in the body shop and in the routine maintenance of the trucks. Solvent storage and disposal practices are unknown.

The truckwash at the Lilly facility uses a closed-system Freon degreaser and an oil/water separator. The Freon in the system is periodically replaced and drummed.

Five underground storage tanks exist at the Lilly Terminal, total tankage is 28,000 gallons. The tanks include the following:

- 1-2000 gallon waste oil tank
- 1-1000 gallon waste oil tank
- 2-10,000 gallon diesel tanks
- 1-5000 gallon diesel tank

DEQE files report that all the tanks tested tight in the Fall of 1982.

A 1-2 gallon diesel spill on an unknown date was reported in the DEQE spill report files. The spill apparently resulted in an oily sheen in a pond next to the Lilly site and in some associated soil contamination. The DEQE files report that all the contaminated soil was excavated and removed from the site.

Matrix ID #21

INDUSTRY PROFILE SHEET

Company Name: Reading Trucking

Number Employees: Unknown

Product/Service: Common Carrier Transfer Station

Address: 84 Concord Street

Date of Occupancy: Unknown

Proximity to Well: 3/8 Mile

Hazardous Materials/Hazardous Waste Activities:

- o Trucks are not washed or maintained on-site, no hazardous waste is generated.

Underground Tanks: None

NPDES or Subsurface Discharge: None

Spill Events: None

Comments/Remarks:

- o Included in July 2, 1983 DEQE site inspection.
- o Lease portion of Lilly Trucking facility.

Matrix ID # 22

INDUSTRY PROFILE SHEET

Company Name: St. Johnsbury Trucking Company, Inc.

Number Employees: Unknown

Product/Service: Trucking Terminal

Address: 88-90 Concord Street

Date of Occupancy: c. 1960 to present

Proximity to Well: 3/8 Mile

Hazardous Materials/Hazardous Waste Activities:

- o Small quantity generator, MAD019303197, Notification date December 3, 1985
- o Trucks repaired and maintained on-site. Trucks are not washed on-site. Approximately 200 gallons of waste oil generated per month. Waste oil is stored in a 600 gallon underground tank and picked up by a vender (A & A Waste Oil) every two months.
- o Solvent degreasers are used on-site. Storage and disposal not known.
- o Unknown route of maintenance drains.

Underground Tanks:

- o 3 underground storage tanks reported to DEQE: 2-10,000 gallon diesel tanks, 1-600 gallon waste oil tank.
- o 2 underground storage tanks, 20,000 gallon tankage, unknown contents; reported to N. Reading Fire Department.

NPDES or Subsurface Discharge: None

Spill Events:

- o May 6, 1981: 1-55 gallon drum of lacquer thinner spilled. Spill was contained and cleaned up.

Comments/Remarks:

- o Included in August 1, 1983 DEQE site inspection.

ST. JOHNSBURY TRUCKING COMPANY, INC.

Overview of the Facility

The St. Johnsbury Trucking Company is located at 88 and 90 Concord Street in North Reading, approximately 3/8 of a mile from the Stickney Well. The site serves as a trucking terminal and has been in existence at that location since 1960.

Review of Hazardous Substance Activities

The St. Johnsbury Trucking Company is a small quantity hazardous waste generator, DEQE Number MAD019303197. The facility generates approximately 200 gallons of waste oil per month during routine truck repair and maintenance. The waste oil is stored in a 600 gallon underground storage tank and is collected by A & A Waste Oil every two months.

Solvent degreasers are used on-site during routine maintenance operations. Solvent and waste solvent storage and disposal practices are unknown. During a August 1985 DEQE site inspection it was noted that several drains existed in the floor of the maintenance building. The route of the drains could not be determined at that time.

The North Reading Fire Department reports state that St. Johnsbury has permits for two underground storage tanks with a total tankage of 20,000 gallons. DEQE files state that three underground storage tanks exist at the St. Johnsbury facility: 2-10,000 gallon diesel tanks and 1-600 gallon waste oil tank.

One spill event was reported in the DEQE files. On May 6, 1981 one 55-gallon drum of lacquer thinner was spilled at the St. Johnsbury facility. The spill was contained with Speedi-Dry and was cleaned up and transported off-site by a licensed hazardous waste transporter.

Matrix ID #23

INDUSTRY PROFILE SHEET

Company Name: Sanborn's Express

Number Employees: Unknown

Product/Service: Trucking Terminal

Address: 80 Concord Street

Date of Occupancy: c. 1960 to present

Proximity to Well: 7/16 mile

Hazardous Materials/Hazardous Waste Activities:

- o Small quantity generator - waste oil generated on-site.
- o Trucks washed and maintained on-site. Approximately 250 gallons of waste oil is generated per month. Waste oil is stored in a 1000 gallon underground tank and collected monthly by a vender (Lynn Oil). Garage drains are connected to the waste oil tank.
- o Solvent degreasers are used on-site. Solvents are stored in 55 gallon drums and collected by Safety Kleen for recycling. Motor oil and anti-freeze are stored on-site in drums.
- o Truck wash is connected to the septic tank through a series of two catch basins.

Underground Tanks:

- o 7-underground tanks, total tankage reported by N. Reading Fire Department is 41,000 gallons, 5 tanks contain diesel fuel, 1-1000 gallon tank contains waste oil.
- o Tanks tested tight in 1981.

NPDES or Subsurface Discharge: None

Spill Events:

- o November 27, 1985: DEQE files report a 55 gallon drum of an
  DEQE Spill #905 unidentified white chemical was spilled.

Comments/Remarks:

- o Included in August 1, 1983 DEQE site inspection
- o On-site drilling observed February 26, 1987.
- o Because garage drums are connected to the underground waste oil tank, could potentially contain large amounts of waste solvents.

SANBORN'S EXPRESS

Overview of the Facility

Sanborn's Express is a trucking terminal located at 80 Concord Street in North Reading, approximately 7/16 of a mile from the Stickney Well. The company has occupied the facility since its construction in 1960.

Review of Hazardous Substance Activities

Sanborn's Express washes and maintains its trucks at the Concord Street site. According to a report from an August 1983 DEQE site inspection, approximately 250 gallons of waste oil is generated per month during routine truck maintenance and repair. The waste oil is stored in a 1000 gallon underground storage tank and collected monthly by Lynn Oil.

Solvent degreasers are used at the terminal in the maintenance and repair of trucks. The solvents are stored in 55 gallon drums on-site. Safety Kleen periodically replaces full drums of waste solvents with new solvent drums. Motor oil and anti-freeze are also stored at the site in 55-gallon drums. DEQE files state that the garage drains at the Sanborn's facility are connected to the waste oil tank. Because of the solvent use in the garage there is a potential for the presence of solvents in the waste oil tank.

The truckwash at the terminal is connected to the septic leaching field through a series of two catch basins.

The North Reading Fire Department reports a total of seven permitted underground tanks at the Sanborn's site for a total tankage of 41,000 gallons. The tanks consist of five diesel tanks and one 1000 gallon waste oil tank. DEQE files report that all tanks tested tight in 1981.

One spill event was reported at the Sanborn's facility. DEQE files state that on November 27, 1985 a 55-gallon drum of an unidentified white chemical was reported spilled at the site. No other information on the spill was available.

On February 26, 1987 ERM observed on-site drilling at the terminal. The purpose of the drilling was not ascertained.

Matrix ID #24

INDUSTRY PROFILE SHEET

Company Name: Centre Trucking Company

Number Employees: Unknown

Product/Service: Trucking Terminal

Address: 81 Concord Street

Date of Occupancy: 1974 to present
no previous occupant of site

Proximity to Well: 5/16 Mile

Hazardous Materials/Hazardous Waste Activities:

- Small quantity generator - waste oil generated on-site.
- Trucks repaired and maintained on-site
- Waste oil generated during truck maintenance is stored in a 500 gallon underground storage tank until it is picked up by a vender for recycling.

Underground Tanks:

- 5 underground storage tanks with a combined tankage of 8000 gallons, tanks contain gasoline, diesel, motor oil and waste oil.

NPDES or Subsurface Discharge: None

Spill Events:

- January 14, 1979: 50 gallons of Kerosene

Comments/Remarks:

- Included in August 8, 1983 DEQE site inspection
- DEQE files report that on January 14, 1979, during a routine wetlands check, members of the N. Reading Conservation Commission discovered "black oil" flowing into the wetlands from Centre Trucking. The source of the oil was an open 175 gallon container in the rear truck lot containing a product used to treat truck canvases. It was determine that 80 to 100 gallons of the compound had been displaced by precipitation and had run off into the wetland behind the site. EPA was notified.

CENTRE TRUCKING COMPANY

Overview of the Facility

The Centre Trucking Company operates a trucking terminal at 81 Concord Street in North Reading, approximately 5/16 of a mile from the Stickney Well. Centre Trucking has operated the Concord Street site since its construction in 1974, there were no previous occupants of the site.

Review of Hazardous Substance Activities

Centre Trucking repairs and maintains the company trucks at the Concord Street site. In an August 1983 DEQE site inspection it was noted that all waste oil generated at the site is stored in a 500-gallon underground storage tank until it is picked up by a vender for recycling. Routine truck repair and maintenance involves the use of solvents. Solvent storage and disposal practices are unknown.

North Reading Fire Department underground tank permits note the existence of five underground storage tanks at the Centre Trucking facility. The total tankage is 8000 gallons and the tanks contain diesel, motor oil and waste oil.

DEQE files report two spill/discharge events that occured at the Concord Street terminal. An EPA report dated January 14, 1979 stated that during a routine wetlands check, members of the North Reading Conservation Commission noted "black oil" flowing into the wetlands behind the Centre Trucking site. The contamination was traced to an open 175 gallon container of a compound used to treat truck canvasses in the rear parking lot of the Centre Truck terminal. It was determined that approximately 80 to 100 gallons of the compound had been displaced by recent precipitation and had run off into the wetlands behind the site.

Additionally, a DEQE spill report also dated January 14, 1979 reported that a spill of 50-gallons of kerosene had occured at the Centre Trucking site.

Matrix ID #25

INDUSTRY PROFILE SHEET

Company Name: Service System Company

Number Employees: Unknown

Product/Service: Food Service

Address: 77 Concord Street

Date of Occupancy: c. 1970-present

Proximity to Well: 3/8 mile

Hazardous Materials/Hazardous Waste Activities: None

o No chemicals stored on-site

Underground Tanks: None

NPDES or Subsurface Discharge: None

Spill Events: None

Comments/Remarks:

o Site included in an August 1, 1983 DEQE site inspection.

Matrix ID #26

INDUSTRY PROFILE SHEET

Company Name: Dyar Sales and Machinery

Number Employees: Unknown

Product/Service: Highway Equipment Distributor

Address: 75 Concord Street

Date of Occupancy: c. 1974-present
No previous site occupant

Proximity to Well: 3/8 mile

Hazardous Materials/Hazardous Waste Activities:

- o Small quantity generator, MAD981897911, Notification date October 17, 1986
- o Solvents are used as degreasers
- o Waste oil is generated and stored in an above ground 50 to 100 gallon steel tank and picked up by a vender

Underground Tanks: None

NPDES or Subsurface Discharge: None

Spill Events: None

Comments/Remarks:

- o Site was included in an August 1, 1983 DEQE site inspection

DYAR SALES AND MACHINERY

Overview of Facility

Dyar Sales and Machinery is a distributor of highway equipment, located at 75 Concord Street, approximately 3/8 of a mile from the Stickney Well. The company has occupied the Concord Street site since 1974 when the building was constructed; there were no previous site occupants.

Review of Hazardous Substance Activities

Dyar Sales and Machinery is a small quantity generator, DEQE number MAD981897911. Waste oil is generated on-site and stored in an above ground 50 to 100 gallon steel tank until it is picked up by a vender. Solvents are used as degreasers on-site during routine equipment repair and maintenance. Disposal and storage of the solvents and solvent waste is unknown. No underground tanks exist at the site.

Matrix ID #27

INDUSTRY PROFILE SHEET

Company Name: Drake Baking Company

Number Employees: Unknown

Product/Service: Transfer Station and Cake Distribution Center

Address: 74 Concord Street

Date of Occupancy: 1976-present

Proximity to Well: 7/16 mile

Hazardous Materials/Hazardous Waste Activities:

- Small quantity generator-waste oil generated on-site
- Waste oil from the trucks is collected and stored in an underground tank. The waste oil is collected by a vender twice a year, approximately 500 gallons/year is generated.
- Solvents are used for cleaning and degreasing. Waste solvents are stored in drums and are collected by a vender.

Underground Tanks:

1- 4000 gallon gasoline tank

1- 500 gallon waste oil tank

Both were replaced in 1979

NPDES or Subsurface Discharge: None

Spill Events: None

Comments/Remarks:

- Trucks are maintained and washed on-site. The wash system is a closed system with oil trays. The wash water is recycled.
- Site was included in an August 1, 1983 DEQE site inspection.

DRAKE BAKING COMPANY

Overview of Facility

Drake Baking Company is a transfer station and cake distribution center located at 74 Concord Street, approximately 7/16 of a mile from the Stickney Well. The company has occupied the site since 1976. It is not known whether there were any previous site occupants, however, the Town of North Reading issued a site building permit in 1950.

Review of Hazardous Substance Activities

Drake Baking Company maintains, washes and repairs the company trucks on-site. DEQE files state that approximately 500 gallons of waste oil is generated annually. The waste oil is stored in a 500 gallon underground tank and collected by a vender twice a year. Solvents are used on-site during routine truck maintenance. Waste solvents are drummed and collected by a vender for recycling.

The on-site truckwash is a closed system with oil trays. Wash water is recycled through the system. Two underground storage tanks exist at the Concord Street site:

1-4000 gallon gasoline tank
1-5000 gallon waste oil tank

Both tanks were replaced in 1979. There are no recorded spill or leakage events at this site.

Matrix ID #28

INDUSTRY PROFILE SHEET

Company Name: Dependable Masonry Construction

Number Employees: Unknown

Product/Service: Unknown

Address: 73 Concord Street

Date of Occupancy: 1975-Present

Proximity to Well: 3/8 Mile

Hazardous Materials/Hazardous Waste Activities:

- No hazardous substances reported at this site.

Underground Tanks: None

NPDES or Subsurface Discharge: None

Spill Events: None

Comments/Remarks:

Matrix ID #29

INDUSTRY PROFILE SHEET

Company Name: Data Processing Systems Company

Number Employees: Unknown

Product/Service: Office and Computer Showroom

Address: 72 Concord Street

Date of Occupancy: Unknown

Proximity to Well: 7/16 Mile

Hazardous Materials/Hazardous Waste Activities:

- No chemicals stored on-site.

Underground Tanks: None

NPDES or Subsurface Discharge: None

Spill Events: None

Comments/Remarks:

- Site included in an July 27, 1983 DEQE site inspection.

Matrix ID #30

INDUSTRY PROFILE SHEET

Company Name: D.L. Maher Corporation

Number Employees: Unknown

Product/Service: Ground Water Development, Well Drilling

Address: 71 Concord Street

Date of Occupancy: 1970-present

Proximity to Well: 3/8 Mile

Hazardous Materials/Hazardous Waste Activities:

- Small quantity generator MAD019547447, Notification Date February 26, 1986
- Drilling rigs are maintained on-site. Waste oil is generated, stored in drums and picked up by a vender.
- Muriatic acid, for well development, is stored on-site in drums.
- Solvents may be used in rig maintenance.

Underground Tanks: North Reading Fire Department underground tank files state that two underground storage tanks containing fuel oil and diesel (unknown tankage) existed at the site. Tanks have been removed.

NPDES or Subsurface Discharge: None

Spill Events: Following a citizen report of men taking dead fish from a pond at 45 Concord Street. 7-19-85 DEQE files report a Notice of Responsibility was issued to D.L. Maher regarding the release of 15 to 20 gallons of the Pesticide Dursban. DEQE stated that the release was the result of operator error and/or malfunctioning lawn servicing equipment at 45 Concord Street.

Comments/Remarks:

- TCE "hotspot" identified at this site
- Included in August 1, 1983 DEQE site inspection

D.L. MAHER

Overview of Facility

D.L. Maher is a ground water development and well drilling company located at 71 Concord Street, North Reading, Massachusetts. The company is situated approximately 3/8 mile south of the Stickney Well. D.L. Maher has occupied the Concord Street site since 1970. No previous occupants existed at this site.

Review of Hazardous Substance Activities

D.L. Maher has been classified as a small quantity generator because of the waste oil generated from the maintenance of the company drill rigs. The drill rigs and trucks are maintained on-site, this may include the use of degreasing solvents. Waste oil from company vehicles is stored on-site in 55-gallon drums until it is picked up and recycled by a vender. The only other chemical stored in quantity on-site is muriatic acid. The muriatic acid is stored in 55-gallon drums. Two underground storage tanks of unknown tankage containing fuel oil and diesel formerly existed at the D.L. Maher facility. Information obtained from the North Reading Fire Department states that both tanks were recently removed.

On July 19, 1985 the DEQE issued a Notice of Responsibility to D.L. Maher concerning a spill of 15 to 20 gallons of the pesticide Dursban. The spill was reported to DEQE by a citizen who observed men (presumably D.L. Maher personnel) removing dead fish from a pond at 45 Concord Street. DEQE attributed the spill to operator error and/or malfunctioning lawn servicing equipment. The D.L. Maher facility was identified in an initial DEQE Stickney will investigation as being a TCE "hotspot", however, subsequent investigation by CDM did not refer to D.L. Maher as a potential source of the Stickney Well contamination.

Matrix ID #31

INDUSTRY PROFILE SHEET

Company Name: Craig Laundry Supply

Number Employees: Unknown

Product/Service: Supplier of Dry Cleaning and Laundry Products

Address: 70 Concord Street

Date of Occupancy: c. 1984-Present

Proximity to Well: 7/16 Mile

Hazardous Materials/Hazardous Waste Activities:

- o May use chlorinated solvents on-site

Underground Tanks:

- o Four underground storage tanks, (1-5000 gallon and 3-2500 gallon) used by former occupant of site for solvent storage are abandoned in-place and concrete-filled.

NPDES or Subsurface Discharge: None

Spill Events: None

Comments/Remarks:

Matrix ID #32

INDUSTRY PROFILE SHEET

Company Name: Contour Chemical Company, Subsidiary of Dexter Corporation.

Number Employees: Unknown

Product/Service: Manufacturer of Mould Release Agents

Address: 70 Concord Street

Date of Occupancy: 1979-1984 (property was sold August 22, 1984, Contour Chemical had vacated the site by August 4, 1983)

Proximity to Well: 7/16 Mile

Hazardous Materials/Hazardous Waste Activities:

- o Large quantity generator, MAD #D19194731 Notification date December 6, 1980 (Number deleted February 12, 1985)

Underground Tanks: (Based on information obtained from the North Reading Fire Department)

- o 4-underground tanks containing Naptha, Toluene, Ethyl Acetate and Naptha #3 (lactol spirits); total tankage 12,500 gallons. Tanks were cleaned, filled with low strength concrete and abandoned in place in 1984.

NPDES or Subsurface Discharge: None

Spill Events: DEQE noted soil staining around the facility in August 4, 1983 site inspection.

Comments/Remarks:

- o An August 4, 1983 DEQE site inspection revealed that the site was not properly closed, and that there may be a potential for ground water pollution.
- o Black-rubber-like material was noted coating the ground in the side yard of the facility. A 1982 subsurface investigation by CDM revealed that this was non-toxic and non-hazardous and was suitable for disposal in a sanitary landfill.
- o DEQE files note that the building roof drainpipes discharge into the ground.

CONTOUR CHEMICAL COMPANY

Overview of the Facility

The Contour Chemical Company, a subsidiary of the Dexter Corporation, owned and operated the facility at 70 Concord Street, North Reading, Massachusetts during the time period from 1979 to 1984. The facility was occupied by Contour Chemical until early 1983; then was vacant until its sale in August 1984. The facility was located approximately 7/16 mile south of the Stickney Well.

Review of Hazardous Substance Activities

Contour Chemical Company was involved in the manufacture of mould release agents. The company was classified as a large quantity generator, MAD #019194731. Four underground storage tanks, used for solvent storage, were located on-site. The tanks consisted of a 5000 gallon tank containing Naptha and three 2500 tanks containing toluene, ethyl acetate and Naptha #3 (lactol spirits). Following the sale of the site in 1984, the tanks were pumped, cleaned, filled with low strength concrete and abandoned in place.

On August 4, 1983, after Contour Chemical had vacated the site. The DEQE conducted a site inspection to determine if the facility had been properly closed. The site inspection revealed black surfical soil staining and dead vegetation surrounding the facility. DEQE noted many "poor housekeeping" practices including roof drain pipes that drained directly into the ground. Following the inspection, DEQE concluded that the site had been improperly closed, and that a potential existed for ground water contamination. It is not known what, if any, further action was taken by the DEQE.

Matrix ID #33

INDUSTRY PROFILE SHEET

Company Name: Empire Adhesives

Number Employees: Unknown

Product/Service: Manufacturer of water-based adhesives

Address: 70 Concord Street

Date of Occupancy: 1965 to 1979

Proximity to Well: 7/16 mile

Hazardous Materials/Hazardous Waste Activities:

- o Manufactured polyvinyl acetate and polyvinyl alcohol products
- o Small quantity generator

Underground Tanks:

- o North Reading Fire Department files state that four underground storage tanks were permitted in 1965. Total tankage - 12,500 gallons, unknown contents.

NPDES or Subsurface Discharge: None

Spill Events: None reported. DEQE did find a black rubber-like material coating the ground at the side of the building. A 1982 CDM investigation determined that the material was a polymer (non-toxic, non-hazardous) discharged by Empire sometime between 1965 and 1979.

Comments/Remarks:

- o DEQE files state that observers reported that Empire periodically discharged a white liquid out the back of the property.

EMPIRE ADHESIVES

Overview of the Facility

Empire Adhesives, a manufacturer of water-based adhesives, occupied the property at 70 Concord Street, North Reading, Massachusetts during the time period from 1965 to 1979. The facility was located approximately 7/16 mile south of the Stickney Well.

Review of Hazardous Substance Activities

Empire Adhesives was classified as a small quantity generator, they were involved in the manufacture of polyvinyl acetate and polyvinyl alcohol products. Information obtained from the North Reading Fire Department stated that Empire Adhesives had obtained permits for four underground storage tanks, one-5000 gallon tank and three-2500 gallon tanks. It is not known what the tanks contained.

No spill incidents were reported at the Empire Adhesives facility although DEQE files state that observers reported that the company periodically discharged a white liquid at the back of the property. It is also probable that the black, rubber-like material described by DEQE and CDM in a 1982 report was discharged by Empire Adhesives into the side yard of the facility sometime between 1965 and 1979. The 1982 CDM report described a black material, approximately two to four inches in thickness, that coated the ground near the plant. Chemical analyses of the material determined it was a non-toxic, non-hazardous polymer, suitable for disposal as solid waste in a sanitary landfill.

Matrix ID #34

INDUSTRY PROFILE SHEET

Company Name: Undercoverwear, Inc.

Number Employees: Unknown

Product/Service: Marketing Women's Wear

Address: 66 Concord Street

Date of Occupancy: c. 1985-Present
No previous site occupant

Proximity to Well: 7/16 Mile

Hazardous Materials/Hazardous Waste Activities:

- o No chemicals stored on-site, office space only

Underground Tanks: None

NPDES or Subsurface Discharge: None

Spill Events: None

Comments/Remarks:

- o Included in an August 3, 1983 DEQE site inspection.

Matrix ID #35

INDUSTRY PROFILE SHEET

Company Name: C.M. Ironworks

Number Employees: Unknown

Product/Service: Distributors of Manhole and Catch Basin Covers

Address: 62 Concord Street

Date of Occupancy: c. 1972-present
No previous site occupant

Proximity to Well: 7/16 Mile

Hazardous Materials/Hazardous Waste Activities:

- o No Manufacturing
- o No solvents used on-site

Underground Tanks: None

NPDES or Subsurface Discharge: None

Spill Events: None

Comments/Remarks:

- o Included in August 2, 1983 DEQE site inspection.

Matrix ID #36

INDUSTRY PROFILE SHEET

Company Name: New England Concrete

Number Employees: Unknown

Product/Service: Unknown

Address: 62 Concord Street

Date of Occupancy: c. 1972-present

Proximity to Well: 7/16 Mile

Hazardous Materials/Hazardous Waste Activities:

- o Small quantity generator-waste oil generated on-site
- o Resin-based, curing seal material and hydraulic oil stored in drums on-site.
- o Waste oil is collected in drums. About 100 gallons/year is generated.

Underground Tanks: None

NPDES or Subsurface Discharge: None

Spill Events:

- o Oil stains in yard noted by DEQE in August 1983. Company representative stated that stains were a result of spillage during transfer from the drums to the equipment. Representative also stated "a few gallons of anti-freeze may have drained on the ground unknowingly"

Comments/Remarks:

- o Included in August 2, 1983 DEQE site inspection.
- o New England Concrete leases the backyard of CM White Ironworks.

NEW ENGLAND CONCRETE

Overview of Facility

New England Concrete is located at 62 Concord Street in North Reading, approximately 7/16 of a mile from the Stickney Well. The company leases the backyard of CM White Ironworks. New England Concrete has occupied the site since approximately 1972.

Review of Hazardous Substance Activities

New England Concrete generates waste oil on-site during routine maintenance of operations equipment. DEQE files state that the waste oil is stored outside in drums and approximately 100 gallons/year is generated. It is likely that solvent degreasers are used at the site, however, no storage or disposal practices are known. Resin-based curing seal material, hydraulic oil and anti-freeze are also stored outside in drums.

An August 1983 DEQE site inspection noted staining in the yard near the drum storage area. A company representative stated that the stains were the result of spillage during transfer of chemicals from the drums to the equipment. The representative also stated that "a few gallons of anti-freeze may have drained on the ground unknowingly".

INDUSTRY PROFILE SHEET

Company Name: Annette's Restaurant

Number Employees: Unknown

Product/Service: Restaurant

Address: 62 Concord Street

Date of Occupancy: c. 1972-present

Proximity to Well: 7/16 Mile

Hazardous Materials/Hazardous Waste Activities:

- No chemicals stored on-site
- No chemical waste generated on-site

Underground Tanks: None

NPDES or Subsurface Discharge: None

Spill Events: None

Comments/Remarks:

- Included in an August 2, 1983 DEQE site inspection.

Matrix ID #38

INDUSTRY PROFILE SHEET

Company Name: MSM Industries

Number Employees: 70

Product/Service: Precision Metalwork

Address: 60 Concord Street

Date of Occupancy: c. 1968-present

Proximity to Well: 7/16 Mile

Hazardous Materials/Hazardous Waste Activities:

- Large quantity generator, MAD 001072461, Notification date May 15, 1981
- Approximately 880 gallons waste solvents (toluene, xylene and MEK) generated annually. Solvent storage and disposal practices not known.

Underground Tanks: None

NPDES or Subsurface Discharge: None

Spill Events: None

Comments/Remarks:

Matrix ID #39

INDUSTRY PROFILE SHEET

Company Name: CHF Products, Inc.

Number Employees: Unknown

Product/Service: Manufacture Metal Parts for the Computer and Defense Industry.

Address: 5 Hallberg Park

Date of Occupancy: post 1970-present

Proximity to Well: 7/16 Mile

Hazardous Materials/Hazardous Waste Activities:

- Small quantity generator, MAD051780476, Notification date August 7, 1985
- Use solvent-based cutting oil and mineral spirits
- Waste oil and solvents are mixed and removed by a vender. Two drums of waste are generated/year.
- Oily metal chips are stored in dumpsters and sold as scrap. Some surface leakage has been noted.
- Cutting oil is stored in 3-above ground, 275 gallon tanks.

Underground Tanks:

1-5500 gallon underground heating oil tank. Tank has been tested results unknown.

NPDES or Subsurface Discharge: None

Spill Events:

- During August 1983 site visit, DEQE noted a "milky-black, latex-like material" on the ground on the site of the facility. The company representative stated that this material was not on CHF property and belonged to Contour Chemical.

Comments/Remarks:

- Included in August 4, 1983 DEQE site inspection.
- DEQE files state that a "number" of barrels were dumped near the river in the rear of the site by a previous site owner. Lead and Cadmium soil contamination resulted from this incident.

CHF PRODUCTS, INC.

Overview of Facility

CHF Products is a manufacturer of metal parts for the computer and defense industry. The company has been located at 5 Hallberg Park since sometime after 1970. According to a note in the DEQE files there was at least one previous site occupant. The Hallberg Park building was constructed in 1970. The Hallberg Park site is located approximately 7/16 of a mile from the Stickney Well.

Review of Hazardous Substance Activities

CHF Products is a small quantity hazardous waste generator, DEQE number MAD051780476. Waste oil and waste solvents are generated at the facility in an amount of approximately 100 gallons per year. The waste oil is mainly solvent-based cutting oil. The cutting oil is stored in three above ground 275-gallon tanks prior to its use in company manufacturing operations. The manufacturing processes at the site also generate waste metal chips. The chips are stored in dumpsters and solid as scrap.

One 5500-gallon underground tank containing heating oil exists at the CHF facility. The DEQE files state that the tank was tested but do not mention a date, results or reasons for the testing.

An August 1984 DEQE site inspection noted several incidences of spills or leakage at the site. Leakage was noted in the area of the dumpsters containing the oily metal chips. A "milky-black, latex-like" material was noted on the ground on the side of the site. A CHF representative stated that this material was not on CHF property and was related to the Contour Chemical/Empire Adhesives site.

DEQE files also report that a "number" of barrels were dumped behind the Hallberg Park site on the banks of the Ipswich River. The barrels, which were reportedly dumped by the previous site owner, resulted in lead and cadmium soil contamination. No other information on this incident was available.

Matrix ID #40

INDUSTRY PROFILE SHEET

Company Name: Pacetti Corporation

Number Employees: Unknown

Product/Service: Engraving and Embassing Operation, Rubber and Plastic Mold Work

Address: 4 Hallberg Park

Date of Occupancy: c. 1969-present
No previous site occupant

Proximity to Well: 7/16 Mile

Hazardous Materials/Hazardous Waste Activities:

- Small quantity generator-generate waste oil and solvents on-site.
- Use cutting oil and solvents. Waste oil and solvents are mixed with the metal chips generated on-site and stored in dumpsters.

Underground Tanks: None

NPDES or Subsurface Discharge: None

Spill Events: None

Comments/Remarks:

- Included in a July 29, 1983 DEQE site inspection.

Matrix ID #41

INDUSTRY PROFILE SHEET

Company Name: Val-Ken Machine Products

Number Employees: Unknown

Product/Service: Machine Shop (mainly cryogenic industry work)

Address: 4 Hallberg Park

Date of Occupancy: c. 1969-present
No previous site occupant

Proximity to Well: 7/16 Mile

Hazardous Materials/Hazardous Waste Activities:

- Small quantity generator-waste solvents generated on-site.
- Solvents used for degreasing. Generate about 30 gallons/year. Formerly (prior to 1983) dumped solvents on the ground in rear of site. Stated to DEQE in August 1983 that they currently put waste solvents in the dumpster.
- Metal chips generated on-site, sold to metal recycler. Stored in drums on-site.
- Any spills are mixed with Speedi-Dry and stored in drums on-site.

Underground Tanks: None

NPDES or Subsurface Discharge: None

Spill Events: None

Comments/Remarks:

- Included in August 3, 1983 DEQE site inspection.

VAL-KEN MACHINE PRODUCTS

Overview of Facility

Val-Ken Machine Products is a machine shop involved in cryogenic industry operations. The company has been located at 4 Hallberg Park since the construction of the building in 1969. The site is located approximately 7/16 of a mile from the Stickney Well.

Review of Hazardous Substance Activities

Val-Ken Machine Products generates approximately 30 gallons of waste solvents annually. During an August 1983 DEQE site inspection a company representative stated that from 1969 to 1983 the waste solvents were dumped in the rear yard of the facility. Currently solvents are mixed with waste metal chips and disposed in a dumpster. The company representative also stated that machine shop spills were mixed with Speedi-Dry and drummed, disposal practices are not known.

Matrix ID #42

INDUSTRY PROFILE SHEET

Company Name: Columbia Construction

Number Employees: Unknown

Product/Service: Construction Company Offices

Address: 58 Concord Street

Date of Occupancy: Unknown

Proximity to Well: 7/16 Mile

Hazardous Materials/Hazardous Waste Activities:

- No chemicals stored on-site
- No waste generated on-site

Underground Tanks: None

NPDES or Subsurface Discharge: None

Spill Events: None

Comments/Remarks:

- Included in August 2, 1983 DEQE site inspection.

Matrix ID #43

INDUSTRY PROFILE SHEET

Company Name: J. Sanford and Sons

Number Employees: Unknown

Product/Service: Steel Panel Manufacturer, Welding and Steel Panel Storage

Address: 50 Concord Street

Date of Occupancy: Unknown

Proximity to Well: 7/16 Mile

Hazardous Materials/Hazardous Waste Activities:

- o Small quantity generator-generate waste oil on-site.
- o Diesel Fuel is stored in 2-275 gallon above ground tanks
- o Waste oil is stored in drums - DEQE files state that company representative stated that BFI disposes of drums; BFI is not a licensed transporter of hazardous waste.

Underground Tanks: None

NPDES or Subsurface Discharge: None

Spill Events: DEQE noted oil stains on the ground near waste oil storage drums during an August 1983 site visit. Waste drums were open and in poor condition.

Comments/Remarks:

- o Included in August 3, 1983 DEQE site inspection.
- o DEQE files state that there are complaints against J. Sanford and Sons in the North Reading Town Files (Board of Health). Complaints state that the company had been dumping and burying construction waste "and other materials" on-site.

Matrix ID #44

INDUSTRY PROFILE SHEET

Company Name: ML Transfer

Number Employees: Unknown

Product/Service: Shoe Warehouse

Address: 44 Concord Street

Date of Occupancy: Unknown

Proximity to Well: 7/16 Mile

Hazardous Materials/Hazardous Waste Activities:

- No chemicals stored on-site

Underground Tanks: None

NPDES or Subsurface Discharge: None

Spill Events: None

Comments/Remarks:

- Included in August 2, 1983 DEQE site inspection.

Matrix ID #45

INDUSTRY PROFILE SHEET

Company Name: United Parcel Service (UPS)

Number Employees: Unknown

Product/Service: Distribution Center of Parcel Delivery

Address: 23 Concord Street

Date of Occupancy: c. 1984-present

Proximity to Well: 1/2 Mile

Hazardous Materials/Hazardous Waste Activities: None

Underground Tanks:

1-5000 gallon underground storage tank, probably contains gasoline or diesel.

NPDES or Subsurface Discharge: None

Spill Events: None

Comments/Remarks:

- Site formerly occupied by Table Talk Pies (noted in August 1983 DEQE report)

Matrix ID #46

INDUSTRY PROFILE SHEET

Company Name: Bobcat of Boston

Number Employees: Unknown

Product/Service: Sales, service and parts for construction equipment

Address: 20 Concord Street

Date of Occupancy: Unknown

Proximity to Well: 1/2 Mile

Hazardous Materials/Hazardous Waste Activities:

- Small quantity generator-generate waste oil on-site
- Generate 100 gallon/month waste oil which is collected in above ground 275 gallon tank and recycled when tank is full.

Underground Tanks:

3-2000 gallon underground storage tanks - unknown contents (noted in North Reading Fire Department Permit Records)

NPDES or Subsurface Discharge: None

Spill Events: No reported events, however, oil stains were noted on the ground near 275 gallon tank during an August 3, 1983 DEQE inspection.

Comments/Remarks:

- Included in an August 3, 1983 DEQE site inspection.

Matrix ID #47

INDUSTRY PROFILE SHEET

Company Name: M.W. Carr Corporation

Number Employees: Unknown

Product/Service: Distributor of Picture Frames

Address: Wilmington Industrial Park, Fordham Road

Date of Occupancy: c. 1979

Proximity to Well: Unknown

Hazardous Materials/Hazardous Waste Activities:

- o No wet processes, no degreasers or chemicals used.

Underground Tanks: None

NPDES or Subsurface Discharge: None

Spill Events: None

Comments/Remarks:

- o Included in a February 1979 DEQE investigation of the Stickney Well contamination.
- o Site is a distribution outlet.

INDUSTRY PROFILE SHEET

Company Name: K-2 Corporation

Number Employees: Unknown

Product/Service: Distributor of Ski Equipment

Address: Wilmington Industrial Park, Fordham Road

Date of Occupancy: c. 1979

Proximity to Well: Unknown

Hazardous Materials/Hazardous Waste Activities:

- o No wet processes on-site, no degreasers or chemicals used.

Underground Tanks: None

NPDES or Subsurface Discharge: None

Spill Events: None

Comments/Remarks:

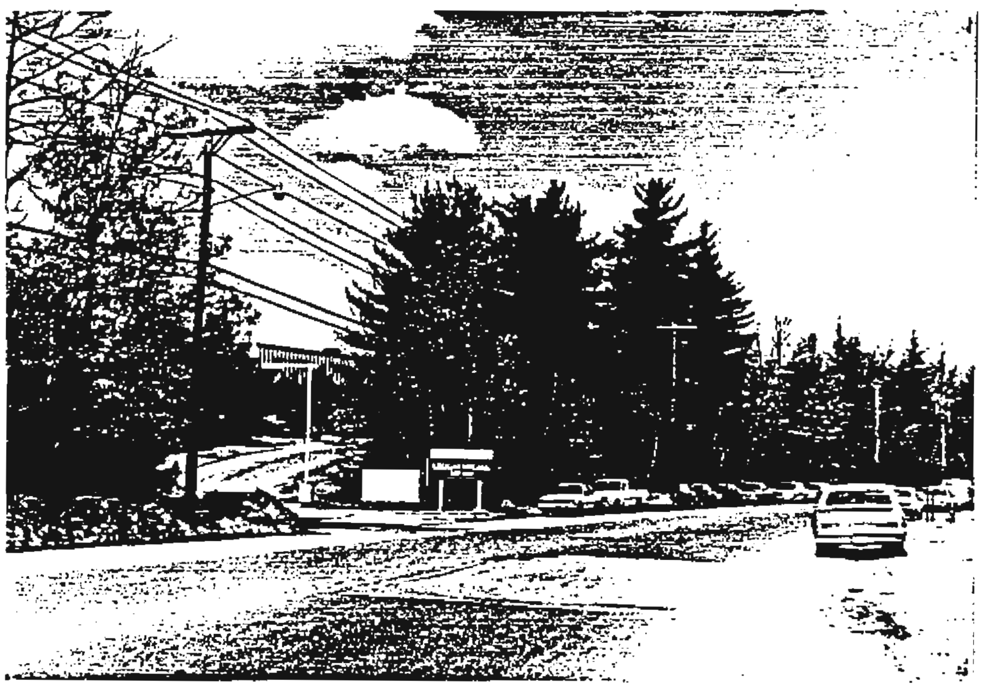
- o Included in a February 1979 DEQE investigation of the Stickney Well contamination.
- o Site is a distribution outlet.

HONEYWELL CORPORATION - 110 FORDHAM ROAD

Western side of building.
3/18/87

View of drum storage area, southern side of building.
3/18/87

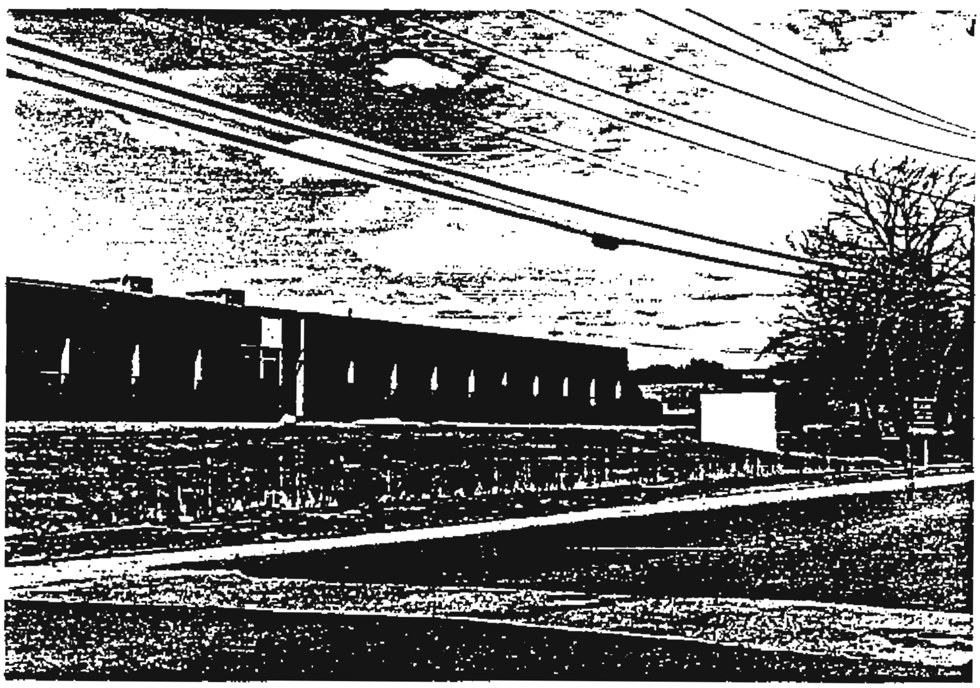
VOLKSWAGEN OF AMERICA - 100 FORDHAM ROAD



Entrance to Volkswagen.
3/18/87

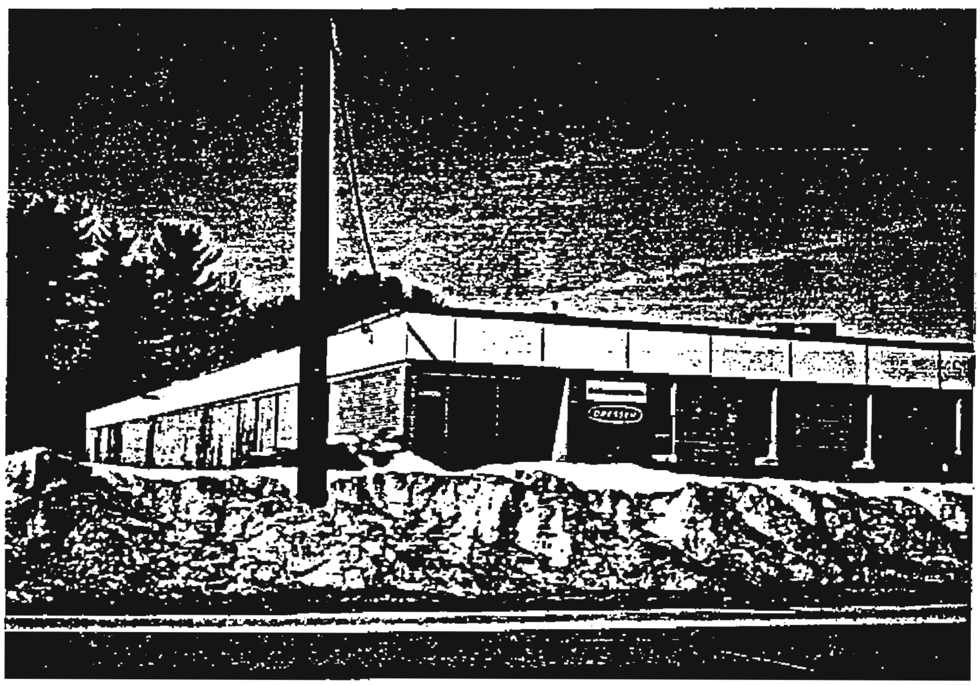
View of front parking lot looking north.
3/18/87

KEYTEK INSTRUMENT - 260 FORDHAM ROAD



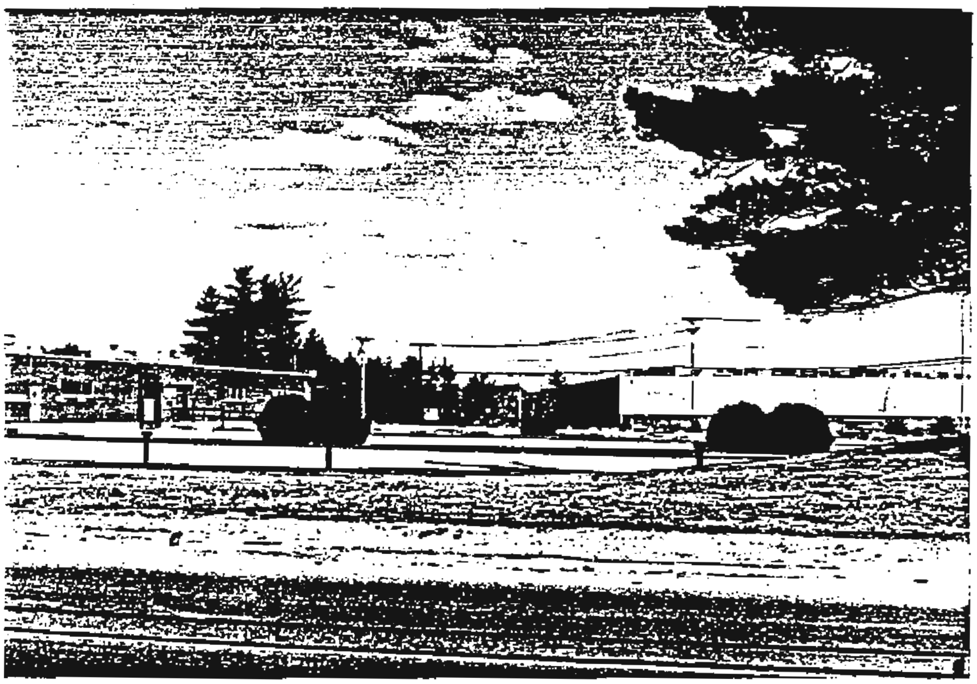
View of Keytek.
3/18/87

DATAMETRICS COMPANY - 340 FORDHAM ROAD



View of Datametrics.
2/27/87

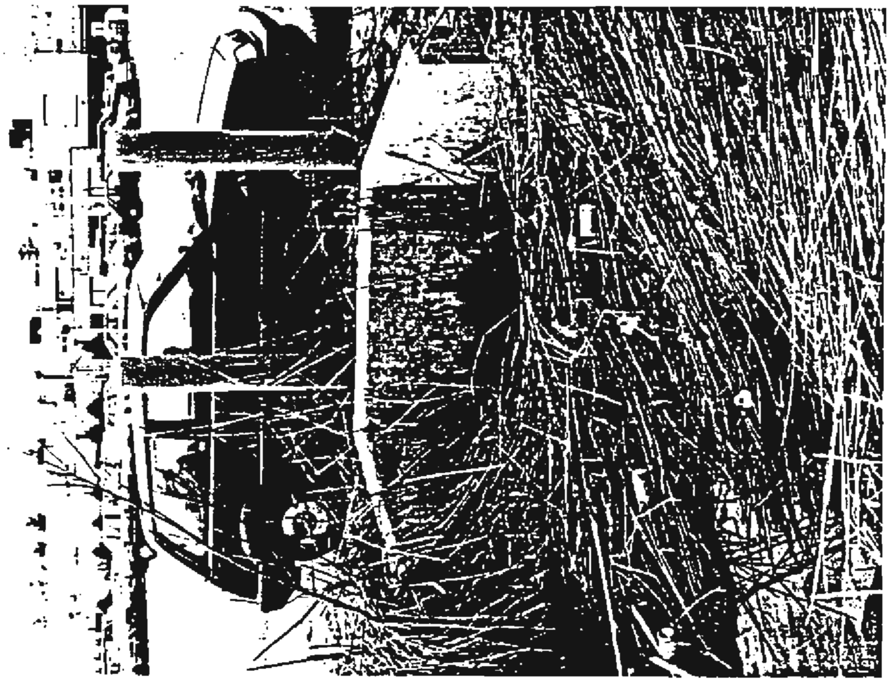
GENERAL ELECTRIC - 55 FORDHAM ROAD



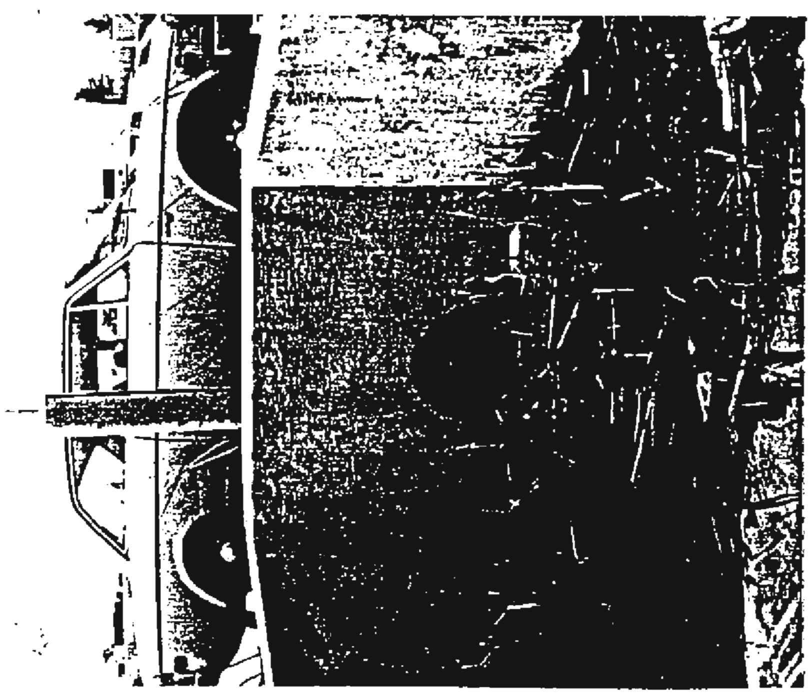
View of GE from Concord St. (Former Compugraphics building at 66 Concord St. in left foreground)
3/18/87

Secondary entrance road to GE off Concord St. between Converse & Roadway.
3/18/87

GENERAL ELECTRIC



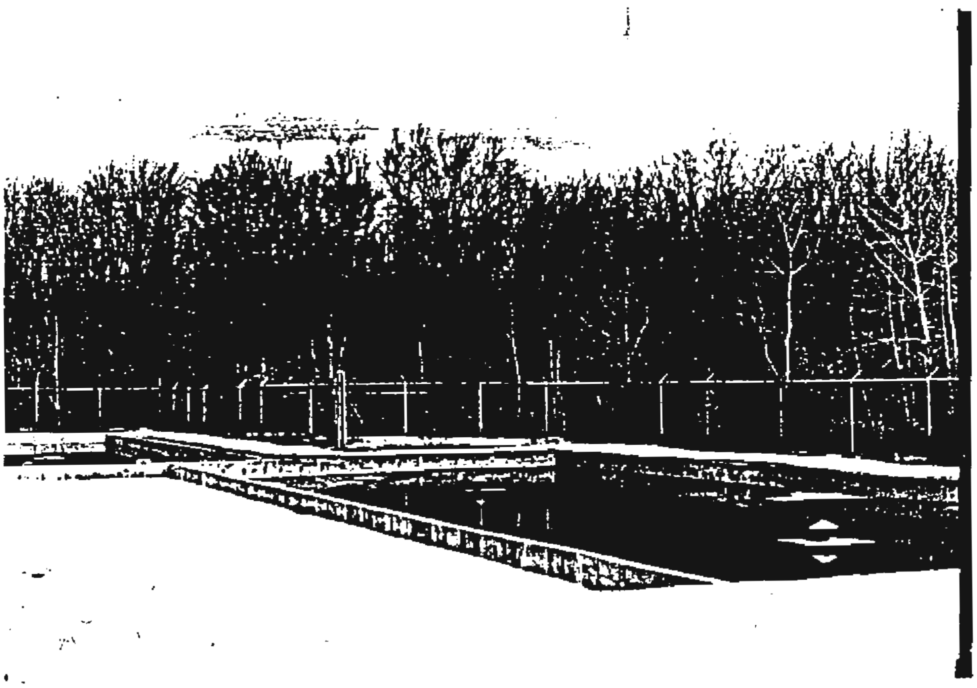
NPDES Outfall 001.
3/18/87



NPDES Outfall 002.
3/18/87

GENERAL ELECTRIC

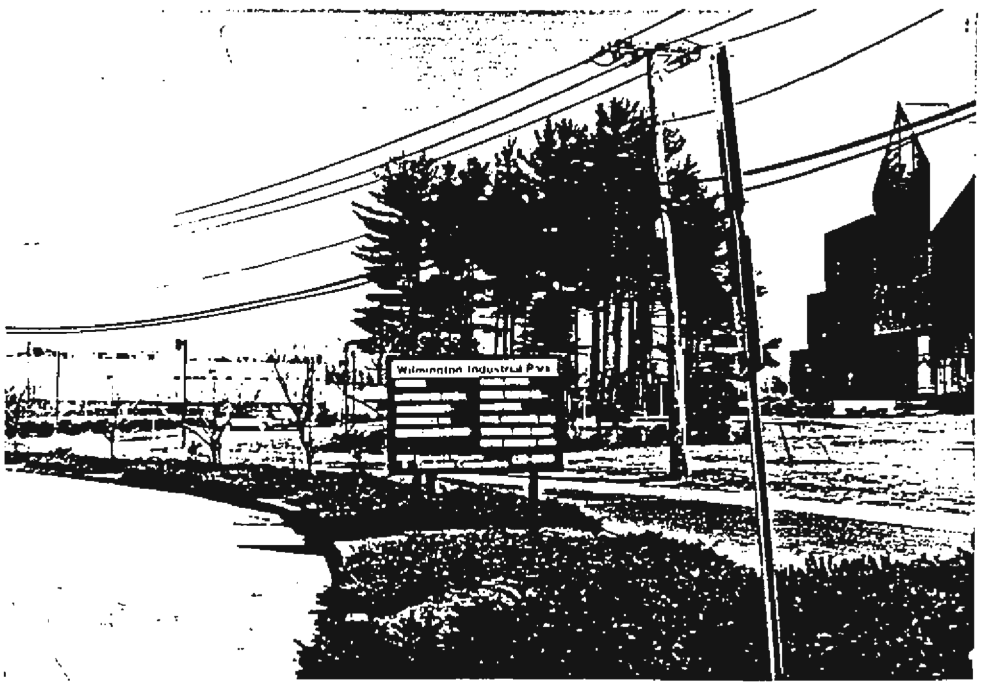
View of old road into gravel pit area next to outfall 001.
(View looking east from GE parking lot)
3/18/87



View of sand filter beds at WWTP.
3/18/87

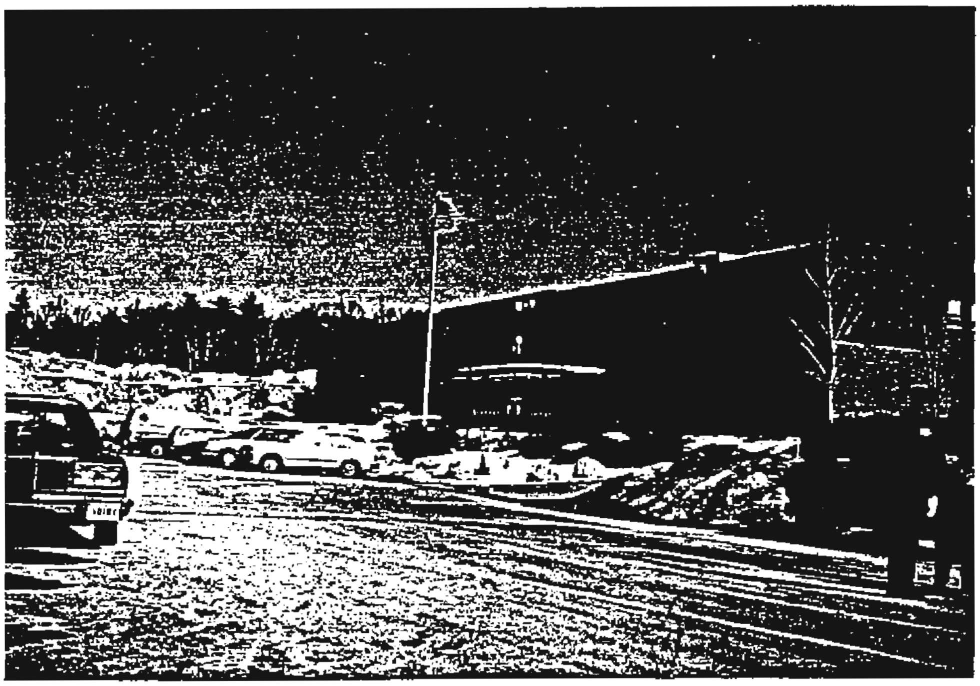
CONVERSE - 1 FORDHAM ROAD
(NEW SITE)

View of building at corner of Fordham Road & Concord St.
(Occupied since 1986)
3/18/87

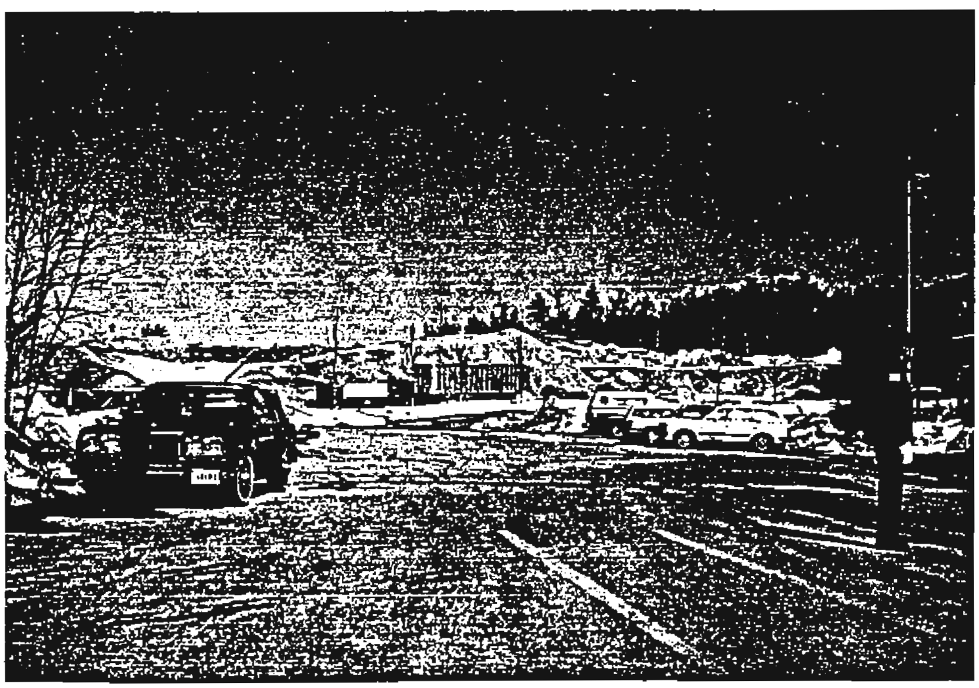


Company directory at entrance to Wilmington Industrial Park.
(Converse located on the right)
3/18/87

ALEPPO TEMPLE - 99 FORDHAM ROAD



Building and parking area at end of Fordham Rd.
(Looking northeast)
2/27/87



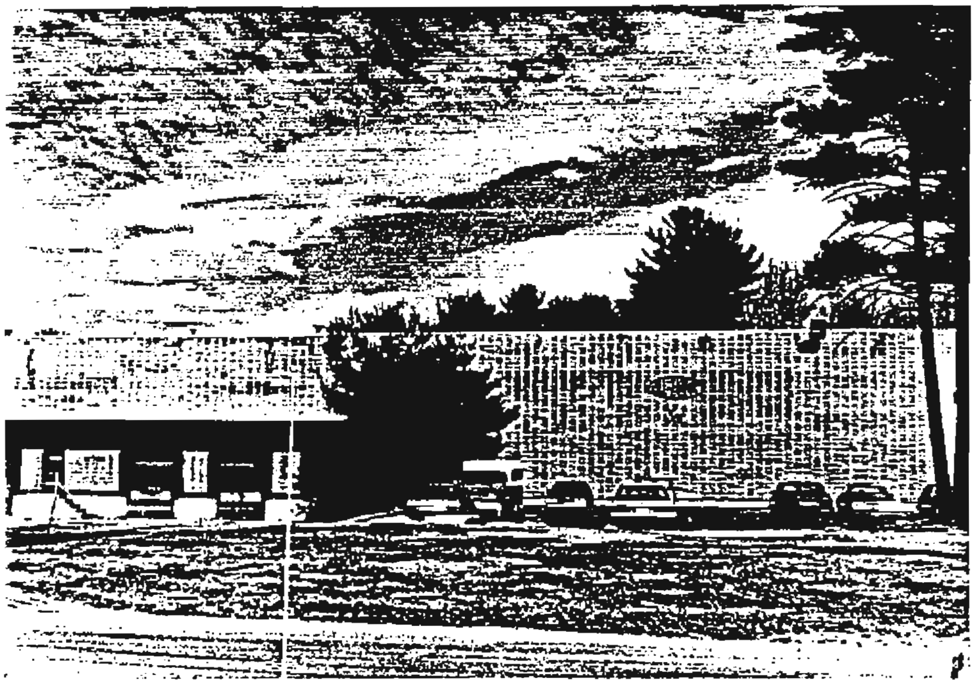
View of rock crushing operation adjacent to Aleppo building.
3/18/87

ALEPPO TEMPLE - 99 FORDHAM ROAD

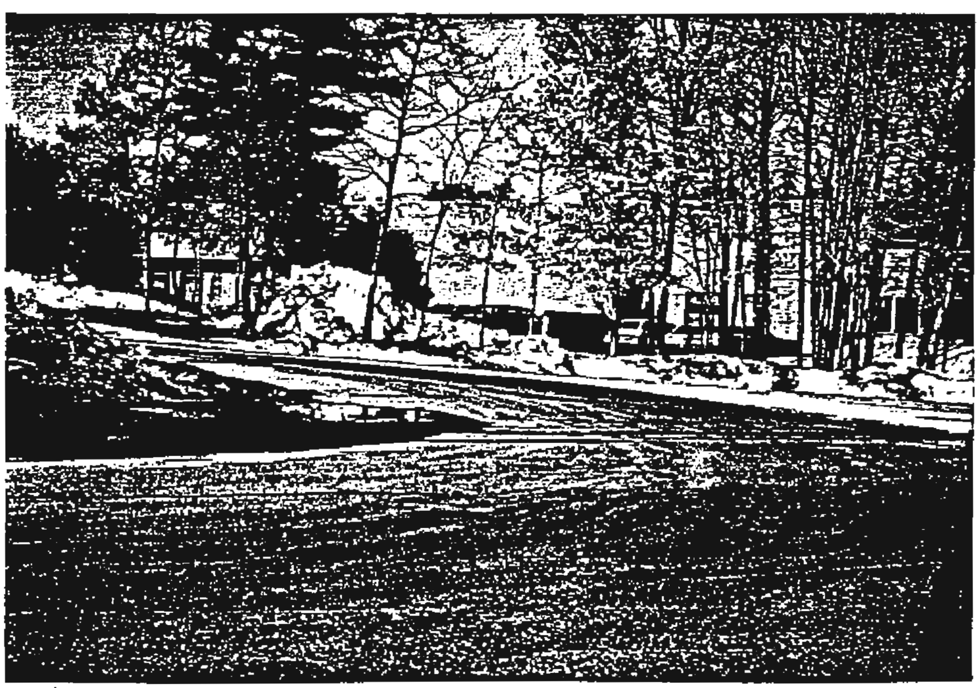
Close-up of rock crushing operation.
3/18/87

Trailer trucks in back of building
(Looking east)
3/18/87

E.I. DUPONT COMPANY - ONE CORNELL PLACE



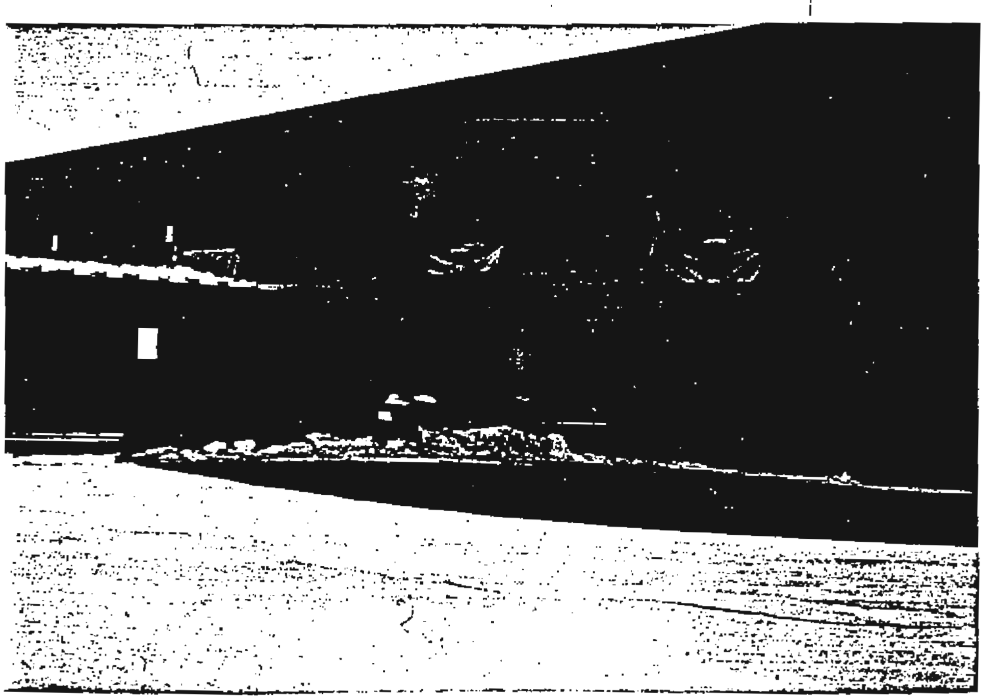
View of southern side of building.
3/18/87



View of south side
2/27/87

COMPUTERVISION - 5 CORNELL PLACE

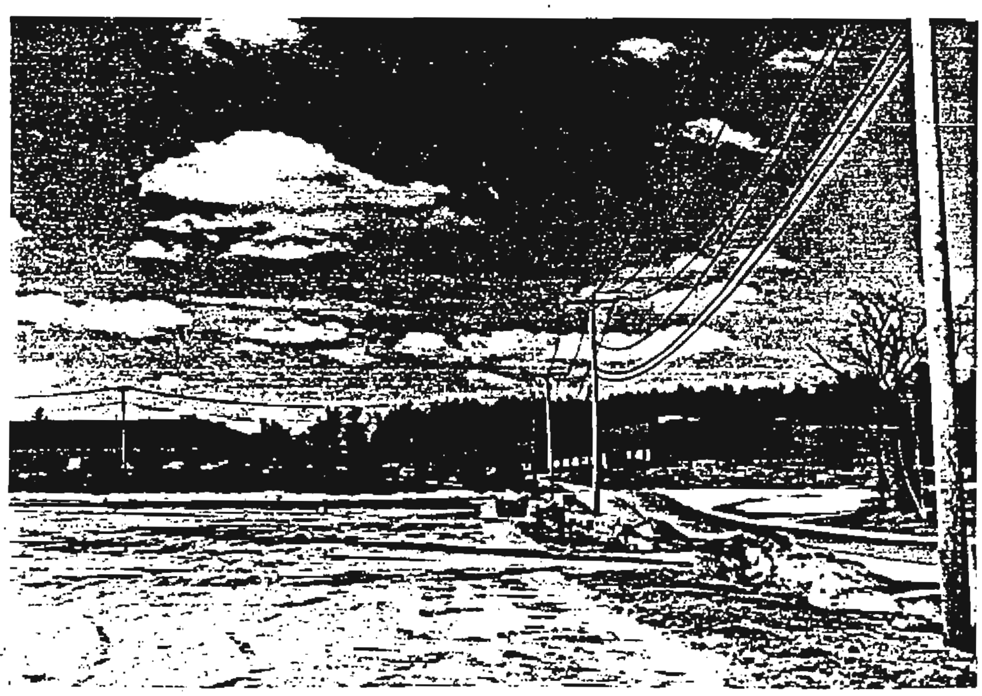
Front of building.
3/18/87



Loading docks at rear of building.
(North side.)
2/27/87

FEDERAL EXPRESS - 10 CORNELL PLACE

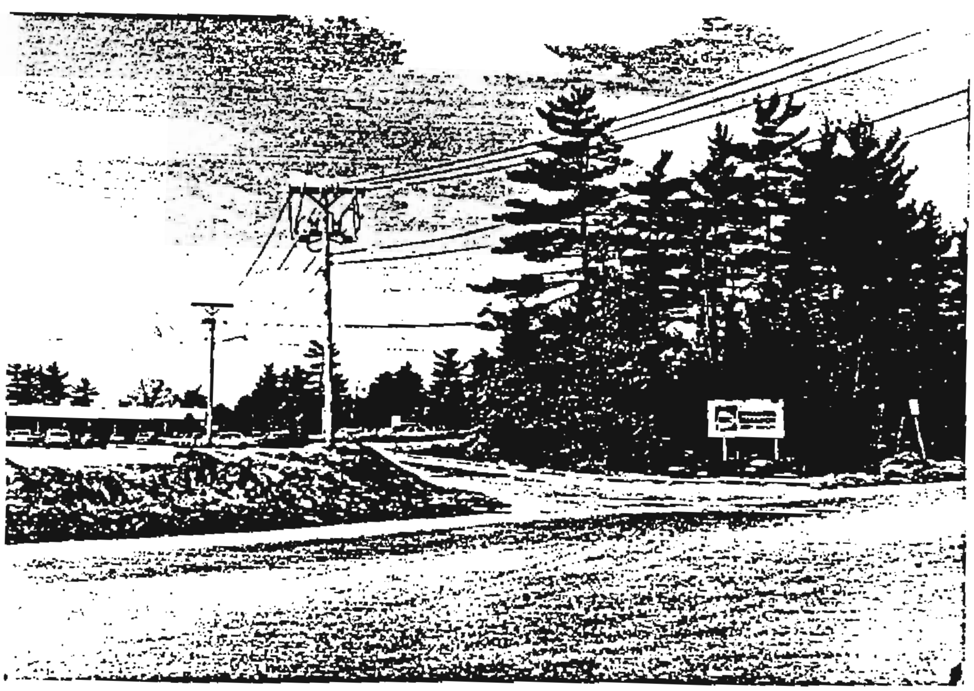
Southern side of building.
3/18/87



View of Computervision and Federal Express Buildings
looking from Keytek's parking lot.
3/18/87

DYNAMICS RESEARCH CORPORATION - 50-60 CONCORD STREET

View of buildings at 50-60 Concord St.
(Looking north)
3/18/87



Entrance off Fordham Rd.
3/18/87

DYNAMICS RESEARCH CORPORATION - 50-60 CONCORD STREET

View of buildings at 50 Concord St.
(Looking south)
3/18/87

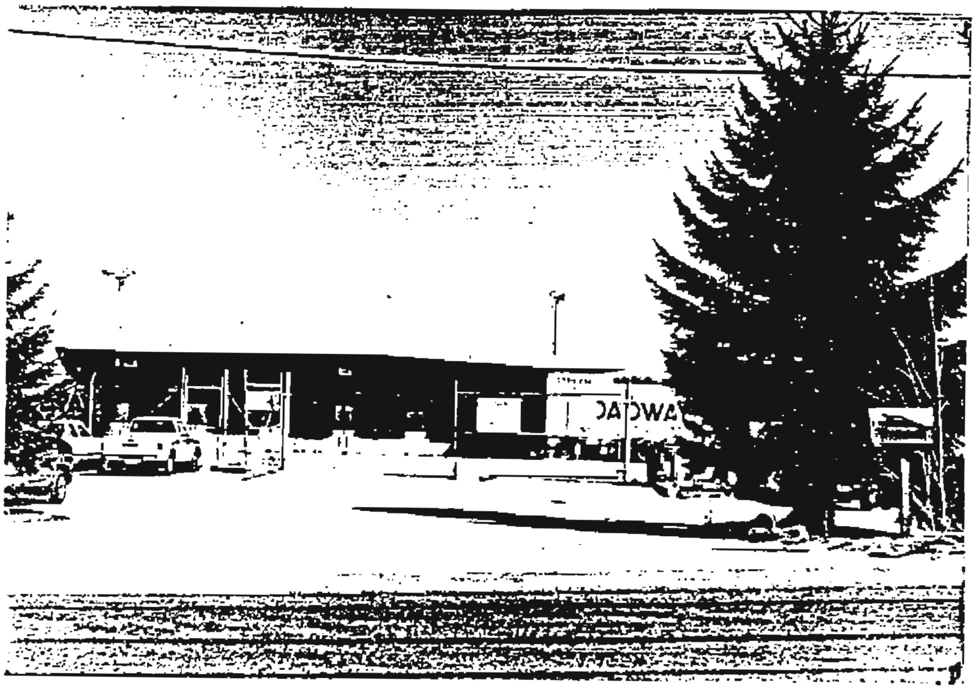
Chemical & hazardous waste storage area,
western side of building.
3/18/87

COMPUGRAPHIC FACILITY - 35-55 CONCORD STREET

View of building at 35 Concord St.
3/18/87

View of facility at 55 Concord St.
(Looking west)
3/18/87

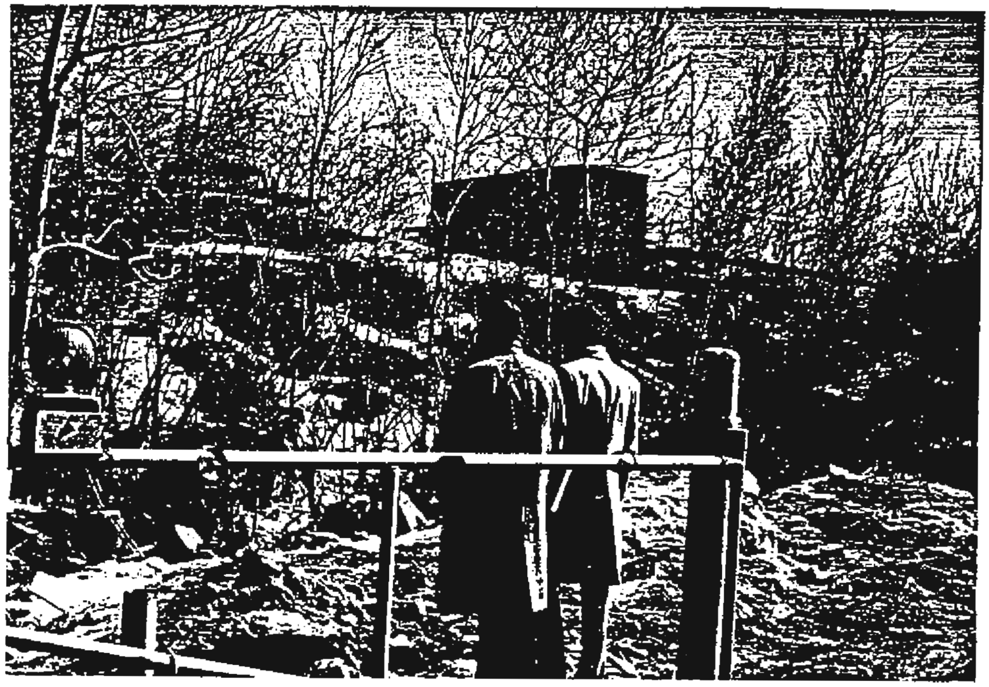
ROADWAY - 95 CONCORD STREET



Roadway Trucking Terminal.
3/18/87

Opening in gate in back of lot.
2/27/87

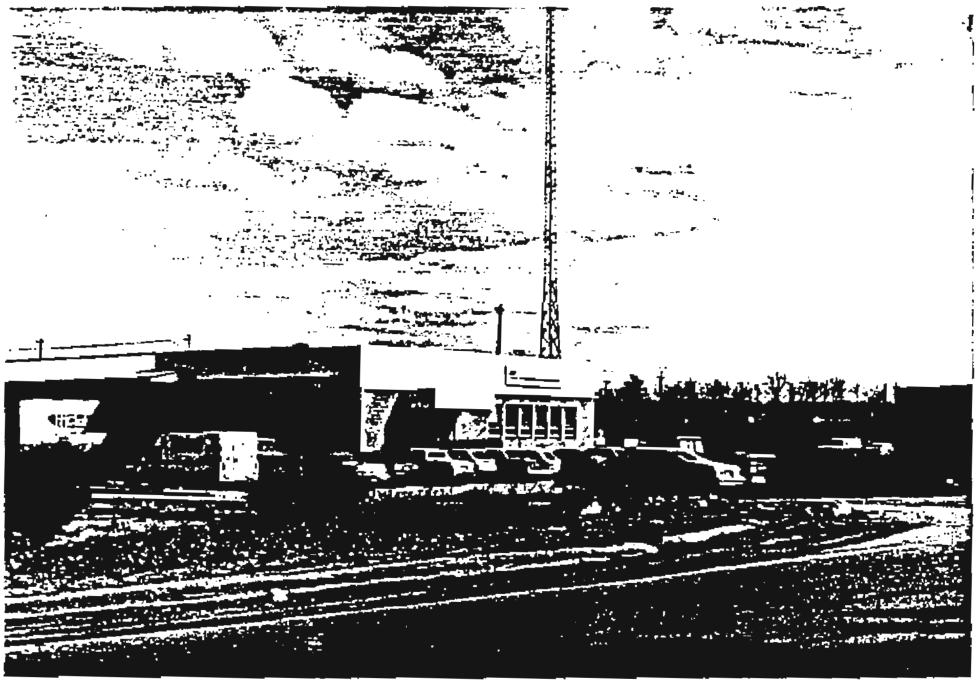
ROADWAY - 95 CONCORD STREET



View of back of property from south-east corner of GE property.
2/27/87

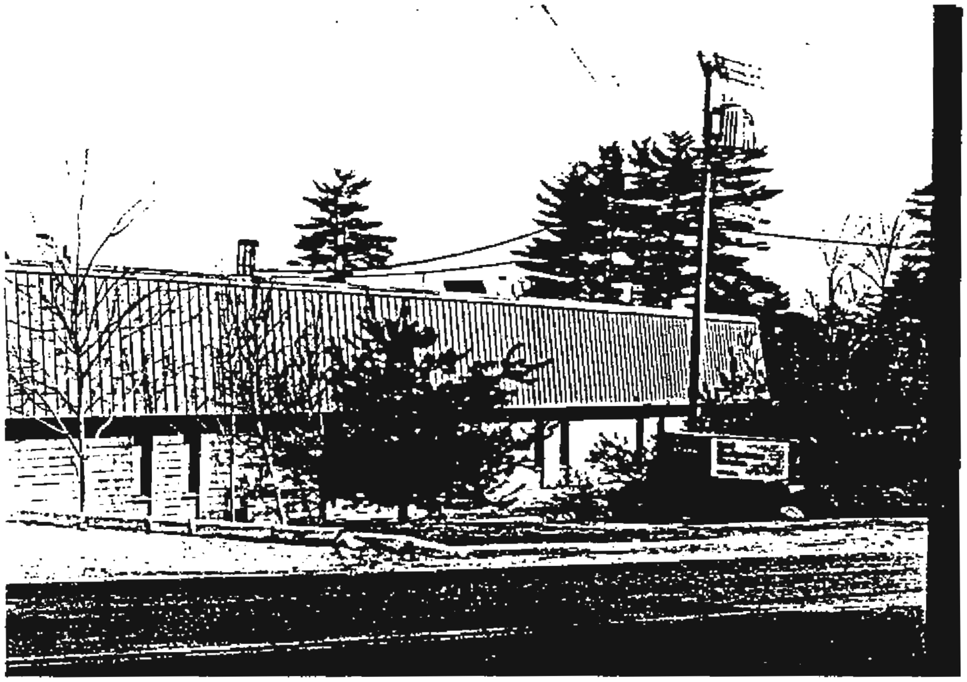
Wetlands behind (north) Roadway terminal.
2/27/87

COLES EXPRESS - 93 CONCORD STREET

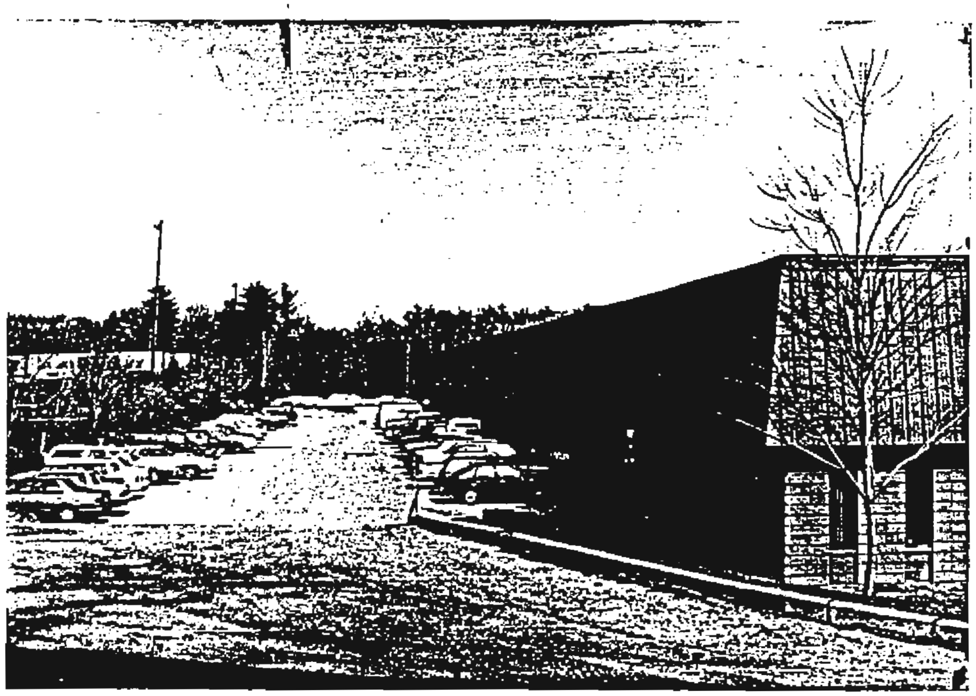


View of trucking terminal.
3/18/87

C.R. BARD, INC. - 87 CONCORD STREET



Front of building.
3/18/87

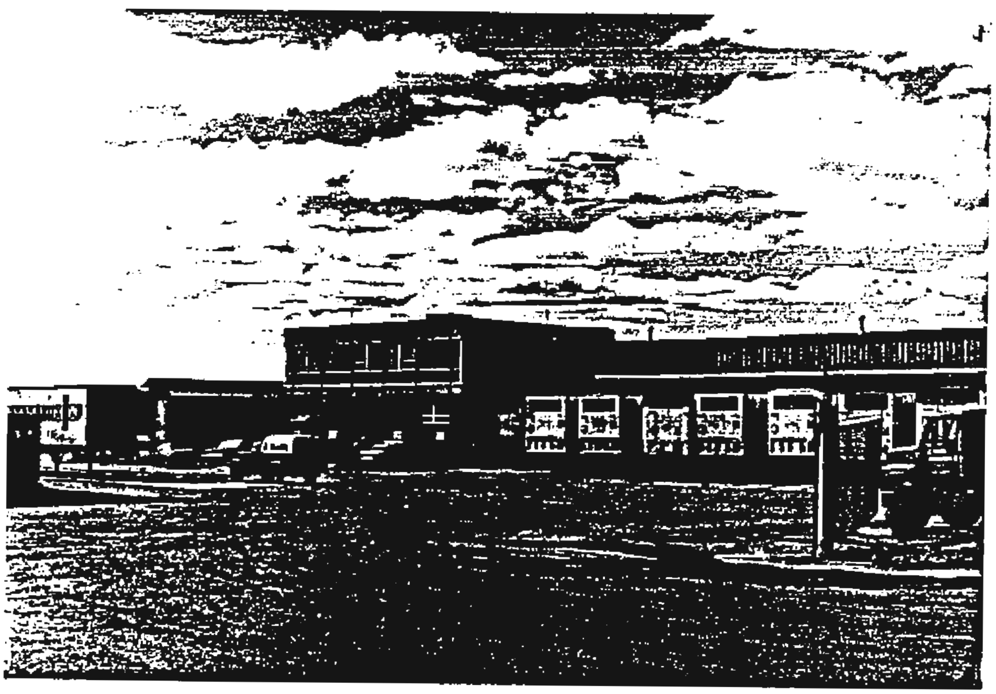


View of western side of building.
3/18/87

LILY TRUCKING - 84 CONCORD STREET

Entrance to Lily Trucking.
3/18/87

ST. JOHNSBURY - 90 CONCORD STREET



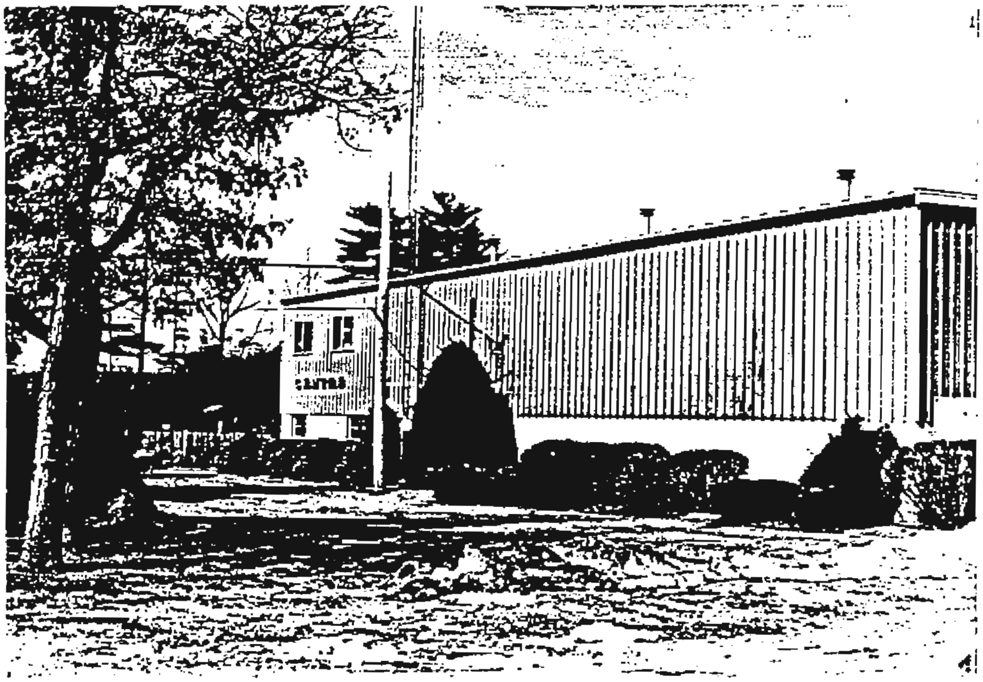
View of the eastern side of the trucking terminal.
3/18/87

SANBORN'S EXPRESS - 80 CONCORD STREET

Western side of trucking terminal.
3/18/87

Drilling rig in front parking lot.
2/27/87

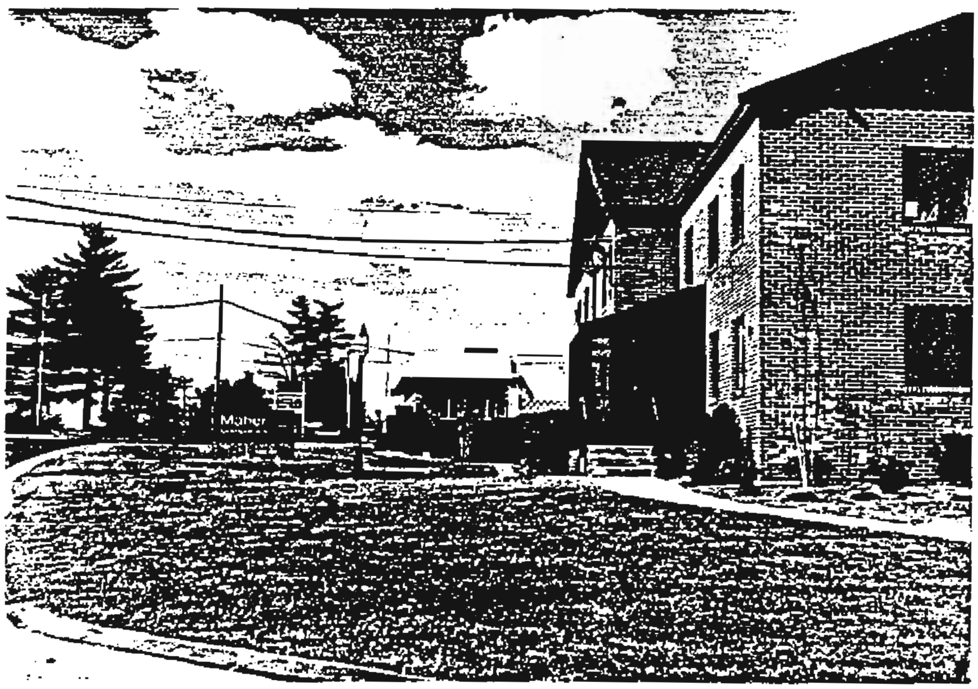
CENTRE TRUCKING COMPANY - 81 CONCORD STREET



Centre Trucking Co.
3/18/87

View of parking lot looking north from Concord St.
3/18/87

D.H. MAHER CORPORATION - 71 CONCORD STREET



View of building.
3/18/87

MSM INDUSTRIES - 60 CONCORD STREET

MSM Industries at 60 Concord St.
3/18/87

CONCLUSIONS

This investigation of possible sources of contamination of the Stickney Well has generated a great deal of industrial activity has been on-going in the study area. The following seven conclusions are drawn as a result of this investigation:

Active Industrial Area

The Stickney Well is surrounded by 47 industries within a 1/2 mile radius. There are 29 hazardous waste generators and 18 underground storage tanks for chemicals or fuel. Nineteen hazardous substance spills have been reported. Ten of the hazardous waste generators are large quantity generators producing more than 1,000 kilograms of waste per month. Twenty seven chemical storage areas were identified in the study area. Underground storage or holding tanks in the study area have a total capacity of at least 221,500 gallons. All of these industrial activities are possible contributing sources to the contamination in the Stickney Well.

Hazardous Substance Users

Over 70 percent of the industries in the study area use solvents, chemicals and/or fuels. Many of these hazardous substances have constituents that have been identified in the well. Therefore, these industries should be considered possible sources of the contamination.

Solvent Users

There are approximately 27 known solvent users in the study area including two documented TCE users. Twenty one of these solvent users were operating in the study area prior to 1979. Current solvent users may have used TCE or PCE in the past. These solvent users are possible sources of TCE or PCE contamination in the well. Most of these solvent users are located within the well's zone of influence and, therefore, are possible sources of contamination.

Waste Oil Generators

Nineteen industries in the study area are known to generate waste oil which is stored in underground tanks or above ground, outside storage areas. "Waste oil" is a catch-all category and often contains miscellaneous wastes including solvents and degreasers. Waste oil is considered hazardous by the Massachusetts DEQE. Thus, these waste oil generators are possible sources of a variety of contaminants.

Historic Industrial Development

The area around the Stickney Well began to develop industrially at a rapid pace in the late 1960's and early 1970's. Of the 48 facilities investigated, approximately 39 were occupied prior to 1979 when the Stickney Well was shut down due to contamination. These 39 facilities include 21 solvent users and

10 waste oil generators. Additionally, these pre-1979 industries account for 26 chemical storage areas and 15 underground tanks. Thus, all these operations are possible sources of the original contamination found in the well.

Hazardous Substance Spills

Thirteen hazardous substance spills, including four known to involve solvents or waste oil, have been reported in the study area since 1979. These and other unreported spills have a potential impact on the well. There was no spills database before 1979.

Data Gaps

Although DEQE and the local government have conducted various investigations of industries in the study area, many data gaps remain. These data gaps include:

- the results of any tightness tests recommended by DEQE on underground tanks suspected of leaking,

- reliable information on hazardous substance use, storage and disposal practices at the seven trucking terminals,

- drum storage practices at industries including spill control plans, drainage and location of storage areas,

- historical data on the type and quantities of solvents used including purchasing records, manifests and annual reports,

- detailed information on certain spills including the chemical name, quantity, response action and the results of clean-up actions,

- no information concerning spills that occurred before 1979 is available.

TABLE 2 - SUMMARY INFORMATION ON INDUSTRIES IN STUDY AREA

	Total
Number of Companies	47
Number of Sites Occupied	54
Hazardous Substance Users	33
Hazardous Waste Generators	29
Large Quantity Hazardous Waste Generators	10
Known Solvent Users	27
Chemical Storage Areas	27
Waste Oil Generator	19
Underground Storage Tanks	18
Underground Waste Oil or Solvent Tanks	10
Above Ground Tanks	6
Reported Spill or Unlicensed Release	19
Truckwash Areas	5
NPDES Outfalls	4
Known Solvent "Hotspot"	2
Industrial Leaching Fields	1

TABLE 3 - REPORTED SPILLS IN THE STUDY AREA

Date of Spill	DEQE Spill #	Responsible Party/ Location of Spill	Amount and Chemical Spilled	Remarks
6/20/84	#379	Federal Metal finishing/ Rt 93N at Concord Street	60-100 gallons diesel fuel	
6/14/84	#365	Unidentified Party Rt 93N at Exit 13	Unknown amount white foamy chemical	No clean-up required
7/10/85	#543	Controlled Ecology Services D.L. Maher 45 Concord Street	15-20 gallons Pesticide (Dursban)	Clean-up completed by Clean Harbors Pond Contaminated
7/15/84	#439	Reading Municipal Light Company Pole #12, Concord St.	1 gallon Transformer Oil	Clean-up completed by Clean Harbors
11/27/85	#905	Sanborn's Motor Express 80 Concord Street	1-55 gallon drum unidentified white chemical.	
1/14/79	---	Centre Trucking Co. 81 Concord Street	50 gallons Kerosene	
8/30/84	#561	Reading Municipal Light Department 81 Concord Street	.5 gallons Transformer Oil	Clean-up completed by Clean Harbors
1/14/79	---	Centre Trucking 81 Concord Street	81-100 gallons Compound for treating truck canvasses	Discharged into wetlands behind site
---	---	Lilly Trucking 84 Concord Street	1-2 gallons diesel fuel	Clean-up involved the removal of contaminated soil.
8/28/80	---	St. Johnsburg Trucking 88-90 Concord Street	1-55 gallon drum laquer thinner	
5/22/85	---	Riley Truck Leasing 90 Concord Street	10-gallons diesel fuel	Clean-up completed by McDonald/Watson
8/28/86	---	Coles Trucking 91-93 Concord Street	40-60 gallons diesel fuel	Clean-up completed by Jetline
9/24/84	#629	Roadway Express 95 Concord Street	Unknown amount gasoline and oil	

APPENDIX B

LABORATORY DATA FOR JUNE 1987 SAMPLING

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890

LAB#: 54596A   DATE REC'D: 87/06/03   DATE COLL'D: 87/06/02 STATUS: CLOSED
LNAME: ERM - New England   FNAME:
STREET: 205 Patland St.   CITY: Boston   STATE: MA ZIP: 02114
SPL LOCATION: GZA-1

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
[illegible] :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
[illegible] :		pH :		BOD-S :	
BAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
S :		Cr :	0.06	Se :	<2.0 ug/l
S :		Co :		Ag :	<0.01
TDS :		Cu :		Na :	
S :		Au :		Tl :	
SOL :		Fe :		Sn :	
G & O :		Pb :	0.02	Ti :	
Al :		Mg :		V :	
b :		Mn :		Zn :	
As :	13 ug/l	Hg :	<0.4 ug/l	THM :	
Ba :	0.07	Mo :		TOC :	
e :		Ni :			
Cd :	<0.005	Pd :			

Remarks: All results in mg/l unless otherwise indicated.

Ronald A. Bayer
Laboratory Director   6/9/87

EnviroTest
Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890

AB#: 54596B DATE REC'D: 87/06/03 DATE COLL'D: 87/06/02 STATUS: CLOSED
LNAME: ERM - New England FNAME:
STREET: CITY: STATE: ZIP:
PL LOCATION: GZA-2

REPORT TO: same
ILL TO: same

T COLI:		Cr+6 :		COD :	
COLI:		Phenol:		HARD-T :	
PC :		CN :		Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
O2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
O4 :		pH :		BOD-S :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
S :		NH3-T :		MLSS :	
H3-C :		TKN :		MLVSS :	
TSS :		Ca :		K :	
S :		Cr :	0.06	Se :	<2.0 ug/l
VS :		Co :		Ag :	<0.01
TDS :		Cu :		Na :	
S :		Au :		Tl :	
% SOL :		Fe :		Sn :	
G & O :		Pb :	0.03	Ti :	
Al :		Mg :		V :	
B :		Mn :		Zn :	
As :	<5.0 ug/l	Hg :	<0.4 ug/l	THM :	
Ba :	0.26	Mo :		TOC :	
Be :		Ni :			
Cd :	0.006	Pd :			

Remarks: All results in mg/l unless otherwise indicated.

Ronald A. Baver
Laboratory Director 6/9/87

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890

LAB#: 54596C DATE REC'D: 87/06/03 DATE COLL'D: 87/06/02 STATUS: CLOSED
LNAME: ERM - New England FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: GZA-3

ANALYZE SUPERNATANT ONLY

REPORT TO: same
BILL TO: same

COLI:		Cr+6 :		COD :	
COLI:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
:		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :		BOD-S :	
MBAS :		LI :		TSS-Inf:	
O2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
SS :		Ca :		K :	
TS :		Cr :	<0.02	Se :	<2.0 ug/l
VS :		Co :		Ag :	<0.01
DS :		Cu :		Na :	
SS :		Au :		Tl :	
% SOL :		Fe :		Sn :	
& G :		Pb :	0.02	Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	
As :	26 ug/l	Hg :	<0.4 ug/l	THM :	
Ba :	0.18	Mo :		TOC :	
Be :		Ni :			
Cd :	<0.005	Pd :			

Remarks: All results in mg/l unless otherwise indicated.

Ronald A. Bauer
Laboratory Director 6/12/87

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890

LAB#: 54596D DATE REC'D: 87/06/03 DATE COLL'D: 87/06/02 STATUS: CLOSED
NAME: ERM - New England FNAME:
TREET: CITY: STATE: ZIP:
SPL LOCATION: SZA-4

ANALYZE SUPERNATANT ONLY

EPORT TO: same
BILL TO: same

COLI:		Cr+6 :		COD :	
COLI:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
:		B :		SO3 :	
D3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :		BOD-S :	
MBAS :		LI :		TSS-Inf:	
O2 :		Cond :		TSS-Eff:	
S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
SS :		Ca :		K :	
TS :		Cr :	0.05	Se :	<2.0 ug/l
S :		Co :		Ag :	<0.01
DS :		Cu :		Na :	
SS :		Au :		Tl :	
% SOL :		Fe :		Sn :	
& G :		Pb :	0.09	Ti :	
:		Mg :		V :	
Sb :		Mn :		Zn :	
:	65 ug/l	Hg :	<0.4 ug/l	THM :	
:	1.1	Mo :		TOC :	
Be :		Ni :			
Cd :	<0.005	Pd :			

Remarks: All results in mg/l unless otherwise indicated.

Ronald A. Bayer
Laboratory Director 6/12/87

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890

LAB#: 54596E   DATE REC'D: 87/06/03   DATE COLL'D: 87/06/02 STATUS: CLOSED
LNAME: ERM - New England   FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: GZA-5

ANALYZE SUPERNATANT ONLY

REPORT TO: same
BILL TO: same

T COLI		Cr+6		COD	
F COLI		Phenol		HARD-T	
SPC		CN		Ca Hard	
F		B		SO3	
NO3		Br		Cl	
NO2		Color		Alk	
T-PO4		Odor		BOD-Inf	
O-PO4		Turb		BOD-Eff	
SO4		pH		BOD-S	
MBAS		LI		TSS-Inf	
SiO2		Cond		TSS-Eff	
H2S		NH3-T		MLSS	
NH3-O		TKN		MLVSS	
VSS		Ca		K	
TS		Cr	0.03	Se	<2.0 ug/l
VS		Co		Ag	<0.01
TDS		Cu		Na	
SS		Au		Tl	
% SOL		Fe		Sn	
O & G		Pb	0.05	Ti	
Al		Mg		V	
Sb		Mn		Zn	
As	20 ug/l	Hg	<0.4 ug/l	THM	
Ba	0.22	Mo		TOC	
Be		Ni			
Cd	<0.005	Pd			

Remarks: All results in mg/l unless otherwise indicated.

Ronald A. Baver
Laboratory Director   6/12/87

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890

LAB#: 54596F DATE REC'D: 87/06/03 DATE COLL'D: 87/06/03 STATUS: CLOSED
LNAME: ERM - New England FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: GZA-6

ANALYZE SUPERNATANT ONLY

REPORT TO: same
BILL TO: same

COLI:		Cr+6 :		COD :	
COLI:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :		BOD-S :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
SS :		Ca :		K :	
TS :		Cr :	<0.02	Se :	<2.0 ug/l
VS :		Co :		Ag :	<0.01
DS :		Cu :		Na :	
S :		Au :		Tl :	
% SOL :		Fe :		Sn :	
& G :		Pb :	0.02	Ti :	
l :		Mg :		V :	
Sb :		Mn :		Zn :	
As :	37 ug/l	Hg :	<0.4 ug/l	THM :	
Ba :	0.10	Mo :		TOC :	
Be :		Ni :			
Cd :	<0.005	Pd :			

Remarks: All results in mg/l unless otherwise indicated.

Ronald A. Bayer
Laboratory Director 6/12/87

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890

LAB#: 54596A DATE REC'D: 87/06/03 DATE COLL'D: 87/06/02 STATUS: CLOSED
.NAME: ERM - New England FNAME:
STREET: 205 Patland St. CITY: Boston STATE: MA ZIP: 02114
SPL LOCATION: GZA-1

ANALYZE SUPERNATANT ONLY

REPORT TO: same
BILL TO: same

COLI:		Cr+6 :		COD :	
COLI:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
:		B :		SO3 :	
:		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :		BOD-S :	
MBAS :		LI :		TSS-Inf:	
O2 :		Cond :		TSS-Eff:	
2S :		NH3-T :		MLSS :	
NH3-O :		TKN :		MLVSS :	
SS :		Ca :		K :	
TS :		Cr :	<0.02	Se :	<2.0 ug/l
S :		Co :		Ag :	<0.01
DS :		Cu :		Na :	
S :		Au :		Tl :	
% SOL :		Fe :		Sn :	
& O :		Pb :	<0.01	Ti :	
l :		Mg :		V :	
Sb :		Mn :		Zn :	
s :	8.7 ug/l	Hg :	<0.4 ug/l	THM :	
a :	0.06	Mo :		TOC :	
Be :		Ni :			
d :	<0.005	Pd :			

Remarks: All results in mg/l unless otherwise indicated.

Ronald A. Bayer
Laboratory Director 6/12/87

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890

```
LAB#: 545968    DATE REC'D: 87/06/03       DATE COLL'D: 87/06/02 STATUS: CLOSED
LNAME: ERM - New England                   FNAME:
STREET:                                    CITY:                  STATE:   ZIP:
SPL LOCATION: GZA-2
                              ANALYZE SUPERNATANT ONLY
REPORT TO: same
BILL   TO: same
```

COLI :		Cr+6 :		COD :	
COLI :		Phenol :		HARD-T :	
SPC :		CN :		Ca Hard :	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf :	
O-PO4 :		Turb :		BOD-Eff :	
SO4 :		pH :		BOD-S :	
MBAS :		LI :		TSS-Inf :	
SIO2 :		Cond :		TSS-Eff :	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
SS :		Ca :		K :	
TS :		Cr :	<0.02	Se :	<2.0 ug/l
VS :		Co :		Ag :	<0.01
TDS :		Cu :		Na :	
SS :		Au :		Tl :	
% SOL :		Fe :		Sn :	
O & G :		Pb :	<0.01	Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	
As :	<5.0 ug/l	Hg :	<0.4 ug/l	THM :	
Ba :	0.23	Mo :		TOC :	
Be :		Ni :			
Cd :	<0.005	Pd :			

Remarks: All results in mg/l unless otherwise indicated.

Ronald A. Bauer
Laboratory Director 6/12/87

EnviroTest
Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890

LAB#: 54596C DATE REC'D: 87/06/03 DATE COLL'D: 87/06/02 STATUS: CLOSED
NAME: ERM - New England FNAME:
TREET: CITY: STATE: ZIP:
SPL LOCATION: GZA-3
ANALYZE SUPERNATANT ONLY
EPORT TO: same
BILL TO: same

COLI:		Cr+6 :		COD :	
COLI:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
:		B :		SO3 :	
O3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :		BOD-S :	
MBAS :		LI :		TSS-Inf:	
O2 :		Cond :		TSS-Eff:	
S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
SS :		Ca :		K :	
TS :		Cr :	<0.02	Se :	<2.0 ug/l
S :		Co :		Ag :	<0.01
DS :		Cu :		Na :	
SS :		Au :		Tl :	
% SOL :		Fe :		Sn :	
& G :		Pb :	0.02	Ti :	
l :		Mo :		V :	
Sb :		Mn :		Zn :	
s :	26 ug/l	Hg :	<0.4 ug/l	THM :	
a :	0.18	Mg :		TOC :	
Be :		Ni :			
d :	<0.005	Pd :			

Remarks: All results in mg/l unless otherwise indicated.

Ronald A. Bayer
Laboratory Director 6/12/87

EnviroTest
Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890

LAB#: 54596D DATE REC'D: 87/06/03 DATE COLL'D: 87/06/02 STATUS: CLOSED
.NAME: ERM - New England FNAME:
:TREET: CITY: STATE: ZIP:
SPL LOCATION: GZA-4

ANALYZE SUPERNATANT ONLY

:EPORT TO: same
BILL TO: same

COLI:		Cr+6 :		COD :	
COLI:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
:		B :		SO3 :	
'O3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :		BOD-S :	
MBAS :		LI :		TSS-Inf:	
O2 :		Cond :		TSS-Eff:	
2S :		NH3-T :		MLSS :	
NH3-O :		TKN :		MLVSS :	

SS :		Ca :		K :	
TS :		Cr :	0.05	Se :	<2.0 ug/l
'S :		Co :		Ag :	<0.01
DS :		Cu :		Na :	
SS :		Au :		Tl :	
% SOL :		Fe :		Sn :	
& O :		Pb :	0.09	Ti :	
.1 :		Mg :		V :	
Sb :		Mn :		Zn :	
s :	65 ug/l	Hg :	<0.4 ug/l	THM :	
a :	1.1	Mo :		TOC :	
Be :		Ni :			
'd :	0.005	Pa :			

Remarks: All results in mg/l unless otherwise indicated.

Ronald A. Bayer
Laboratory Director 6/12/87

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890

LAB#: 54596E DATE REC'D: 87/06/03 DATE COLL'D: 87/06/02 STATUS: CLOSED
LNAME: ERM - New England FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: GZA-5

ANALYZE SUPERNATANT ONLY

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :		BOD-S :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-O :		TKN :		MLVSS :	
TSS :		Ca :		K :	
TS :		Cr :	0.03	Se :	<2.0 ug/l
VS :		Co :		Ag :	<0.01
TDS :		Cu :		Na :	
SS :		Au :		Tl :	
% SOL :		Fe :		Sn :	
O & G :		Pb :	0.05	Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	
As :	20 ug/l	Hg :	<0.4 ug/l	THM :	
Ba :	0.22	Mo :		TOC :	
Be :		Ni :			
Cd :	<0.005	Pd :			

Remarks: All results in mg/l unless otherwise indicated.

Ronald A. Bauer
Laboratory Director 6/12/87

EnviroTest Laboratories Inc.

315 Fullerton Avenue
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LAB#: 54596F DATE REC'D: 87/06/03 DATE COLL'D: 87/06/03 STATUS: CLOSED
NAME: ERM - New England FNAME:
TREET: CITY: STATE: ZIP:
SPL LOCATION: GZA-6

ANALYZE SUPERNATANT ONLY

EPORT TO: same
BILL TO: same

COLI	:	Cr+6	:	COD	:
COLI	:	Phenol	:	HARD-T	:
SPC	:	CN	:	Ca Hard	:
	:	B	:	SO3	:
O3	:	Br	:	Cl	:
NO2	:	Color	:	Alk	:
-PO4	:	Odor	:	BOD-Inf	:
-PO4	:	Turb	:	BOD-Eff	:
SO4	:	pH	:	BOD-S	:
AS	:	LI	:	TSS-Inf	:
O2	:	Cond	:	TSS-Eff	:
.2S	:	NH3-T	:	MLSS	:
NH3-C	:	TKN	:	MLVSS	:
SS	:	Ca	:	K	:
TS	:	Cr	: <0.02	Se	: <2.0 ug/l
S	:	Co	:	Ag	: <0.01
DS	:	Cu	:	Na	:
SS	:	Au	:	Tl	:
% SOL	:	Fe	:	Sn	:
& G	:	Pb	: 0.02	Ti	:
Al	:	Mg	:	V	:
Sb	:	Mn	:	Zn	:
	: 37 ug/l	Hg	: <0.4 ug/l	THM	:
	: 0.10	Mo	:	TOC	:
Be	:	Ni	:		
C	: <0.005	Pd	:		

Remarks: All results in mg/l unless otherwise indicated.

Ronald A. Bayer
Laboratory Director 6/12/87

EnviroTest Laboratories Inc.

315 Fullerton Avenue
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.AB#: 54736G DATE REC'D: 87/06/06 DATE COLL'D: 87/06/05 STATUS: CLOSED
LNAME: ERM New England FNAME:
STREET: CITY: STATE: ZIP:
.PL LOCATION: G2A-7

ANALYZE SUPERNATANT ONLY

REPORT TO: same
ILL TO: same

T COLI:	Cr+6 :	COD :
COLI:	Phenol:	HARD-T :
PC :	CN :	Ca Hard:
F :	B :	SO3 :
03 :	Br :	Cl :
02 :	Color :	Alk :
T-PO4 :	Odor :	BOD-Inf:
-PO4 :	Turb :	BOD-Eff:
04 :	pH :	BOD-S :
mBAS :	LI :	TSS-Inf:
SiO2 :	Cond :	TSS-Eff:
2S :	NH3-T :	MLSS :
.H3-C :	TKN :	MLVSS :
S :	Ca :	K :
:	Cr : 0.03	Se : <2.0 ug/l
VS :	Co :	Ag : <0.01
TDS :	Cu :	Na :
S :	Au :	Tl :
% SOL :	Fe :	Sn :
G & O :	Pb : <0.01	Ti :
l :	Mg :	V :
.b :	Mn :	Zn :
As : 36 ug/l	Hg : <0.4 ug/l	THM :
a : 0.06	Mo :	TOC :
e :	Ni :	
Cd : <0.005	Pd :	

Remarks: All results in mg/l unless otherwise indicated.

Ronald A. Bayer
Laboratory Director 6/12/87

EnviroTest Laboratories Inc.

315 Fullerton Avenue
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(914) 562-0890

LAB#: 54736F DATE REC'D: 87/06/06 DATE COLL'D: 87/06/05 STATUS: CLOSED
LNAME: ERM New England FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: G2A-8

ANALYZE SUPERNATANT ONLY

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
COLI:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
F :		B :		SO3 :	
03 :		Br :		Cl :	
02 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
04 :		pH :		BOD-S :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
S :		Ca :		K :	
S :		Cr :	0.04	Se :	<2.0 ug/l
VS :		Co :		Ag :	<0.01
TDS :		Cu :		Na :	
S :		Au :		Tl :	
% SOL :		Fe :		Sn :	
G & O :		Pb :	<0.01	Ti :	
l :		Mg :		V :	
Sb :		Mn :		Zn :	
As :	27 ug/l	Hg :	<0.4 ug/l	THM :	
a :	0.26	Mo :		TOC :	
e :		Ni :			
Cd :	0.006	Pd :			

Remarks: All results in mg/l unless otherwise indicated.

Ronald A. Bayer
Laboratory Director 6/12/87

EnviroTest Laboratories Inc.
315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890

LAB#: 54736E DATE REC'D: 87/06/06 DATE COLL'D: 87/06/05 STATUS: CLOSED
LNAME: ERM New England FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: G2A-9

ANALYZE SUPERNATANT ONLY

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :		BOD-S :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
TSS :		Ca :		K :	
TS :		Cr :	<0.02	Se :	<2.0 ug/l
VS :		Co :		Ag :	<0.01
TDS :		Cu :		Na :	
SS :		Au :		Tl :	
% SOL :		Fe :		Sn :	
G & O :		Pb :	<0.01	Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	
As :	43 ug/l	Hg :	<0.4 ug/l	THM :	
Ba :	0.07	Mo :		TOC :	
Be :		Ni :			
Cd :	0.007	Pd :			

Remarks: All results in mg/l unless otherwise indicated.

D. [signature] For
Ronald A. Bayer
Laboratory Director 6/12/87

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890

.AB#: 54736D DATE REC'D: 87/06/06 DATE COLL'D: 87/06/05 STATUS: CLOSED
LNAME: ERM New England FNAME:
TREET: CITY: STATE: ZIP:
PL LOCATION: G2A-10

ANALYZE SUPERNATANT ONLY

PEPORT TO: same
ILL TO: same

T COLI:		Cr+6 :		COD :	
COLI:		Phenol:		HARD-T :	
.PC :		CN :		Ca Hard:	
F :		B :		SO3 :	
O3 :		Br :		Cl :	
O2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
^-PO4 :		Turb :		BOD-Eff:	
O4 :		pH :		BOD-S :	
mBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
2S :		NH3-T :		MLSS :	
..H3-C :		TKN :		MLVSS :	
S :		Ca :		K :	
:		Cr :	0.02	Se :	<2.0 ug/l
VS :		Co :		Ag :	<0.01
TDS :		Cu :		Na :	
S :		Au :		Tl :	
% SOL :		Fe :		Sn :	
G & O :		Pb :	<0.01	Ti :	
l :		Mg :		V :	
:		Mn :		Zn :	
As :	43 ug/l	Hg :	<0.4 ug/l	THM :	
a :	0.21	Mo :		TOC :	
e :		Ni :			
Cd :	<0.005	Pd :			

Remarks: All results in mg/l unless otherwise indicated.

Ronald A. Bayer
Laboratory Director 6/12/87

EnviroTest Laboratories Inc.

315 Fullerton Avenue
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(914) 562-0890

LAB#: 54736C DATE REC'D: 87/06/06 DATE COLL'D: 87/06/05 STATUS: CLOSED
LNAME: ERM New England FNAME:
TREET: CITY: STATE: ZIP:
PL LOCATION: G2A-11

ANALYZE SUPERNATANT ONLY

REPORT TO: same
ILL TO: same

T COLI:		Cr+6 :		COD :	
COLI:		Phenol:		HARD-T :	
PC :		CN :		Ca Hard:	
F :		B :		SO3 :	
O3 :		Br :		Cl :	
O2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
-PO4 :		Turb :		BOD-Eff:	
O4 :		pH :		BOD-S :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
S :		Ca :		K :	
:		Cr :	<0.02	Se :	<2.0 ug/l
VS :		Co :		Ag :	<0.01
TDS :		Cu :		Na :	
3 :		Au :		Tl :	
% SOL :		Fe :		Sn :	
G & O :		Pb :	<0.01	Ti :	
l :		Mg :		V :	
OD :		Mn :		Zn :	
As :	37 ug/l	Hg :	<0.4 ug/l	THM :	
a :	<0.05	Mo :		TOC :	
e :		Ni :			
Cd :	<0.01	Pd :			

Remarks: All results in mg/l unless otherwise indicated.

Ronald A. Bayer
Laboratory Director 6/12/87

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890

LAB#: 54736A DATE REC'D: 87/06/06 DATE COLL'D: 87/06/05 STATUS: CLOSED
LNAME: ERM New England FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: G2A-12

ANALYZE SUPERNATANT ONLY

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :		BOD-S :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
[illegible]S :		Ca :		K :	
TS :		Cr :	0.04	Se :	<2.0 ug/l
VS :		Co :		Ag :	<0.01
TDS :		Cu :		Na :	
SS :		Au :		Tl :	
% SOL :		Fe :		Sn :	
G & O :		Pb :	0.06	Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	
As :	20 ug/l	Hg :	<0.4 ug/l	THM :	
Ba :	0.72	Mo :		TOC :	
Be :		Ni :			
Cd :	<0.005	Pd :			

Remarks: All results in mg/l unless otherwise indicated.

Ronald A. Bayer
Laboratory Director 6/12/87

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890

LAB#: 54736B DATE REC'D: 87/06/06 DATE COLL'D: 87/06/05 STATUS: CLOSED
LNAME: ERM New England FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: G2A-13

ANALYZE SUPERNATANT ONLY

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :		BOD-S :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
S :		Ca :		K :	
S :		Cr :	0.07	Se :	<2.0 ug/l
VS :		Co :		Ag :	<0.01
TDS :		Cu :		Na :	
S :		Au :		Tl :	
% SOL :		Fe :		Sn :	
O & G :		Pb :	0.05	Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	
As :	<5.0 ug/l	Hg :	<0.4 ug/l	THM :	
Ba :	0.32	Mo :		TOC :	
Be :		Ni :			
Cd :	<0.005	Pd :			

Remarks: All results in mg/l unless otherwise indicated.

Ronald A. Bayer
Laboratory Director 6/12/87

New York State Department of Health Approved

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890

AB#: 54736I DATE REC'D: 87/06/06 DATE COLL'D: 87/06/05 STATUS: CLOSED
LNAME: ERM New England FNAME:
STREET: CITY: STATE: ZIP:
PL LOCATION: G2A-14

ANALYZE SUPERNATANT ONLY

REPORT TO: same
ILL TO: same

T COLI:		Cr+6 :		COD :	
~ COLI:		Phenol:		HARD-T :	
PC :		CN :		Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
02 :		Color :		Alk :	
-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
04 :		pH :		BOD-S :	
BAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
2S :		NH3-T :		MLSS :	
H3-C :		TKN :		MLVSS :	
:		Ca :		K :	
S :		Cr :	<0.02	Se :	<2.0 ug/l
vS :		Co :		Ag :	<0.01
TDS :		Cu :		Na :	
S :		Au :		Tl :	
SOL :		Fe :		Sn :	
G & O :		Pb :	0.01	Ti :	
l :		Mg :		V :	
b :		Mn :		Zn :	
As :	<5.0 ug/l	Hg :	<0.4 ug/l	THM :	
a :	0.22	Mo :		TOC :	
e :		Ni :			
d :	<0.005	Pd :			

Remarks: All results in mg/l unless otherwise indicated.

Ronald A. Bayer
Laboratory Director 6/12/87

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890

LAB#: 54736J DATE REC'D: 87/06/06 DATE COLL'D: 87/06/05 STATUS: CLOSED
LNAME: ERM New England FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: G2A-14A (deep)
ANALYZE SUPERNATANT ONLY

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :		BOD-S :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
[illegible] :		Cr :	0.03	Se :	<2.0 ug/l
VS :		Co :		Ag :	<0.01
TDS :		Cu :		Na :	
SS :		Au :		Tl :	
% SOL :		Fe :		Sn :	
G & O :		Pb :	<0.01	Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	
As :	<5.0 ug/l	Hg :	<0.4 ug/l	THM :	
Ba :	0.06	Mo :		TOC :	
Be :		Ni :			
Cd :	0.005	Pd :			

Remarks: All results in mg/l unless otherwise indicated.

Ronald A. Bayer
Laboratory Director 6/12/87

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890

LAB#: 54736H DATE REC'D: 87/06/06 DATE COLL'D: 87/06/05 STATUS: CLOSED
LNAME: ERM New England FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: G2A-15

ANALYZE SUPERNATANT ONLY

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
COLI:		Phenol:		HARD-T :	
PC :		CN :		Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
IO2 :		Color :		Alk :	
-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
O4 :		pH :		BOD-S :	
IBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
I2S :		NH3-T :		MLSS :	
IH3-C :		TKN :		MLVSS :	
SS :		Ca :		K :	
S :		Cr :	<0.02	Se :	<2.0 ug/l
VS :		Co :		Ag :	<0.01
TDS :		Cu :		Na :	
S :		Au :		Tl :	
SOL :		Fe :		Sn :	
G & O :		Pb :	<0.01	Ti :	
l :		Mg :		V :	
b :		Mn :		Zn :	
As :	36 ug/l	Hg :	<0.4 ug/l	THM :	
a :	<0.05	Mo :		TOC :	
e :		Ni :			
cd :	<0.005	Pd :			

Remarks: All results in mg/l unless otherwise indicated.

Ronald A. Bayer
Laboratory Director 6/12/87

LAB # 54596A

Client: ERM New England

Sol Location: GZA-1

Sol Coll'd: 6/2/87

Sample Rec'd: 6/3/87

EPA Method 624 Volatile Organics Purge & Trap GC/MS

COMPOUND	RESULTS Sample Concen. ug/l	MDL ug/l	BLANK Conc. ug/l	QC REPLICATE Lab #54450K 1st ug/l	2nd ug/l	QC MATRIX SPK Lab #54450K Sol ug/l	Conc. Added ug/l	% Rec
1) Acrolein	ND	100	ND	ND	ND	–	–	–
2) Acrylonitrile	ND	100	ND	ND	ND	–	–	–
3) Benzene	ND	1	ND	52	52	ND	50	104
4) Bromodichloromethane	ND	1	ND	52	54	ND	50	104
5) Bromoform	ND	1	ND	44	44	ND	50	88
6) Bromomethane	ND	1	ND	ND	ND	–	–	–
7) Carbon tetrachloride	ND	1	ND	47	49	ND	50	94
8) Chlorobenzene	ND	1	ND	48	51	ND	50	96
9) Chloroethane	ND	1	ND	ND	ND	–	–	–
10) 2-Chloroethylvinyl ether	ND	1	ND	ND	ND	–	–	–
11) Chloroform	ND	1	ND	52	54	ND	50	104
12) Chloromethane	ND	1	ND	ND	ND	–	–	–
13) Cis-1,3-dichloropropene	ND	1	ND	36	32	ND	11	72
14) Dibromochloromethane	ND	1	ND	48	49	ND	50	96
15) 1,2-Dichlorobenzene	ND	10	ND	ND	ND	–	–	–
16) 1,3-Dichlorobenzene	ND	10	ND	44	42	ND	50	88
17) 1,4-Dichlorobenzene	ND	10	ND	43	40	ND	50	86
18) 1,1-Dichloroethane	ND	1	ND	54	59	ND	50	108
19) 1,2-Dichloroethane	ND	1	ND	57	61	ND	50	114
20) 1,1-Dichloroethene	ND	1	ND	49	53	ND	50	98
21) 1,2-Dichloropropane	ND	1	ND	54	56	ND	50	108
22) Ethylbenzene	ND	1	ND	48	48	ND	50	96
23) Methylene chloride	ND	1	ND	63	60	ND	50	126
24) 1,1,2,2-Tetrachloroethane	ND	1	ND	52	53	ND	50	104
25) Tetrachloroethene	ND	1	ND	46	40	ND	50	92
26) Toluene	ND	1	ND	45	45	ND	50	90
27) trans-1,3-Dichloropropene	ND	1	ND	16	13	ND	38	32
28) trans-1,2-Dichloroethylene	ND	1	ND	45	47	ND	50	90
29) 1,1,1-Trichloroethane	ND	1	ND	50	55	ND	50	100
30) 1,1,2-Trichloroethane	ND	1	ND	51	53	ND	50	102
31) Trichloroethene	ND	1	ND	46	50	ND	50	92
32) Trichlorofluoromethane	ND	1	ND	ND	ND	–	–	–
33) Vinyl chloride	ND	1	ND	ND	ND	–	–	–

For EnviroTest Laboratories, Inc.

Ronald A. Baver
President

6/12/87

LAB # 54596B

Client: ERM New England   Spl Location: GZA-2

Spl Coll'd: 6/2/87   Sample Rec'd: 6/3/87

EPA Method 624   Volatile Organics   Purge & Trap GC/MS

COMPOUND	RESULTS Sample Concen. ug/l	MDL ug/l	BLANK Conc. ug/l	QC REPLICATE Lab #54450K 1st ug/l	2nd ug/l	QC MATRIX SPK Lab #54450K Spl ug/l	Conc. Added ug/l	% Rec
1) Acrolein	ND	100	ND	ND	ND	-	-	-
2) Acrylonitrile	ND	100	ND	ND	ND	-	-	-
3) Benzene	ND	1	ND	52	52	ND	50	104
4) Bromodichloromethane	ND	1	ND	52	54	ND	50	104
5) Bromoform	ND	1	ND	44	44	ND	50	88
6) Bromomethane	ND	1	ND	ND	ND	-	-	-
7) Carbon tetrachloride	ND	1	ND	47	49	ND	50	94
8) Chlorobenzene	ND	1	ND	48	51	ND	50	96
9) Chloroethane	ND	1	ND	ND	ND	-	-	-
10) 2-Chloroethylvinyl ether	ND	1	ND	ND	ND	-	-	-
11) Chloroform	ND	1	ND	52	54	ND	50	104
12) Chloromethane	ND	1	ND	ND	ND	-	-	-
13) Cis-1,3-dichloropropene	ND	1	ND	36	32	ND	11	72
14) Dibromochloromethane	ND	1	ND	48	49	ND	50	96
15) 1,2-Dichlorobenzene	ND	10	ND	ND	ND	-	-	-
16) 1,3-Dichlorobenzene	ND	10	ND	44	42	ND	50	88
17) 1,4-Dichlorobenzene	ND	10	ND	43	40	ND	50	86
18) 1,1-Dichloroethane	ND	1	ND	54	59	ND	50	108
19) 1,2-Dichloroethane	ND	1	ND	57	61	ND	50	114
20) 1,1-Dichloroethene	ND	1	ND	49	53	ND	50	98
21) 1,2-Dichloropropane	ND	1	ND	54	56	ND	50	108
22) Ethylbenzene	ND	1	ND	48	48	ND	50	96
23) Methylene chloride	ND	1	ND	63	60	ND	50	126
24) 1,1,2,2-Tetrachloroethane	ND	1	ND	52	53	ND	50	104
25) Tetrachloroethene	ND	1	ND	46	40	ND	50	92
26) Toluene	ND	1	ND	45	45	ND	50	90
27) trans-1,3-Dichloropropene	ND	1	ND	16	13	ND	38	32
28) trans-1,2-Dichloroethylene	ND	1	ND	45	49	ND	50	90
29) 1,1,1-Trichloroethane	ND	1	ND	50	55	ND	50	100
30) 1,1,2-Trichloroethane	ND	1	ND	51	53	ND	50	102
31) Trichloroethene	ND	1	ND	46	50	ND	50	92
32) Trichlorofluoromethane	ND	1	ND	ND	ND	-	-	-
33) Vinyl chloride	ND	1	ND	ND	ND	-	-	-

For EnviroTest Laboratories, Inc.

Ronald A. Bayer
President   6/12/87

LAB # 54596C

Client: ERM New England

Spl Location: GZA-3

Spl Coll'd: 6/2/87

Sample Rec'd: 6/3/87

EPA Method 624 Volatile Organics Purge & Trap GC/MS

COMPOUND	RESULTS Sample Concen. ug/l	MDL ug/l	BLANK Conc. ug/l	QC REPLICATE Lab #54450K 1st ug/l	2nd ug/l	QC MATRIX SPK Lab #54450K Spl ug/l	Conc. Added ug/l	% Rec
1) Acrolein	ND	100	ND	ND	ND	–	–	–
2) Acrylonitrile	ND	100	ND	ND	ND	–	–	–
3) Benzene	ND	1	ND	52	52	ND	50	104
4) Bromodichloromethane	ND	1	ND	52	54	ND	50	104
5) Bromoform	ND	1	ND	44	44	ND	50	88
6) Bromomethane	ND	1	ND	ND	ND	–	–	–
7) Carbon tetrachloride	ND	1	ND	47	49	ND	50	94
8) Chlorobenzene	ND	1	ND	48	51	ND	50	96
9) Chloroethane	ND	1	ND	ND	ND	–	–	–
10) 2-Chloroethylvinyl ether	ND	1	ND	ND	ND	–	–	–
11) Chloroform	ND	1	ND	52	54	ND	50	104
12) Chloromethane	ND	1	ND	ND	ND	–	–	–
13) Cis-1,3-dichloropropene	ND	1	ND	36	32	ND	11	72
14) Dibromochloromethane	ND	1	ND	48	49	ND	50	96
15) 1,2-Dichlorobenzene	ND	10	ND	ND	ND	–	–	–
16) 1,3-Dichlorobenzene	ND	10	ND	44	42	ND	50	88
17) 1,4-Dichlorobenzene	ND	10	ND	43	40	ND	50	86
18) 1,1-Dichloroethane	ND	1	ND	54	59	ND	50	108
19) 1,2-Dichloroethane	ND	1	ND	57	61	ND	50	114
20) 1,1-Dichloroethene	ND	1	ND	49	53	ND	50	98
21) 1,2-Dichloropropane	ND	1	ND	54	56	ND	50	108
22) Ethylbenzene	ND	1	ND	48	48	ND	50	96
23) Methylene chloride	ND	1	ND	63	60	ND	50	126
24) 1,1,2,2-Tetrachloroethane	ND	1	ND	52	53	ND	50	104
25) Tetrachloroethene	ND	1	ND	46	40	ND	50	92
26) Toluene	ND	1	ND	45	45	ND	50	90
27) trans-1,3-Dichloropropene	ND	1	ND	16	13	ND	38	32
28) trans-1,2-Dichloroethylene	ND	1	ND	45	49	ND	50	90
29) 1,1,1-Trichloroethane	ND	1	ND	50	55	ND	50	100
30) 1,1,2-Trichloroethane	ND	1	ND	51	53	ND	50	102
31) Trichloroethene	ND	1	ND	46	50	ND	50	92
32) Trichlorofluoromethane	ND	1	ND	ND	ND	–	–	–
33) Vinyl chloride	ND	1	ND	ND	ND	–	–	–

For EnviroTest Laboratories, Inc.

Ronald A. Bauer
President

6/12/87

LAB # 54596A

Client: ERM New England
Spl Location: GZA-1

Spl Coll'd: 6/2/87
Sample Rec'd: 6/3/87

EPA Method 624 Volatile Organics Purge & Trap GC/MS

COMPOUND	RESULTS Sample Concen. ug/l	RESULTS MDL ug/l	BLANK Conc. ug/l	QC REPLICATE Lab #54450K 1st ug/l	QC REPLICATE Lab #54450K 2nd ug/l	QC MATRIX SPK Lab #54450K Spl ug/l	QC MATRIX SPK Lab #54450K Conc. Added ug/l	QC MATRIX SPK Lab #54450K % Rec
1) Acrolein	ND	100	ND	ND	ND	-	-	-
2) Acrylonitrile	ND	100	ND	ND	ND	-	-	-
3) Benzene	ND	1	ND	52	52	ND	50	104
4) Bromodichloromethane	ND	1	ND	52	54	ND	50	104
5) Bromoform	ND	1	ND	44	44	ND	50	88
6) Bromomethane	ND	1	ND	ND	ND	-	-	-
7) Carbon tetrachloride	ND	1	ND	47	49	ND	50	94
8) Chlorobenzene	ND	1	ND	48	51	ND	50	96
9) Chloroethane	ND	1	ND	ND	ND	-	-	-
10) 2-Chloroethylvinyl ether	ND	1	ND	ND	ND	-	-	-
11) Chloroform	ND	1	ND	52	54	ND	50	104
12) Chloromethane	ND	1	ND	ND	ND	-	-	-
13) Cis-1,3-dichloropropene	ND	1	ND	36	32	ND	11	72
14) Dibromochloromethane	ND	1	ND	48	49	ND	50	96
15) 1,2-Dichlorobenzene	ND	10	ND	ND	ND	-	-	-
16) 1,3-Dichlorobenzene	ND	10	ND	44	42	ND	50	88
17) 1,4-Dichlorobenzene	ND	10	ND	43	40	ND	50	86
18) 1,1-Dichloroethane	ND	1	ND	54	59	ND	50	108
19) 1,2-Dichloroethane	ND	1	ND	57	61	ND	50	114
20) 1,1-Dichloroethene	ND	1	ND	49	53	ND	50	98
21) 1,2-Dichloropropane	ND	1	ND	54	56	ND	50	108
22) Ethylbenzene	ND	1	ND	48	48	ND	50	96
23) Methylene chloride	ND	1	ND	63	60	ND	50	126
24) 1,1,2,2-Tetrachloroethane	ND	1	ND	52	53	ND	50	104
25) Tetrachloroethene	ND	1	ND	46	40	ND	50	92
26) Toluene	ND	1	ND	45	45	ND	50	90
27) trans-1,3-Dichloropropene	ND	1	ND	16	13	ND	38	32
28) trans-1,2-Dichloroethylene	ND	1	ND	45	49	ND	50	90
29) 1,1,1-Trichloroethane	ND	1	ND	50	55	ND	50	100
30) 1,1,2-Trichloroethane	ND	1	ND	51	53	ND	50	102
31) Trichloroethene	ND	1	ND	46	50	ND	50	92
32) Trichlorofluoromethane	ND	1	ND	ND	ND	-	-	-
33) Vinyl chloride	ND	1	ND	ND	ND	-	-	-

For EnviroTest Laboratories, Inc. ____________________

Ronald A. Bauer
President

6/12/87

EnviroTest Laboratories Inc.

LAB # 54596B

Client: ERM New England Spl Location: GZA-2

Spl Coll'd: 6/2/87 Sample Rec'd: 6/3/87

EPA Method 624 Volatile Organics Purge & Trap GC/MS

COMPOUND	RESULTS Sample Concen. ug/l	RESULTS MDL ug/l	BLANK Conc. ug/l	QC REPLICATE Lab #54450K 1st ug/l	QC REPLICATE Lab #54450K 2nd ug/l	QC MATRIX SPK Lab #54450K Spl ug/l	QC MATRIX SPK Lab #54450K Conc. Added ug/l	QC MATRIX SPK Lab #54450K % Rec
1) Acrolein	ND	100	ND	ND	ND	-	-	-
2) Acrylonitrile	ND	100	ND	ND	ND	-	-	-
3) Benzene	ND	1	ND	52	52	ND	50	104
4) Bromodichloromethane	ND	1	ND	52	54	ND	50	104
5) Bromoform	ND	1	ND	44	44	ND	50	88
6) Bromomethane	ND	1	ND	ND	ND	-	-	-
7) Carbon tetrachloride	ND	1	ND	47	49	ND	50	94
8) Chlorobenzene	ND	1	ND	48	51	ND	50	96
9) Chloroethane	ND	1	ND	ND	ND	-	-	-
10) 2-Chloroethylvinyl ether	ND	1	ND	ND	ND	-	-	-
11) Chloroform	ND	1	ND	52	54	ND	50	104
12) Chloromethane	ND	1	ND	ND	ND	-	-	-
13) Cis-1.3-dichloropropene	ND	1	ND	36	32	ND	11	72
14) Dibromochloromethane	ND	1	ND	48	49	ND	50	96
15) 1.2-Dichlorobenzene	ND	10	ND	ND	ND	-	-	-
16) 1.3-Dichlorobenzene	ND	10	ND	44	42	ND	50	88
17) 1.4-Dichlorobenzene	ND	10	ND	43	40	ND	50	86
18) 1.1-Dichloroethane	ND	1	ND	54	59	ND	50	108
19) 1.2-Dichloroethane	ND	1	ND	57	61	ND	50	114
20) 1.1-Dichloroethene	ND	1	ND	49	53	ND	50	98
21) 1.2-Dichloropropane	ND	1	ND	54	56	ND	50	108
22) Ethylbenzene	ND	1	ND	48	48	ND	50	96
23) Methylene chloride	ND	1	ND	63	60	ND	50	126
24) 1.1.2.2-Tetrachloroethane	ND	1	ND	52	53	ND	50	104
25) Tetrachloroethene	ND	1	ND	46	40	ND	50	92
26) Toluene	ND	1	ND	45	45	ND	50	90
27) trans-1.3-Dichloropropene	ND	1	ND	16	13	ND	38	32
28) trans-1.2-Dichloroethylene	ND	1	ND	45	47	ND	50	90
29) 1.1.1-Trichloroethane	ND	1	ND	50	55	ND	50	100
30) 1.1.2-Trichloroethane	ND	1	ND	51	53	ND	50	102
31) Trichloroethene	ND	1	ND	46	50	ND	50	92
32) Trichlorofluoromethane	ND	1	ND	ND	ND	-	-	-
33) Vinyl chloride	ND	1	ND	ND	ND	-	-	-

For EnviroTest Laboratories, Inc.

Ronald A. Bayer
President 6/12/87

LAB # 54596C

Client: ERM New England

Sol Location: GZA-3

Spl Coll'd: 6/2/87

Sample Rec'd: 6/3/87

EPA Method 624 Volatile Organics Purge & Trap GC/MS

COMPOUND	RESULTS Sample Concen. ug/l	MDL ug/l	BLANK Conc. ug/l	QC REPLICATE Lab #54450K 1st ug/l	QC REPLICATE Lab #54450K 2nd ug/l	QC MATRIX SPK Lab #54450K Spl ug/l	QC MATRIX SPK Lab #54450K Conc. Added ug/l	QC MATRIX SPK Lab #54450K % Rec
1) Acrolein	ND	100	ND	ND	ND	-	-	-
2) Acrylonitrile	ND	100	ND	ND	ND	-	-	-
3) Benzene	ND	1	ND	52	52	ND	50	104
4) Bromodichloromethane	ND	1	ND	52	54	ND	50	104
5) Bromoform	ND	1	ND	44	44	ND	50	88
6) Bromomethane	ND	1	ND	ND	ND	-	-	-
7) Carbon tetrachloride	ND	1	ND	47	49	ND	50	94
8) Chlorobenzene	ND	1	ND	48	51	ND	50	96
9) Chloroethane	ND	1	ND	ND	ND	-	-	-
10) 2-Chloroethylvinyl ether	ND	1	ND	ND	ND	-	-	-
11) Chloroform	ND	1	ND	52	54	ND	50	104
12) Chloromethane	ND	1	ND	ND	ND	-	-	-
13) Cis-1,3-dichloropropene	ND	1	ND	36	32	ND	11	72
14) Dibromochloromethane	ND	1	ND	48	49	ND	50	96
15) 1,2-Dichlorobenzene	ND	10	ND	ND	ND	-	-	-
16) 1,3-Dichlorobenzene	ND	10	ND	44	42	ND	50	88
17) 1,4-Dichlorobenzene	ND	10	ND	43	40	ND	50	86
18) 1,1-Dichloroethane	ND	1	ND	54	57	ND	50	108
19) 1,2-Dichloroethane	ND	1	ND	57	61	ND	50	114
20) 1,1-Dichloroethene	ND	1	ND	49	53	ND	50	98
21) 1,2-Dichloropropane	ND	1	ND	54	56	ND	50	108
22) Ethylbenzene	ND	1	ND	48	48	ND	50	96
23) Methylene chloride	ND	1	ND	63	60	ND	50	126
24) 1,1,2,2-Tetrachloroethane	ND	1	ND	52	53	ND	50	104
25) Tetrachloroethene	ND	1	ND	46	40	ND	50	92
26) Toluene	ND	1	ND	45	45	ND	50	90
27) trans-1,3-Dichloropropene	ND	1	ND	16	13	ND	38	32
28) trans-1,2-Dichloroethylene	ND	1	ND	45	49	ND	50	90
29) 1,1,1-Trichloroethane	ND	1	ND	50	55	ND	50	100
30) 1,1,2-Trichloroethane	ND	1	ND	51	53	ND	50	102
31) Trichloroethene	ND	1	ND	46	50	ND	50	92
32) Trichlorofluoromethane	ND	1	ND	ND	ND	-	-	-
33) Vinyl chloride	ND	1	ND	ND	ND	-	-	-

For EnviroTest Laboratories, Inc. ____________________

Ronald A. Bayer
President

6/12/87

LAB # 54596D

Client: ERM New England

Spl Location: GZA-4

Spl Coll'd: 6/2/87

Sample Rec'd: 6/3/87

EPA Method 624 Volatile Organics Purge & Trap GC/MS

COMPOUND	RESULTS Sample Concen. ug/l	MDL ug/l	BLANK Conc. ug/l	QC REPLICATE Lab #54450K 1st ug/l	2nd ug/l	QC MATRIX SPK Lab #54450K Spl ug/l	Conc. Added ug/l	% Rec
1) Acrolein	ND	100	ND	ND	ND	-	-	-
2) Acrylonitrile	ND	100	ND	ND	ND	-	-	-
3) Benzene	ND	1	ND	52	52	ND	50	104
4) Bromodichloromethane	ND	1	ND	52	54	ND	50	104
5) Bromoform	ND	1	ND	44	44	ND	50	88
6) Bromomethane	ND	1	ND	ND	ND	-	-	-
7) Carbon tetrachloride	ND	1	ND	47	49	ND	50	94
8) Chlorobenzene	ND	1	ND	48	51	ND	50	96
9) Chloroethane	ND	1	ND	ND	ND	-	-	-
10) 2-Chloroethylvinyl ether	ND	1	ND	ND	ND	-	-	-
11) Chloroform	ND	1	ND	52	54	ND	50	104
12) Chloromethane	ND	1	ND	ND	ND	-	-	-
13) Cis-1.3-dichloropropene	ND	1	ND	36	32	ND	11	72
14) Dibromochloromethane	ND	1	ND	48	49	ND	50	96
15) 1.2-Dichlorobenzene	ND	10	ND	ND	ND	-	-	-
16) 1.3-Dichlorobenzene	ND	10	ND	44	42	ND	50	88
17) 1.4-Dichlorobenzene	ND	10	ND	43	40	ND	50	86
18) 1.1-Dichloroethane	ND	1	ND	54	59	ND	50	106
19) 1.2-Dichloroethane	ND	1	ND	57	61	ND	50	114
20) 1.1-Dichloroethene	ND	1	ND	49	53	ND	50	98
21) 1.2-Dichloropropane	ND	1	ND	54	56	ND	50	108
22) Ethylbenzene	ND	1	ND	48	48	ND	50	96
23) Methylene chloride	ND	1	ND	63	60	ND	50	126
24) 1.1.2.2-Tetrachloroethane	ND	1	ND	52	53	ND	50	104
25) Tetrachloroethene	ND	1	ND	46	40	ND	50	92
26) Toluene	ND	1	ND	45	45	ND	50	90
27) trans-1.3-Dichloropropene	ND	1	ND	16	13	ND	38	32
28) trans-1.2-Dichloroethylene	ND	1	ND	45	47	ND	50	90
29) 1.1.1-Trichloroethane	ND	1	ND	50	55	ND	50	100
30) 1.1.2-Trichloroethane	ND	1	ND	51	53	ND	50	102
31) Trichloroethene	ND	1	ND	46	50	ND	50	92
32) Trichlorofluoromethane	ND	1	ND	ND	ND	-	-	-
33) Vinyl chloride	ND	1	ND	ND	ND	-	-	-

For EnviroTest Laboratories, Inc.

Ronald A. Bayer
President

6/12/87

LAB # 54596E

Client: ERM New England

Spl Location: GZA-5

Spl Coll'd: 6/2/87

Sample Rec'd: 6/3/87

EPA Method 624 Volatile Organics Purge & Trap GC/MS

COMPOUND	RESULTS Sample Concen. ug/l	MDL ug/l	BLANK Conc. ug/l	QC REPLICATE Lab #54450K 1st ug/l	2nd ug/l	QC MATRIX SPK Lab #54450K Spl ug/l	Conc. Added ug/l	% Rec
1) Acrolein	ND	100	ND	ND	ND	-	-	-
2) Acrylonitrile	ND	100	ND	ND	ND	-	-	-
3) Benzene	ND	1	ND	52	52	ND	50	104
4) Bromodichloromethane	ND	1	ND	52	54	ND	50	104
5) Bromoform	ND	1	ND	44	44	ND	50	88
6) Bromomethane	ND	1	ND	ND	ND	-	-	-
7) Carbon tetrachloride	ND	1	ND	47	49	ND	50	94
8) Chlorobenzene	ND	1	ND	48	51	ND	50	96
9) Chloroethane	ND	1	ND	ND	ND	-	-	-
10) 2-Chloroethylvinyl ether	ND	1	ND	ND	ND	-	-	-
11) Chloroform	ND	1	ND	52	54	ND	50	104
12) Chloromethane	ND	1	ND	ND	ND	-	-	-
13) Cis-1,3-dichloropropene	ND	1	ND	36	32	ND	11	72
14) Dibromochloromethane	ND	1	ND	48	49	ND	50	96
15) 1,2-Dichlorobenzene	ND	10	ND	ND	ND	-	-	-
16) 1,3-Dichlorobenzene	ND	10	ND	44	42	ND	50	88
17) 1,4-Dichlorobenzene	ND	10	ND	43	40	ND	50	86
18) 1,1-Dichloroethane	ND	1	ND	54	59	ND	50	108
19) 1,2-Dichloroethane	ND	1	ND	57	61	ND	50	114
20) 1,1-Dichloroethene	ND	1	ND	49	53	ND	50	98
21) 1,2-Dichloropropane	ND	1	ND	54	56	ND	50	108
22) Ethylbenzene	ND	1	ND	48	48	ND	50	96
23) Methylene chloride	ND	1	ND	63	60	ND	50	126
24) 1,1,2,2-Tetrachloroethane	ND	1	ND	52	53	ND	50	104
25) Tetrachloroethene	ND	1	ND	46	40	ND	50	92
26) Toluene	ND	1	ND	45	45	ND	50	90
27) trans-1,3-Dichloropropene	ND	1	ND	16	13	ND	50	32
28) trans-1,2-Dichloroethylene	ND	1	ND	45	49	ND	50	90
29) 1,1,1-Trichloroethane	ND	1	ND	50	55	ND	50	100
30) 1,1,2-Trichloroethane	ND	1	ND	51	53	ND	50	102
31) Trichloroethene	ND	1	ND	46	50	ND	50	92
32) Trichlorofluoromethane	ND	1	ND	ND	ND	-	-	-
33) Vinyl chloride	ND	1	ND	ND	ND	-	-	-

For EnviroTest Laboratories, Inc.

Ronald A. Bayer
President

6/12/87

LAB # 54596F

Client: ERM New England   Sol Location: GZA-6

Sol Coll'd: 6/2/87   Sample Rec'd: 6/3/87

EPA Method 624   Volátile Organics   Purge & Trap GC/MS

COMPOUND	RESULTS Sample Concen. ug/l	MDL ug/l	BLANK Conc. ug/l	QC REPLICATE Lab #54450K 1st ug/l	2nd ug/l	QC MATRIX SPK Lab #54450K Sol ug/l	Conc. Added ug/l	% Rec
1) Acrolein	ND	100	ND	ND	ND	–	–	–
2) Acrylonitrile	ND	100	ND	ND	ND	–	–	–
3) Benzene	ND	1	ND	52	52	ND	50	104
4) Bromodichloromethane	ND	1	ND	52	54	ND	50	104
5) Bromoform	ND	1	ND	44	44	ND	50	88
6) Bromomethane	ND	1	ND	ND	ND	–	–	–
7) Carbon tetrachloride	ND	1	ND	47	49	ND	50	94
8) Chlorobenzene	ND	1	ND	48	51	ND	50	96
9) Chloroethane	ND	1	ND	ND	ND	–	–	–
10) 2-Chloroethylvinyl ether	ND	1	ND	ND	ND	–	–	–
11) Chloroform	ND	1	ND	52	54	ND	50	104
12) Chloromethane	ND	1	ND	ND	ND	–	–	–
13) Cis-1,3-dichloropropene	ND	1	ND	36	32	ND	11	72
14) Dibromochloromethane	ND	1	ND	48	49	ND	50	96
15) 1,2-Dichlorobenzene	ND	10	ND	ND	ND	–	–	–
16) 1,3-Dichlorobenzene	ND	10	ND	44	42	ND	50	88
17) 1,4-Dichlorobenzene	ND	10	ND	43	40	ND	50	86
18) 1,1-Dichloroethane	ND	1	ND	54	59	ND	50	108
19) 1,2-Dichloroethane	ND	1	ND	57	61	ND	50	114
20) 1,1-Dichloroethene	ND	1	ND	49	53	ND	50	98
21) 1,2-Dichloropropane	ND	1	ND	54	56	ND	50	108
22) Ethylbenzene	ND	1	ND	48	48	ND	50	96
23) Methylene chloride	ND	1	ND	63	60	ND	50	126
24) 1,1,2,2-Tetrachloroethane	ND	1	ND	52	53	ND	50	104
25) Tetrachloroethene	ND	1	ND	46	40	ND	50	92
26) Toluene	ND	1	ND	45	45	ND	50	90
27) trans-1,3-Dichloropropene	ND	1	ND	16	13	ND	38	32
28) trans-1,2-Dichloroethylene	ND	1	ND	45	49	ND	50	90
29) 1,1,1-Trichloroethane	ND	1	ND	50	55	ND	50	100
30) 1,1,2-Trichloroethane	ND	1	ND	51	53	ND	50	102
31) Trichloroethene ,	ND	1	ND	46	50	ND	50	92
32) Trichlorofluoromethane	ND	1	ND	ND	ND	–	–	–
33) Vinyl chloride	ND	1	ND	ND	ND	–	–	–

For EnviroTest Laboratories, Inc. ______________________

Ronald A. Bayer
President   6/12/87

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890

LAB#: 54736G   DATE REC'D: 87/06/06   DATE COLL'D: 87/06/05   STATUS: closed
NAME: ERM - New England
TREET: CITY: STATE: ZIP:
SPL LOCATION: Project #1502 GZA-7   COLL'D BY:

EPORT TO: same
BILL TO: same

VOLATILE ORGANICS ANALYSIS

Bromodichloromethane	:	Tetrachloroethylene	:
Bromoform	:	Trans-1,3-dichloropropene	:
romomethane	:	Trans-1,2-dichloroethylene	: 3,620
Carbon tetrachloride	:	1,1,1-trichloroethane	: 140
Chlorobenzene	:	1,1,2-trichloroethane	:
hloroethane	:	Trichloroethylene	:
2-chloroethylvinyl ether	:	Trichlorofluoromethane	:
Chloroform	:	1,1,2-trichloro-1,2,2-trifluoroethane	:
hloromethane	:	Vinyl chloride	: 1,670
is-1,3-dichloropropene	:		
Dibromochloromethane	:		
,1-dichloroethane	: 38	Benzene	:
1,2-dichloroethane	:	1,2-dichlorobenzene	:
1,1-dichloroethylene	:	1,3-dichlorobenzene	:
.2-dichloropropane	:	1,4-dichlorobenzene	:
methylene chloride	: 760	Ethylbenzene	:
1,1,2,2-tetrachloroethane	:	Toluene	: 1,600
		Total Xylenes	:

ll results in ug/l.

emarks: All other EPA 624 <50 ug/l.

Ronald A. Bayer
Laboratory Director   6/22/87

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890

LAB#: 54736F DATE REC'D: 87/06/06 DATE COLL'D: 87/06/05 STATUS: closed
NAME: ERM - New England
STREET: CITY: STATE: ZIP:
SPL LOCATION: Project #1502 GZA-8 COLL'D BY:

REPORT TO: same
BILL TO: same

VOLATILE ORGANICS ANALYSIS

Bromodichloromethane :		Tetrachloroethylene :	18
Bromoform :		Trans-1,3-dichloropropene :	
Bromomethane :		Trans-1,2-dichloroethylene:	
Carbon tetrachloride :		1,1,1-trichloroethane :	
Chlorobenzene :		1,1,2-trichloroethane :	
Chloroethane :		Trichloroethylene :	16
2-chloroethylvinyl ether :		Trichlorofluoromethane :	
Chloroform :		1,1,2-trichloro-1,2,2-trifluoroethane :	
Chloromethane :		Vinyl chloride :	
Cis-1,3-dichloropropene :			
Dibromochloromethane :			
1,1-dichloroethane :		Benzene :	
1,2-dichloroethane :		1,2-dichlorobenzene :	
1,1-dichloroethylene :		1,3-dichlorobenzene :	
1,2-dichloropropane :		1,4-dichlorobenzene :	
Methylene chloride :		Ethylbenzene :	
1,1,2,2-tetrachloroethane:		Toluene :	
		Total Xylenes :	

All results in ug/l.

Remarks: All other EPA 624 <1.0 ug/l.

D. Terese for
Ronald A. Bayer
Laboratory Director 6/22/87

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890

LAB#: 54736E DATE REC'D: 87/06/06 DATE COLL'D: 87/06/05 STATUS: closed
NAME: ERM - New England
STREET: CITY: STATE: ZIP:
SPL LOCATION: Project #1502 GZA-9 COLL'D BY:

REPORT TO: same
BILL TO: same

VOLATILE ORGANICS ANALYSIS

Bromodichloromethane	:	Tetrachloroethylene	: 16
Bromoform	:	Trans-1,3-dichloropropene	:
Bromomethane	:	Trans-1,2-dichloroethylene	: 69
Carbon tetrachloride	:	1,1,1-trichloroethane	:
Chlorobenzene	:	1,1,2-trichloroethane	:
Chloroethane	:	Trichloroethylene	: 28
2-chloroethylvinyl ether	:	Trichlorofluoromethane	:
Chloroform	:	1,1,2-trichloro-1,2,2-trifluoroethane	:
Chloromethane	:	Vinyl chloride	: 5.6
Cis-1,3-dichloropropene	:		
Dibromochloromethane	:		
1,1-dichloroethane	:	Benzene	:
1,2-dichloroethane	:	1,2-dichlorobenzene	:
1,1-dichloroethylene	:	1,3-dichlorobenzene	:
1,2-dichloropropane	:	1,4-dichlorobenzene	:
Methylene chloride	:	Ethylbenzene	:
1,1,2,2-tetrachloroethane	:	Toluene	:
		Total Xylenes	:

All results in ug/l.

Remarks: All other EPA 624 <1.0 ug/l.

Ronald A. Bayer
Laboratory Director 6/22/87

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890

LAB#: 54736D DATE.REC'D: 87/06/06 DATE COLL'D: 87/06/05 STATUS: closed
NAME: ERM - New England
STREET: CITY: STATE: ZIP:
SPL LOCATION: Project #1502 GZA-10 COLL'D BY:

REPORT TO: same
BILL TO: same

VOLATILE ORGANICS ANALYSIS

Bromodichloromethane	:	Tetrachloroethylene	:
Bromoform	:	Trans-1,3-dichloropropene	:
Bromomethane	:	Trans-1,2-dichloroethylene	:
Carbon tetrachloride	:	1,1,1-trichloroethane	:
Chlorobenzene	:	1,1,2-trichloroethane	:
Chloroethane	:	Trichloroethylene	:
2-chloroethylvinyl ether	:	Trichlorofluoromethane	:
Chloroform	:	1,1,2-trichloro-1,2,2-trifluoroethane	:
Chloromethane	:	Vinyl chloride	:
cis-1,3-dichloropropene	:		
Dibromochloromethane	:		
1,1-dichloroethane	:	Benzene	:
1,2-dichloroethane	:	1,2-dichlorobenzene	:
1,1-dichloroethylene	:	1,3-dichlorobenzene	:
1,2-dichloropropane	:	1,4-dichlorobenzene	:
methylene chloride	:	Ethylbenzene	:
1,1,2,2-tetrachloroethane	:	Toluene	:
		Total Xylenes	:

All results in ug/l.

Remarks: All EPA 624 <1.0 ug/l.

Ronald A. Bayer
Laboratory Director 6/22/87

New York State Department of Health Approved

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890

LAB#: 54736C DATE REC'D: 87/06/06 DATE COLL'D: 87/06/05 STATUS: closed
AME: ERM - New England
TREET: CITY: STATE: ZIP:
SPL LOCATION: Project #1502 GZA-11 COLL'D BY:

EPORT TO: same
BILL TO: same

VOLATILE ORGANICS ANALYSIS

Bromodichloromethane	:	Tetrachloroethylene	:
romoform	:	Trans-1,3-dichloropropene	:
romomethane	:	Trans-1,2-dichloroethylene	:
Carbon tetrachloride	:	1,1,1-trichloroethane	:
hlorobenzene	:	1,1,2-trichloroethane	:
hloroethane	:	Trichloroethylene	:
2-chloroethylvinyl ether	:	Trichlorofluoromethane	:
Chloroform	:	1,1,2-trichloro-1,2,2-trifluoroethane	:
hloromethane	:	Vinyl chloride	:
cis-1,3-dichloropropene	:		
Dibromochloromethane	:		
,1-dichloroethane	:	Benzene	:
1,2-dichloroethane	:	1,2-dichlorobenzene	:
.1-dichloroethylene	:	1,3-dichlorobenzene	:
.2-dichloropropane	:	1,4-dichlorobenzene	:
Methylene chloride	:	Ethylbenzene	:
.1,2,2-tetrachloroethane	:	Toluene	:
		Total Xylenes	:

All results in ug/l.

Remarks: All EPA 624 <1.0 ug/l.

Ronald A. Bayer
Laboratory Director 6/22/87

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890

LAB#: 54736A DATE REC'D: 87/06/06 DATE COLL'D: 87/06/05 STATUS: closed
NAME: ERM - New England
STREET: CITY: STATE: ZIP:
SPL LOCATION: Project #1502 GZA-12 COLL'D BY:

REPORT TO: same
BILL TO: same

VOLATILE ORGANICS ANALYSIS

Bromodichloromethane	:	Tetrachloroethylene	:
Bromoform	:	Trans-1,3-dichloropropene	:
Bromomethane	:	Trans-1,2-dichloroethylene	:
Carbon tetrachloride	:	1,1,1-trichloroethane	:
Chlorobenzene	:	1,1,2-trichloroethane	:
Chloroethane	:	Trichloroethylene	:
2-chloroethylvinyl ether	:	Trichlorofluoromethane	:
Chloroform	:	1,1,2-trichloro-1,2,2-trifluoroethane	:
Chloromethane	:		
Cis-1,3-dichloropropene	:	Vinyl chloride	:
Dibromochloromethane	:		
1,1-dichloroethane	:	Benzene	:
1,2-dichloroethane	:	1,2-dichlorobenzene	:
1,1-dichloroethylene	:	1,3-dichlorobenzene	:
1,2-dichloropropane	:	1,4-dichlorobenzene	:
Methylene chloride	:	Ethylbenzene	:
1,1,2,2-tetrachloroethane	:	Toluene	:
		Total Xylenes	:

All results in ug/l.

Remarks: All EPA 624 <1.0 ug/l.

Ronald A. Bayer
Laboratory Director 6/22/87

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890

LAB#: 54736B   DATE REC'D: 87/06/06   DATE COLL'D: 87/06/05   STATUS: closed
NAME: ERM - New England
STREET: CITY: STATE: ZIP:
SPL LOCATION: Project #1502 GZA-13   COLL'D BY:

REPORT TO: same
BILL TO: same

VOLATILE ORGANICS ANALYSIS

Bromodichloromethane	:	Tetrachloroethylene	:
Bromoform	:	Trans-1,3-dichloropropene	:
Bromomethane	:	Trans-1,2-dichloroethylene	:
Carbon tetrachloride	:	1,1,1-trichloroethane	:
Chlorobenzene	:	1,1,2-trichloroethane	:
Chloroethane	:	Trichloroethylene	:
2-chloroethylvinyl ether	:	Trichlorofluoromethane	:
Chloroform	:	1,1,2-trichloro-1,2,2-trifluoroethane	:
Chloromethane	:	Vinyl chloride	:
Cis-1,3-dichloropropene	:		
Dibromochloromethane	:		
1,1-dichloroethane	:	Benzene	:
1,2-dichloroethane	:	1,2-dichlorobenzene	:
1,1-dichloroethylene	:	1,3-dichlorobenzene	:
1,2-dichloropropane	:	1,4-dichlorobenzene	:
Methylene chloride	:	Ethylbenzene	:
1,1,2,2-tetrachloroethane	:	Toluene	:
		Total Xylenes	:

All results in ug/l.

Remarks: All EPA 624 <1.0 ug/l.

Ronald A. Bayer
Laboratory Director   6/22/87

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890

LAB#: 54736I DATE.REC'D: 87/06/06 DATE COLL'D: 87/06/05 STATUS: closed
IAME: ERM - New England
:TREET: CITY: STATE: ZIP:
SPL LOCATION: Project #1502 GZA-14 COLL'D BY:

:EPORT TO: same
BILL TO: same

VOLATILE ORGANICS ANALYSIS

Bromodichloromethane	:	Tetrachloroethylene	:
romoform	:	Trans-1,3-dichloropropene	:
romomethane	:	Trans-1,2-dichloroethylene	:
Carbon tetrachloride	:	1,1,1-trichloroethane	:
^hlorobenzene	:	1,1,2-trichloroethane	:
hloroethane	:	Trichloroethylene	:
2-chloroethylvinyl ether	:	Trichlorofluoromethane	:
^hloroform	:	1,1,2-trichloro-1,2,2-	:
hloromethane	:	trifluoroethane	:
ɩis-1,3-dichloropropene	:	Vinyl chloride	:
Dibromochloromethane	:		
,1-dichloroethane	:	Benzene	:
1,2-dichloroethane	:	1,2-dichlorobenzene	:
,1-dichloroethylene	:	1,3-dichlorobenzene	:
,2-dichloropropane	:	1,4-dichlorobenzene	:
Methylene chloride	:	Ethylbenzene	:
,1,2,2-tetrachloroethane	:	Toluene	:
		Total Xylenes	:

All results in ug/l.

emarks: All EPA 624 <1.0 ug/l.

Ronald A. Bayer
Laboratory Director 6/22/87

EnviroTest
Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890

LAB#: 54736J DATE REC'D: 87/06/06 DATE COLL'D: 87/06/05 STATUS: closed
AME: ERM - New England
_TREET: CITY: STATE: ZIP:
SPL LOCATION: Project #1502 GZA-14A Deep wellCOLL'D BY:

EPORT TO: same
BILL TO: same

VOLATILE ORGANICS ANALYSIS

Bromodichloromethane	:	Tetrachloroethylene	: 11
romoform	:	Trans-1,3-dichloropropene	:
romomethane	:	Trans-1,2-dichloroethylene	:
Carbon tetrachloride	:	1,1,1-trichloroethane	:
hlorobenzene	:	1,1,2-trichloroethane	:
hloroethane	:	Trichloroethylene	: 36
2-chloroethylvinyl ether	:	Trichlorofluoromethane	:
hloroform	:	1,1,2-trichloro-1,2,2- trifluoroethane	:
hloromethane	:	Vinyl chloride	:
cis-1,3-dichloropropene	:		
Dibromochloromethane	:		
,1-dichloroethane	:	Benzene	:
1,2-dichloroethane	:	1,2-dichlorobenzene	:
,1-dichloroethylene	:	1,3-dichlorobenzene	:
,2-dichloropropane	:	1,4-dichlorobenzene	:
Methylene chloride	:	Ethylbenzene	:
,1,2,2-tetrachloroethane	:	Toluene	:
		Total Xylenes	:

All results in ug/l.

emarks: All EPA 624 <1.0 ug/l.

Ronald A. Bayer
Laboratory Director 6/22/87

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890

LAB#: 54736H DATE.REC'D: 87/06/06 DATE COLL'D: 87/06/05 STATUS: closed
IAME: ERM - New England
:TREET: CITY: STATE: ZIP:
SPL LOCATION: Project #1502 GZA-15 COLL'D BY:

:EPORT TO: same
BILL TO: same

VOLATILE ORGANICS ANALYSIS

Bromodichloromethane	:	Tetrachloroethylene	: 19
romoform	:	Trans-1,3-dichloropropene	:
.romomethane	:	Trans-1,2-dichloroethylene	: 5,770
Carbon tetrachloride	:	1,1,1-trichloroethane	: 43
hlorobenzene	:	1,1,2-trichloroethane	:
hloroethane	:	Trichloroethylene	: 18
2-chloroethylvinyl ether	:	Trichlorofluoromethane	:
Chloroform	:	1,1,2-trichloro-1,2,2-trifluoroethane	:
hloromethane	:	Vinyl chloride	: 13,700
cis-1,3-dichloropropene	:		
Dibromochloromethane	:		
,1-dichloroethane	: 51	Benzene	:
1,2-dichloroethane	:	1,2-dichlorobenzene	:
,1-dichloroethylene	: 4.7	1,3-dichlorobenzene	:
,2-dichloropropane	:	1,4-dichlorobenzene	:
Methylene chloride	:	Ethylbenzene	: 12
,1,2,2-tetrachloroethane	:	Toluene	: 350
		Total Xylenes	:

All results in ug/l.

emarks: All other EPA 624 <1.0 ug/l.

Ronald A. Bayer
Laboratory Director 6/22/87

APPENDIX C

LABORATORY DATA- CDM and GZA SAMPLING EVENTS

SUMMARY OF RESULTS OF CDM VOLATILE ORGANIC ANALYSIS
(EPA Method 601-602) November, 1985

Parameter	DLM-1	3	5	7A-1
Tetrachloroethylene	27	8.4	(P)	41
Trichlorehtylene	40	21	5.9	18
All other Method 601-602 parameters	(P)	(P)	(P)	(P)
Total VOC's	67	29.4	5.9	59

All results in ug/l (ppb)
(P) present but under the detection limit

SUMMARY OF RESULTS OF CDM VOLATILE ORGANIC ANALYSIS
(EPA Method 624) February 4, 1986

Parameter	MW-1	MW-11A
Tetrachloroethene	11	ND
Trichlorethene	9.3	ND
All other 624 Parameter	ND	ND
Total VOC's	20.3	ND

All results in ppb (ug/l)

*CDM report indicates wells MW-1 - MW-11A were sampled.
Data on wells MW-2 - MW-10 not available to ERM.

..MMARY OF RESULTS OF CDM VOLATILE ORGANIC ANALYSIS
(EPA Method 601/602) March 5, 1986

..rameter	CDM MW-3	CDM MW-7	CDM MW-8	CDM MW-9	GE-6	CDM MW-1	CDM MW-2	CDM MW-4	CDM MW-5	CDM MW-11	CDM MW-11A	CDM MW-4A
1,1-dichloroethane	ND	4.0	ND	ND	ND	ND	ND	1.6	ND	ND	ND	ND
.,2-dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1-dichloroethene	ND	18.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trans-1,2-dichloroethene	ND	ND	ND	ND	ND	ND	ND	9.6	ND	ND	ND	ND
·trachloroethene	ND	54.0	ND	ND	ND	8.9	ND	70	24	ND	ND	59
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
.,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
·ichloroethene	ND	99.0	ND	ND	ND	6.8	ND	75	65	ND	ND	19
Trichlorofluoroemethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
nyl Chloride	ND	1.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
·tal VOC's	ND	176.6	ND	ND	ND	15.7	ND	156.2	89.0	ND	ND	78

l results in ug/l (ppb)

SUMMARY OF RESULTS OF CDM VOLATILE ORGANIC CHEMICAL ANALYSIS
(EPA Method 601-602) May 16, 1986

Parameter	GZA-1	GZA-4
Tetrachloroethylene	ND	ND
Trichlorethylene	ND	ND
All other 601/602 Compounds	ND	ND

All results in ug/l (ppb)

ND = Not Detected

RESULTS OF ORGANIC PRIORITY POLLUTANT ANALYSES OF VOLATILE ORGANIC COMPOUNDS
July 31, 1986

Parameter	CDM MW-5	CDM MW-7	DD 1	D-001	D-002 3	SCB	WWE 5
1-1-Dichloroethane	7.8	<2	<2	<2	<2	<2	<2
trans-1,2-Dichloroethylene	7.1	20	<2	<2	<2	<2	<2
Trichloroethylene	130	74	<2	<2	<2	<2	<2
Tetrachlorehtylene	47	44	<2	<2	<2	<2	<2
Toluene	3.0	2.3	<2	<2	3.7	<2	2.7
Chloroform	<2	<2	<2	<2	<2	<2	6
Bromodichloromethane	<2	<2	<2	<2	<2	<2	2.8

All results in ug/l (ppb)

Data collected by GZA

1 Stormwater Discharge Culvert

2 Storm Catch Basin -on line with non-contact cooling water discharge 001

3 Non-contact cooling water 002 - from catch basin

4 Non-contact cooling water 001 - from catch basin

5 Waste water treatment plant effluent

SUMMARY OF RESULTS OF CDM VOLATILE ORGANIC ANALYSIS
(EPA Method 624) July 31, 1986

Parameter	CDM MW-4	CDM MW-4A	CDM MW-3	SW-5
Trichloroethene	240	130	<50	(p) <50
1,1,2,2-Tetrachloroetene	91	55	<50	<10
Chlorobenzene	<10	<10	80	<10
1,1,1-Trichloroetane	<10	<10	<10 (p)	<10
TVO	331	185	80	(9)

All results in ug/l (ppb)

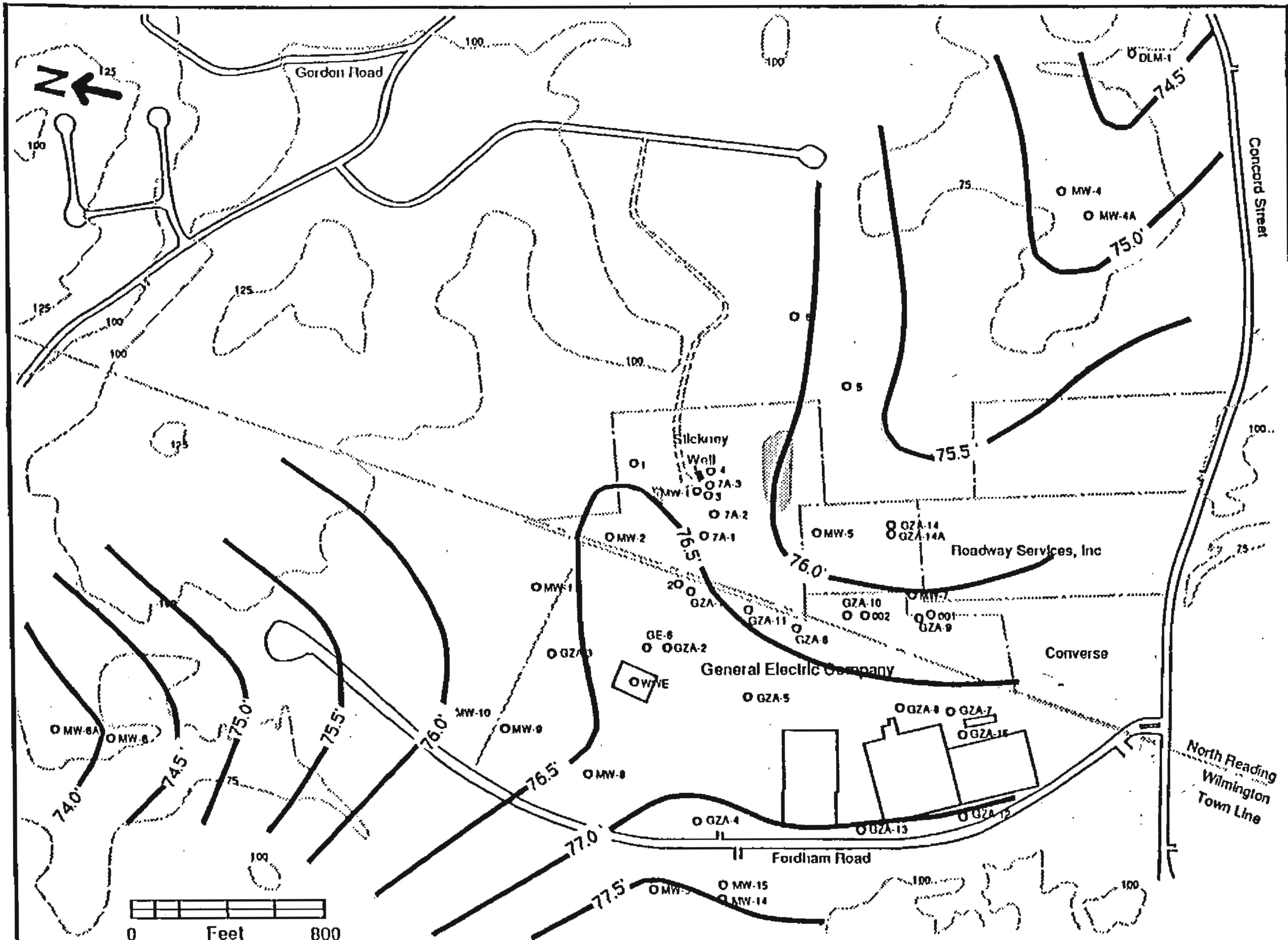
(P) = Present, but below the detection limit.

SUMMARY OF RESULTS OF CDM VOLATILE ORGANIC ANALYSIS
(EPA Method 624) August 1986

Parameter	MW-3	MW-4	MW-4A	SW-5
Trichloroethylene	*< 50	240	130	<50
1,1,2'2-tetrachloroethylene	*< 50	91	55	<10
Chlorobenzene	80	<10	<10	<10
1,1,1-Trichloroethane	<10 (P)	<10	<10	<10
Other Method 624 Parameters ND	<10	<10	<10	<10
TVO	80	331	185	<50

All results in ug/l (ppb)

(P) present, but below the detection limit



WATER TABLE LEVELS UNDER NON-PUMPING CONDITIONS
(JUNE 1996) BY CAMP DRESSER AND McKEE

——74.5 water table elevation in feet above mean sea level

APPENDIX D

GZA BORING LOGS

GOLDBERG-ZOINO & ASSOCIATES, INC.
GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS

PROJECT: General Electric, Wilmington, Massachusetts

REPORT OF BORING NUMBER GZA-1
SHEET 1 OF 2
DATE 3/4/87 FILE A-7201

BORING CO. GZA Drilling, Inc.
FOREMAN J. Caine
GZA ENGINEER R. Chase/bjm

BORING LOCATION See Location Plan
GROUND ELEV
DATE STARTED 3/4/87 DATE ENDED 3/4/87

CASING
SIZE: 4" I.D.
HAMMER: 300 lb.
FALL: 24 inches

SAMPLER
TYPE: Split spoon OTHER:
HAMMER: 140 lb.
FALL: 30 inches

GROUNDWATER READINGS

DATE	DEPTH	CASING AT	STABILIZATION TIME
3/4	1.7	Out	Completion

DEPTH	CAS. BL. /FT.	SAMPLE NO.	PEN./REC.	DEPTH	BLOWS/6"	SAMPLE DESCRIPTION	STRATA CHG and GEN. DESC.	EQUIPMENT INSTALLED	FIELD TESTING 1.	RMKS.
		S-1	24/0	0-2	Wt. 140	Sample not retained.		CEMENT BENTONITE 1'-2'	H-Nu (11.7 ev)	2.
					1					
					1					
					1		PEAT			
5	13	S-2	24/9	5-7	7	Medium dense, brown, fine SAND, trace Silt.			2.5	
					6					
	14				6					
					10					
	16							2" PVC WELLSCREEN 3'-38'		
	23									
	29									
10	10	S-3	24/12	10-12	3	Loose, gray, coarse to fine SAND, trace(-) Silt.	SAND	FINE FILTER SAND 2'-42'	1.0	
					4					
	17				5					
					11					
	26									
	37									
	44									3 4 5
15	22	S-4	24/5	15-17	42	Very dense, gray, medium to coarse GRAVEL, trace coarse to fine Sand, trace(-) Silt.			5.2	
					29					
	30				30					
					31					
	47									
	39									
	42									
20	30	S-5	24/9	20-22	19	Dense, gray, coarse to fine SAND, little, fine to medium Gravel, trace Silt			N.D.	
					19					
	35				14					
					21					
	41									
	43									
	32									
25										

REMARKS:
2. Spoon was pushed first two feet through peat stratum.
3. Driler noted change at bottom of casing blows (approximately 14.5')/Gravel.
4. Gravel looked more like rock chips (boulder).
5. Casing blow counts after drilling ahead 5' in boulders/Gravel.

1. Field testing results represent organic vapor levels (referenced to a benzene standard) measured in the head space of sealed soil sample jars using an H-Nu Model PI-101 photoionization analyzer. Results recorded in parts per million (ppm) ND indicates none detected.

NOTES: 1) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. 2) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THE BORINGS LOGS. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO FACTORS NOT ACCOUNTED FOR AT THE TIME MEASUREMENTS WERE MADE.

GOLDBERG-ZOINO & ASSOCIATES, INC.
GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS

PROJECT: General Electric, Wilmington, Massachusetts

REPORT OF BORING NUMBER GZA-1
SHEET 2 OF 2
DATE 3/4/87 FILE A-7201

BORING CO. GZA Drilling, Inc.
FOREMAN J. Caine
GZA ENGINEER R. Chase/bjm

BORING LOCATION See Location Plan
GROUND ELEV.
DATE STARTED 3/4/87 DATE ENDED 3/4/87

CASING
SIZE: 4" I.D.
HAMMER: 300 lb.
FALL: 24 inches

SAMPLER
TYPE: Split spoon OTHER:
HAMMER: 140 lb.
FALL: 30

GROUNDWATER READINGS

DATE	DEPTH	CASING AT	STABILIZATION TIME
3/4	1.7	out	Completion

DEPTH	CAS. BL./FT.	SAMPLE NO.	PEN./REC.	DEPTH	BLOWS/6"	SAMPLE DESCRIPTION	STRATA CHG. and GEN. DESC.	EQUIPMENT INSTALLED	FIELD TESTING 1.	RMKS.
	41	S 6	24/5	25-257	18	Medium dense, gray, coarse to fine SAND, trace fine Gravel, trace Silt.			1.0	
					20					
	40				7					
					11					
	44									6
	78									
	10/?						SAND	2" PVC WELLSCREEN 3'-38'		
30	71	S-7	24/12	30-32	13	Dense, gray, coarse to fine SAND, trace Silt.				
					14					
	92				20				N.D.	
					17			FINE FILTER SAND 2'-42'		
	101									
	97									
	99									
35	92	S-8	24/9	35-37	48	Dense, gray, fine to medium GRAVEL and coarse to fine SAND, trace Silt.			3.4	
					20					
	73				21		GRAVEL AND SAND			
					28					
	61									
	70									
	62							2' PVC SETTLING TUBE 38'-40'		
40		S-9	24/5	40-42	12	Medium, dense, gray coarse SAND, little fine Gravel.	SAND		N.D.	
					11					
					15					
					15					

REMARKS:

6. Ten casing blows and drive head brake, drilled ahead due to rock at bottom hole.

NOTES: 1) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. 2) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THE BORINGS LOGS. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO FACTORS NOT ACCOUNTED FOR AT THE TIME MEASUREMENTS WERE MADE.

GOLDBERG-ZOINO & ASSOCIATES, INC. GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT General Electric Wilmington, Massachusetts	REPORT OF BORING NUMBER GZA-2 SHEET 1 OF 1 DATE 2/26/87 FILE A-7291

BORING CO. GZA Drilling, Inc.
FOREMAN J. Caine
GZA ENGINEER R. Chase/bjm

BORING LOCATION See location plan
GROUND ELEV.
DATE STARTED 3/2/87 DATE ENDED 3/2/87

CASING
SIZE: 4" I.D.
HAMMER: 300 lb
FALL: 24 inches

SAMPLER
TYPE: Split spoon
HAMMER: 140 lb.
FALL: 30
OTHER:

GROUNDWATER READINGS

DATE	DEPTH	CASING AT	STABILIZATION TIME
3.3	2.14	Out	18 hours

DEPTH	CAS. BL. /FT.	SAMPLE NO.	PEN./REC.	SAMPLE DEPTH	BLOWS/6"	SAMPLE DESCRIPTION	STRATA CHG and GEN. DESC.	EQUIPMENT INSTALLED	FIELD TESTING 1.	RMKS.
	Push	S-1	24/0	0-2	1	No recovery.		BENTONITE 0'-2'	H-Nu (11.7 ev)	2.
					1					3.
					1					4.
					1					
							PEAT			
								FINE FILTER SND 2'-20'		
5										
	17	S-2	24/12	5-7	2	3" Medium dense, brown, ORGANIC MATTER and SILT.				
		S-2A			7				6.0	
	23				10	9" Medium dense, gray, fine to medium SAND, trace Silt.				
					11			2" PVC WELL SCREEN 3'-18'		
	26								N.D.	
	29									
	23									
10	27	S-3	24/24	10-12	6	Medium dense, gray, fine to medium SAND, trace Silt.	SAND		1.0	
					12					
	30				16					
					17					
	28									
	37									
	47									
15	30	S-4	24/24	15-17	9	Medium dense, brown, fine SAND, trace Silt.			N.D.	
					11					
	29				16					
					22					
	39									
	47							TWO FOOT SETTLING TUBE 18'-20'		
	32									
20		S-5	24/19	20-22	5	Medium dense, brown, fine SAND, trace Silt.			N.D.	
					10					
					15					
					16					
						Bottom of borehole 22'				

REMARKS:

1. Field testing results represent organic vapor levels (referenced to a benzene standard) measured in the headspace of sealed soil sample jars using an H-Nu Model PI-101 photoionization analyzer. Results recorded in parts per million (ppm). ND indicates none detected.
2. Water at drilling locatin approximately 1-2' above ground surface.
3. GZA-2 approximately 15' to the north of existing well.
4. Due to approximatley 18" water above ground surface no cement.

NOTES: 1) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. 2) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THE BORINGS LOGS. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO FACTORS NOT ACCOUNTED FOR AT THE TIME MEASUREMENTS WERE MADE.

GOLDBERG-ZOINO & ASSOCIATES, INC. GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT: General Electric, Wilmington, Massachusetts	REPORT OF BORING NUMBER GZA-2 SHEET 1 OF 1 DATE 3/2/87 FILE A-7201

BORING CO. GZA Drilling, Inc.
FOREMAN J. Caine
GZA ENGINEER R. Chase/bjm

BORING LOCATION See Location Plan
GROUND ELEV.
DATE STARTED 3/2/87 DATE ENDED 3/3/87

CASING
SIZE: 4" I.D.
HAMMER: 300 lb.
FALL: 24 inches

SAMPLER
TYPE: Split spoon OTHER:
HAMMER: 140 lb.
FALL: 30

GROUNDWATER READINGS			
DATE	DEPTH	CASING AT	STABILIZATION TIME
3/3	2.65	Out	End

DEPTH	CAS. BL. /FT.	SAMPLE NO.	PEN./REC.	DEPTH	BLOWS/6"	SAMPLE DESCRIPTION	STRATA CHG. and GEN. DESC.	EQUIPMENT INSTALLED	FIELD TESTING 1.	RMKS.
	14	S-1	24/9	0-2	2	Dense, brown, coarse to fine SAND, little fine Gravel, trace Silt.			H-Nu (11.7 ev)	
					19				N.D.	
	56				21					
					29					
	71							2" PVC WELLSCREEN 0'-13'		
	87									
	146						SAND			
5										2
	40	S-2	9/6	5-5.75	70	Very dense, brown, coarse to fine SAND, some Rock chips, trace(-) Silt.		FINE FILTER SAND 0'-17'	N.D.	
					140/3"					
	38									
	70									3
	90									
	82									
10										4
	39	S-3	24/2	10-12	35	Very dense, brown, coarse to fine SAND and fine GRAVEL.	SAND & GRAVEL			
					35				N.D.	
	46				25					
					34					
	70					Wash sample - while drilling brown coarse to fine SAND.				
	58							TWO FOOT SETTLING TUBE 13'-15'		
							GRAVELLY SAND			
	44									
15										
		S-4	24/6	15-17	20	Very dense, brown-red fine to medium SAND, some fine to medium Gravel, trace Silt.			N.D.	5
					29					
					27					
					20					
						Bottom of borehole at 17'				

REMARKS:
1. Field testing results represent organic vapor levels (referenced to a benzene standard) measured in the headspace of sealed soil sample jars using an H-Nu Model PI-101 photoionization analyzer. Results recorded in parts per million (ppm). ND indicates none detected.
2. Refusal on spoon - drill ahead to get through.
3. Drilled ahead before driving casing due to cobbles and boulders.
4. Low recovery due to cobble in front of spoon.
5. PVC stick up 2.65, water table at ground surface.

NOTES: 1) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. 2) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THE BORINGS LOGS. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO FACTORS NOT ACCOUNTED FOR AT THE TIME MEASUREMENTS WERE MADE.

GOLDBERG-ZOINO & ASSOCIATES, INC. GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT General Electric Wilmington, MA	REPORT OF BORING NUMBER [illegible] SHEET [illegible] OF [illegible] DATE 11/12/86 FILE [illegible]

BORING CO. GZA Drilling, Inc.
FOREMAN Richie Jones
GZA ENGINEER C. McDermott/mdk

BORING LOCATION See Site Location Plan
GROUND ELEV.
DATE STARTED 11/12/86 DATE ENDED 11/13/86

CASING
SIZE: HW(4")
HAMMER: 300 lb
FALL: 24"

SAMPLER
TYPE: Split Spoon OTHER:
HAMMER: 140 lb
FALL: 30"

GROUNDWATER READINGS

DATE	DEPTH	CASING AT	STABILIZATION TIME
11/1[illegible]	5.[illegible]	TO [illegible]	4 hours

DEPTH	CAS. BL./FT.	SAMPLE NO.	PEN./REC.	DEPTH	BLOWS/6"	SAMPLE DESCRIPTION	STRATA CHG. and GEN. DESC.	EQUIPMENT INSTALLED	FIELD TESTING	RMKS.
		S-1	24/8	0-2	4	Dense, brown SILT, some fine to coarse Sand, little Gravel, (FILL).		Protective Casing Cement Seal 0-2'	0.2	1. 2.
					12					
					31					
					2'		FILL	Bentonite Seal 2-4'		
5								Fine Filter Sand 4-18'		3.
		S-2	24/0	5-7	22	No Recovery.	5.5'			4.
					23		FINE SAND			
					28					
					33					
	18	S-3	24/15	7-9	28	Dense, light brown fine SAND, little Silt.		2" PVC Wellscreen 5-15'	ND	5.
					16					
	48				21					
					25		9'			
	78						CLAYEY SILT			
10	43	S-4	24/6	10-12	19	Very dense, gray Clayey SILT, little fine to coarse Sand, trace Gravel.			ND	
					34					
	84				25					
					23					
	[illegible]									
	55						11.5'			
							FINE SAND			
	87									
15	58	S-5	24/1	15-17	31	Dense, gray fine SAND, little Silt.		2" Solid PVC 15-17'	ND	
					31					
	57				17					
					23		17'			
	71						FINE TO COARSE SAND			
		S-6	24/6	18-20	18	Medium dense, brown, fine to coarse SAND, little Gravel, little Silt, with one Cobble.				
					12					
					13					
					13					
20										

REMARKS:
1. Field testing results represent organic vapor levels (referenced to a benzene standard) measured in the head space of sealed soil sample jars using an H-Nu Model PI-101 photoionizaiton analyzer. Results recorded in parts per million (ppm). ND indicates none detected.
2. Started boring with 3 3/4" Hollow Stem Augers.
3. Five feet of boulder and gravel fill.
4. Piece of gravel in top of split spoon sample.
5. Split spoon sample was saturated.
6. Augered to 7', and switched to HW casing.

NOTES: 1) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. 2) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THE BORINGS LOGS. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO FACTORS NOT ACCOUNTED FOR AT THE TIME MEASUREMENTS WERE MADE.

GOLDBERG-ZOINO & ASSOCIATES, INC. GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT: General Electric, Wilmington, MA	REPORT OF BORING NUMBER [illegible] SHEET 1 OF 1 DATE 11/12/86 FILE A-7650/A-7201

BORING CO. GZA Drilling, Inc.
FOREMAN Richie Jones
GZA ENGINEER [illegible] McDermott/mdk

BORING LOCATION See Site Location Plan
GROUND ELEV.
DATE STARTED 11/12/86 DATE ENDED 11/12/86

CASING		SAMPLER	
SIZE:	HW [illegible]	TYPE:	Split Spoon
HAMMER:	300 lb.	HAMMER:	140 lb.
FALL:	24"	FALL:	30"

OTHER:

GROUNDWATER READINGS			
DATE	DEPTH	CASING AT	STABILIZATION TIME
11/13	3.1	TO PVC	

DEPTH	CAS. BL. /FT.	SAMPLE NO.	PEN./REC.	SAMPLE DEPTH	BLOWS/6"	SAMPLE DESCRIPTION	STRATA CHG and GEN. DESC.	EQUIPMENT INSTALLED	FIELD TESTING	RMKS.
						6" of Asphalt Auger cuttings	ASPHALT	Roadbox Cement Seal 0-1.5'		1.
		S-1	24/0	.5-2.5	6	Medium dense, brown, fine to coarse SAND, some Gravel, little Silt, (FILL).	FILL		ND	2.
					7					
					[illegible]			Bentonite Seal 1.5-3'		
					9					
							4'	Fine Filter Sand 3-16'		
5	38	S-2	24/16	5-7	9	Medium dense, brown, fine SAND, some Silt.			ND	3. 4.
					15		SILTY FINE SAND			
	35				14					
					16					
	39							2" PVC Wellscreen 3-13'		
							8'			
	37						SILT			
	30									
10	31	S-3	24/14	10-12	5	Medium dense, brown SILT, little(+) fine Sand, with two 2" lenses of fine SAND.			ND	
					8					
	40				9					
					14					
	55									
	55							2" Solid PVC 13-15'		
	45									
15										
		S-4	24/8	16-18	10	Very dense, brown; TOP 3": SILT, some fine Sand, trace coarse Sand. BOTTOM 5": Fine to coarse SAND, some(-) Gravel, little Silt, with three Cobbles.				
		S-4A			15		17' FINE TO COARSE SAND			
					36					
					25					
						Bottom of Boring at 18'				
20										

REMARKS:

1. Field testing results represent total organic vapor levels (referenced to a benzene standard) measured in the head space of sealed soil sample jars using an H-Nu Model PI-101 photoionization analyzer. results recorded in parts per million (ppm). ND indicates none detected.
2. Started boring with 3 3/4" Hollow Stem Augers.
3. Split spoon sample was saturated.
4. Augered to 5', and switched to HW Casing.

NOTES: 1) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. 2) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THE BORINGS LOGS. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO FACTORS NOT ACCOUNTED FOR AT THE TIME MEASUREMENTS WERE MADE.

GOLDBERG-ZOINO & ASSOCIATES, INC.
GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS

PROJECT: General Electric, Wilmington, MA

REPORT OF BORING NUMBER GZA-[illegible]
SHEET 1 OF 1
DATE 11/10/86
FILE [illegible]

BORING CO. GZA Drilling, Inc.
FOREMAN Richie Jones
GZA ENGINEER C. McDermott/mdk
BORING LOCATION See Site Location Plan
GROUND ELEV.
DATE STARTED 11/10/86 DATE ENDED 11/10/86

CASING
SIZE: HW (4")
HAMMER: 300 lb.
FALL: 24

SAMPLER
TYPE: Split Spoon
HAMMER: 140 lb.
FALL: 30"
OTHER:

GROUNDWATER READINGS

DATE	DEPTH	CASING AT	STABILIZATION TIME
11/10	4.2	TO PVC	2 hours
11/13	4.1	TO PVC	2 days

DEPTH	CAS. BL. /FT.	SAMPLE NO.	PEN./REC.	DEPTH	BLOWS/6"	SAMPLE DESCRIPTION	STRATA CHG. and GEN. DESC.	EQUIPMENT INSTALLED	FIELD TESTING	RMKS.
		S-1	24/4	0-2	3	Medium dense, brown, fine to medium SAND, little(+) Silt, trace(+) coarse Sand, (Grass and Roots).		Protective Casing Cement Seal 0-2'		1.
					3				9 ppm	2.
					7		FILL			
					10					
							3'	Bentonite Seal 2.5-5'		
							ORGANIC PEAT			
5	9	S-2	24/24	5-7	1	Medium dense, TOP 6": Black Organic PEAT. BOTTOM 18": Dark brown, fine to medium SAND, little(+) Silt.	5.5'	Fine Filter Sand 5-20.5'		3. 4.
		S-2A			5		FINE TO COARSE SAND		ND	
	39				15				ND	
					23					
	51									
	47							2" PVC Wellscreen 8-18'		
							9'			
	39									
10	29	S-3	24/10	10-12	9	Medium dense, gray fine SAND, some(-) Silt.	SILTY FINE SAND		0.1/ND	
					10					
	31				10					
					10					
	35									
	28									
	29									
15	26	S-4	24/14	15-17	6	Medium dense, gray fine SAND, little(+) Silt.			0.1/ND	
					6					
	22				6					
					9					
	38									
	41							2" PVC Solid 18-20'		
	39									
20		S-5	24/24	20-22	3	Medium dense, TOP 18": Brown fine SAND, little Silt, trace medium Sand. BOTTOM 6": Brown SILT, little fine Sand.			ND	
		S-5A			7				ND	
					9		21.5'			
					13		SILT			
						Bottom of Boring at 22'				

REMARKS:

1. Field testing results represent total organic vapor levels (referenced to a benzene standard) measured in the head space of sealed soil sample jars using an H-Nu Model PI-101 photoionization analyzer. Results recorded in parts per million (ppm). ND indicates none detected.
2. Started boring with 3 3/4" Hollow Stem Augers.
3. Split spoon sample was saturated.
4. Augered to 5', and switched to HW Casing.

NOTES: 1) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. 2) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THE BORINGS LOGS. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO FACTORS NOT ACCOUNTED FOR AT THE TIME MEASUREMENTS WERE MADE.

GOLDBERG-ZOINO & ASSOCIATES, INC.
GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS

PROJECT: General Electric, Wilmington, MA

REPORT OF BORING NUMBER GZA-7A
SHEET 1 OF 1
DATE 11/13/86
FILE 5-7650/5-7701

BORING CO. GZA Drilling, Inc.
FOREMAN Richie Jones
GZA ENGINEER C. McDermott/mdk

BORING LOCATION See Site Location Plan
GROUND ELEV.
DATE STARTED 11/13/86 DATE ENDED 11/13/86

CASING
SIZE Hollow Stem Augers (3 3/4")
HAMMER: - lb
FALL: -

SAMPLER
TYPE Split Spoon
HAMMER 140 lb
FALL 30"
OTHER:

GROUNDWATER READINGS

DATE	DEPTH	CASING AT	STABILIZATION TIME

DEPTH	CAS. BL./FT.	SAMPLE NO.	PEN./REC.	DEPTH	BLOWS/6"	SAMPLE DESCRIPTION	STRATA CHG and GEN. DESC.	EQUIPMENT INSTALLED	FIELD TESTING	RMKS.
										1. 2.
		S-1	14-10	1.5-2.5'	27 60 70/2	Very dense, brown, fine to coarse SAND, little(-) Silt, trace Gravel.			0.8	
							3.5'			3.
						Auger refusal at 3.5'				
5										

REMARKS:

1. Field testing results represent total organic vapor levels (referenced to a benzene standard, measured in the head space of sealed soil sample jars using an H-Nu Model PI-101 photoionization analyzer. Results recorded in parts per million (ppm). ND indicates none detected.
2. Augered through boulders from .5 to 3 feet.
3. Auger refusal at 3.5', moved rig back 3'.

NOTES: 1) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. 2) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THE BORINGS LOGS. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO FACTORS NOT ACCOUNTED FOR AT THE TIME MEASUREMENTS WERE MADE.

GOLDBERG-ZOINO & ASSOCIATES, INC.
GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS

PROJECT: General Electric, Wilmington, MA

REPORT OF BORING NUMBER GZA-75 [illegible]
SHEET 1 OF 1
DATE 11/13/86
FILE [illegible]

BORING CO. [illegible] Drilling, Inc.
FOREMAN [illegible] Jones
GZA ENGINEER C. McDermott/mdk

BORING LOCATION See Site Location Plan
GROUND ELEV.
DATE STARTED 11/13/86
DATE ENDED 11/13/86

CASING
SIZE: Hollow Stem Auger (3 3/4")
HAMMER: lb
FALL:

SAMPLER
TYPE: Split Spoon
HAMMER: 140 lb
FALL: 30"
OTHER:

GROUNDWATER READINGS

DATE	DEPTH	CASING AT	STABILIZATION TIME

DEPTH	CAS. BL. /FT.	SAMPLE NO.	PEN./REC.	DEPTH	BLOWS/6"	SAMPLE DESCRIPTION	STRATA CHG. & GEN. DESC.	EQUIPMENT INSTALLED	FIELD TESTING	RMKS.
						No Split Spoon sample collected.	3'			
						Auger Refusal at 3'				
5										

REMARKS:

NOTES: 1) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. 2) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THE BORINGS LOGS. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO FACTORS NOT ACCOUNTED FOR AT THE TIME MEASUREMENTS WERE MADE.

GOLDBERG-ZOINO & ASSOCIATES, INC.
GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS

PROJECT: General Electric [illegible], Wilmington, MA

REPORT OF BORING NUMBER [illegible]
SHEET 1 OF [illegible]
DATE [illegible]
FILE [illegible]

BORING CO. GZA Drilling, Inc.
FOREMAN Richie Jones
GZA ENGINEER C. McDermott/mdk

BORING LOCATION See Site Location Plan
GROUND ELEV.
DATE STARTED 11/13/86 DATE ENDED 11/13/86

CASING
SIZE: Hollow Stem Auger (3 3/4")
HAMMER: lb.
FALL:

SAMPLER
TYPE: Split Spoon OTHER:
HAMMER: 140 lb.
FALL: 30"

GROUNDWATER READINGS

DATE	DEPTH	CASING AT	STABILIZATION TIME

DEPTH	CAS. BL. /FT.	SAMPLE NO.	PEN./REC.	DEPTH	BLOWS/6"	SAMPLE DESCRIPTION	STRATA CHG. and GEN. DESC.	EQUIPMENT INSTALLED	FIELD TESTING	RMKS.
						No Split Spoon Sample Collected.	2'			
						Auger Refusal at 2'				
5										

REMARKS:

NOTES: 1) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. 2) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THE BORINGS LOGS. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO FACTORS NOT ACCOUNTED FOR AT THE TIME MEASUREMENTS WERE MADE.

GOLDBERG-ZOINO & ASSOCIATES, INC.
GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS

PROJECT: General Electric, Wilmington, MA

REPORT OF BORING NUMBER [illegible]
SHEET 1 OF 1
DATE 11/13/86
FILE A-7650/A-7201

BORING CO. GZA Drilling, Inc.
FOREMAN Richie Jones
GZA ENGINEER C. McDermott/mdk
BORING LOCATION See Site Location Plan
GROUND ELEV.
DATE STARTED 11/13/86 DATE ENDED 11/13/86

CASING
SIZE Hollow stem Auger (3 3/4")
HAMMER: lb
FALL:

SAMPLER
TYPE: Split Spoon
HAMMER: 140 lb.
FALL: 30"
OTHER:

GROUNDWATER READINGS

DATE	DEPTH	CASING AT	STABILIZATION TIME

DEPTH	CAS. BL. /FT.	SAMPLE NO.	PEN./REC.	DEPTH	BLOWS/6"	SAMPLE DESCRIPTION	STRATA CHG and GEN. DESC.	EQUIPMENT INSTALLED	FIELD TESTING	RMKS.
						No Split Spoon Sample Collected.	1.5'			
						Auger Refusal at 1.5'				
5										

REMARKS:

NOTES: 1) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. 2) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THE BORINGS LOGS. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO FACTORS NOT ACCOUNTED FOR AT THE TIME MEASUREMENTS WERE MADE.

GOLDBERG-ZOINO & ASSOCIATES, INC.
GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS

PROJECT: General Electric
Wilmington, MA

REPORT OF BORING NUMBER [illegible]
SHEET 1 OF 1
DATE [illegible] FILE [illegible]

BORING CO. GZA Drilling, Inc.
FOREMAN Richie Jones
GZA ENGINEER C. McDermott/mdk

BORING LOCATION See Site Location Plan
GROUND ELEV.
DATE STARTED 11/13/86 DATE ENDED 11/13/86

CASING
SIZE: Hollow stem Auger (3 3/4")
HAMMER: lb
FALL:

SAMPLER
TYPE: Split Spoon OTHER:
HAMMER: 140 lb
FALL: 30"

GROUNDWATER READINGS

DATE	DEPTH	CASING AT	STABILIZATION TIME

DEPTH	CAS. BL./FT.	SAMPLE NO.	PEN./REC.	DEPTH	BLOWS/6"	SAMPLE DESCRIPTION	STRATA CHG. and GEN. DESC.	EQUIPMENT INSTALLED	FIELD TESTING	RMKS.
						No Split Spoon Sample Collected.	2'			
						Auger Refusal at 2'				
5										

REMARKS:

NOTES: 1) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. 2) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THE BORINGS LOGS. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO FACTORS NOT ACCOUNTED FOR AT THE TIME MEASUREMENTS WERE MADE.

GOLDBERG-ZOINO & ASSOCIATES, INC.
GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS

PROJECT: General Electric, Wilmington, MA

REPORT OF BORING NUMBER [illegible]
SHEET 1 OF [illegible]
DATE 11/13/96
FILE [illegible]

BORING CO. GZA Drilling, Inc.
FOREMAN Richie Jones
GZA ENGINEER C. McDermott/mdk

BORING LOCATION See Site Location Plan
GROUND ELEV.
DATE STARTED 11/13/96 DATE ENDED 11/13/86

CASING
SIZE: Hollow Stem Auger (3 1/4")
HAMMER: lb.
FALL:

SAMPLER
TYPE: Split Spoon
HAMMER: 140 lb.
FALL: 30"
OTHER:

·GROUNDWATER READINGS·			
DATE	DEPTH	CASING AT	STABILIZATION TIME

DEPTH	CAS. BL. /FT.	SAMPLE NO.	PEN./REC.	DEPTH	BLOWS/6"	SAMPLE DESCRIPTION	STRATA CHG and GEN. DESC.	EQUIPMENT INSTALLED	FIELD TESTING	RMKS.
						No Split Spoon Sample Collected.	2.5'			
						Auger Refusal at 2.5'				
5										

REMARKS:

NOTES: 1) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. 2) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THE BORINGS LOGS. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO FACTORS NOT ACCOUNTED FOR AT THE TIME MEASUREMENTS WERE MADE.

GOLDBERG-ZOINO & ASSOCIATES, INC.
GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS

PROJECT: General Electric, Wilmington, MA

REPORT OF BORING NUMBER GZA-[illegible]
SHEET 1 OF 2
DATE 11/4/86 FILE [illegible]

BORING CO. GZA Drilling, Inc.
FOREMAN Richie Jones
GZA ENGINEER R. Chase/mdk

BORING LOCATION See Site Location Plan
GROUND ELEV.
DATE STARTED 11/4/86 DATE ENDED 11/5/86

CASING		SAMPLER	
SIZE:	NW (3")	TYPE	Split Spoon
HAMMER:	300 lb	HAMMER:	140 lb
FALL:	24"	FALL:	30"

OTHER:

GROUNDWATER READINGS

DATE	DEPTH	CASING AT	STABILIZATION TIME
11/5	8'11"	35'	OVERNIGHT
11/10	5.9	TOPVC	
11/13	5.7	TOPVC	

DEPTH	CAS. BL./FT.	SAMPLE NO.	PEN./REC.	SAMPLE DEPTH	BLOWS/6"	SAMPLE DESCRIPTION	STRATA CHG and GEN. DESC.	EQUIPMENT INSTALLED	FIELD TESTING	RMKS.
						6" of Asphalt.	ASPHALT	Roadbox Cement Seal 0-2'		1.
		S-1	24/19	.5-2.5	5	Very dense, brown, fine to coarse SAND, little Gravel, little Silt, (FILL).	FILL		ND	2.
		S-1A			25					
					50					
					70					
								Bentonite Seal 2.5-4.5'		
							4' FINE SAND	Fine Filter Sand 4.5-32'		
5		S-2	24/16	5-7	51	TOP 4": Very dense, brown, fine to medium SAND, trace coarse Sand, with one Cobble, trace Silt, trace Organic (Wood).			ND	3.
		S-2A			29	BOTTOM 12": Very dense, gray-brown, fine SAND, little Silt.				
					40				ND	
					45					
										4.
10	27	S-3	24/24	10-12	17	TOP 8": Dense, brown fine SAND, little Silt.	10.5'		ND	5.
	-	S-3A			25	MIDDLE 8" Dense, brown, fine to coarse SAND, trace Silt, trace(-) Gravel.	FINE TO COARSE SAND	1.5" PVC Wellscreen 6-31'	ND	6.
	27	S-3B			21					
					47	BOTTOM 10": Dense, reddish-brown, fine to medium SAND, little Silt.			ND	
	23									
	30									
	31									
15	21	S-4	24/6"	15-17	17	Dense, gray-brown, fine to coarse SAND, some Gravel, trace Silt.			ND	
					15					
	25				19					
					14					
	23									
	23									
							19' FINE SAND			
	15									
20	15	S-5	24/13	20-22	7	Medium dense, gray fine SAND, some Silt.			ND	
					7					
	11				6					
					6					
	13									
							23'			
	21									
	33									
25										

REMARKS:

1. Field testing results represent total organic vapor levels (referenced to a benzene standard measured in the head space of sealed soil sample jars using an H-Nu Model PI-101 photoionizatoon analyzer. Results recorded in parts per million (ppm). ND indicates none detected.
2. Started boring with 3 1/4" Hollow Stem Augers.
3. Split spoon sample was moist.
4. Augered soil was saturated at approximately 8'.
5. Split spoon sample was saturated.
6. Placed casing inside Augers at 10', and spun Augers out of the borehole.

NOTES: 1) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. 2) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THE BORINGS LOGS. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO FACTORS NOT ACCOUNTED FOR AT THE TIME MEASUREMENTS WERE MADE.

GOLDBERG-ZOINO & ASSOCIATES, INC.
GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS

PROJECT: General Electric, Wilmington, MA

REPORT OF BORING NUMBER GZA-3
SHEET 2 OF 2
DATE 11/4/86
FILE A-7650/A-7201

BORING CO. GZA Drilling, Inc.
FOREMAN Richie Jones
GZA ENGINEER R. Chase/mdk

BORING LOCATION See Site Location Plan
GROUND ELEV.
DATE STARTED 11/4/86 DATE ENDED 11/5/86

CASING
SIZE: NW (3")
HAMMER: 300 lb
FALL: 24"

SAMPLER
TYPE: Split Spoon
HAMMER: 140 lb
FALL: 20"
OTHER:

GROUNDWATER READINGS

DATE	DEPTH	CASING AT	STABILIZATION TIME

DEPTH	CAS. BL./FT.	SAMPLE NO.	PEN./REC.	DEPTH	BLOWS/6"	SAMPLE DESCRIPTION	STRATA CHG. AND GEN. DESC.	EQUIPMENT INSTALLED	FIELD TESTING	RMKS.
	27	S-6	24/4"	25-27	41	Very dense, brown-gray, fine to coarse SAND, some Gravel, trace Silt.	FINE TO COARSE SAND, SOME GRAVEL		ND	
					31					
	34				39					
					15					
	54									
	39									
	49									
30	37	S-7	24/6	30-32	19	Dense, brown, fine to coarse SAND some GRAVEL, trace Silt, with one Cobble.			ND	
					18					
	60				26					
					35					
	100/6						32.5'			7.
						Roller bit Refusal at 32.5'				
35										

REMARKS:

7. Casing refusal and roller bit refusal at 32.5'.

NOTES: 1) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. 2) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THE BORINGS LOGS. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO FACTORS NOT ACCOUNTED FOR AT THE TIME MEASUREMENTS WERE MADE.

GOLDBERG-ZOINO & ASSOCIATES, INC. GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT General Electric Wilmington, MA	REPORT OF BORING NUMBER [illegible] SHEET 1 OF [illegible] DATE 11/5/86 FILE [illegible]

BORING CO. GZA Drilling, Inc.
FOREMAN Richie Jones
GZA ENGINEER R. Chase /mdk

BORING LOCATION See Site Location Plan
GROUND ELEV.
DATE STARTED 11/5/86 DATE ENDED 11/7/86

CASING		SAMPLER	
SIZE:	NW (3")	TYPE:	Split Spoon
HAMMER:	300 lb.	HAMMER:	140 lb.
FALL:	24"	FALL:	30"

OTHER:

GROUNDWATER READINGS

DATE	DEPTH	CASING AT	STABILIZATION TIME
11/10	3.93	TO PVC	
11/13	4.78	TO PVC	

DEPTH	CAS. BL. /FT.	SAMPLE NO.	PEN./REC.	DEPTH	BLOWS/6"	SAMPLE DESCRIPTION	STRATA CHG. and GEN. DESC.	EQUIPMENT INSTALLED	FIELD TESTING	RMKS.
		S-1	24/14	0-2	4	Dense, brown, fine to coarse SAND, little Gravel, trace Silt, (FILL).	FILL	Roadbox; Cement Seal 0-2'	ND	1. 2. 3. 4.
					12					
					21					
					15					
5	72	S-2	24/6"	5-7	30	Medium dense, gray, fine to coarse SAND, little Gravel, trace Silt.			ND	5. 6.
					11					
	14				2					
					2					
	5						8'			
	5						ORGANIC PEAT			
	4									
10	8	S-3	24/19	10-12	1	Very loose, dark brown ORGANIC PEAT.			ND	
					0					
	6				1					
					1			Bentonite Seal 11.5-13.5'		
	7						13'			
	7						FINE TO COARSE SAND	Fine Sand Filter 13.5-20'		
	8									
15	38	S-4	24/10	15-17	146	Very dense, gray, fine to coarse SAND, little(+) Gravel, trace Silt		1.5" PVC Wellscreen 14-19'		
					73					
	48				100/3"					
	202									
	153									
	46/5						20'			
20						Roller bit Refusal at 20'				

REMARKS:

1. Field testing results represent total organic vapor levels (referenced to a benzene standard) measured in the head space of sealed soil sample jars using an H-Nu Model PI-101 photoionization analyzer. Results recorded in parts per million (ppm). ND indicates none detected.
2. Split spoon sample was moist.
3. Started boring with 3 3/4" Hollow Stem Auger.
4. Auger refusal at 3'. Moved rig ahead 4'.
5. Split spoon sample was saturated.
6. Placed casing inside Augers at 5', and spun Augers out of the borehole.

NOTES: 1) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. 2) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THE BORINGS LOGS. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO FACTORS NOT ACCOUNTED FOR AT THE TIME MEASUREMENTS WERE MADE.

GOLDBERG-ZOINO & ASSOCIATES, INC. GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT: General Electric, Wilmington, MA	REPORT OF BORING NUMBER GZA-10
		SHEET 1 OF 2
		DATE 11/7/86 FILE A-7-5074-7251

BORING CO. GZA Drilling, Inc.
FOREMAN Richie Jones
GZA ENGINEER C. McDermott/mdk
BORING LOCATION See Site Location Plan
GROUND ELEV.
DATE STARTED 11/7/86 DATE ENDED 11/10/86

CASING
SIZE: NW (3")
HAMMER: 300 lb
FALL: 24

SAMPLER
TYPE: Split Spoon OTHER:
HAMMER: 140 lb
FALL: 30"

GROUNDWATER READINGS

DATE	DEPTH	CASING AT	STABILIZATION TIME
11/12	4.2	TO PVC	6 hours
11/13	4.0	TO PVC	

DEPTH	CAS. BL. /FT.	NO.	PEN./REC.	DEPTH	BLOWS/6"	SAMPLE DESCRIPTION	STRATA CHG. and GEN. DESC.	EQUIPMENT INSTALLED	FIELD TESTING	RMKS.
		S-1	24/9	0-2	3	Medium dense, brown, fine to coarse SAND, little(+) Silt, little(-) Gravel.	FILL	Protective Casing Cement Seal 0-2'	ND	1.
					5					2.
					7					3.
					15					
							4'			4.
							ORGANIC PEAT			
5		S-2	24/24	5-7	1	Very loose, dark brown Organic PEAT.			ND	5.
					0					
					1			Bentonite Seal 6-8.5'		
					1					
							9'			
	39						FINE TO COARSE SAND			6.
10	30	S-3	24/9	10-12	24	Dense, gray, fine to coarse SAND, little(+) Gravel, little Silt.			ND	
					23					
	34				13			Fine Filter Sand 11-39'		
					14					
	40									
	60									
	74									
15	75	S-4	24/9	15-17	17	Dense, brown, fine to coarse SAND, some(-) Gravel, little Silt.		1.5" PVC Wellscreen 13'38'	ND	
					14					
	47				22					
					15					
	74									
	103									
	96									
20	16	S-5	24/10	20-22	51	Very dense, brown, fine to coarse SAND, some(+) Gravel, little Silt.			ND	
					52					
	95				85					
					63					
	190									
	101									
	92									

REMARKS:

1. Field testing results results represent total organic vapor levels (referenced to a benzene standard) measured in the head space of selaed soil sample jars using an H-Nu Model PI-101 photoionization analyzer. Results recordedin parts per million (ppm). ND indicates none detected.
2. Started boring with 3 3/4" Hollow Stem Auger.
3. Moved rig foward 4', due to Auger refusal at 3'.
4. Blasted rock fill from 2' to 4'.
5. Split spoon sample was saturated.
6. Placed casing inside Augers at 5', pushed casing to 9', and spun Augers out of the borehole.

NOTES: 1) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. 2) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THE BORINGS LOGS. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO FACTORS NOT ACCOUNTED FOR AT THE TIME MEASUREMENTS WERE MADE.

GOLDBERG-ZOINO & ASSOCIATES, INC.
GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS

PROJECT: General Electric, Wilmington, MA

REPORT OF BORING NUMBER [illegible]
SHEET 2 OF 2
DATE 11/7/86 FILE A-7650/A-7291

BORING CO. GZA Drilling, Inc.
FOREMAN Richie Jones
GZA ENGINEER C. McDermott/mdK

BORING LOCATION See Site Location Plan
GROUND ELEV.
DATE STARTED 11/7/86 DATE ENDED 11/10/86

CASING
SIZE: HW (3")
HAMMER: 300 lb
FALL: 24"

SAMPLER
TYPE: Split Spoon OTHER:
HAMMER: 140 lb
FALL: 30"

GROUNDWATER READINGS

DATE	DEPTH	CASING AT	STABILIZATION TIME

DEPTH	CAS. BL./FT.	SAMPLE NO.	PEN./REC.	SAMPLE DEPTH	BLOWS/6"	SAMPLE DESCRIPTION	STRATA CHG and GEN. DESC.	EQUIPMENT INSTALLED	FIELD TESTING	RMKS.
	58	S-6	24/7	25-27	51	Very dense, brown, fine to coarse SAND, some Gravel, little Silt.			ND	
					27					
	71				24					
					18		FINE TO COARSE SAND			
	51									
	35									
	35									
30	35	S-7	24/12	30-32	8	Dense, brown, fine to coarse SAND, little(-) Gravel, little Silt.			ND	
					15					
	49				15					
					22					
	52									
	34									
	70									
35	50	S-8	24/9	35-37	51	Very dense, brown, fine to coarse SAND, little(+) Silt, trace(+) Gravel.			ND	
					45					
	131				47					
					45					
	200									
	170									7.
		S-9	0/0	39-39	100/0	Split Spoon Refusal at 39'				
40										

REMARKS:

7. Roller bit refusal and split spoon refusal at 39'.

NOTES: 1) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. 2) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THE BORINGS LOGS. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO FACTORS NOT ACCOUNTED FOR AT THE TIME MEASUREMENTS WERE MADE.

GOLDBERG-ZOINO & ASSOCIATES, INC. GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT: General Electric, Wilmington, MA	REPORT OF BORING NUMBER [illegible] SHEET 1 OF 2 DATE 11/10/86 FILE A-7650/A-7201

BORING CO. GZA Drilling, Inc.
FOREMAN Richie Jones
GZA ENGINEER C. McDermott/ R. Chase/mdk

BORING LOCATION See Site Location Plan
GROUND ELEV.
DATE STARTED 11/10/86 DATE ENDED 11/11/86

CASING
SIZE: NW (3")
HAMMER: 300 lb.
FALL: 30

SAMPLER
TYPE: Split Spoon OTHER:
HAMMER: 140 lb.
FALL: 24"

GROUNDWATER READINGS

DATE	DEPTH	CASING AT	STABILIZATION TIME
11/13	3.10	TO PVC	

DEPTH	CAS. BL. /FT.	SAMPLE NO.	PEN./REC.	DEPTH	BLOWS/6"	SAMPLE DESCRIPTION	STRATA CHG. and GEN. DESC.	EQUIPMENT INSTALLED	FIELD TESTING	RMKS.
		S-1	24/10	0-2	3	Loose, brown;		Protective		1.
		S-1A			3	TOP 9": Fine to medium SAND, little	FILL	Casing	0.1	2.
					2	(+) Silt.	1.5'	Cement		
					2	BOTTOM 1": Organic PEAT.	ORGANIC PEAT	Seal 0-2'	0.1	
								Bentonite Seal 2.5-5'		
5	1	S-2	24/10	5-7	1	Very loose, dark brown;		Fine		3. 4.
		S-2A			0	TOP 6": Organic PEAT.	5'	Filter	ND	
	1				1	BOTTOM 4": Fine SAND, some Silt,	FINE TO MEDIUM SAND	Sand	ND	
					3	(Roots).		5-42'		
	6									
	18									
	30									
10	11	S-3	24/15	10-12	6	TOP 1": Medium dense, gray fine	10.5'		ND	
		S-3A			5	SAND, trace Silt.		1.5" PVC		
	12				6	BOTTOM 14": Medium dense, gray		Wellscreen	ND	
					6	SILT, some fine Sand.	SILT	6-41'		
	15									
	12									
	17									
15	1?	S-4	24/17	15-17	3	Loose, gray SILT, some(+) fine			ND	5.
					4	Sand.				
	13				5					
					3					
	14									
	1?									
	15									
20	21	S-5	24/8	20-22	4	Loose, gray Clayey SILT, little(+)			ND	6.
					4	fine Sand.				
	18				4					
					4					
	18									
	19									
	19									

REMARKS:

1. Field testing results represent total organic vapor levels (referenced to a benzene standard) measured in the head space of sealed soil sample jars using an H-Nu Model PI-101 photoionization analyzer. Results recorded in parts per million (ppm). ND indicates none detected.
2. Started boring with 3 3/4" Hollow Stem Augers.
3. Split spoon sample was saturated.
4. Placed casing inside Augers at 5', and spun casing out of the borehole.
5. Sample S-4 contained 3 clay layers less than 1/8" each in lower 6" of Sample.
6. Sample S-5 contained 2 clay layers less than 1/8" each in lower 6" of Sample.

NOTES: 1) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. 2) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THE BORINGS LOGS. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO FACTORS NOT ACCOUNTED FOR AT THE TIME MEASUREMENTS WERE MADE.

GOLDBERG-ZOINO & ASSOCIATES, INC. GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT General Electric Wilmington, MA	REPORT OF BORING NUMBER [illegible] SHEET 2 OF 2 DATE [illegible] FILE [illegible]

BORING CO. GZA Drilling, Inc.
FOREMAN Richie Jones
GZA ENGINEER Rick Chase/mdk

BORING LOCATION See Site Location Plan
GROUND ELEV.
DATE STARTED 11/10/86 DATE ENDED 11/11/86

CASING
SIZE: NW(3")
HAMMER: 300 lb.
FALL: 24"

SAMPLER
TYPE: Split Spoon OTHER:
HAMMER: 140 lb.
FALL: 30"

GROUNDWATER READINGS

DATE	DEPTH	CASING AT	STABILIZATION TIME

DEPTH	CAS. BL. /FT.	SAMPLE NO.	PEN./REC.	DEPTH	BLOWS/6"	SAMPLE DESCRIPTION	STRATA CHG and GEN. DESC.	EQUIPMENT INSTALLED	FIELD TESTING	RMKS.
	34	S-6	24/19	25-27	2	Loose, gray fine SAND and SILT, trace Clayey Silt.			ND	7.
					4					
	30				3					
					4					
	32									
	36									
	39									
30										
	38	S-7	24/24	30-32	1	TOP 2": Loose gray fine SAND, trace Silt.	30.5'		ND	8.
		S-7A			2	MIDDLE 17": Loose, gray SILT & CLAY, trace fine Sand.	SILT & CLAY		ND	
	39	S-7B			7	BOTTOM 5": Loose, brown, fine to medium SAND, little Silt.			ND	
					11					
	39									
	53						FINE TO COARSE SAND			
	56									
35										
	65	S-8	24/22	35-37	8	Medium dense, brown, fine to coarse SAND, trace(+) Gravel, trace Silt.			ND	
					12					
	73				18					
					23					
	54						37.5'			
							GRAVEL			
	55									
	53						GLACIAL TILL			
40										
	40	S-9	24/6	40-42	8	Very dense, brown, fine to coarse SAND, some Silt, little Gravel, (GLACIAL TILL).				
					30					
	60				51					
					92		42'			5.
						Roller bit Refusal at 42'				

REMARKS:
7. Sample S-6 contained 5 clay layers approximately ½" thick on the top 10".
8. Sample S-7 contained 5 clay layers approximately ½" thick in the top 10".

NOTES: 1) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. 2) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THE BORINGS LOGS. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO FACTORS NOT ACCOUNTED FOR AT THE TIME MEASUREMENTS WERE MADE.

GOLDBERG-ZOINO & ASSOCIATES, INC. GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT: General Electric, Wilmington, MA	REPORT OF BORING NUMBER [illegible] SHEET 1 OF 2 DATE 11/3/86 FILE [illegible]

BORING CO. GZA Drilling, Inc.
FOREMAN Richie Jones
GZA ENGINEER C. McDermott/mdk
BORING LOCATION See Site Location Plan
GROUND ELEV.
DATE STARTED 11/3/86 DATE ENDED 11/3/86

CASING
SIZE: NW (3")
HAMMER: 300 lb.
FALL: 24"

SAMPLER
TYPE: Split Spoon OTHER:
HAMMER: 140 lb
FALL: 30"

GROUNDWATER READINGS

DATE	DEPTH	CASING AT	STABILIZATION TIME
11/3	11.08	To PVC	1 hour
11/4	11.06	To PVC	1 day
11/13	10.82	To PVC	10 days

DEPTH	CAS. BL. /FT.	SAMPLE NO.	PEN./REC.	DEPTH	BLOWS/6"	SAMPLE DESCRIPTION	STRATA CHG and GEN. DESC.	EQUIPMENT INSTALLED	FIELD TESTING	RMKS.
		S-1	24/15	0-2	8	Dense:		Roadbox	ND	1.
		S-1A			13	TOP 5": Dark brown, fine to medium SAND, some(+) Silt, trace(-) Gravel (Roots).		Cement 0-2'		
					20		FILL			
					23	BOTTOM 7": Fine to coarse SAND, little Silt, trace Gravel, (FILL).			ND	
							4'			
							FINE SAND			
5		S-2	24/14	5-7	4	Medium dense;	5.5'			
		S-2A			5	TOP 11": Light brown fine SAND, trace Silt.			ND	
					14					
					26	BOTTOM 3": Brown, fine to coarse SAND, trace(+) Gravel, trace Silt.	SILTY FINE TO COARSE SAND		0.1/ND	
								Bentonite Seal 7.5-9'		
10		S-3	24/17	10-12	49	Very dense, brown, fine to coarse SAND, little(+) Gravel, little Silt		Filter Sand 9-26'	ND	2.
					62					
					53					
					36					
								1.5" PVC Wellscreen 9.5-24.5'		
15	25	S-4	24/20	15-17	67	Very dense, brown, fine to coarse SAND, some(-) Silt, little Gravel.			ND	3.
					55					
	88				58					4.
					49					
	134									
	210									
	156									
20	85									
		S-5	17/6	20.5-22	37	Very dense, grayish brown, fine to coarse SAND, some Gravel, little Silt.			0.1/ND	
	130/10				30					5.
	16/2				150/5"					
	58									
	67/8									
	6/4									
	49									6.
25										7.

REMARKS:

1. Field testing results represent total organic vapor levels (referenced to a benzene standard measured in the head space of sealed soil sample jars using an H-Nu Model PI-101 photoionization analyzer. Results recorded in parts per million (ppm). ND indicates none detected.
2. Started boring with 3 3/4" Hollow Stem Augers.
3. Split spoon sample was saturated and placed casing inside Augers at 15'.
4. Placed casing inside augers and spun out of the borehole.
5. Two cobbles in split spoon sample.
6. Roller bitted down to 23' and drove casing to 23.5'.
7. Roller bitted down to 25' and drove casing to 25' and cleaned out casing to 25'.

NOTES: 1) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. 2) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THE BORINGS LOGS. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO FACTORS NOT ACCOUNTED FOR AT THE TIME MEASUREMENTS WERE MADE.

GOLDBERG-ZOINO & ASSOCIATES, INC.
GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS

PROJECT: General Electric, Wilmington, MA

REPORT OF BORING NUMBER [illegible]
SHEET 2 OF 2
DATE 11/3/86 FILE A-7550/A-[illegible]

BORING CO. GZA Drilling, Inc.
FOREMAN Richie Jones
GZA ENGINEER C. McDermott/mdk

BORING LOCATION See Location Plan
GROUND ELEV.
DATE STARTED 11/3/86 DATE ENDED 11/3/86

CASING
SIZE: NW (3")
HAMMER: 300 lb
FALL: 24"

SAMPLER
TYPE: Split Spoon OTHER:
HAMMER: 140 lb.
FALL: 30"

-GROUNDWATER READINGS-

DATE	DEPTH	CASING AT	STABILIZATION TIME

DEPTH	CAS. BL. /FT.	SAMPLE NO.	PEN./REC.	DEPTH	BLOWS/6"	SAMPLE DESCRIPTION	STRATA CHG and GEN. DESC	EQUIPMENT INSTALLED	FIELD TESTING	RMKS.
		S-6	8/5	25-25.7	53	Very dense, brown, fine to coarse SAND, some Silt, little Gravel.				
					65/2		26'			
						Split Spoon Refusal at 26'				
30										
35										

REMARKS:

NOTES: 1) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. 2) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THE BORINGS LOGS. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO FACTORS NOT ACCOUNTED FOR AT THE TIME MEASUREMENTS WERE MADE.

GOLDBERG-ZOINO & ASSOCIATES, INC. GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT General Electric Wilmington, MA	REPORT OF BORING NUMBER [illegible] SHEET 1 OF 2 DATE 11/3/86 FILE A-7550 [illegible]

BORING CO. GZA Drilling, Inc. BORING LOCATION See Site Location Plan
FOREMAN Richie Jones GROUND ELEV
GZA ENGINEER C. McDermott/R. Chase/mlk DATE STARTED 11/3/86 DATE ENDED 11/4/86

CASING	SAMPLER
SIZE: NW (3")	TYPE: Split Spoon OTHER:
HAMMER: 300 lb	HAMMER: 140 lb
FALL: 24"	FALL: 30"

GROUNDWATER READINGS

DATE	DEPTH	CASING AT	STABILIZATION TIME
11/4	9	TOC	12 hours
11/13	7.5	To PVC	

DEPTH	CAS. BL. /FT.	SAMPLE NO.	PEN./REC.	DEPTH	BLOWS/6"	SAMPLE DESCRIPTION	STRATA CHG and GEN. DESC.	EQUIPMENT INSTALLED	FIELD TESTING	RMKS.
		S-1	24/17	0-2	1 6 10 14	Medium dense, TOP 6": Dark brown fine SAND, some Silt, trace medium to coarse Sand, (FILL). BOTTOM 11": Brown, fine to medium SAND, little Silt, trace Gravel, (FILL).	FILL	Roadbox Cement 0-2'	ND ND	1. 2.
							4.5'	Bentonite Seal 4-6'		
5		S-2	24/15	5-7	7 9 14 16	Medium dense, reddish brown fine SAND, some(-) Silt.	FINE SAND	Fine Filter Sand 6-25'	ND	
10	7 16 20 42 29	S-3	24/14	10-12	7 10 12 13	Medium dense, reddish brown fine SAND, little Silt.	13'	1.5" PVC Wellscreen 8-23'	ND	3. 4.
15	49 99 135 120 152	S-4	24/6	15-17	45 33 17 29	Dense, brown, fine to coarse SAND, some Gravel, little Silt.	SILTY FINE TO COARSE SAND		0.1/ND	5.
20	42 73 154 115/3"	S-5	24/20	20-22	58 94 50 53	Very dense, brown, fine to coarse SAND, some Gravel, little(+) Silt.			ND	6.
25										

REMARKS:
1. Field testing results represent total organic vapor levels (referenced to a benzene standard) measured in the head space of sealed soil sample jars using an H-Nu Model PI-101 photoionization analyzer. Results recorded in parts per million (ppm). ND indicates none detected.
2. Started boring with 3 3/4" Hollow Stem Augers.
3. Split spoon sample was saturated.
4. Placed casing inside Augers at 10', drove casing to 15', and spun Augers out of the borehole.
5. Roller bitted to 15'.
6. Stopped driving casing at 23' and roller bitted below casing.

NOTES: 1) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. 2) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THE BORINGS LOGS. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO FACTORS NOT ACCOUNTED FOR AT THE TIME MEASUREMENTS WERE MADE.

GOLDBERG-ZOINO & ASSOCIATES, INC. GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT: General Electric, Wilmington, MA	REPORT OF BORING NUMBER GZA-13; SHEET 2 OF 2; DATE 11/4/86; FILE A-7630/A-7201

BORING CO. GZA Drilling, Inc.
FOREMAN Richie Jones
GZA ENGINEER R. Chase/edk

BORING LOCATION See Site Location Plan
GROUND ELEV.
DATE STARTED 11/3/86 DATE ENDED 11/4/86

CASING
SIZE: NW (3")
HAMMER: 300 lb
FALL: 24"

SAMPLER
TYPE: Split Spoon
HAMMER: 140 lb
FALL: 30"
OTHER:

GROUNDWATER READINGS

DATE	DEPTH	CASING AT	STABILIZATION TIME

DEPTH	CAS. BL. /FT.	SAMPLE NO.	SAMPLE PEN./REC.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRTA. CHG. and GEN. DESC.	EQUIPMENT INSTALLED	FIELD TESTING	RMKS.
		S-6	3"/2"	25-27	100/3"	Very dense, brown, fine to coarse SAND, trace Silt.				
						Split Spoon Refusal at 25'				
30										

REMARKS:

NOTES: 1) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. 2) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THE BORINGS LOGS. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO FACTORS NOT ACCOUNTED FOR AT THE TIME MEASUREMENTS WERE MADE.

GOLDBERG-ZOINO & ASSOCIATES, INC.
GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS

PROJECT: General Electric, Wilmington, MA

REPORT OF BORING NUMBER [illegible]
SHEET 1 OF [illegible]
DATE [illegible] FILE [illegible]

BORING CO. Guild Drilling
FOREMAN P. Thornsbury
GZA ENGINEER R Chase/[illegible]

BORING LOCATION See Location Plan
GROUND ELEV.
DATE STARTED [illegible] DATE ENDED [illegible]

CASING		SAMPLER	
SIZE:	4" Casing	TYPE:	2" split spoon
HAMMER:	300 lb.	HAMMER:	140 lb.
FALL:	24 inches	FALL:	30 inches

OTHER:

GROUNDWATER READINGS

DATE	DEPTH	CASING AT	STABILIZATION TIME
5/8	4.0	Out	Completion

DEPTH	CAS. BL./FT.	SAMPLE NO.	PEN./REC.	SAMPLE DEPTH	BLOWS/6"	SAMPLE DESCRIPTION	STRATA CHG. and GEN. DESC.	EQUIPMENT INSTALLED	FIELD TESTING	RMKS.
		S-1	24/16	0-2	1	Very loose, dark brown SILT, little fine Gravel, little fine Sand, trace Organic Matter	Topsoil	Cement 0-1	N.D.	
					1					
					1			Bentonite 1-2		
					1		2'			
							Sand			
5	16?	S-2	24/19	4.5-6.5	19	Very dense, brown, coarse to fine SAND and fine to medium Gravel, trace Silt.	Sand with Gravel and Cobbles		N.D.	
					23					
	125				35					
					26					
	59									
	45									
	25									
		S-3	24/4	9.5-11.5	12	Medium dense, brown, coarse to fine SAND, trace Silt.			N.D.	
10	WOP				10					
					13					
	2				18			1-½" I.D. PVC riser Pipe 0-39		
	8									
	[illegible]									
	21									
15	11	S-4	24/6	14.5-16.5	6	Medium dense, brown medium to fine GRAVEL and coarse to fine SAND, trace Silt.			N.D.	
					8					
	13				9					
					11					
	28									
	24									
	20									
20	22	S-5	24/6	19.5-21.5	7	Loose, brown, fine GRAVEL and coarse to fine SAND, trace Silt.			N.D.	
					4					
	19				3					
					8					
	20									
	26									
	33						24'			
25	25	S-6	24/9	24.5-26.5	7				N.D.	

REMARKS:

1. Field testing results represent organic vapor levels (referenced to a benzene standard) measured in the headspace of sealed soil sample jars using an H-Nu Model PI-101 photoionization analyzer. Results recorded in parts per million (ppm). ND indicates none detected.

NOTES: 1) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. 2) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THE BORINGS LOGS. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO FACTORS NOT ACCOUNTED FOR AT THE TIME MEASUREMENTS WERE MADE.

GOLDBERG-ZOINO & ASSOCIATES, INC. GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT General Electric Wilmington, MA	REPORT OF BORING NUMBER GZA-[illegible] SHEET [illegible] OF [illegible] DATE [illegible] FILE [illegible]

BORING CO. Guild Drilling
FOREMAN P. Thornsbury
GZA ENGINEER P. Chase

BORING LOCATION See Location Plan
GROUND ELEV.
DATE STARTED 5/7/87 DATE ENDED 5/8/87

CASING
SIZE: 4" H.W. Casing
HAMMER: 300 lb.
FALL: 24 inches

SAMPLER
TYPE: 2" split spoon OTHER:
HAMMER: 140 lb.
FALL: 30 inches

-GROUNDWATER READINGS-

DATE	DEPTH	CASING AT	STABILIZATION TIME

DEPTH	CAS. BL./FT.	SAMPLE NO.	PEN./REC.	DEPTH	BLOWS/6"	SAMPLE DESCRIPTION	STRTA. CHG. and GEN. DESC.	EQUIPMENT INSTALLED	FIELD TESTING	RMKS.
25					5	Loose, gray, fine SAND, little Silt.	Sand and Silt		N.D.	
	[illegible]				5					
					7					
	40									
	42									
	49									
30	38	S-7	24/7	29-31.5	5	Medium dense, gray, fine SAND, little Silt.			N.D.	
					5					
	37				6					
					8					
	29									
	54							Bentonite 32-34		
	53									
35	[illegible]	S-8	24/4	34-36.5	6	Medium dense, gray fine to medium SAND, some Silt.			N.D.	
					15					
	52				5					
					5					
	50								—	
								Sand 34-55		
	57									
	[illegible]						38.5			
40	[illegible]	S-9	24/6	39-41.5	11	Medium dense, gray fine to medium SAND, little Silt.	Sand and Cobbles		N.D.	
					5					
	[illegible]				6					
					7					
	66							1½" I.D. PVC Well Screen 39-49		
	63									
	[illegible]									
45	[illegible]	S-10	24/6	44-46.5	7	Medium dense, gray coarse to fine SAND and ROCKCHIP, trace Silt.			N.D.	
					5					
	53				6					
					11					
	[illegible]									
	[illegible]									
	95									
50	75	S-11	24/6	49-51.5	14					

REMARKS:

NOTES: 1) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. 2) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THE BORINGS LOGS. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO FACTORS NOT ACCOUNTED FOR AT THE TIME MEASUREMENTS WERE MADE.

GOLDBERG-ZOINO & ASSOCIATES, INC. GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT: General Electric, [illegible]	REPORT OF BORING NUMBER [illegible] SHEET [illegible] OF [illegible] DATE [illegible] FILE [illegible]

BORING CO. Guild Drilling

FOREMAN P. Thornsbury

GZA ENGINEER R. Chase/[illegible]

BORING LOCATION See Location Plan

GROUND ELEV.

DATE STARTED 5/7/87 DATE ENDED 5/8/87

CASING		SAMPLER	
SIZE:	4" H.W. Casing	TYPE:	2" split spoon
HAMMER:	300 lb.	HAMMER:	140 lb.
FALL:	24 inches	FALL:	30 inches
		OTHER:	

GROUNDWATER READINGS				
DATE	DEPTH	CASING AT	STABILIZATION	TIME

DEPTH	CAS. BL. /FT.	SAMPLE NO.	PEN./REC.	DEPTH	BLOWS/6"	SAMPLE DESCRIPTION	STRATA CHG and GEN. DESC.	EQUIPMENT INSTALLED	FIELD TESTING	RMKS.
50					10	Medium dense, gray fine SAND and SILT.			N.D.	
	[illegible]				18		Sand and Silt			
					[illegible]					
	125									
	111									
	128									
55	[illegible]	S-[illegible]	24/6	54.5-56.5	[illegible]	Loose, gray, fine SAND, some (+) Silt.			N.D.	
					[illegible]					
	[illegible]				[illegible]					
					9					
	[illegible]									
	72									
	94									
60	[illegible]	S-13	[illegible]	59.5-61.5	[illegible]	Medium dense, gray fine SAND and SILT			N.D.	
					20					
	[illegible]				29					
					15					
	[illegible]									
	[illegible]									
	[illegible]									
							64'			
65	5	S-14	24/5	64.5-66.5	9	Medium dense, gray coarse to fine SAND and fine to medium GRAVEL, trace Silt.			N.D.	
					12		Sand and Gravel			
	[illegible]				[illegible]					
					[illegible]					
	[illegible]									
	[illegible]									
	[illegible]					Very dense, gray, fine to coarse SAND, some medium Gravel trace, Silt.				
70	172	S-15	24/8	69.5-71.5	[illegible]				N.D.	
					38					
					[illegible]	Bottom of borehole at 70'11".				

REMARKS:

NOTES: 1) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. 2) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THE BORINGS LOGS. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO FACTORS NOT ACCOUNTED FOR AT THE TIME MEASUREMENTS WERE MADE.

GOLDBERG-ZOINO & ASSOCIATES, INC.
GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS

PROJECT: General Electric
[illegible], MA

REPORT OF BORING NUMBER [illegible]
SHEET 1 OF [illegible]
DATE 5/8/87 FILE [illegible]

BORING CO. Guild Drilling
FOREMAN P. Thornsbury
GZA ENGINEER R.Chase/tmj

BORING LOCATION See Location Plan
GROUND ELEV.
DATE STARTED 5/8/87 DATE ENDED 5/8/87

CASING
SIZE: 4" HW Casing
HAMMER: 300 lb.
FALL: [illegible] inches

SAMPLER
TYPE: 2" split spoon
HAMMER: 140 lb.
FALL: [illegible] inches
OTHER:

GROUNDWATER READINGS

DATE	DEPTH	CASING AT	STABILIZATION TIME
5/8	3.75	Out	Completion

DEPTH	CAS. BL. /FT.	SAMPLE NO.	PEN./REC.	DEPTH	BLOWS/6"	SAMPLE DESCRIPTION	STRTA. CHG and GEN. DESC.	EQUIPMENT INSTALLED	FIELD TESTING	RMKS.
							TopSoil 2'			
						Refer to Boring Log GZA-14.	Sand	1½" I.D. PVC Well Screen 0-15'		
5								Sand 0-15'		
							Sand with Gravel and Cobbles			
10										
15						Bottom of boring at 15'.				

REMARKS:

NOTES: 1) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. 2) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THE BORINGS LOGS. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO FACTORS NOT ACCOUNTED FOR AT THE TIME MEASUREMENTS WERE MADE.

BORING LOCATION GZA-7

GE Wilmington, MA

DRILLED BY GZA Drilling, Inc.

LOGGED BY K. Grundstrom

REVEIWED

CASING ID 4"

GROUND EL (MSL)

DATE START/FINISH 3/24/87 / 3/24/87

CORE SIZE NX

INCLINATION

DEPTH to WATER TABLE 4.7'

DATE 3/24/87

CORE TYPE

BEARING

TOTAL DEPTH 17.5'

EL MSL ft	SAMPLE DEPTH ft	SAMPLE TYPE and No.	N or REC	RATE OF ADV min/ft	RQD
	0-2.5	S-1			
2.5	2.5-5.0	C-1	[illegible]"	6	0/[illegible] = 0%
				4.5	
				2/6"	
5.0	5.0-[illegible]	C-2	36"	5	24/36 = 66%
				3	
				3	
7.5					
	8.0-12.5	C-3	51"	6.5	51/51 = 100%
				6.5	
10.0				6	
				4/18"	
12.5	12.5-17.5	C-4	60"	6	40/60 = 60%
				4	
				4	
15.0					
				4	
				3	
17.5					

- SOIL AND ROCK DESCRIPTIONS -

Notes: (WEATHERING, DEFECTS, etc.) (TYPE, TEXTURE, MINERALOGY, COLOR, HARDNESS, etc.)

Brown-gray fine to medium SAND, some Silt, little Gravel (soil classified from visual observation of auger cuttings)
FILL
Top of Rock at 2.5'

Highly fractured, hard, light gray with slight pink coloration, very slightly weathered to fresh fine-grained GRANITE.

Moderatley fractured, light gray with slight pink coloration, very slightly weathered to fresh fine-grained GRANITE (fracture surface at approximately 5 to 6 feet stained black, also slight chemical odor).

Very slightly fractured, light gray with slight pink coloration, very slightly weathered to fresh fine-grained granite.

Moderately fractured, light gray with slight pink coloration, very slightly weathered to fresh fine-grained GRANITE (oxidized iron stains observed on several fracture surfaces).

Bottom of boring at 17.5 feet.

Well Installed:

1¼" PVC wellscreen 4'-14'
1¼" PVC riser 0'-4'
filter sand 4.0'-15'
bentonite seal 2.5'-4.0'
roadbox 0'-2.5'
cement grout at surface.

LEGEND:
N = STANDARD PENETRATION RESISTANCE, BLOWS/FT.
REC = LENGTH RECOVERED/LENGTH CORED, %
RQD = LENGTH OF SOUND CORE 4" AND LONGER/LENGTH CORED, %
S = SPLIT SPOON SAMPLE
U = UNDISTURBED SAMPLES.
D = DRILLING BREAK
F = FIXED PISTON
WX = WEATHERED
S = SHELBY TUBE
k = COEFFICIENT OF PERMEABILITY
N = DENISON
P = PITCHER
2 = GROUNDWATER
O = OSTERBERG

NOTES:
1. While coring between eleven and twelve feet, core barrel abruptly dropped 3 to 4 inches.

PAGE OF

LOG OF BORING

FORM

BORING LOCATION	GZA-15, GE Wilmington, Massachusetts	DRILLED BY	GZA Drilling, Inc.
		LOGGED BY	K. Grundstrom/C. McDermot
		REVIEWED	
CASING ID	4"	DATE START/FINISH	3/24/87 / 3/25/87
GROUND EL (MSL)		DEPTH to WATER TABLE	5.1'
		DATE	3/25/87
CORE SIZE	NX	INCLINATION	
CORE TYPE		BEARING	
TOTAL DEPTH	13'10"		

EL MSL ft	SAMPLE: DEPTH ft	SAMPLE: TYPE and No	SAMPLE: N or REC	RATE OF ADV. min/ft	RQD		SOIL AND ROCK DESCRIPTIONS — Notes: (WEATHERING, DEFECTS, etc.) (TYPE, TEXTURE, MINERALOGY, COLOR, HARDNESS, etc.)
	0-.75'	S-1					Medium dense brown fine to medium SAND, little Silt, little Gravel (soil classified from visual observation of split spoon sample) Top of rock at 1.75'
2.5	2'9"-5'[illegible]"	R-1	18	5½	9/16 = 50%	1.	Moderately fractured, hard, light gray, very slightly weathered to fresh SCHIST (fracture surface stained with brown to black spots).
				8			
				5/6"			
5.0	5'[illegible]"-7'[illegible]"	R-2	23	>10	20.5/23 = 89%	2.	Slightly fractured, hard, light gray to pink, fresh, medium grained GRANITE.
				>10			
						3.	
7.5	7'[illegible]"-9'7"	R-3	24		5/28 = 19%	4.	Moderately to severely fractured, hard, pink, very slightly weathered to fresh, medium grained GRANITE (fractured surface stained black).
				3		5.	
						6.	
				5/7"			
10.0	9'[illegible]"-[illegible]	R-4	[illegible]	4	0/52 = 0%		Severely fractured, hard, gray, slightly weathered foliated GRANITE.
				4			
				45			
12.5				4			
				3/5"			Bottom of boring at 13'10".
15.0				1			

Well Installed:

1½" PVC wellscreen	3'10"-13'10"
1½" PVC riser	0'-3'10"
filter sand	3'10"-13'10"
bentonite seal	2'-3'10"
roadbox	0'-2.5'
cement grout at surface	

LEGEND:
N: STANDARD PENETRATION RESISTANCE, BLOWS/FT.
REC: LENGTH RECOVERED/LENGTH CORED, %
RQD: LENGTH OF SOUND CORE 4" AND LONGER/LENGTH CORED, %
S: SPLIT SPOON SAMPLE
D: DRILLING BREAK
WE: WEATHERED
k: COEFFICIENT OF PERMEABILITY
∇: GROUNDWATER
U: UNDISTURBED SAMPLES:
F: FIXED PISTON
S: SHELBY TUBE
D: DENISON
P: PITCHER
O: OSTERBERG

NOTES:
1. casing set at 2'9" for R-1. After R-1 casing seated at 3.5'.
2. No water return on later part of R-1 or on R-2.
3. Bound up on R-2 at 7'3".
4. Did not time start of R-3 due to recoring of rock from 6'9"-7'3".
5. Spun casing from 3.4' to 5.7' [illegible]
6. Hole collapsed to 9'5", started R-4 at 9'5" and recored to 9'7".

PAGE OF | LOG OF BORING FORM

GOLDBERG-ZOINO & ASSOCIATES, INC.
GEOTECHNICAL-GEOHYDROLOGICAL CONSULTANTS