Site Assessment Report
of the

Former Whitney Barrel Company Site
256 Salem Street
Woburn, Massachusetts

Vol. 1

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1.0 Introduction

This Report presents results of a Site Assessment performed by GHR Engineering Associates, Inc. (GHR), of property formerly occupied by the Whitney Barrel Co., Inc. (the Site) at 256 Salem Street, Woburn, Massachusetts. The Scope of Work performed by GHR at the Site was designed to comply with an Administrative Consent Order entered into by the Massachusetts Department of Environmental Quality Engineering (DEQE) under Massachusetts General Laws, (M.G.L.) Chapter 21E., and the Site owner, Mrs. Ruth J. Whitney on July 6, 1988. A copy of the Order is presented in Appendix A. The Scope of Work was submitted to DEQE in January, 1988, and subsequently reviewed and approved by DEQE prior to its incorporation into the Consent Order.

The work reported herein was undertaken and performed in accordance with generally accepted engineering practices and subject to the limitations provided in Section Nine. No other warranty, expressed or implied is made.

SECTION TWO - SITE BACKGROUND

2.0 Introduction

This section discusses Site ownership, location and physical surface conditions at the former Whitney Barrel Co., Inc. property (hereafter referred to as the "Site"), Woburn, Massachusetts. A discussion of the environmental Site setting is also included. Figure 1 depicts the general location of the Site. Figure 2 shows the Site's location relative to surrounding properties and includes the City of Woburn Assessor's office lot designations. Figures 3, 4, and 5 are detailed Site Plans showing all field exploration locations (established during the current Site assessment), Site surface features, utility lines, and other Site-specific information.

2.1 Site Location and Ownership

- USGS Quadrangles: Lexington and Boston North (7.5 minute series)
- UTM Coordinates: 47 06200m N
3 24750m E
- Latitude/Longitude: 42° 29' 27"N / 71° 07' 57"E
- County: Middlesex
- Address: 256 Salem Street
Woburn, Massachusetts 01801

- Assessor's Maps: The Site comprises Lot 37 on Map 16 (portion of Block 16005) as shown on the City of Woburn Assessor's maps and delineated on Figure 2.

- Site Ownership: According to records at the Middlesex, South District (S.D.) Registry of Deeds, the current owner of the 256 Salem Street property (the Site) is Mrs. Ruth J. Whitney, who acquired title to the property under the will of her late husband John E. Whitney, Jr. At the time of his death (August 14, 1984), John E. Whitney, Jr. was owner and operator of the Whitney Barrel Co., Inc. and the Site.

2.2 Current Site Use

The Site is currently used by a number of individuals and businesses who lease a portion of the property from Mrs. Ruth Whitney, the current Site owner (Whitney, 1988). The individuals leasing part of the Site include:

- Robert Jones, American Artesian Well Co. - Rents yard space in the southeast corner of the property for equipment storage and parking of trucks.

- John Anderson, Anderson Oil Co. - Rents the southern third of the main building as a garage to park trucks. An aboveground storage tank (approximately 20 gallons) is located inside the garage. Tank contents are not known.

- Edmund Lynch, Wayside Storage Trailers - Rents space in the southwest corner of the property for parking of storage trailers.

- Robert Hernon, Hernon Construction Co. - Rents yard space in the west central portion of the property (north of Wayside Storage Trailers) for parking of trucks and storage of construction equipment. Hernon Construction uses two on-Site aboveground storage tanks. One aboveground storage tank is approximately 50 gallons. Contents of this tank are not known, but believed to be a petroleum product based on oil-like surface soil staining noted by GHR in the area surrounding the tank. The second tank is approximately 500 gallons and contains diesel fuel. In general, most of the surficial soil staining described below in Section 2.3.1 was observed by GHR in the portion of the property currently occupied by Hernon Construction Co.

- Murray Ross, Ross Barrel Company - Rents parking space for trucks that transport barrels.

- Bruce Marchand of Woburn, Massachusetts - Rents the center third of the main building for a wood working business.

- Phillip Chimento of Woburn, Massachusetts - Rents a portion of the rear third of the main building for auto repairs and auto body work.

- Steven Allen, Allen Glass Co. - Rents a portion of the rear third of the main building for auto glass repair.

- Al Stackpole of Cambridge, Massachusetts - Rents building space for equipment repairs (street sweepers).

- All Star Towing of Woburn, Massachusetts - Rents yard space for storage of towed vehicles. Vehicles mainly occupy a large section of the northern upland portion of the property.

- Warren O'Leary of Woburn, Massachusetts - Rents yard space for parking trucks.

2.3 Site Description

The Site is located in a commercial/industrial area in Woburn, Massachusetts. The Site is approximately 2.72 acres in size and is bordered by Murphy's Waste Oil to the west, the J.J. Riley Leather Co./Wildwood Conservation property to the north, the Aberjona Auto Parts, Inc. property and Metropolitan District Commisison (MDC)/City of Woburn Sewer easements to the east, and Salem Street to the south (Figure 2). The following describes Site conditions as observed by representatives of GHR throughout the field investigation conducted between June and November, 1988. Additional information included in this Section was obtained from various city and state offices, as well as from the report entitled "Wells G & H Remedial Investigation Report" October, 1986, and prepared by NUS Corporation, 1986, and from information provided to GHR by John E. Whitney III, the Site owner's son and former employee of the Whitney Barrel Company.

2.3.1 Physical Setting

- Total Acreage: According to a property line survey conducted by GHR, the Site comprises 2.719 acres of land.

- Zoning: According to the City of Woburn Zoning office, the Site and the surrounding properties are zoned for industrial use and are designated specifically for industrial park development/use.

- Buildings: There are two existing buildings on the Site. One building located on the southeast corner of the property, is a small two-story, wood-frame building with a concrete foundation, formerly used for office space by the Whitney Barrel Co. The second and main building, is a larger warehouse-like building which formerly housed barrel reconditioning operations, and currently houses a variety of businesses that lease space from the current owner. This building is constructed of wood, cinderblock, and sheet metal, and has a concrete slab on-grade foundation. Both buildings are in a state of disrepair. The main building (as it exists currently and has been described herein) was reconstructed after a fire destroyed the building and all its contents in 1979 (Whitney, 1988). A previous fire in May 1977 had destroyed the northerly end of the building and all its contents (Woburn Fire Department Record, 1977; Figure 4).

o <u>Roadways and Parking Areas:</u> All roadways and parking areas are shown on Figure 4 and described below. Salem Street, a moderately travelled two-way public road, borders the Site to the south. An unnamed and unpaved sewer easement road borders the northeast corner of the Site. This road parallels the City of Woburn and the MDC (now MWRA) sewer easements and extends north (across Aberjona Auto Parts property) from the paved Salem Street entrance for Aberjona Auto Parts, Inc. to a locked gate accessway to the J.J. Riley Co./Wildwood Conservation property. This easement roadway is not overgrown and, as observed by GHR during the on-Site work, it is occassionally used to access the sewer manhole in the northeast corner of the Site.

The Salem Street entrance to the Site (the main driveway) is paved with bituminous concrete from Salem Street northward to the main building. A new patch of asphalt approximately 80 feet long by 40 feet wide, has also been recently placed on the southwest side of the main building. It appears that this asphalt was laid in sections by Hernon Construction, the lessee of this portion of the property. The southwest area is used for parking of heavy construction equipment. During the course of the Site assessment GHR observed surface staining on this new pavement with what appears to be petroleum derivative or product. Staining was also observed on surface soils near the edge of this rececntly paved area.

An access road which circumscribes the rest of the main building is used by all current Site occupants and their customers for business access and parking. This access road surface is unpaved, but is covered with coarse angular gravel and hard packed soil. During periods of rain, GHR observed that this road floods, and ponded water remains in the heavily rutted sections of the road for a number of days following precipitation.

All open spaces on the Site not used for access roadways have been used historically for parking junked vehicles (cars, trucks, buses, etc.) and for stockpiling/storage of scrap metal (underground storage tanks, drums, pipe, steel reinforcement) and concrete. These open areas are also unpaved. The parking/storage areas have been recently reduced in size, however, and most vehicles and debris piles have been removed from the Site.

Oil stained surface soil and pavement was observed by GHR over most of the Site, but appear more predominantly in the southwest portion of the property. In the southwestern portion of the Site, small surface spills, believed to be petroleum product and antifreeze likely associated with the parking and maintenance of the heavy construction equipment were observed by GHR personnel during the field investigation in this area.

- Site Utilities: All on-Site utility lines are depicted on Figure 5. The Site is connected to the Massachusetts Water Resources Authority (MWRA)/Metropolitan District Commission (MDC) water and sanitary sewer systems through municipal water and sanitary sewer lines. The main building has no sanitary facilities, but has a floor drain which connects to the City of Woburn/MWRA sanitary sewer system at the manhole located just beyond the northeast corner of the property. The floor drain, located inside the building approximately five feet south of the rear garage entrance, was used during the barrel cleaning operation to discharge wash/rinse water (Whitney, 1988). The floor drain is still operative and may be used to collect rinse water from vehicle washing performed by current occupants of the building (Whitney, 1988). A City of Woburn sanitary sewer line also exists beneath the northern end of the Whitney property (Figure 5) and ties into the main line northeast of the Site (MDC Sewer Map, 1940). The smaller office building has sanitary facilities that discharge to a septic tank and leaching field which extends northward off the north side of the building (G. Olson, 1950).

The water line servicing the main building is located approximately 10 feet west of the main building and runs approximately parallel to the building out to Salem Street where connection is made to a municipal line (Whitney, 1988, personal communication).

Both on-Site buildings have overhead electrical and/or phone lines that connect to lines along Salem Street. There are two electric utility poles on the southwest portion of the Site.

- <u>Fencing:</u> On-Site fencing is depicted on Figure 4. There is a six foot high corrugated steel fence along the south end of the property (along Salem Street) with a seven foot high chain-link lockable gate at the access to Salem Street. A ten foot high chain-link fence connects to the east side of the office building (approximately the Site's eastern property line) and extends eastward onto Aberjona Auto Parts property. There is a 30 foot by 20 foot stockade fenced area located along the southeast perimeter of the Site. This area has half of a chain-link gate (an old van blocks the other half of the gateway), and is or was apparently used for storage of gravel, woodchips and other fencing materials. Snow fencing has been installed near the western and northern Site perimeters to isolate wetland areas and prevent filling, debris dumping, or parking of vehicles in wetlands. On-Site fencing is depicted on Figure 4.

- Catch Basins: There are no catch basins located on-Site.

- Septic Tanks/Leach Fields: A septic tank and leach field receives sanitary waste from the small office building on-Site. A 1950 historical plan (Olson, 1950) of the Site indicated that the septic system is located north of the office building as shown on Figure 5.

- Sanitary Sewers: The Site is serviced by the Deer Island MWRA sanitary sewer system via municipal lines. (MWRA Files, 1988), although the floor drain in the main building is the only connection to this sewer system. The approximate location of this sewer line is depicted on Figure 5. This sanitary sewer line was used to discharge wash/rinse water from the barrel reconditioning operations (Whitney, 1988; MWRA Files, 1988). The Whitney Barrel Co. had an Industrial User Discharge Permit (#43 000 288-8 issued November 21, 1981) for discharge of wastewater to the sewer (MWRA/City of Woburn, 1981).

- Subsurface Tanks: There are no known subsurface tanks on the Site. Permits for two underground storage tanks (5000 gallon gasoline and 5000 gallon diesel fuel) were found on file at the Woburn Fire Chief's office. The permits were issued March 10, 1975, but according to the Woburn Fire Deparment, the tanks were never installed.

- Aboveground Tanks: The approximate locations of on-Site aboveground storage tanks are shown on Figure 4. There are four aboveground tanks on the property. One tank located in the northwest corner of the property has a 6,000 gallon capacity and is reportedly abandoned though it still contains an unknown solid material (Whitney, 1988). The second tank is an active 500 gallon tank containing diesel fuel. This tank, located on the southwest corner of the Site, is used by Hernon Construction, the lessee of the southwest portion of the property. A third tank, estimated by GHR to have a capacity of 50 gallons, is also located on property leased by Hernon Construction in the southwest portion of the Site. Visible oil-like soil staining on the ground surface surrounding this tank suggests that it may contain or have contained petroleum product. A fourth tank, estimated by GHR to have a capacity of 20 gallons, is located in the garage in the southern part of the main building. The contents of this tank (if any) are not known.

- Ditches: No ditches were identified on the Site or on any surrounding properties. There is a drainage swale that runs along the northern and northwestern portions of the property. On-Site wetland areas are associated with this swale. The swale, as shown on Figure 5, connects to a culvert under the unpaved easement road along the eastern-northeastern Site boundary.

- Refuse/Rubbish: Refer to Figure 4 for locations of existing refuse piles. Historically, the entire Site has been utilized as a storage area for assorted metal refuse, including tanks and barrels. Plastic barrels were also cleaned and stored on the Site. Currently, the Site is littered with assorted loose debris and several debris piles containing scrap metal. Junked autos line both the eastern and western borders of the Site. A large pile of steel reinforcement and concrete rubble was recently brought to the northwest portion of the Site from demolition of the Post-Office Square Garage in Boston for storage until scrap metal from this debris can be sold. Refuse piles are also located in the northwest corner of the Site. The piles contain railroad ties apparently covered with creosote and fencing material. Along the central portion of the west side of the Site there are debris piles containing cement, old 55 gallon steel barrels and assorted metal. After recent efforts to clean up surface debris at the Site, much of the scrap metal has been removed from the Site and remaining debris has been gathered into piles for off-Site disposal/removal.

- Site Abutters: Site abutters are shown on Figure 2 and are described below:

The Aberjona Auto Parts (280 Salem Street, Lots 34 and 36) property abuts the Site to the east/northeast. The property is owned by Clifford C. Boutwell, who operates an auto salvage/junkyard business at this location. Aberjona Auto Parts has been in operation at this location for approximately 30 years and reportedly uses a degreasing solvent (trade name ZEP) on the premises to clean auto parts before resale (NUS, 1986). Auto parts were allegedly degreased with solvent and water, with rinsewaters collected in a grease pit that discharged to the MWRA sewer (NUS, 1986). Solvent is stored on the property in drums (NUS, 1986).

Prior to occupancy by Aberjona Auto Parts, the property was used as a gas station. Two underground storage tanks for gasoline are reportedly located on the south side of the property, but had been drained when the sale of gasoline was terminated (NUS, 1986). A 5000 gallon underground storage tank used for gasoline was removed from the Site in 1985 (Doherty, 1988, personal communication). It is not known if this tank was one of the two described in the NUS report. NUS reported that an additional 500 gallon underground storage tank used for waste oil and transmission fluid is located at the southeast corner of the garage (NUS, 1986). The installation date for any of the tanks said to exist on the property is not known.

The Aberjona Auto Parts property is listed (EPA MAD 019722594) on the US EPA CERCLIS list dated May 6, 1988. The property is also listed by DEQE (#3-1146) as a Location To Be Investigated (LTBI) on the DEQE Site List dated October 15, 1988.

The John J. Riley Company/Wildwood Conservation Corp. property (228 Salem Street) borders the Site to the north, and consists of two parcels of land, one undeveloped and the other occupied by an active tannery. The undeveloped parcel (Lot 42) was established in 1985 by John J. Riley as the Wildwood Conservation Corp. This parcel immediately abuts the Site. The developed parcel is occupied by two buildings, a process plant and offices, two former chromium lagoons which were last used in 1970, and piles of unprocessed hides located behind the process building (NUS, 1986).

In 1980 both parcels were subject to a Site inspection performed by Ecology & Environment (E&E). Woodward Clyde Consultants studied the undeveloped parcel in 1984. The undeveloped parcel was further studied for EPA by NUS in 1986. The NUS report stated that drums and miscellaneous debris, including numerous pesticide container caps, were observed on the undeveloped parcel during the 1980 E&E Site inspection (NUS, 1986). From a review of historical aerial photographs, Woodward Clyde's 1984 report suggested that the Riley Site had apparently been used for storage of large tanks and drums by the Whitney Barrel Company and Murphy's Waste Oil (NUS, 1986).

The tannery's industrial pumping well (referred to in the NUS report as Riley production well no. 2 or well # S-46) is located approximately 50 feet north of the former Whitney Barrel Co. Site (Figure 9). According to the EPA and USGS (Myette et al., 1987) this well pumps 500 to 700 gallons per minute for 14 hours per day, 6 days per week (personal communication, Barbara Newman (EPA), 1988). The well is not pumped on

Sunday. In 1983 a 15 hour pump test was performed on Riley well no. 2 by Woodward Clyde Consultants (NUS, 1986). Results of the pump test indicated that the wetland areas located on the northern portion of the Site are within the zone of influence of the Riley production well under pumping conditions (NUS, 1986).

The J.J. Riley Co. property is listed (EPA No. MAD 001035872) on the US EPA CERCLIS list dated May 6, 1988. The property is also listed by DEQE (No. 3-0482) as a Location To Be Investigated (LTBI) on the DEQE Site list dated October 15, 1988.

The Murphy's Waste Oil (252 Salem Street, Lot 41) property abuts the Site to the west. This property, owned by Old Oil Realty Trust, is occupied by an active waste oil transport and disposal facility. A Hazardous Waste Management Facility Closure Plan pursuant to RCRA was completed for the property in 1988 (Pawlowski, 1988, personal communication). The Closure Plan was considered by DEQE to be a partial closure since the facility will continue to be operated by Clean Harbors, Inc. of Braintree, MA (Public Notice, 1988). As part of the closure plan, the company proposed to clean and dismantle 13 on-Site waste oil storage tanks. Other on-Site tanks were to remain on the property to be used for continued operation of the waste motor oil business. According to the Woburn Conservation Commission, Clean Harbors, Inc. is currently performing a Phase I Site assessment of the property pursuant to MGL Chapter 21E (Murphy, 1988, personal communication).

During the field investigation at the Whitney property, GHR noted seven large (greater than 6,000 gallon capacity) aboveground storage tanks located on the northeastern portion of the Murphy's Waste Oil property. These tanks are contained in an area surrounded by a concrete berm. GHR obtained access to Murphy's Waste Oil property to measure the water level in a monitoring well (installed by Clean Harbons, Inc.) located near the aboveground tanks. During the on-Site visit to measure the water level, no surface soil staining was observed by GHR in the area near the tanks. According to the Woburn Fire Department records, no underground storage tanks exist on the property.

The 263/267 Salem Street property (Lot 2) abuts the Site and Salem Street to the south. According to the Woburn Assessor's records, Mary E. Quinn is the owner of this property which is used for both multi-family residences and office space. Company names affiliated with the office space were not identified in records reviewed by GHR. According to the Assessor's map it appears that two buildings exist on the property. GHR observed that the southern most building does not appear to be in use and is in a state of disrepair. Records at the Assessor's office also indicate five waste oil tanks are located on the property (52,000 gallons, total, in underground storage tanks and 48.000 gallons, total, in aboveground storage tanks). The location or age of these tanks are not known, nor is it known whether these tanks are still in use.

The 247 Salem Street property (Lot 1) also abuts the Site and Salem Street to the south. According to records at the Assessor's office, the property is owned by Lawrence Levine of Lynnfield, Massachusetts and is used for manufacturing and woodworking. According to the Assessor's map, it appears that one building exists on the property. Records reviewed by GHR did not detail any other information regarding this property.

- Railroad Tracks: Railroad tracks do not cross the Site, however, active Boston and Maine Railroad (B&M RR) tracks are located approximately 500 feet west of the Site. The B&M RR easement abuts the west side of both the Murphy's Waste Oil and the J.J. Riley/Wildwood Conservation properties.

2.3.2 Environmental Setting

- Topography: The Whitney Barrel Site lies within the floodplain of the Aberjona River, and is located approximately 600 feet southwest of the river. The entire surface of the Site is relatively flat at an elevation of approximately 45 feet above NGVD (National Geodetic Vertical Datum of 1929), with the areas along the northern and northwestern perimeters of the Site slightly lower in elevation. These lower areas likely collect most of the surface drainage from the Site, and are classified as wetlands by the United States Fish and Wildlife Service (US F&WS, 1977). These wetland areas are further described as Palustrine Emergent Marshes which remain wet for most of the year (US F&WS, 1977). Total on-Site vertical relief is less than three feet.

- Vegetation: The majority of the Site contains no vegetation. The undeveloped uplands surrounding the Site are described as deciduous forest consisting primarily of Red Maples, Oaks, Sumac and Birch (Monroe, 1988). The on-Site wetland areas contain vegetation typical of a wet meadow (Sedges, Rushes, Purple Loostrife) and also contain vegetation typical of a wetter environment (Jewelweed and Cattails) (Monroe, 1988). All on-Site vegetation appears healthy.

- Soils: Surface soils on the Site are characterized by densely packed fine sand and gravel fill. In the northern and northwestern wetland areas, surface soils are typical of the wetland depositional environment and consist of brown organic peat or topsoil. Subsurface soils on the Site have been characterized during the current assessment. from numerous borings and test pits across the Site. A description of on-Site subsurface soils is included in Section Five. Schematic stratigraphic cross-sections for the Site are shown as Figures 6, 7, and 8. Soil logs for test pits and borings completed by GHR are included in Appendices C and D.

- Surface Water/Wetlands: The Site lies in the floodplain of the Aberjona River. The river is located approximately 600 feet northeast of the Site. On-Site, there are wetlands associated with a drainage swale that runs along the northern and northwestern portions of the property. These wetland areas remain wet for most of the year and likely collect Site drainage. The swale is classified as an intermittant stream and is hydrologically connected to a culvert under the unpaved road near the northeast corner of the Site (Monroe, 1988).

- Groundwater Quality: Extensive groundwater sampling and analyses have been completed by government and private parties in the Site vicinity as a result of the US EPA's study of Woburn Municipal Drinking Water Wells G & H (NUS, 1986). Based on these studies, the regional groundwater quality in the Aberjona River Valley between state Route 128 and Salem Street may be characterized as containing contamination by chlorinated volatile organic compounds.

  Eleven monitoring wells installed by various consultants on the properties abutting the Site have been included on the Monitoring Well Summary Table (Table 4) in this report. These well locations have also been plotted on the Site Plan (Figure 9). Groundwater elevations from wells to which permission was granted to take measurements were used to create the groundwater contour map for the Site (Figure 9).

  Groundwater samples from many of these wells were collected and analyzed in 1985 as part of the Wells G & H Remedial Investigation performed by NUS for EPA (NUS, 1986). The analytical results of groundwater sampling conducted by NUS at the well locations closest to the Site have been summarized in Table 1.

- Surface Water Quality: The on-Site wetlands are the nearest surface water body to the Site. Sampling of surface water from on-Site wetland areas was not completed as part of this assessment or any previous investigation/assessment of the Site. Limited surface water sampling from the Aberjona River was conducted as part of the US EPA's Wells G & H Study (NUS, 1986) in the vicinity of the Site. NUS (1986) reported that the Aberjona River is contaminated with low concentrations of volatile organic compounds. Screening results (using a Photovac Model 10A10) Gas Chromatograph for volatile organic compounds from NUS' sampling round indicated that trichloroethene was the only compound detected. This compound was detected at the sampling locations closest to the Site, both upstream and downstream of the former Whitney Barrel facility (NUS, 1986). Aberjona Auto Parts, Inc. and the MDC/City of Woburn sewer easement lie between the Site and the Aberjona River. The river flows southward and is located approximately 600 feet northeast of the Site.

- o <u>Demography:</u> The Site is located in a commercial/industrial area and is surrounded by commercial/industrial type businesses on the north, east and west. One lot to the south of the Site is partly used for mutli-family residential dwellings.

2.4 Potential Sensitive Receptors

This Section identifies potential sensitive receptors for any oil or hazardous material possibly existing at the Site and in the Site vicinity.

2.4.1 Surface Water/Wetlands

On-Site wetland areas in the northern and northwestern portion of the Site are the closest surface water receptor to the Site. These wetland areas are slightly lower in elevation than the rest of the Site and, therefore receive Site drainage/runoff. Site impact to on-Site surface water wetlands was not addressed as part of this assessment. On-Site wetlands drain to a culvert located in the northeast corner of the property (Figure 4). The culvert eventually drains to the Aberjona River located 600 feet northeast of the Site.

The Aberjona River is classified by the Massachusetts DEQE (310 CMR 4.03) as a Class B waterway, designated for the uses of protection and propagation of fish, other aquatic life and wildlife and for pimary and secondary contact recreation. GHR found no information in the references reviewed that the Aberjona River is currently used for recreational purposes. The river is not designated for, nor is it used as a public water supply. The Aberjona River enters the Mystic River Basin and is part of the Boston Harbor Drainage System. Information reviewed by GHR indicated that water quality in the Aberjona River both upstream and downstream of the Site has been degraded by urban activities (NUS, 1986). Access to the river is not restricted.

2.4.2 Direct Contact/Population

The Site is not completely surrounded by a locked fence and is therefore presently accessible to the general public (Refer to Figure 4 for on-Site fecning). "No Trespassing" and "No Dumping" signs have been posted to discourage potential trespassers and dumpers. During work hours, the Site is also subject to a steady influx of people related to the businesses leasing space on-Site.

2.4.3 Groundwater

Groundwater within a one-mile radius of the Site is not used as a potable water supply. It is, however, used for industrial purposes. The J.J. Riley Co., an active tannery west of the Site, currently uses a production well located just north of the Site (well # S46, refer to Figure 9). This well reportedly pumps 350,000 gallons of water per day for 6 days a week (Newman, 1988, personal communication). Pump tests performed in 1983 at the Riley well (S46) indicated that at least a portion of the Site (the northern wetland area) was within the zone of influence of the Riley production well under pumping conditions
(NUS, 1986).

Woburn Municipal Wells G and H are located approximately 2,000 feet northeast of the Site on the other side of the Aberjona River. These two wells would not be considered sensitive receptors because they were shut down in 1979 due to volatile organic contamination alleged to have originated at other industrial properties in the area. Furthermore, in 1986, the USGS, in conjunction with the US EPA, conducted a 30 day pumping test of the Municipal Wells (Myette et al., 1987). The study indicated that under pumping conditions, the zone of influence of Woburn's Municipal Wells G & H did not extend to the Whitney Barrel Site.

SECTION THREE - SITE HISTORY

3.0 Introduction

This Section summarizes research conducted on the history of the Site. The purpose of the research was to identify current or historical activities on the Site and surrounding properties relating to the use and handling of oil or hazardous materials. Sources of information utilized for compilation of this Section include:

- USGS topographic maps, Lexington and Boston North quadrangles
- Municipal water and sewer plans
- Underground storage tank permits and records
- DEQE incident, RCRA, and hazardous waste files
- US EPA CERCLIS, Region I, dated May 6, 1988
- Utility permit records on file with the City of Woburn and MWRA
- Fire Department response files
- Middlesex County Registry of Deeds
- Wells G & H Site Remedial Investigation Report, Part I, US EPA, October 17, 1986
- Response to CERCLA/RCRA Information Request re: Whitney Barrel Co., prepared by John E. Whitney III, February 16, 1988.
- City Planning Office maps
- DEQE Confirmed Sites List, dated October 15, 1988

- DEQE Notice of Responsibility pursuant to MGL Chapter 21E, re: Woburn - Whitney Barrel, 256 Salem Street (Case #3-534), December 1, 1986.

- GHR communication with John E. Whitney III, 1988.

3.1 Site Ownership History and Historical Site Use Exclusive of Whitney Barrel Company Activities

Site ownership was identified back to 1919 when the property was owned by Hugh Quinn of Woburn. In 1938 the deed was transferred from Hugh Quinn to Daniel J. Quinn, also of Woburn. John E. Whitney, Sr. and Helen T. Whitney purchased the property from Daniel J. Quinn in 1950; however, the City of Woburn held the 1950 tax title for the property until 1954. A complete ownership history, as recorded at the Middlesex County Registry of Deeds is summarized in Table 2.

The Site was vacant prior to 1950 and was reportedly used for storage (type unknown) while Daniel Quinn owned the property (from 1938 to 1950) (Middlesex County Registry of Deeds, Book 4284, Page 561). During the 1920's and 1930's the Site was allegedly used by a farmer for poppy farming and illicit opium production (Whitney, 1988, personal communication). The farmer was allegedly apprehended and his crop was erradicated. The validity of this information could not be confirmed by GHR in any records that were reviewed.

The on-Site buildings and associated utility connections were constructed in 1950 by the Whitneys. No records existed in City files that an actual sewer connection was ever made at the Site (personal communication, Woburn DPW Dept. Superintendent, 1988). GHR was able to determine by conducting a dye test in the sewer line that the floor drain in the main building is, in fact, connected to the City/MWRA sewer system (see Section 2.3.1).

The Site history/Site use relating to Whitney Barrel Co. (1950-1985) is addressed separately below. During the period when the Whitney Barrel Co. operated on-Site, the facility was shared with at least two tenants. It is reported (Whitney, 1988, personal communication) that during the 1960's, Hero Chemical Company leased and occupied a small extension off the boiler room on the northwest side of the main building (Figure 4). This extension, including the floor, was reportedly constructed exclusively of wood. Hero Chemical (now Hero Coating of Everett, Massachusetts) utilized the space for glue manufacturing. It is not known if the company used or generated any hazardous waste on-Site. During the 1970's, this same facility space was leased by two chemists for research in analytical chemistry (Whitney, 1988, personal communication). The chemists occupied the space until a fire in May, 1979 destroyed the entire main building, including this extension. The extension was not reconstructed when the main building was rebuilt in 1980. No other information could be obtained regarding the activities of the two chemists.

3.2 Whitney Barrel Company History

Table 3 presents a chronological summary of Site related activities from 1919 to the present. Whitney Barrel Co. was a family owned and operated barrel reclaiming business established by the late John E. Whitney, Sr. at 256 Salem Street in 1950. The two buildings formerly used by Whitney Barrel Co. still exist on-Site. The larger building housed the barrel cleaning and refinishing operations, and the smaller building was used for office space. There is very little corporate documentation available for Whitney Barrel Co., primarily because a 1979 fire destroyed the main building on-Site. All contents of the building were lost in the fire including most corporate documentation (Whitney, 1988, personal communication). The company history was reconstructed from public records and interviews with John E. Whitney III, whose father, the late John E. Whitney Jr., owned and operated the company from 1972 until his death in late 1984.

From 1950 until early 1985, barrels (predominantly 55 gallon barrels) were brought to the Site by the truckload to be cleaned, refinished and resold. Tanks of all sizes were also cleaned on-Site and then sold for scrap metal. Most barrels cleaned at the Site reportedly came from the food and cosmetic industries (MDC 1978 and 1983), although customer lists indicate that the company did business with many other types of businesses (refer to Appendix G).

In the earlier years of the Whitney Barrel operation some barrels still containing waste residues were received at the Site for cleaning (MDC, 1981). These residues were reportedly drained from the barrels prior to washing and contained in a drum for off-Site disposal (MDC, 1978). The company later made it general practice to accept only those barrels that were considered empty and it became company policy that barrels containing residue were rejected or sent back to their source (MDC, 1981). It was also reported that most barrels cleaned at the Site in the later years were precleaned at the point of origin before delivery to the Site for refinishing (MDC, 1981).

Prior to cleaning, barrels were stored in the rear section of the main building (Whitney, 1988). This area, called the "raw warehouse" was a wooden structure 100 feet long by 40 feet wide (Whitney, 1988 personal communication). The raw warehouse burned down during a 1977 fire at the facility (Woburn Fire Department Record, 1977). Large pieces of metal and steel tanks were stored, cleaned, and cut for scrap outside of the main building, off the back of the raw warehouse (Whitney, 1988). After the 1977 fire destroyed the warehouse, all barrels and tanks were stored outside of the main building (Whitney, 1988).

Barrels and tanks to be reconditioned were cleaned in a 300 gallon (10 feet x 2 feet x 2 feet) wash tank on a platform inside the main building (MDC 1978: Whitney, 1988). The wash tank used for barrel cleaning no longer exists on-Site. According to John E. Whitney, III and various MDC Inspection Reports, the cleaning process consisted of the following:

1. Barrels were steam cleaned with trisodium phosphate and a flake caustic wash solution. Wash water from this process was skimmed and then discharged manually to the City /MWRA sanitary sewer system via the floor drain located five feet inside the rear entrance of the main building (MDC, 1983, 1981, and 1978). The oil and grease was skimmed

off of the washwater and drummed for off-Site disposal (MDC, 1981). Any sludge that accumulated in the wash tank was drummed and collected for off-Site disposal (MDC, 1978).

2. Following the initial wash, barrels were steam rinsed. Rinsewater was also contained in the wash tank and discharged manually to the City sewer system via the floor drain (Whitney, 1988).

The Whitney Barrel Co. had an Industrial User Permit (No. 43000288-8) issued in 1981 by the Metropolitan District Commission (MDC) for discharge to the on-Site sanitary sewer. One permit violation, for high pH (11.25) was noted in a sampling report from an April 1983 MDC inspection of the Whitney Barrel facility (MDC, 1983). The elevated pH was attributed to the caustic used in the barrel washing (MDC, 1983). In 1983, the MDC also noted permit violations in regards to the Whitney Barrel Co. not submitting a discharge report or a compliance schedule (Grandin, 1983). Although wash water samples were collected periodically (for metals, oil and grease, and pH analyses) by MDC representatives during routine facility compliance inspections (MDC, 1983), no analytical results were found by GHR in MDC (now MWRA) files. The MDC permit expired on October 31, 1983.

After washing, barrels were dried with a vacuum-type dryer, reshaped and buffed in preparation for painting. Barrels were painted with drum enamel paint thinned with Solvisol No. 5 (Whitney, 1988). Painting was performed in a small paint booth located in the main building (MDC, 1983). Mr. John E. Whitney, III stated that any waste paint thinner was subsequently mixed with new paint and re-used (MDC, 1983).

A series of fires occurred at the Site while the Whitney Barrel Co. was active. Woburn Fire Department records indicate that the first fire occurred in 1960. Subsequent fires occurred in 1965, 1967, 1972, 1973, 1977, 1979 and 1986. The most destructive fires occurred in 1977 and 1979. The 1977 fire destroyed the "raw warehouse", and the 1979 fire demolished the entire main building and its contents (Whitney, 1988). Records completed by the Woburn Fire Department for the 1977 fire reported that "chemicals and residue from used barrels" were the main flame spread factors (Woburn Fire Department, 1977). The 1977 fire originated in the barrel wash room. During the 1979 fire, John E. Whitney, III, then employed at the facility, reported that many barrels awaiting reconditioning exploded and were blown out of the building (Whitney, 1988, personal communication). According to the Woburn Fire Department records, a large amount of water was necessary to extinguish both fires.

The main building was reconstructed in 1980, using the existing concrete foundation (Whitney, 1988, personal communication). The raw warehouse was never rebuilt. After the fire of May 1979, the volume of barrel/tank reconditioning performed at the Site was reported to be significantly reduced (Whitney, 1988).

In August 1984, John E. Whitney, Jr., the owner and operator of the facility, died, and in early 1985, the company ceased operations.

3.3 Site Regulatory History

The Whitney Barrel Co. (EPA No. MAD 019725324), although no longer active, is listed on the DEQE's RCRA list dated July 27, 1988 as a RCRA generator whose waste is not regulated and as a non-regulated, small quantity handler. Whitney Barrel filed for this RCRA status on April 15, 1981.

The Site is also listed as an "Unclassified Hazardous Waste Site" on DEQE's Confirmed Site List (Site #3-0534) dated October 15, 1988. The listing date for the Site was January 15, 1987, and its status is given as Phase I.

The Site also appears on the CERCLIS, the US EPA Superfund Program Site listing dated May 6, 1988. The Site was first listed in 1980. Ecology and Environment (E&E) conducted a preliminary assessment (PA) and a Site inspection (SI) at the facility in 1980, and concluded that no environmental problems were identifed on-Site but reported that wastewater, routinely discharged to the MWRA sewer could possibly exfiltrate from sewer lines (E&E, 1980). No documentation to support this hypothesis was identified by E&E and no intrusive field investigations were performed during the 1980 studies.

In 1979 the Massachusetts DEQE Division of Water Pollution Control filed suit against Whitney Barrel Co. for allegedly allowing Kingston Steel Barrel Co., Inc. of Kingston, New Hampshire to discharge industrial wastewater into the MDC manhole located just beyond the northeast corner of the Site. This discharge of industrial wastewater to the MDC sewer was in violation of MGL Chapter 21, Section 43 and the then MDC sewer regulations issued under MGL Chapter 92, Section 8A. Without admitting the allegations of the complaint, Whitney Barrel consented to the entry of a Final Judgement on April 25, 1985 and agreed to pay a civil penalty of $5,000.00. At the time of the alleged discharge, neither Whitney Barrel Co. nor Kingston Steel Barrel Co. had a National Pollution Discharge Elimination System (NPDES) permit. 7

Also in 1979, the Massachusetts DEQE Division of Water Pollution Control (Lord, 1979, MWPC), inspected at the Site and reported that there were areas on-Site "..where oil and various chemicals have either leaked or spilled on the ground from the tanks and barrels.." stored on the property.

In February 1985, the Remedial Investigation contractor for the City of Woburn Wells G & H study, NUS Corporation, attempted to install a monitoring well on the Whitney Barrel Co. property. NUS reported (DEQE - NE, 1986) that at a depth of 3.5 feet, a black sludge-like material was encountered during drilling. Routine air monitoring using an Organic Vapor Analyzer (OVA) conducted by NUS during drilling for health and safety purposes detected a total volatile organic (TVO) compound concentration of approximately 250 ppm over the borehole when the driller reached that depth. The hole was abandoned by NUS and the issue was later referred to the Massachusetts DEQE by the US EPA.

In December 1986, the DEQE issued a Notice of Responsibility (NOR) to Whitney Barrel Co. pursuant to MGL Chapter 21E. The information reported by NUS was cited as evidence in support of the issuance of the NOR. The Whitney Barrel Company was identified as a responsible party and was requested by DEQE to take actions to define and evaluate on-Site environmental conditions. In October 1987, the E.C. Jordan Company of Wakefield, Massachusetts prepared a Scope of Work and Cost Plan for a Phase I Site Assessment at DEQE's request. After discussion with DEQE, the current Site owner, Ruth Whitney, agreed to contract with GHR to perform the work required by DEQE in the NOR.

Pursuant to an Administrative Consent Order effective July 6, 1988 between Ruth Whitney and DEQE, the Site investigation summarized in this report was initiated. The Scope of Work for the Site investigation was developed by GHR during Consent Order negotiations and was approved by DEQE as sufficient to satisfy requirements for Phase I and II of the response action within the meaning of Section 3A (d) (2&3) of Chapter 21E.

SECTION FOUR - FIELD INVESTIGATION

4.0 INTRODUCTION

This Section presents a summary of the field investigation performed as part of the Site assessment. The field investigation consisted of the following activities:

- Installation of eight soil vapor probes, subsequent sampling and analyses of soil vapors, and further development of Site Health and Safety Plan based on results.

- Conductance of an electromagnetic terrain conductivity geophysical survey.

- Confirmation of floor drain connection to sewer.

- Excavation of seventeen test pits, and collection and analysis of soil samples.

- Execution of twelve soil borings, and collection and analysis of soil samples.

- Installation of four piezometers.

- Installation of four monitoring wells.

- o Sampling and analysis of groundwater.

- o Survey of Site.

The field investigation was designed to evaluate current hydrogeological conditions, evaluate the likelihood for the existence and source(s) of any oil and hazardous materials, assess the nature and on-Site extent of oil or hazardous materials, and provide data on soil and groundwater quality.

4.1 Soil Vapor Survey and Health and Safety Plan Development

A soil vapor survey (SVS) of a portion of the Site was conducted in June and July, 1988. The purpose of the soil vapor survey was to help to characterize on-Site health and safety issues (i.e. levels of personal protection required) for further development of the Site Health and Safety Plan to be used during the intrusive field investigation. The results of the SVS were also used to identify areas of the Site in which soil and/or groundwater may be contaminated by volatile constituents and to aid in planning test pit and monitoring well locations.

Prior to initiation of the more intrusive phases of the field investigation, eight soil vapor probes, SG-1 through SG-8, were installed on June 23, 1988 at the Site. Locations of the probes are depicted on Figure 3. The soil vapor probes were constructed of five foot lengths of one-half inch ID Schedule 40 PVC slotted at one inch intervals over the bottom three feet. Approximately 1.5 inch diameter borings were advanced by steel drive bar to a depth of 3.5 feet and the soil vapor probes were installed into the borings. Silica filter sand was packed around the slotted interval of each probe in each boring. The probe installation was completed by placing a bentonite/cement mix seal at the ground surface at each boring location to create a seal around the annular space between the boring and the PVC.

The soil vapor in each probe was screened on June 23, 1988 with an HNu-101 photoionization detector referenced to a benzene standard by inserting the tip of the HNu-101 into each probe. Samples were subsequently collected from the soil vapor probes on June 27 and 28 1988 and were sent to GHR Analytical, Inc. of Lakeville, MA for volatile organic compound screening for EPA Method 601/602 compounds. The procedure utilized for collection of soil vapor samples was as follows:

- The top of each probe was sealed with a teflon seal fitted in a Swagelok[R] union fitting

- 600 ml of soil vapor was evacuated from within each probe with a 60 ml syringe and:

- 5 ml of soil vapor was collected in an airtight glass syringe. Separate syringes and needles were utilized for collection of each sample. After vapor sample collection, the needles were capped with small pieces of rubber and the syringes were immediately placed on ice and transported, following chain of custody protocol, to GHR Analytical.

On July 12, 1988 hydrogen sulfide vapor content in four of the soil vapor probes (SG-3, SG-4, SG-5, and SG-6) was measured. Hydrogen sulfide vapor measurements from the probes were obtained utilizing draeger tubes. On August 1, 1988, GHR resampled soil vapor probe SG-5 for confirmatory analysis of the presence or absence of volatile organic compounds. The same procedures described above were used to collect and analyze the soil vapor sample for the confirmatory soil vapor sampling round.

4.2 Geophysical Survey

GHR conducted an electromagnetic (EM) terrain conductivity survey at the Site on July 25, 1988. A Geonics Limited Model EM31DL EM conductivity unit was used by GHR during the geophysical survey. The primary objective of the EM survey was to identify the location and/or potential presence of on-Site buried conductive objects (i.e. metal tanks, drums, and subsurface utilities) before the initiation of intrusive on-Site activities.

The Geonics EM31DL is calibrated to read the apparent subsurface conductivity in millimhos per meter (MMHO/M). The conductivity value resulting from an EM instrument is a composite, and represents the combined effects of the thickness of soil or rock layers, the depths, and the specific conductivities of the materials. The instrument reading represents the combination of these affects extending from the surface to a depth of approximately 20 feet (the nominal depth of penetration of the Geonics EM31DL). The resulting conductivity values are influenced more strongly by shallow materials then by deeper layers.

The EM survey was initially conducted with the EM instrument operated to measure the quadrature-phase component of the induced magnetic field, since this component of the magnetic field is linearly related to the ground conductivity. This initial survey was conducted on a reconaissance basis, that is, along geophysical survey lines, as shown on Figure 11, with individual station readings every 12.5 feet. Equipment and automobiles stored on-Site prohibited GHR from geophysically surveying approximately half of the Site in a reconaissance manner.

After the initial EM survey was performed, the Geonics EM31DL was operated to measure the inphase component of the induced magetic field, since this component of the magnetic field is more sensitive than the quadrature-phase component at detecting buried metallic objects. This portion of the EM survey was performed by systematically criss-crossing the Site with the EM instrument. Anomalous conductivity values were marked with a wooden stake for location.

4.3 Confirmation of Floor Drain Connection to City/MWRA Sewer

A floor drain dye test was conducted on August 23, 1988, to determine if the floor drain located in the rear of the main building was still connected to the municipal sewer main. The dye test was conducted as follows:

- o A five gallon mixture of food coloring in water was used as the dye indicator.

- The MWRA sewer manhole cover was removed from the manhole where the on-Site drain discharges into the MWRA sewer.

- Dye indicator was poured into the floor drain located inside the main building on-Site, and discharge of dye was then observed in the sewer manhole in the MWRA sewer.

The dye was observed discharging to the sewer main, indicating that the floor drain line was still connected to the sewer.

4.4 Test Pit Excavations

Seventeen test pits were excavated by the Greene Company of Allston, Massachusetts on August 25 and 26, 1988. The purpose of test pit excavations was to characterize subsurface soils and to collect soil samples for chemical analysis. Chemical analysis was performed in order to determine concentrations of selected parameters as described below.

Test pit locations are depicted on Figures 3 and 9. Test pit logs are presented in Appendix C. Each test pit excavation was observed and soils logged by a GHR geologist using the Burmister Classification System. The surface dimensions of each test pit excavation were approximately three feet by eight feet. Each test pit was excavated to a depth of five to eight feet or until groundwater was encounterd.

Materials excavated from each test pit were placed on six-mil thick polyethylene sheeting during excavation. After observation, sampling and logging of soils, excavated materials were backfilled into the test pit. The location of each test pit was staked and flagged.

Twelve composite soil samples were collected for laboratory analysis of 23 bulk HSL metals by EPA Method 200 Series, pesticides/PCB's by EPA Method 8080 and acid-base/neutral extractable organic compounds and volatile organic compounds (VOCs) by EPA Method 8270/8240. A duplicate sample was collected from TP-12 and assigned a separate sample number (TP-19) to prevent laboratory bias during analysis. The sampling procedure was as follows: Upon completion of each test pit, the side of the backhoe bucket was scraped from the bottom of the excavation up the sidewall to the top of the excavation. The bucket was pulled directly out and raised to the surface. The loose soil in the bucket was cleared away with a clean sampling spatula in order to retrieve a representative composite soil sample. Care was taken not to collect potentially non-representative soil immediately adjacent to the backhoe bucket. The resultant sample was a vertical composite of the soils from the bottom to the top of the test pit. *

Soil sample containers were labeled with date, time, sample location, sample number, and sample collector. Samples were chosen for laboratory analysis based on GHR's observations and on field screening methods described below. Soil samples selected for detailed analysis were put on ice immediately after sampling and were delivered to GHR Analytical following chain of custody protocol.

Upon completion of each excavation, the backhoe was steam cleaned. All steam cleaning was performed on the west side of the main building between the location of TP-6 and B-3. Sampling equipment was also steam cleaned, then rinsed with methanol, and rinsed again with clean water.

During excavation, composite soil samples collected from each test pit excavation were screened with an HNu-101 photoionization detector referenced to a benzene standard for total volatile organic (TVO) content measured in the headspace of sealed glass soil jars. In addition, the ambient air in and around test pit excavations was continuously monitored for TVO content with an HNu-101 as specified in the Health and Safety Plan (Appendix B). TVO measurements at each test pit location from composite samples, from ambient air readings, and from soil samples collected from selected soil horizons (based on observed elevated ambient TVO readings) in TP-3, TP-12, TP-13, TP-15, and TP-18 are indicated on test pit logs in Appendix C. Based on the Health and Safety Plan, TVO concentrations in ambient air detected during excavation of TP-12, TP-13, and TP-15 (>5 ppm TVO continuously) mandated a personal protective equipment upgrade from modified Level D to Level C protection for personnel excavating and observing test pits.

4.5 Soil Borings

Twelve soil borings were executed by GeoLogic, Inc. of Watertown, MA on August 30, 1988 through September 2, 1988. Four wells and four piezometers were installed in the twelve soil borings. Boring, piezometer, and well locations are depicted on Figures 3 and 9 and test boring/monitoring well installation logs are presented in Appendix D. The purpose of soil borings was to characterize subsurface soils, collect soil samples, and to facilitate installation of piezometers and monitoring wells. Piezometers and monitoring wells were installed to assess hydrogeolgoic conditions and groundwater quality at the Site.

Soil borings were advanced utilizing 4.25 inch inside diameter hollow-stem augers. Standard penetration tests yielding split-spoon soil samples were conducted at five foot intervals in each soil boring. Soil samples were visually classified and logged by both the drilling foreman and a GHR geologist. Soil samples were retrieved and field screened for total volatile organic content measured in the headspace of sealed soil sample jars with an HNu Model 101 photoionization detector referenced to a benzene standard. The HNu-101 field screening results are presented on drilling logs in Appendix ~~C.~~ D. All drilling and split-spoon sampling equipment was steam cleaned prior to execution of each boring. Split-spoon sampling equipment was decontaminated via an alconox wash-methanol rinse-water rinse between collection of each split-spoon sample at each boring location.

*Composite soil samples were collected for laboratory analysis from each soil boring and a duplicate sample was collected from B-6. At the same time a grab sediment sample was collected from the floor drain located inside the main building on-Site. Composite soil samples and the floor drain sediment sample were submitted for analysis of volatile and acid-base/neutral extractable organic compounds by EPA Methods 624 and 625, pesticides and PCB's via EPA Method 8080, and 23 bulk HSL metals. Soil samples selected for analysis were packed on ice immediately after sampling and were delivered to GHR Analytical following chain-of-custody protocol.

4.6 Piezometer Installation

Piezometers were installed in four soil borings (B-1, B-2, B-4, and B-7). Each piezometer was 10 feet long and constructed of 0.5 inch ID Schedule 40 PVC, slotted at one-inch intervals over the bottom 3 feet. Piezometer locations are depicted on Figure 3 and details of installation are included in Appendix D. Each piezometer was installed by inserting the slotted end into the soil boring. Natural sand was packed around the slotted section of the piezometer. Each piezometer boring was backfilled to the ground surface with natural material from each boring location.

4.7 Monitoring Well Installation

Monitoring wells were installed in four soil borings, MW-1S, MW-2S, MW-3S, and MW-4S, as depicted on Figure 3. Monitoring wells were constructed of Schedule 40 2.0-inch ID PVC riser pipe, attached via flush threaded joints to Schedule 40, 2.0-inch 0.010 inch slotted well screen. To prevent possible contamination of the wells by volatile or semivolatile organic compounds, no glue, tape, lubricants, or other materials were utilized to join PVC pipe sections. The monitoring wells were sand packed with filter sand from the base of the well screens to variable heights above the top of the well screens (Appendix D). At least a 1-foot seal of bentonite pellets was installed above each well screen to prevent the infiltration of surface water into the well. The wells were then backfilled with native soils above the bentonite seals. Wells MW-1S, MW-2S, and MW-3S were fitted with a roadway box set in cement and well MW-4S was fitted with a 4-inch diameter, 4-foot long locking protector pipe set in cement to protect the well against tampering, vandalism, and the elements. Details of construction of each monitoring well are provided in Appendix D.

Wells were developed on September 26, 1988 by pumping and/or bailing each well until the purge water was clear or until 50 well volumes were removed. Purge water was discharged to the ground surface within 20 feet of each well location. Care was taken to adjust the pumping rate to avoid pooling of purge water at the ground surface.

4.8 Groundwater Sampling

Groundwater samples from monitoring wells MW-1S through MW-4S were collected on October 17, 1988. Field sampling logs are included in Appendix E. Prior to sampling, the static water level and total depth of each well was measured. Non-aqueous phase product was not observed in any of the monitoring wells. The total standing volume of water in each well was calculated, then each well was purged of at least three standing volumes of water to ensure that a representative sample of groundwater was obtained. Wells were purged using a PVC bailer. Purging and sampling apparatus was decontaminated between wells to prevent cross contamination of samples by scrubbing in alconox water, rinsing with methanol, and final rinsing with water.

Groundwater was collected after purging the third volume and field screened for pH, conductivity, and temperature. Groundwater samples were collected for laboratory analysis of volatile and acid-base/neutral extractable organic compounds (EPA Method 9240/8270), pesticides and PCB's (EPA Method 608), and 23 HSL bulk metals (EPA Method 200 Series). Groundwater samples collected for metals analysis were field filtered through 0.4 micron paper filters immediately after collection and were preserved to a pH of 2 with nitric acid after filtering. Groundwater sample containers were labeled with date, time, sample location, sample number, and sample collector. Groundwater samples were put on ice immediately after sampling and were delivered to GHR Analytical following chain of custody protocol.

4.9 Elevation and Location Survey, Water Level Measurements, and Determination of Groundwater Flow Direction

A survey of the elevation and location of all test pits, soil borings, and monitoring wells was conducted on October 4, 1988. The surveyed locations of on-Site features, field investigation points, and the property line are depicted on Figure 9.

On November 3, 1988, GHR obtained permission and access to ten off-Site monitoring wells (Figure 9) and obtained depth to groundwater measurements from the top of the PVC in on-Site wells and piezometers and the accessed off-Site wells. A summary of monitoring well information for all wells included in the water level survey is presented in Table 4. Depth to groundwater measurements were subtracted from monitoring well elevations (top of PVC) to produce groundwater table elevations. These values and a resulting groundwater contour plan are presented on Figure 9.

SECTION FIVE - SITE GEOLOGY AND HYDROGEOLOGY

5.0 Introduction

Surficial geology of the Boston North quadrangle, which includes the Site and surrounding area, has not been mapped by the US Geological Survey. However, the surficial and bedrock geology of the area including the Site has been characterized in previous environmental assessment reports related to investigations of Woburn Municipal Wells G & H contamination (eg. NUS, 1986). Hydrogeologic information for the area including the Site has been compiled by the US Geological Survey (Delaney and Gay, 1980 and Myette, et al., 1987). Details of surficial geologic conditions on-Site were developed from GHR's field investigation program, as described in Section Four of this Report.

5.1 Surficial Geology

The surficial geology of the Site is characterized from twelve soil borings and eighteen test pits executed across the Site. Soil borings and test pit locations are shown on Figure 3. Schematic stratigraphic cross-sections are shown on Figures 6, 7, and 8. Figure 9 indicates the location of the cross-section lines. Details of Site stratigraphy are found on the test pit logs in Appendix C and the soil boring logs in Appendix D. Photographs of subsurface stratigraphy are shown on Figure 10.

The borings and test pits performed for this assessment indicate that two major surficial stratigraphic units occur at the Site. In general, stratigraphy at the Site is characterized by fill material at the ground surface underlain by glacial outwash deposits. The on-Site fill material ranges in thickness from two to six feet. The fill is composed predominantly of sand

and gravel to cobbles, with isolated occurrences of thin (one to three inches) layers of ash, metal, brick, plastic, and wood fragments, and thin organic soil horizons. Figure 10a depicts the fill material, consisting of sand and gravel, excavated from test pit TP-15.

The transition from the overlying fill material to the outwash deposits is marked by a black organic sand horizon containing what appears to be wood ash. This organic horizon is approximately three inches thick and was encountered in nearly every boring and test pit on-Site. Figures 10a and 10b depict the stratigraphic relationship and character of the dark colored organic horizon.

The origin of the organic horizon is unknown but its character and areal distribution seem to indicate a fire occurred sometime prior to the filling of the Site. Although there have been several fires on the Site in the past forty years, the land surface at the Site has not been significantly altered in that time according to John E. Whitney, III, and therefore cannot account for the organic horizon.

The organic horizon directly overlies outwash deposits. Outwash is a glacial deposit, usually ranging in size from fine sand to coarse gravel, that was deposited by meltwater from an ice mass. Outwash deposits commonly contain laminar cross-bedding and often include coarser-grained outwash channel deposits. Both of these features were observed in the test pit and/or soil boring excavations on-Site (refer to Appendices C and D for details of stratigraphy).

All borings and test pits executed on-Site were terminated in outwash material, therefore total outwash thickness was not determined. Information from soil borings near the Site indicate that the outwash deposits are up to 85 feet thick. The outwash deposits consist predominantly of fine to medium sand. Isolated fine to medium sand and fine to coarse gravel lenses, ranging in thickness from several inches to several feet occur throughout the Site. Refer to Figures 6, 7, and 8 for location and character of the sand and gravel lenses.

5.2 Bedrock Geology

None of the soil borings or test pits performed for this assessment penetrated bedrock. However, information on area bedrock geology has been compiled during previous investigations (eg. NUS, 1986). Information was derived from bedrock outcrops along the valley margins and from numerous test borings completed in bedrock throughout the Aberjona River valley.

The surficial material, described in Section 5.1 was deposited in a glacially-scoured bedrock valley. The Aberjona River flows along the axis of the bedrock valley, trending northwest to southeast. Local bedrock has been mapped as the Dedham Granodiorite and the Salem Gabbro-diorite (NUS, 1986).

Depth to bedrock in the section of the valley including the Site ranges from the ground surface where outcrops occur along the B & M railroad tracks, approximately 500 feet northwest of the Site to approximately 110 feet below ground surface near the valley axis (NUS, 1986). Bedrock was encountered at a depth of 61.5 feet below ground surface (16.08 below NGVD) during the installation of monitoring well W-8 (NUS, 1986). Well W-8 is located approximately 200 feet north of the Site (refer to Figure 9 for well location). Based on bedrock elevation information from test borings located on surrounding properties, depth to bedrock on the Site is estimated to be 60 to 90 feet below ground surface.

5.3 Hydrogeology

The Site is located in the Aberjona River valley, which is included in the Mystic River drainage basin. Aquifer characteristics for the area including the Site have been compiled by the US Geological Survey (Delaney and Gay, 1980 and Myette, et al, 1987).

The primary aquifer in the Aberjona valley is the stratified drift deposits (outwash sand and gravel) that underlie the Site and surrounding area. The primary recharge source for the aquifer is precipitation and surface water infiltration. The transmissivity of the primary aquifer has been mapped as greater than 4000 square feet/day with an estimated potential well yield of greater than 300 gallons/minute.

An industrial water supply well, owned by J.J. Riley is located just north of the Site. Refer to Figure 9 for Riley well (also designated S-46 in previous reports) location. The well is screened in outwash material. According to Barbara Newman of the US EPA, Region I (project manager for the Wells G & H study) the well is pumped six days a week for approximately 14 hours per day. Reported pumping rates range from 500 to 700 gallons/minute with an estimated production rate of 350,000 gallons/day (B. Newman, 1988, Myette, et al., 1987 and NUS, 1986).

GHR installed four monitoring wells and four piezometers in test borings at the Site, as described in Section Four. Static water level information was obtained on November 3, 1988 from the on-Site wells, one piezometer (all others had silted in), and from ten wells located on adjoining properties to the north, east and west. Table 4 summarizes information for all wells included in the static water level survey. Figure 9 shows well locations and static water level elevations.

In general, the groundwater surface at the Site area slopes gently to the northeast. The wetlands bordering the Site to the north and west are interpreted as areas where the groundwater surface is at or near the land surface. From inspection of Figure 9 it appears that there is a localized groundwater divide in the vicinity of wells MW-4S, B-7 and BSW-2. We can only surmise that this divide has been caused by the pumping of the Riley production well (S-46) located immediately northwest of the Site. GHR understands that the well is still active but information on the pumping rate, length of pumping or aquifer characteristics at the Riley well could not be confirmed. Groundwater to the south and east of the divide does not appear to be affected by pumping of the Riley well and flows to the northeast. Groundwater north and west of the divide appears to be captured by the Riley well. It should be understood that this groundwater divide is not static in space or time. Depending upon the pumping rate and duration of pumping of the Riley well, the groundwater divide will shift and encompass more (or less) of the Site.

SECTION SIX - FIELD AND LABORATORY RESULTS

6.0 Introduction

This Section summarizes results of field testing and laboratory analytical work performed during the course of the field investigation. Laboratory analytical data is presented in Appendix F and summarized below. Field testing data is presented on Test Pit and Well Logs in Appendices C and D, respectively and is also summarized below. The results are discussed in the chronological order in which the field tasks were conducted.

6.1 Soil Vapor Sampling Results

Four soil vapor samples were collected on June 27, 1988; four soil vapor samples were collected on June 28, 1988; and one soil vapor sample was collected on July 25, 1988. All soil vapor samples were submitted to the laboratory for a purgeable halocarbon and purgeable aromatic scans. Soil vapor probes were field screened on June 23, 27 and 28, 1988, and on July 12 and 25, 1988, with an HNu-101 photoionization detector referenced to a benzene standard. Results of HNu-101 field screening of each soil probe are summarized in Table 5. On July 12, 1988, four soil vapor probes were tested for presence of hydrogen sulfide by draeger tube semi-quantitative analysis.

Soil vapor probes were installed on June 23, 1988. HNu-101 field screening (referenced to a benzene standard) of soil vapor probes performed on June 23, 1988 detected up to 300 ppm (at SG-5) total volatile organic compounds (TVO; Table 5) Laboratory analyses of soil vapor samples collected on June 27 and 28, 1988 from each probe did not detect purgeable halocarbon or purgeable aromatic organic compounds. It should be noted that the HNu-101 was operated with a 10.2ev ionizing lamp during all field screening activity. On July 12, 1988, soil vapor probes were screened again for TVO content with the HNu-101. Vapor samples screened from probes SG-3, SG-4, SG-5, and SG-6 showed TVO concentrations above detection limits of the HNu-101 (Table 5). Also on July 12, 1988, vapor samples from these probes were field screened for hydrogen sulfide utilizing draeger tubes. No hydrogen sulfide was detected by the draeger tubes in soil vapor from SG-3, SG-4, SG-5 or SG-6. On July 25, 1988, an additional soil vapor sample was collected from probe SG-5 for laboratory analysis for confirmation of previous results. Probe SG-5 was selected based on elevated field screening results previously obtained. The laboratory analysis of soil vapor collected from SG-5 on July 25, 1988 did not detect purgeable halocarbons or purgeable aromatics.

During each field screening of soil vapor probes, the highest HNu-101 readings were detected in probes SG-4 and SG-5 (Table 5). Although calibrated to benzene, and therefore, all results referenced to a benzene standard, the HNu-101 photoionization detector is capable of detecting several chemical species (other than volatile organic compounds) with the 10.2ev ionizing lamp. Analytical results from the soil vapor samples suggest that the compounds detected by HNu-101 screening are not purgeable halocarbon or purgeable aromatic volatile organic compounds. The HNu-101 results likely represent detection of organic and/or inorganic compound vapors with ionization potentials less than 10.2 ev that were not detected by the analytical scans or by hydrogen sulfide screening. The Site Health and Safety plan (Appendix A) for test pit excavations and soil borings was subsequently modified to include the observations and results described in Section 6.1.

6.2 Geophysical Survey Results

The apparent terrain conductivity values obtained during the initial EM survey (instrument operated to measure the quadrature phase component of the induced magnetic field) ranged from 8 to 54 millimhos per meter (mmho/m). Background conductivity values were approximately 15 mmho/m. Areas at anomalously high (greater than 20 mmho/m) or negative terrain conductivity values were marked and plotted as shown on Figure 11. Anomalously high or negative conductivity values obtained when the EM instrument was operated to read the in-phase component of the induced magnetic field were also marked and plotted as shown on Figure 11.

The subsurface investigation program was then planned to include further investigation at the anomalous areas identified from the geophysical survey. No evidence of buried metal objects, such as tanks or barrels, was discovered during excavation of on-Site test pits or during execution of soil borings and installation of monitoring wells. Anomalously high and negative terrain conductivity values detected at the Site are most likly attributable to metal surface and surfically buried debris present at all locations on the Site.

6.3 Results of Analyses of Test Pit Soils

Analytical results of soil samples collected from test pits are summarized in Table 6. Eleven composite soil samples were analyzed for bulk metals (EPA Method 200 Series). volatile organics (EPA Method 8240), base/neutral and acid extractable organics (EPA Method 8270), and for PCBs and Pesticides (EPA Method 8080). Sample selection criteria are described in Section 4.4.

6.3.1 Results of Field Screening of Soils From Test Pits

Field screening of ambient air and air in test pits for total volatile organic compounds (TVOs) was conducted during each of the test pit excavations using an HNu-101 photoionization detector referenced to a benzene standard. Ambient air TVO concentrations detected during the excavation of each test pit ranged from 0 to 30 parts per million (ppm) at TP-12. TVO concentrations within each test pit ranged from 45 to 200 ppm in test pits TP-12 and TP-13 and from 0 to 12 ppm in the remaining test pits. Composite soil samples collected from each test pit were also field screened with the HNu-101 referenced to a benzene standard. Screening measurements of these soil samples ranged from 0.2 ppm (TP-2) to 260 ppm (TP-6), and are provided on Figure 12. The highest (>50 ppm) HNu-101 readings were from soil samples collected from test pits excavated close to the existing on-Site building, near the rear (northern) entrance.

6.3.1 Results of Analysis of Test Pit Soils for Bulk Metals Content

Analyses for 23 bulk metals was performed on the 12 composite soil samples from the test pits for laboratory analysis. Results are presented on Table 6, along with a range of expected background concentrations for the same metals in soils after Lindsay (1979).

Beryllium, cadmium, selenium, silver, thallium. and vanadium were not detected in any test pit soil sample above the instrument's detection limit for that element. Aluminum, barium, calcium, chromium, cobalt, copper, iron, magnesium, manganese, nickel, potassium, sodium, and zinc were all detected in one or more soil samples, but at concentrations well below or within the natural or background range of occurrence for these metals (Table 6).

Antimony was detected in 5 of the 12 soil samples. In these 5 samples, antimony concentrations ranged from 22 to 32 mg/kg. These concentrations exceed the expected background concentration range of 0.6 to 10 mg/kg (Lindsay, 1979). In the remaining six samples antimony was not detected above the method detection limit. It should be noted that the analytical method detection limit for antimony was 20 mg/kg as set by EPA Method 204.1 for analysis of bulk antimony.

Arsenic was detected in all 12 samples. In 10 samples, arsenic concentrations were less than 5 mg/kg. These concentrations are well within the background range of 1 to 50 mg/kg (Lindsay, 1979). In the soil sample from TP-12, however, the concentration of arsenic was 415 mg/kg (375 mg/kg in the duplicate).

Lead was also detected in all 12 samples. In 11 samples, lead concentrations ranged between 10 to 100 mg/kg. These concentrations are well within the background range of 2 to 200 mg/kg for lead (Lindsay, 1979). The soil sample from TP-17, however, contained 252 mg/kg of lead.

Mercury was detected in all 11 soil samples analyzed. The concentrations detected ranged between 0.34 to 0.70 mg/kg. These concentrations are above the background range of 0.01 to 0.3 mg/kg for mercury (Lindsay, 1979).

6.3.3 Results of Analyses of Test Pit Soils for Volatile Organic Compounds

Eleven test pit composite soil samples were analyzed for thirty five (35) volatile organic compounds (VOCs). The results of these analyses are presented in Table 6 for the samples showing VOC concentrations above detection limits. Methylene chloride, acetone, 2-butanone, and 4-methyl-2-pentanone were detected in one or more samples as laboratory blank contamination.

Of the 11 samples, 5 samples (soils from TP-1, TP-7, TP-9, TP-12, and TP-13) contained detectable concentrations of total volatile organic compounds (VOCs), ranging from 7 ug/kg total volatile organics (TVO) in TP-1 to 711,176 ug/kg (310,212 ug/kg in the duplicate) in TP-12. With the exception of TP-12, the other four soil samples in which VOCs were detected contained less than 100 ug/kg TVO. The compounds identified in the soil sample from TP-12 are trichloroethene (TCE), tetrachloroethene (TTCE), toluene, total xylenes, ethylbenzene, 1,1,1-trichloroethane (TCA), and chlorobenzene. TCE and TTCE comprise over 90% of the VOCs detected in the soil sample from TP-12. The results of analysis of a duplicate sample from this location showed the same compounds and additionally, 1,2-dichloroethene. TTCE was detected at all of the remaining four locations (TP-1, TP-7, TP-9, TP-13) and TCE was detected at two of the remaining four locations (TP-1, TP-7).

6.3.4 Results of Analyses of Text Pit Soils for Base/Neutral Extractable Compounds

Base/neutral extractable compounds (BNEs) were identified in all eleven of the soil samples analyzed (Table 6). A total of 25 different compounds were detected; each sample contained a different distribution of compounds. The soil sample from TP-9 contained five compounds, the least number of BNE compounds detected in any one sample, with a total BNE concentration of 864 ug/kg. Soil sample TP-12, however, contained thirteen compounds, but the total concentration of BNE compounds (237 ug/kg, 217 ug/kg in the duplicate sample) was the lowest overall. The highest concentrations of BNEs were detected in the sample from TP-17 (24,090 ug/kg total BNEs). This sample contained 22 different BNE compounds.

6.3.5 Results of Analysis of Test Pit Soils for Acid Extractable Compounds

Each test pit soil sample was analyzed for the presence of 15 acid extractable compounds. Only one compound was detected, 2,4,5 -

trichlorophenol, and in only two test pit soil sample locations, 16 ug/kg in TP-12; (17 ug/kg in the duplicate sample for TP-12), and 93 ug/kg in TP-15).

6.3.6 Results of Analysis of Test Pit Soils for Pesticides/PCB's

Each of the twelve composite soil samples were analyzed for 19 pesticide compounds and 7 PCB aroclor compounds. One pesticide compound (chlordane) was detected in 6 of the test pit soil samples. The highest concentration of chlordane was detected in the sample from TP-11 which showed at a concentration of 26.8 ug/kg.

Four (4) PCB aroclor compounds (PCB-1242, PCB-1254, PCB-1248, PCB-1260) were detected in 11 of the 12 test pit soil samples, with no more than 2 aroclors detected in any one sample. The highest concentrations of any one PCB compound were detected in TP-11 (46.6 mg/kg of PCB-1260) and in TP-12 (56 mg/kg of PCB-1260; 94.8 mg/kg in the duplicate).

6.4 Results of Analyses of Soils From Soil Borings

Analytical results of soil boring samples are summarized in Table 7. Composite soil samples from each of the twelve soil borings advanced on-Site were analyzed for bulk metals, volatile organics, base/neutral and acid extractable organics, and for PCBs and pesticides. The methods of analyses were the same as for the test pit soil samples. Sample selection criteria are described in Section 4.5.

6.4.1 Results of Field Screening of Soils From Soil Borings

Analytical screening for total volatile organics (TVOs) was conducted during each boring and on each split spoon sample with an HNu Model 101 photoionization detector referenced to a benzene standard. Results of TVO field screening of split spoon soil samples from borings B-1, B-2, B-3, B-7, and B-8 were all less than 3 ppm Figure 12. Results of TVO field screening of split spoon samples from B-6, MW-2S, MW-3S, and MW-4S were typically between 10 and 100 ppm. Results of TVO field screening that were above 100 ppm were measured in the split spoon samples from B-4 (250 ppm at 0 to 2 feet), B-5 (125 ppm at 0 to 2 feet), and from MW-1S (170 ppm at 4 to 6 feet).

6.4.2 Results of Analyses of Soils from Soil Borings for Bulk Metals Content

Analysis of soils for 23 bulk metals was performed on a composite split spoon soil sample from each of the twelve borings. Results are presented on Table 7, along with a range of expected background concentrations for the same metals in soils after Lindsay (1979).

Beryllium, cadmium, selenium, silver, thallium, and vanadium were not detected in any of the composite split spoon soil samples above the instrument's detection limits for these elements. Aluminum, arsenic, barium, calcium, chromium, cobalt, copper, iron, magnesium, manganese, nickel, potassium, sodium, and zinc were all detected in one or more samples, but at concentrations well below or within the natural or background range of occurrence for these metals (Lindsay, 1979).

Antimony was detected in five of the twelve samples at concentrations (22 to 30 mg/kg) above the expected background concentration range of 0.6 to 10 mg/kg (Lindsay, 1979). Antimony was not detected above the instrument's detection limit of 20 mg/kg in any of the other seven samples. Again, it should be noted that the method detection limit of 20 mg/kg is higher than the high end (10 mg/kg) of the background range for antimony.

Lead was detected in all samples, but in only one sample (B-3) at a concentration (233 mg/kg) above the expected background range of 2 to 200 mg/kg (Lindsay, 1979).

Mercury was detected in four of the twelve samples at concentrations ranging from 0.28 mg/kg to 0.52 mg/kg. Two of the four samples contained mercury above the expected background range of 0.01 to 0.3 mg/kg (Lindsay, 1979): 0.36 mg/kg in MW-3S, and 0.52 mg/kg in B-3.

6.4.3 Results of Analyses of Soils From Soil Borings for Volatile Organic Compounds

Table 7 summarizes those VOCs detected in split spoon samples. Methylene chloride, acetone, and 2-butanone were detected in one or more samples as laboratory blank contamination.

Of the twelve samples, eight samples contained near trace but detectable concentrations of VOCs ranging from 2 ug/kg TVO in soils from MW-3S and B-7 to 18 ug/kg TVO in soils from B-4. The VOCs detected in split-spoon samples include: TTCE, TCE, carbon disulfide, toluene, methylene chloride and acetone. TTCE and acetone were the individual compounds detected at the highest concentrations (13ug/kg TTCE in MW-1S and 17 ug/kg acetone in B-4).

6.4.4 Results of Analyses of Soils from Soil Borings for Base/Neutral Extractable Organic Compounds

Base/Neutral extractable organic compounds (BNEs) were identified in all of the 12 soil samples (Table 7). A total of 23 different BNE compounds were detected: each sample with a different distribution of compounds. Total BNE concentrations ranged from 160 ug/kg in the B-4 composite sample to 16,810 ug/kg in the B-7 sample. The distribution of total BNE concentrations (Figure 13) detected in split spoon samples is very similar to the total BNE concentrations detected in test pit soil samples.

6.4.5 Results of Analyses of Soils from Soil Borings for Acid Extractable Organic Compounds

No acid extractable organic compounds were detected within any of the twelve soil samples.

6.4.6 Results of Analyses of Soils From Soil Borings For Pesticides/PCB's

Chlordane and PCB aroclors 1254 and 1260 were the only compounds detected in soil samples from the borings. Chlordane was detected in 10 of the 12 samples at concentrations ranging from 0.06 ug/kg in soil from B-8 to 6.30 ug/kg in soil from B-5. Chlordane was not detected at MW-1S or B-2.

PCBs were detected in 9 of the 12 samples at concentrations ranging from 0.07 mg/kg in B-1 to 5.37 mg/kg in MW-3. Only one type of PCB compound (either PCB-1254 or PCB-1260) was detected in soil samples where PCB's were detected. The highest concentrations of PCBs were detected in soils from MW-3S (5.37 mg/kg of PCB-1260) and B-5 (5.36 mg/kg of PCB-1260). PCBs were not detected in soils from MW-2S, B-2, and B-8.

6.5 Groundwater Sampling Results

Analytical results of groundwater samples are summarized in Table 8. The four groundwater samples were analyzed for heavy metals (EPA Method 200 series), volatile organics (EPA Method 8240), base/neutral and acid extractable organics (EPA Method 8270), and for PCBs and pesticides (EPA Method 608).

6.5.1 Results of Bulk Metals Content Analyses

Results of bulk metal analyses, with the Massachusetts Maximum Contaminant Levels (MMCLs) as set forth in 310 CMR 22.06, or Massachusetts Minimum Groundwater Quality Standards (MMGQSs) for Class I and II Groundwaters as set forth in 314 CMR 6.06, are presented on Table 12.

Antimony, barium, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, nickel, selenium, silver, thallium, and vanadium were not detected in any of the four groundwater samples above the instrument's detection limits. The detection limit for lead (0.1 mg/l) however, is above the MMCL for lead (0.05 mg/l) for the analytical method used. Therefore lead could be present in groundwater at the Site, at concentrations above this regulatory standard, but below the detection limit for the analytical method called for in this investigation.

Zinc was detected in all four samples, but at concentrations (0.02 to 0.06 mg/kg) well below the MMGQS (5.0 mg/kg) for zinc in Class I and II Groundwaters.

Calcium, magnesium, and potassium were detected in all samples. Aluminum was detected in all groundwater samples except the sample from MW-3S. MMGQSs do not exist for these compounds.

Arsenic was detected in three (MW-1S, MW-2S, MW-3S) of the four samples, but in only one (MW-3S) at a concentration (0.062 mg/kg) slightly above the MCL for arsenic (0.05 mg/kg). Iron, manganese, and sodium were detected in all four samples at concentrations that exceed the MMGQSs for these elements (0.3 mg/l, 0.05 mg/l, 20 mg/l respectively). mg/l

6.5.2 Results of Volatile Organic Compound Analyses

Table 8 summarizes the results of volatile organic compound analyses for on-Site groundwater samples. Volatile organic compounds (VOCs) were detected in all four groundwater samples ranging from 65 ug/kg total volatile organics (TVO) in MW-1S to 1020 ug/kg TVO in MW-4S. Methylene chloride, acetone, and 2-butanone were detected in one or more of the samples as laboratory blank contamination. One sample from MW-4 contained 140 ug/l of acetone, which is above the laboratory blank concentration. This concentration (140 ug/l) of acetone is well below the MMGQS for acetone (700 ug/l). Chloroform was also detected in the Field Blank, but not in any of the samples from the Site.

The VOCs detected in groundwater on-Site are benzene, chlorobenzene, 1,1,1-trichloroethane (1,1,1-TCA), 1,1-dichloroethane (1,1-DCA), chloroethene, 1,2-dichloroethene (1,2-DCE), ethylbenzene, toluene, vinyl chloride, 4-methyl-2-pentanone, and total xylenes. The compounds detected with the highest concentrations at any on-Site location are 1,1-DCA at 300 ug/l and total xylenes at 180 ug/l, both in grounwater from MW-4S. Each of the remaining compounds were detected at concentrations of less than 100 ug/l in any given sample.

VOCs that were detected above MMCLs as set forth in 310 CMR 22.07 and/or MMGQSs as set forth in 314 CMR 6.07 include benzene and vinyl chloride. Benzene, detected in groundwater at all four locations, equals or exceeds the MMCL for benzene (5 ug/l) at 3 locations (MW-1S, MW-3S, MW-4S). The highest benzene concentration (63 ug/l) was detected at MW-4S. Vinyl chloride, also detected in groundwater at all four locations, exceeds the MMCL for vinyl chloride (2 ug/l) at all locations. The highest concentration of vinyl chloride (32 ug/l) was detected in groundwater from MW-3S.

Chlorobenzene. 1,1,1-trichloroethane (1,1,1-TCA), 1,2-DCE, ethylbenzene, toluene, acetone, and total xylenes were detected below the MCLs or MMGQSs set for those compounds. No standards or guidelines exist for the remaining compounds detected: 1,1-DCA, chloroethane, 2-butanone, and 4-methyl-2-pentanone.

6.5.3 Results of Base/Neutral Extractable Organic Compound Analyses

Base/neutral extractable (BNEs) organic analysis compound results for groundwater samples are summarized in Table 8. Eight (8) different BNE compounds were detected in groundwater at the Site with the highest number of compounds (seven BNEs) in groundwater from MW-4S. The highest BNE concentrations detected in groundwater on-Site were for 1,4-dichlorobenzene (para-DCB) at 140 ug/l in MW-2S, and 1,3-dichlorobenzene (meta-DCB) at 29 ug/l in MW-2S.

MMCLs do not exist for any of the BNE compounds detected on-Site. MMGQSs exist for only two of the BNE compounds, ortho-DCB (600 ug/l) and para-DCB (5 ug/l). Ortho-DCB was detected in two samples from on-Site locations (MW-3S, MW-4S), but at concentrations below the MMGQS. Para-DCB, detected at all on-Site locations except MW-1S, was present in groundwater at concentrations exceeding the MMGQS for this compound in all cases.

6.5.4 Results of Acid Extractable Organic Compound Analyses

Acid extractable analytical results for groundwater samples are summarized in Table 8. Phenolic compounds were the only acid extractable organics identified, principally in MW-4S. One compound (4-methylphenol at

6 ug/l) was detected in MW-3. There are currently no Massachusetts regulations, guidelines, or standards available for comparison with the on-Site acid extractable compound concentrations detected in groundwater samples.

6.5.5 Results of Pesticide/PCB Analyses

Analytical results for pesticide/PCB analyses are summarized in Table 8. There were no pesticides and only one PCB arochlor compound (PCB-1260) detected in on-Site groundwater samples.

PCB-1260 was detected in samples from two wells, MW-2S and MW-3S. There are no Massachusetts regulatory guidelines available for PCBs in groundwater for comparison with the PCB concentrations detected in samples from on-Site groundwater.

6.6 Results of Analysis of Floor Drain Sediment Sample

Analytical results of the floor drain sediment sample are summarized on Table 9. The floor drain sediment sample was analyzed for bulk metals (EPA Method 200 series), volatile organics (EPA Method 8240), base/neutral and acid extractable organics (EPA Method 8270) and for pesticides and PCBs (EPA Method 8080).

6.6.1 Results of Bulk Metal Content Analyses

Analysis for 23 bulk metals was performed on the floor drain sediment sample. A summary of the results are presented on Table 9 along with a range of observed background concentrations for the same metals in soils after Lindsay (1979). Although the sediment was collected from a floor drain, natural background occurrence concentration ranges for metals in soil are included for comparison purposes. The report of laboratory analytical results is included in Appendix F.

Antimony, beryllium, selenium, silver, thallium and vanadium were not detected above analytical method detection limits for these elements. Aluminum, arsenic, barium, calcium, chromium, cobalt, iron, magnesium, manganese, nickel, potassium, and sodium were all detected in the floor drain sediment sample but at concentrations well below or within the natural or background range of occurrence for these metals in soils.

Cadmium was detected at a concentration of 24.8 mg/kg, which is above the observed background occurrence range of 0.01 to 0.7 mg/kg (Lindsay, 1979). Copper was detected at a concentration of 179 mg/kg, which is above the expected background occurrence range of 2 to 100 mg/kg (Lindsay, 1979). Lead was detected at a concentration of 1500 mg/kg, which is above the expected background occurrence range of 2 to 200 mg/kg (Lindsay, 1979). Mercury was detected at a concentration of 1.4 mg/kg, which is above the expected background occurrence range of 0.01 to 0.3 mg/kg (Lindsay, 1979). Finally, zinc was also detected at a concentration of 581 mg/kg, which is above the expected background occurence range of 10 to 300 mg/kg (Lindsay, 1979).

6.6.2 Results of Volatile Organic Analysis

Analyses for the presence of 35 volatile organic compounds was performed on the floor drain sediment sample. Table 9 summarizes only those compounds detected. Methylene chloride, acetone, and 2-butanone were detected at concentrations below the concentration detected in the laboratory blank. The report of laboratory analytical results is included in Appendix E. Volatile organic compounds detected included chlorobenzene (7500 ug/kg), ethylbenzene (9900 ug/kg), toluene (90,000 ug/kg), and total xylenes (46,000 ug/kg). Laboratory analyses also identified 1,1,1-trichloroethane (TCA) (1400 ug/kg), 1,1 dichloroethane (DCA) (1900 ug/kg) and tetrachloroethene (TTCE) (2100 ug/kg) but at concentrations less than the detection limits (refer to laboratory report in Appendix F for details) of the analytical method.

6.6.3 Results of Base/Neutral Extractable Organic Compound Analysis

Nine (9) different base/neutral extractable compounds were detected in the floor drain sediment sample. A summary of the base/neutral extractable compounds detected is presented on Table 9, and the report of laboratory analytical results is presented in Appendix E. Base/neutral extractable compounds detected included bis-(2-ethylhexyl) phthalate (40,000,000 ug/kg), benzyl butyl phthalate (23,000,000 ug/kg), Di-N-butyl phthalate (52,000 ug/kg) Di-N-octyl phthalate (75,000 ug/kg), diethyl phthalate (18,000 ug/kg) and benzyl alcohol (76,000 ug/kg). Laboratory analysis also identified napthalene 6,600 ug/kg, phenanthrene 5,000 ug/kg, and 2-methylnaphthalene 6,500 ug/kg, but at concentrations less than the detection limits (refer to laboratory report in Appendix F for details) of the analytical method.

6.6.4 Results of Acid Extractable Organic Compound Analysis

The floor drain sediment sample was analyzed for the presence of 15 acid extractable compounds. Table 9 presents a summary of the compounds detected, and the report of laboratory analytical results is presented in Appendix F. Only one compound, phenol, was detected in the floor drain sediment at a concentration of 110,000 ug/kg.

6.6.5 Results of Pesticides/PCBs Analysis

The floor drain sediment sample was analyzed for the presence of 19 pesticide compounds and 7 PCB aroclor compounds. Table 9 presents a summary of the compounds detected and the report of laboratory analytical results is presented in Appendix F. A concentration of 38.3 mg/kg chlordane, a pesticide, was the only compound detected from the analysis of the floor drain sediment sample.

SECTION SEVEN - FINDINGS, ON-SITE DISTRIBUTION, AND POSSIBLE SOURCES OF CONTAMINATION

7.0 Introduction

This Section summarizes the findings discussed in Sections 6.1 through 6.5, and discusses these findings in terms of on-Site location and distribution. The locations and distribution of the compounds and/or elements detected on-Site are discussed by compound or element group (eg. bulk metals, volatile organic compounds, and pesticide/PCB compounds). Findings for all media (groundwater, soil, and floor drain sediment) are included in the discussion for each type of compound or element.

7.1 Bulk Metals

Of the 23 metals for which soils were analyzed. Nineteen metals were either not detected in any sample or were detected at concentrations well within the expected natural background concentration range for soil as reported by Lindsay (1979) and as listed in Table 6. The four metals detected in on-Site soil samples at concentrations above the expected background range were antimony, arsenic, lead, and mercury. chromium

Antimony was detected in 10 of the 23 soil samples (11 test pits and 12 soil boring samples), at concentrations of 22 mg/kg to 32 mg/kg. The expected range for antimony in soil is 0.6 to 10 mg/kg. The soil samples in which antimony was detected occur across the entire Site in a randomly distributed pattern, exhibiting no obvious trend that would indicate a specific point source.

Antimony is commonly used as a hardening alloy for lead, especially in storage batteries and solder. Various compounds containing antimony are also used as pigments and dyes, insecticides, dessicants, catalysts, and as flame retardants in textiles. Junked cars historically stockpiled over most areas of the Site may be the possible on-Site source for the elevated antimony concentrations, but the distribution may also reflect the background concentrations for antimony in the Site area. Antimony was not detected in the floor drain sediment or in on-Site groundwater samples.

Arsenic was detected in only one (TP-12) of the 23 soil samples, at a concentration (415 mg/kg, 375 mg/kg in the duplicate) above the expected background range of 1 to 50 mg/kg. The remaining 22 soil samples each contained less than 8 mg/kg of arsenic. The occurrence of an elevated concentration of arsenic in one sample indicates an isolated on-Site point source of arsenic in the soil at TP-12.

Arsenic was also detected in groundwater at three on-Site monitoring well locations, but was detected at a concentration above the MMCL for arsenic (0.05 ug/l) in the sample from only one well (MW-3S at 0.062 ug/l). This well is apparently upgradient of TP-12 (refer to Figure 9 for groundwater flow plan), the only soil sampling location where arsenic was detected above the expected natural background range. Composite soil samples from the boring at MW-3S contained 7.62 mg/kg of arsenic. Arsenic was detected in the floor drain sediment (15 mg/kg) but at a concentration well within the expected background range of arsenic in soils. Common uses and potential sources of arsenic include rodenticide and defoliant compounds, paint pigments, wood treatment compounds, and alloy additives in batteries, cable sheaths, and glass.

Lead was detected in only two soil samples (B-3 and TP-17) at concentrations (233 mg/kg and 252 mg/kg, respectively) above the expected background range for lead in soil (2 to 200 mg/kg). In the remaining 21 soil samples, lead was detected at concentrations of 100 mg/kg or less. Samples B-3 and TP-17 are from different portions of the Site. The slightly elevated lead concentrations in these samples appear to be unassociated with elevated concentrations of metals in other samples. For example, as mentioned earlier, antimony may be derived from lead-based batteries, and therefore might be associated with lead in soil. Antimony was detected above expected background concentrations at ten locations on-Site; however, samples B-3 and TP-17 did not contain detectable concentrations of antimony. It is GHR's opinion that the slightly elevated lead concentrations at these two soil sampling locations indicate isolated point source occurrences which may reflect the industrial use of the area.

Lead was not detected in any of the on-Site groundwater samples. Lead was detected, however, in the floor drain sediment sample at a concentration (1,500 mg/kg) well above the expected background range in soil. This occurrence, combined with the fact that other gasoline components (i.e. toluene, ethylbenzene and xylene) co-exist with the elevated lead at this location suggests that the lead concentrations in the floor drain sediment sample might be attributable to use of leaded gasoline in the area. Autobody work (welding) and painting (car paint, barrel enamel) might also be a source of the on-Site lead.

Mercury was detected in 13 of the 23 on-Site soil samples at concentrations (up to 0.70 mg/kg) above the expected background range for mercury in soil (0.01 to 0.3 mg/kg). Because of the widespread occurrence of mercury at the Site, and at concentrations only slightly exceeding the expected background range, it is *GHR's opinion that the observed concentrations of mercury may represent* background concentrations for the Site area. Mercury was not detected in on-Site groundwater samples; however, it was detected in the floor drain sediment at a concentration of 1.4 mg/kg. The presence of mercury in the floor drain sample indicates an on-Site origin, although the presence of this element could arise from a number of sources. Common uses and potential sources of mercury include: silvering on glass (as in mirrors), pesticides and fungicides, use as a wood preservative, and use in batteries and in paint pigments.

7.2 Volatile Organic Compounds

Eleven of the twenty-five soil samples submitted for analysis contained no volatile organic compound concentrations above analytical detection limits. Of the fourteen samples that contained detectable concentrations of VOCs, only the sample from TP-12 had a total volatile organic (TVO) concentration greater than 100 ug/kg (711,176 ug/kg, and 310,212 ug/kg in the duplicate). Refer to Figure 14 for distribution of TVO concentrations.

TP-12 is located 40 feet north of the rear garage bay entrance to the main building, within the driveway to the bay. Eight soil sample locations within 50 feet of TP-12 contained either no detectable concentrations of VOCs or low VOC concentrations (less than 35 ug/kg). This distribution of TVO concentrations indicates that the volatile organic contamination at TP-12 is likely the result of spills or releases in the vicinity of TP-12.

The specific compounds detected in soils from TP-12 suggest two possible sources of volatile organic contamination; solvents and degreasing compounds. The VOCs present with the highest concentrations; tetrachloroethene and trichloroethene (320,000 ug/kg and 330,000 ug/kg respectively) are commonly used solvents and degreasing compounds.

The remainder of the VOCs detected at TP-12 include total xylenes, toluene, and ethylbenzene. The combined occurrence of these compounds is indicative of a gasoline release. Because the VOCs in soils from TP-12 were detected in the vadose zone (i.e., above the water table), the source of the VOCs in on-Site soils is likely the result of on-Site activities.

Five groundwater samples were collected from four on-Site monitoring wells. VOCs were detected in all four locations with TVO concentrations ranging from 65 ug/l (MW-1S) to 1,020 ug/l (MW-4S). Figure 14 illustrates TVO distribution in groundwater.

Of the seventeen individual VOCs that occur in at least one on-Site location, three compounds (benzene, vinyl chloride, and chloroethane) occur in groundwater samples only. While the absence of these compounds from on-Site soils does not necessarily preclude an on-Site source for these compounds, their presence in an apparently upgradient on-Site groundwater sample (MW-1S) suggests that VOCs in the area of MW-1S may at least be partially derived from off-Site sources. All of the VOCs detected in groundwater are compounds found in gasoline, solvents, and degreasing products. Present and historic use of all of these products on-Site has been documented.

The sediment from the floor drain just inside the garage bay (SD-1) was also analyzed for VOCs. The sediment TVO concentration was 158,000 ug/kg. Approximately 92% of the total volatile organics detected in SD-1 are gasoline components. The remainder of the compounds detected are common solvents. The presence of VOCs in the floor drain sediment indicate an on-Site source for these compounds.

7.3 Base/Neutral and Acid Extractable Organics

Base/neutral extractable organic compounds (BNEs) were detected in all twenty-five soil samples collected from the Site, ranging from 160 ug/kg total BNEs in soil from B-4 to 24,090 ug/kg total BNEs in TP-17. Figure 13 depicts the total BNE concentrations detected at each sample location. The areal distribution of BNEs in soil depicted in Figure 13, suggests that four principle locations of BNE contamination exist on-Site: in the vicinity of B-7; in the vicinity of TP-17, TP-11, and B-5, just north of the driveway to the rear entrance of the building; in the vicinity of B-6 and TP-15; and in the vicinity of B-3 and TP-6, on the southeast side of the main building.

Many of the BNE compounds identified in on-Site soils are likely the result of incomplete vehicular combustion (exhaust), other combustion sources (eg. fires) or petroleum products such as lubricating oils and fuel oils. A majority of the BNE compounds is also known as polycyclic aromatic hydrocarbons (PAHs) The current and historic use of the Site perimeter for car and truck storage could account, at least in part, for the PAH compounds in soil, either through exhaust emissions or from petroleum product leaks.

PAHs are also products of other forms of combustion, such as fires. As was discussed in Section Three of this Report, numerous fires have occurred on-Site over at least the past forty years. In particular, an extensive fire in 1979 destroyed the entire main building. A portion of the building (off the existing building's north end) was destroyed by fire in 1977 and was never reconstructed (refer to Figure 4). Two of the areas of relatively high PAH concentrations (near B-6 and TP-15, and near TP-17, TP-11, and B-5) are in the vicinity of the former main building's northerly extension (formerly referred to as the "raw warehouse").

Another suite of BNEs (trichlorobenzene, dichlorobenzenes, and napthalenes) occur in ten of the twenty-three soil sampling locations on-Site. These three compounds have been identified at locations on the north and west parts of the Site. These compounds are commonly used in solvents, fumigants, insecticides, and various lubricant oils.

Historically, the Whitney Barrel Company also received and stored large underground storage tanks. Conversations with the Whitneys indicate that when the firm was in operation, these tanks were cleaned and refinished outside the main building. This tank cleaning activity may represent another possible on-Site source of the trichlorobenzene, dichlorobenzene, or napthalene detected in the soils.

Another suite of BNEs, the phthalates, comprises the remainder of the total BNE concentrations detected in on-Site soils. The on-Site distribution of phthalates concentrations varies with the total BNE concentrations (Figure 13), with the highest values generally north of the main building. Phthalates are used as plasticizing agents in the manufacturing of various plastic products and safety glass.

According to John E. Whitney, III, many of the drums handled by the Whitney Barrel Company were plastic. Following the 1977 fire, all materials received for cleaning were stored outside, on the north side of the main building. Degradation of plastic drums and other materials stored on-Site may have resulted in the leaching of phthalates into the surrounding soil.

Sediment from the floor drain (SD-1) was found to contain high concentrations (63,239,100 ug/kg) of BNEs. Phthalate compounds comprise approximately 95% of the total BNE concentration detected in SD-1. The current use of the north end of the main building (where the floor drain is located) for autobody work and auto window installation is another potential source of phthalate compounds, as discussed above.

BNEs were detected at all four groundwater sampling locations in concentrations ranging from 10 ug/l (total BNEs at MW-1S) to 169 ug/l (at MW-2S). The compounds dichlorobenzene, trichlorobenzene, and napthalene comprise 100% of the total BNEs in samples from MW-2S and MW-3S and 88% of total BNEs at MW-4S. These compounds were identified in soil samples from test pits and borings in the vicinity of these wells. These compounds are soluble in water/and or solvents. PAH compounds were not detected in groundwater, though they comprised the primary BNE contamination in soil. One hundred percent of the BNEs detected in groundwater at MW-1S are classified as phthalates. PAH compounds are not very soluble in water. Phthalates are more soluble in water than the PAHs, however, and as they occur in on-Site soils, their occurrence in on-Site groundwater samples from MW-1S, MW-3S, and MW-4S is not surprising.

The only acid extractable compounds detected in any media at any sampling location were phenols. Concentrations less than 100 ug/kg of total phenols in soils were detected at only two of the twenty-three sampling locations (TP-12 and TP-15). Phenol was also detected in the floor drain sediment at a concentration of 110,000 ug/kg. Phenols were detected in groundwater at only two locations (MW-3S and MW-4S) at total concentrations ranging from 6 ug/l to 109 ug/l.

Phenolic compounds are commonly used as fuel oil additives, and as components of solvents and rubber products. All of these potential sources have been documented on-Site. The isolated occurrences of phenols in soil and the presence of phenols in only the most downgradient wells on-Site indicate that an on-Site source of phenolic compounds is possible.

7.4 Pesticides and PCBs

Chlordane, the only pesticide compound detected at the Site, was present in 16 soil samples and in the floor drain sediment sample. The highest concentrations were detected in the floor drain sample (38.3 mg/kg), in soil from TP-12 (17.6 mg/kg; 19.5 mg/kg in the duplicate), and in soil from TP-11 (26.8 mg/kg). Although chlordane occurs on-Site on all sides of the main building, the highest concentrations occur only in a specific area near the rear garage bay of the main building (Figure 15). This suggests an on-Site source for chlordane contamination. Chlordane was not detected in any on-Site groundwater samples.

PCBs in the form of aroclors 1242, 1254, 1248, and 1260 were detected in several on-Site soil samples. Because all soil samples collected were composited, no determination can be made of the vertical distribution of PCBs in soil. PCB-1260 is the aroclor most commonly found on-Site. The on-Site distribution of this compound, like chlordane, appears to be random, however, concentrations are highest in the same two soil samples containing the highest chlordane concentrations (Figure 16). Soil at location TP-11 contained 46.6 mg/kg of PCB-1260, and at TP-12, 56 mg/kg (94.8 mg/kg in the duplicate sample) of PCB-1260 was detected. PCBs were not detected in the floor drain sample. Because the highest concentrations of PCBs in soil exist closest to the rear garage bay of the main building, and in general, decrease radially away from that area, an on-Site source for the PCBs is suggested. Low concentrations of PCB-1260 also exist in groundwater from wells MW-2S and MW-3S. The higher PCB-1260 concentration (2.8 ug/l) was detected in groundwater at MW-2S, located apparently downgradient (refer to Figure 9 for groundwater contour map) of the soil sample locations with the highest PCB concentrations. Well MW-3S, the well closest to the area of highest PCB concentrations in soil contained a slightly lower concentration (2.2 ug/l) of PCB-1260. PCBs were not detected in groundwater from either of the other two on-Site wells.

It has been GHR's experience that chlordane is often found associated with PCBs. The surmised reason for this correlation is attributed to the common practice of mixing pesticides in oil to facilitate application because many pesticides, like chlordane, are insoluble in water but are soluble in oil. Often the oils used for this purpose contained PCBs. Regulatory standards are not available for comparison to chlordane concentrations in soil.

The regulation used by DEQE for evaluation of PCB contaminated soils is 50 mg/kg, as defined in 310 CMR 30. PCBs were detected in soils at only one location on-Site (TP-12) at concentrations above this standard.

SECTION EIGHT - RECOMMENDATIONS

GHR Engineering Associates, Inc. makes the following recommendations based on the results and findings presented in the Report. These recommendations reflect the requirements of the Massachusetts Contingency Plan (MCP) 310 CMR 40, which became effective on October 3, 1988 while this assessment was ongoing:

1. Stained surficial soils present in several areas of the Site should be sampled and analyzed for Total Petroleum Hydrocarbon (TPH) content, with selected samples also analyzed for HSL constituents. This soil sampling and analysis is necessary to enable a decision on the need for Short-Term Measures based on the possible presence of oil or hazardous materials in soils at or near the surface (310 CMR 40.542(2) (c)).

2. Subject to confirmation based on the results of the surficial soil analyses, the Site should be classified by DEQE as a Non-Priority Disposal Site under Chapter 21E.

3. Additional monitoring wells should be installed along the western border of the Site to evaluate the possible migration of potentially contaminated groundwater onto the Site from off-Site sources.

4. As originally proposed by GHR, but subsequently deleted by the DEQE from the final Scope of Work in the Consent Order, additional characterization of the groundwater at the Site should be performed with respect to both the direction of flow and possible contaminant migration as influenced by the pumping of the Riley Tannery Company production well (S-46). This

additional work might include: researching the use and pumping rate of the production well; reviewing any pumping test results that may have been performed on the production well. and making additional water table measurements in all accessible monitoring wells during pumping and non-pumping conditions.

5. Additional monitoring wells should be installed at the Site to evaluate the potential for the contaminants detected in on-Site soils to migrate to a depth below that of the existing on-Site monitoring wells. The additional wells should be installed at appropriate depths and locations to determine vertical hydraulic gradients at the Site.

6. Recently released or soon to be published assessment reports of surrounding properties should be reviewed in light of the findings of this Report. These other reports include, but are not limited to, the Wells G & H Supplemental Remedial Investigation, the 1983 Beatrice Foods Property Site Assessment. and the RCRA Closure Plan for the Murphy Waste Oil Company property.

7. Surface water. seasonally or intermittently present in the on-Site wetlands, should be sampled and analyzed for HSL constituents.

8. The floor drain in the main on-Site building should be cleaned out. with proper disposal of the material removed, and the floor then permanently sealed to eliminate any further use, by tenants, of the drain line extending from the main building to the MWRA sewer line.

9. A Risk Characterization pursuant to 310 CMR 40.545 should be conducted.

10. All tenants at the Site should be notified of their individual responsibilities with respect to compliance with environmental laws and regulations. Observations and findings made during this assessment indicate that some tenants may not be in full compliance.

11. Access to the Site should be better controlled to prevent unauthorized entrance and potential contact with stained soils, until such time that it is determined that the surficial soils pose no harm. The front gate should be locked during all non-working hours.

Upon completion of the investigations and evaluations outlined above, the Site will have progressed through the Comprehensive Site Assessment Phase (Phase II) of the new MCP process, thereby allowing a decision to be made on the need for initiating a Phase III, Feasibility Study in accordance with the MCP.

SECTION NINE - LIMITATIONS

1. The purpose of this Report was to review and summarize the Site history and present physical characteristics of the Site with regard to the potential presence of oil and hazardous material as defined in MGL, c. 21E. No attempt was made to determine the compliance of present or former owners or occupants of the Site with Federal, State or local environmental or land use laws and regulations.

2. The observations made during GHR's inspection and research of the Site, and the conclusions drawn therefrom, were made under the conditions stated herein. Except as noted herein, no subsurface examinations by test pits or borings were performed, and no groundwater monitoring wells were installed or sampled. Where subsurface examinations and associated laboratory analyses of samples were not performed, GHR makes no representations or certifications concerning soil or groundwater quality.

3. With respect to sample collection and analysis, except as otherwise noted herein, no samples were collected of waste, wastewater, soil, sediment, surface water, groundwater, air or building materials.

4. If sample collection and analysis was performed as part of GHR's assessment, the resulting laboratory data and conclusions drawn therefrom are limited to the specifc contaminants or analytical parameters reported. No data or conclusions are offered or implied with respect to oil or hazardous materials that were not tested for during this assessment.

5. This assessment did not include an evaluation of the presence of asbestos. Unless otherwise noted herein, this assessment did not include testing for herbicides or pesticides in soil or groundwater, nor radioactive materials in any form nor infectious materials.

6. Descriptions presented in this Report concerning subsurface tanks, waste disposal or storage facilities is based on information obtained from GHR's review of public records, private records (if provided by the Client) and interviews with knowledgeable sources (if conducted). GHR does not guarantee the completeness or accuracy of such information.

7. As this Report was in the final stages of preparation, the existence of a 1983 report on the former Beatrice Foods property located in the vicinity of the Whitney Site was made public. GHR has had no opportunity to review the 1983 Beatrice report for relevance, if any, to this Report. Similarly, it was anticipated that a "Supplemental Remedial Investigation" report on the Woburn Wells G & H Superfund Site would be available prior to the completion of this Report. Unfortunately, the supplemental Wells G & H report was not available and so GHR has not had an opportunity to review it.

REFERENCES

REFERENCES

Bartolomeo, John, 1973. Memo describing Site Visit to Whitney Barrel Company Inc., April 26.

Delaney, D.F. and F.B. Gay, 1980. "Hydrology and Water Resources of the Coastal Drainage Basins of Northeastern Massachusetts from Castle Neck River, Ipswich to Mystic River", Boston: U.S. Geological Survey Hydrologic Investigations Atlas HA-589.

DEQE, 1988. Department of Environmental Quality Engineering Notice (For Facility Closure Plan at Murphy's Waste Oil Seervice, Inc.), published January 26, 1988.

DEQE, 1988. Massachusetts DEQE Site List published October 15, 1988.

DEQE, 1986. Letter from Richard Chalpin (DEQE) to Whitney Barrel Company, RE: Notice of Responsibility Pursuant to MGL Chapter 21E, DEQE Case #3-534, December 1, 1986.

DEQE/RCRA, 1988. RCRA Generators List dated July 27,1988.

Doherty, Robert E., Personal Communication, 1988. Personal Communication between D. Kirkpatrick (GHR) and R. Doherty (Woburn Fire Chief), RE: Aberjona Autoparts Tank Removal, November 21, 1988.

E & E, 1980 " Site Inspection Report for Whitney Barrel Company, Inc ", December 16, Ecology and Environment, Inc.

E & E, 1980. " Preliminary Assessment for Whitney Barrel Co., Inc.", November 3, Ecology and Environment, Inc.

Flynn, Jeanne, 1988. Notes from research conducted at Middlesex County Registry of Deeds, Cambridge, MA and the Assessors Office, Woburn, MA, by J. Flynn (Lantz and Associates), September.

GHR, 1988. Property Line Survey Plan, October 4, 1988.

GHR, 1988. Field Notes from Field Investigations conducted at the former Whitney Barrel Company Site, June through November.

Grandin, Wayne T., 1983. Letter to Jack Whitney from Wayne Grandin (Chief Engineer of Industial Waste, MDC), Subject: *Permit Expiration Date, September 29.*

Gushue, John, 1988. "Customer Listing for Whitney Barrel Co.", compiled by John Gushue, Esq.(Lantz and Associates).

Lindsay, W.L., 1979. Chemical Equilibria in Soils. New York: John Wiley and Sons, 449p.

Lord, Sabin M.,Jr., 1979. Letter to John Whitney (Whitney Barrel) from Sabin Lord (Massachusetts Division of Water Pollution Control), RE: Pollution Complaint, June 29.

Massachusetts Contingency Plan (310 CMR 40.00). Effective date : October 3, 1988.

Massachusetts Division of Water Pollution Control Regulations (314 CMR 1.00-7.00). Effective date : May 27, 1988.

Massachusetts Hazardous Waste Regulations (310 CMR 30.00). Effective date: December 31, 1987.

Massachusetts General Laws, Chapter 21E - Oil and Hazardous Material Release Prevention and Response Act. Reprinted March 26, 1984.

Metropolitan District Commission (MDC) Sewerage Division, 1940. Sewer Line Map of Woburn, scale : 1"= 600'.

Metropolitan District Commission (MDC), 1978-1988. Notes from file research includes : MDC Industrial Waste Program Sampling Reports/Records dated March 31, 1987 and April 25, 1983 ; MDC Inspection Reports for Facility Inspections on April 15, 1983, September 8, 1981, November 22, 1978, and June 23, 1978.

Monroe, Brooke, 1988. Inland Wetland Delineation and Characterization, Whitney Barrel Company, prepared by B. Monroe (GHR), August 3.

Murphy, William, Personal Communication, 1988. Personal Communication between B. Myers (GHR) and W. Murphy (Woburn Conservation Commission), RE: Murphy's Waste Oil 21E Study, July 25 and August 18.

Myette, C.F., et.al., 1987. " Area of Influence and zone of Contribution to Superfund Site Wells G & H ", Woburn, Massachusetts : U.S. Geological Survey Water Resources Investigation Report 87-4100.

Newman, Barbara, Personal Communication, 1988. Personal communication between B. Myers (GHR) and B. Newman (EPA), RE: Riley Production Well Use, October 28 and November 21.

NUS Corp., 1986. " Wells G & H Site Remedial Investigation Report, Part I, Woburn Massachusetts ", Volumes I-IV, NUS Corporation, October 17.

Olson, Geo. W., 1950." Plan of Land, Woburn, Mass., Surveyed for Daniel Quinn", Scale : 1" = 50', September 5.

Pawlowski, Edward, Personal Communication, 1988. Personal Communication between M. Hawiger (GHR) and Ed Pawlowski (DEQE), RE: Murphy's Waste Oil Closure Plan, August 11.

RCRA Inspection Report, 1981. Facility Inspection at Whitney Barrel Company for Issuance of RCRA Classification, April 15, 1981.

Sax, N. Irving and Richard J. Lewis, Sr., editors, 1987. Hawley's Condensed Chemical Dictionary, Eleventh Edition, New York : Van Nostrand Reinhold Company, Inc.

USEPA, 1988 CERCLIS Site Listing, May 6.

USF&WS, 1971. Wetlands Inventory Map, Lexington, MA Quadrangle, U.S. Fish and Wildlife Service.

U.S. Department of Agriculture Soil Conservation Service, 1986. " Middlesex County Massachusetts Interim Soil Survey Report : Middlesex Conservation District ", 2nd ed., July 1986.

Whitney, Personal Communication, 1988. Personal Communication between B. Myers (GHR) and John E. Whitney,III, Notes during GHR Field Investigation at the former Whitney Barrel Site, June through December, 1988.

Whitney, John E. III, 1988. Response to CERCLA/RCRA Information Request, provided to EPA by John E. Whitney, III, February.

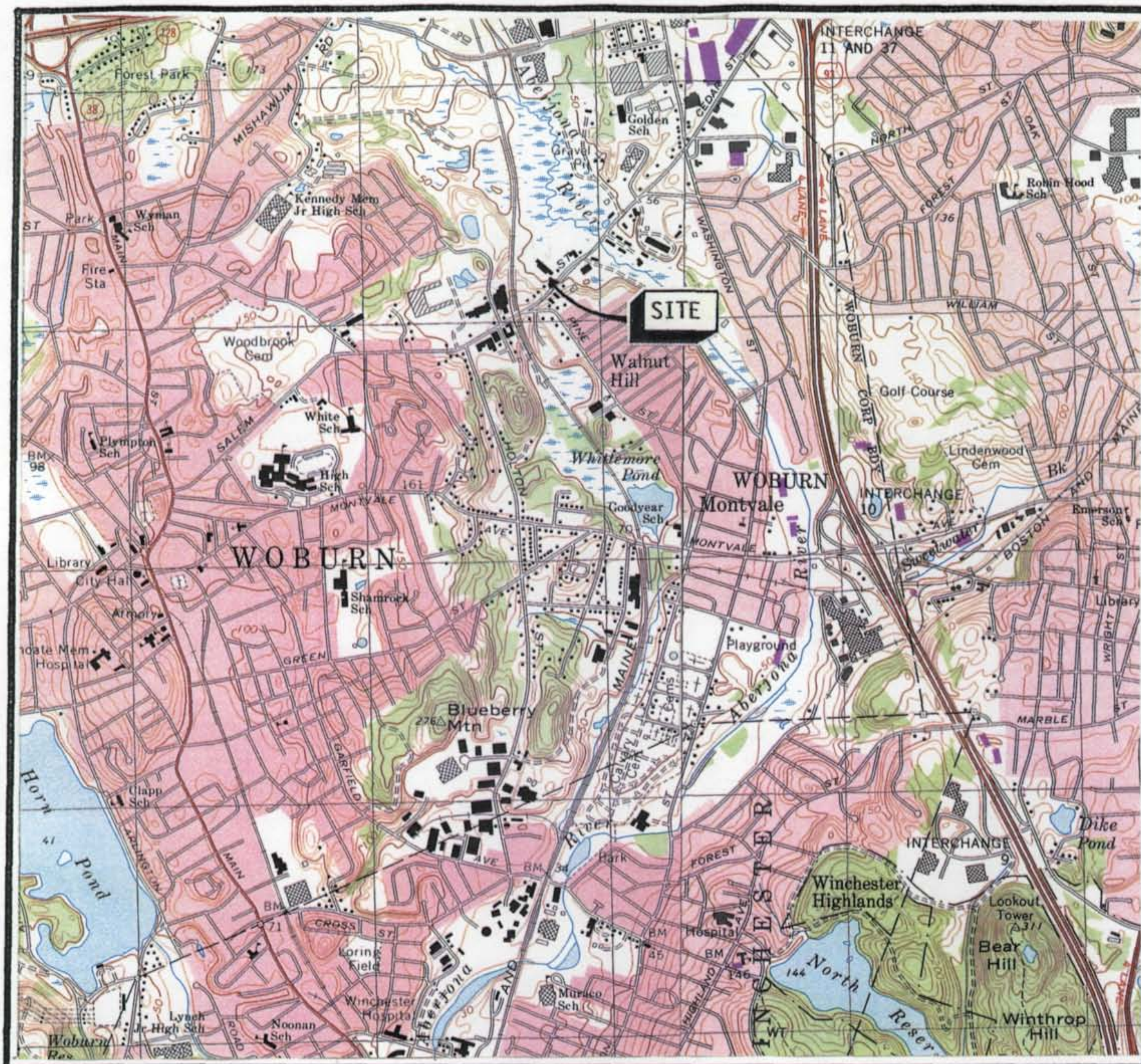
Woburn Assessors Department, 1988. Notes from file search conducted by GHR, RE: Site Abutters, December 7.

Woburn Fire Department 1960 through 1986. Notes from fire record and tank permit search conducted at Woburn Fire Department by GHR, November 21.

Woburn, City of and MDC, 1981. Industrial User Discharge Permit (#43 000 288-8), issued to Whitney Barrel Co., November 21.

Woburn Department of Public Works, Superintendent, Personal Communication, 1988. Personal Communication between M. Rooney (GHR) and Arthur (Woburn DPW Superintendent), RE: Sewer Connection at 256 Salem Street, August 9.

Woburn Zoning Department, 1988. Notes from file search conducted by GHR, RE: Site Zoning, December 7.



SCALE 1:25 000

1 ½ 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

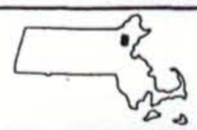
1 .5 0 1 KILOMETER

CONTOUR INTERVAL 10 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

N

PROJECT:	WHITNEY BARREL COMPANY SALEM STREET, WOBURN, MA
CLIENT:	RUTH J. WHITNEY
TITLE:	SITE LOCUS FIGURE 1

GHR
ENGINEERING ASSOCIATES, INC.
1050 Waltham Street
Lexington, MA 02173



QUADRANGLE LOCATIONS

BOSTON NORTH, 1979
LEXINGTON, 1971

QUADRANGLE NAMES

PROJECT NUMBER
3661.002

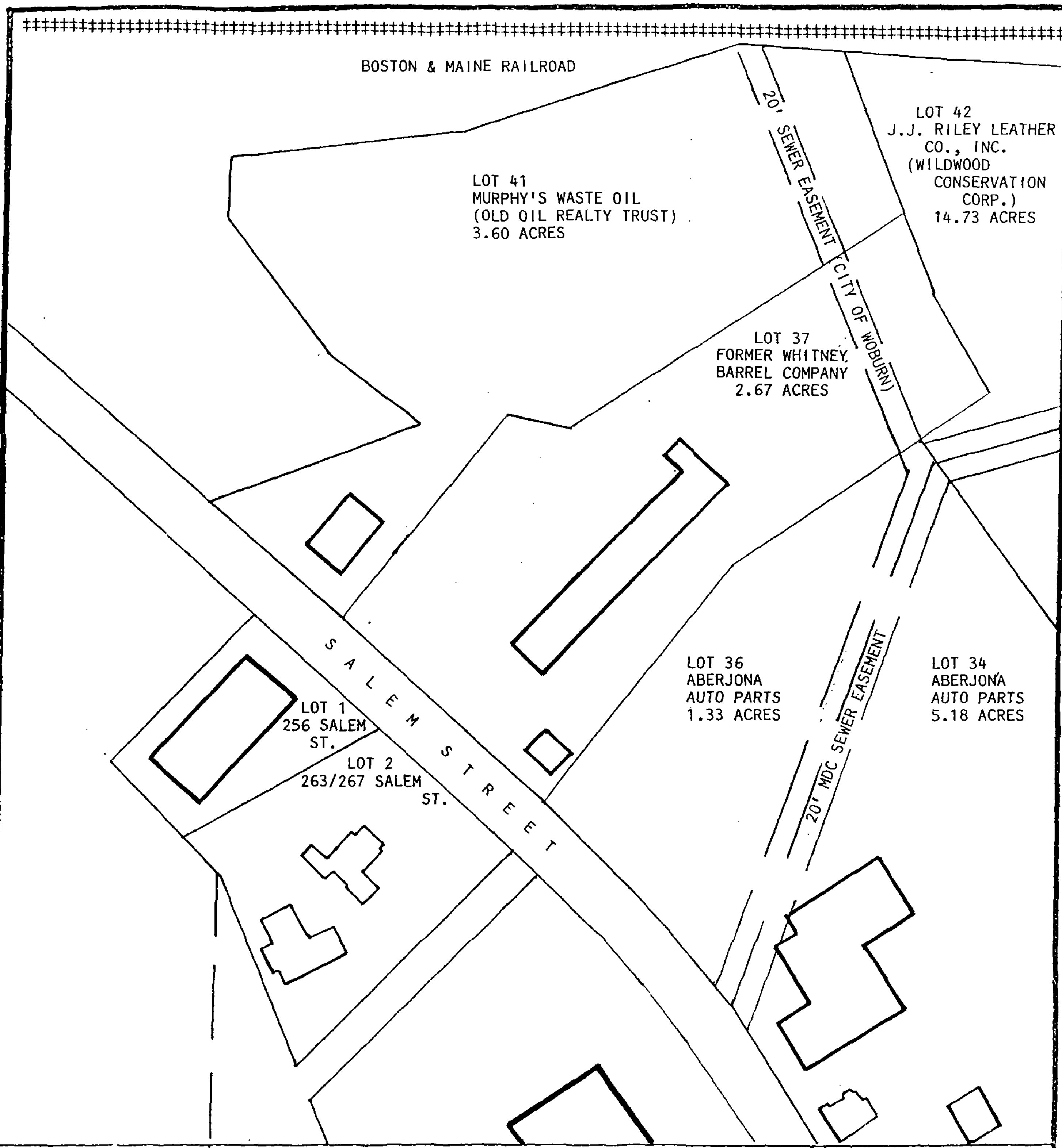


FIGURE DERIVED FROM
WOBURN ASSESSORS
MAP 16

N

SCALE: 1" = 130'
(approx.)

PROJECT: WHITNEY BARREL COMPANY
WOBURN, MA

CLIENT: RUTH J. WHITNEY

TITLE: FIGURE 2
DETAIL OF ASSESSORS MAP

GHR
ENGINEERING ASSOCIATES, INC.
1050 Waltham Street
Lexington, MA 02173

PROJECT NUMBER
3661.002

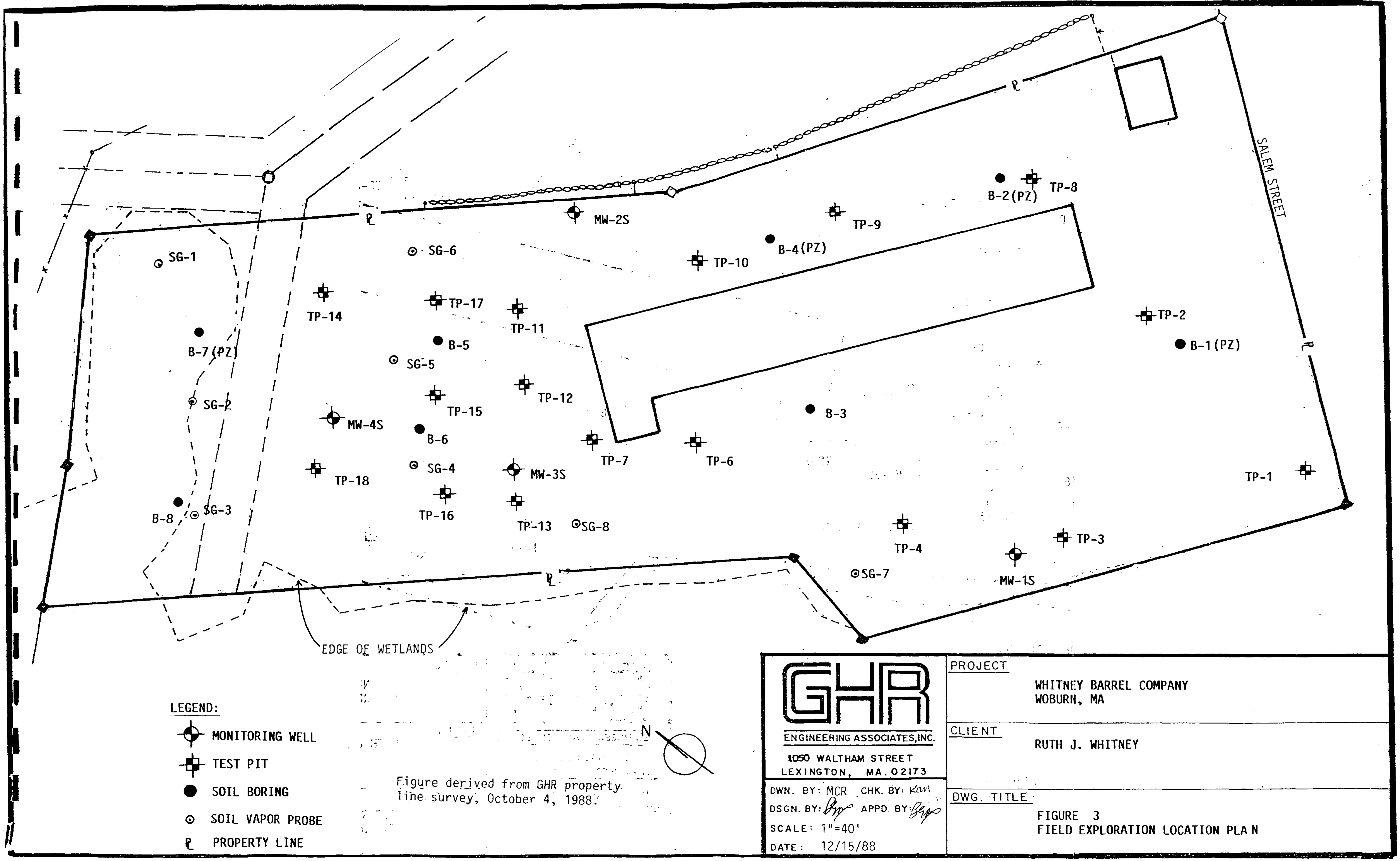
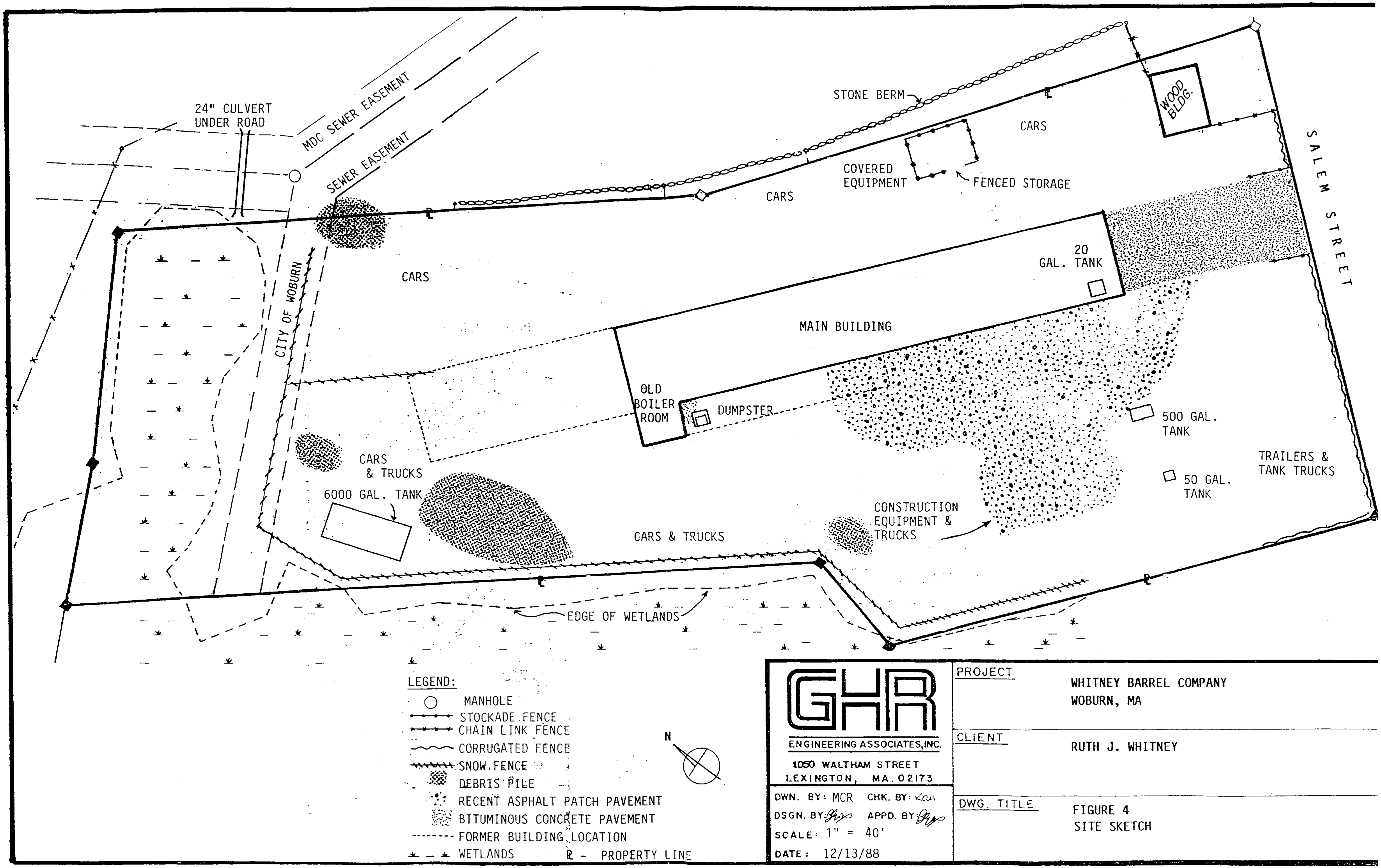
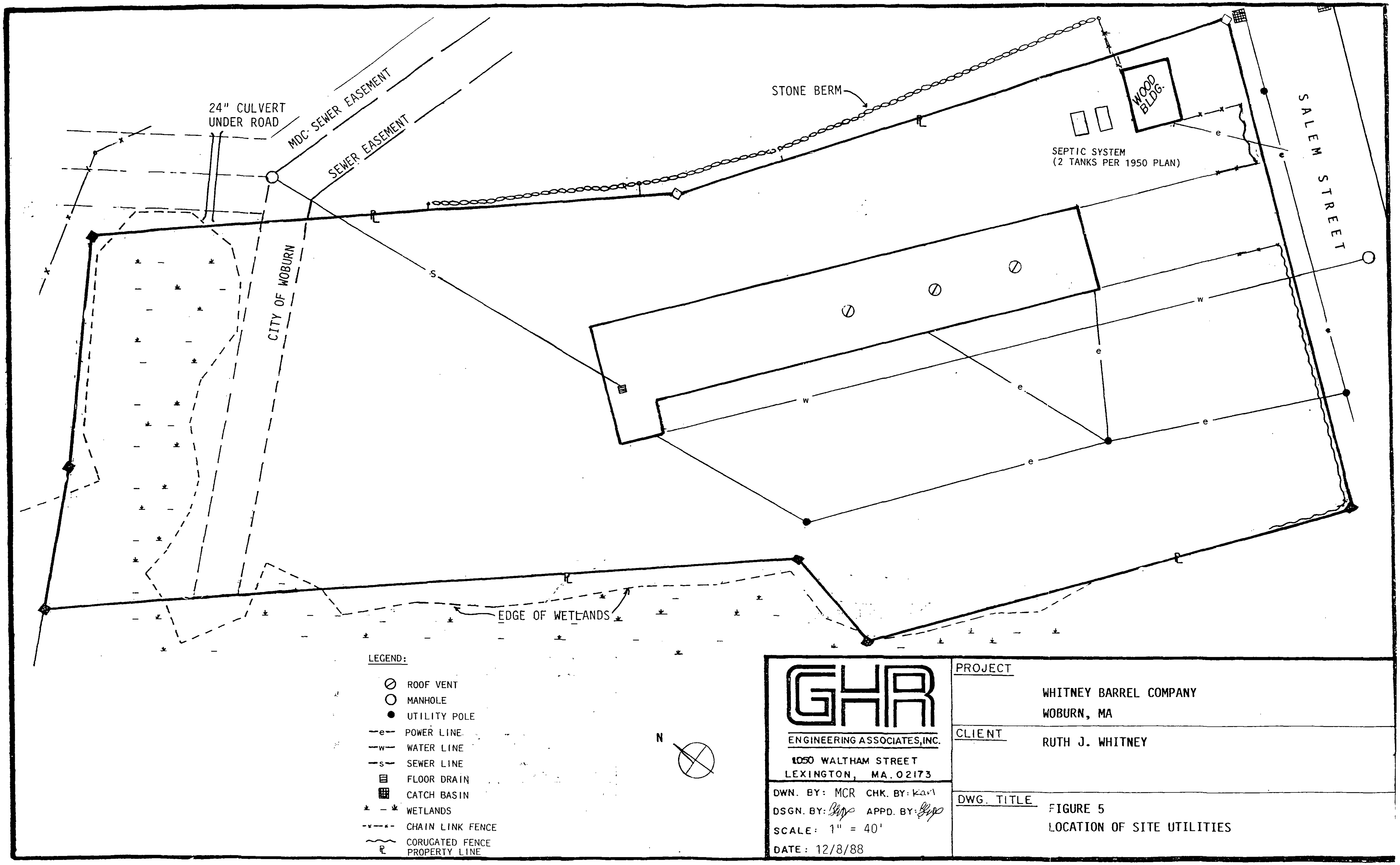


Figure derived from GHR property line survey, October 4, 1988.

GHR ENGINEERING ASSOCIATES, INC. 1050 WALTHAM STREET LEXINGTON, MA. 02173	PROJECT: WHITNEY BARREL COMPANY WOBURN, MA
DWN. BY: MCR CHK. BY: Kan	CLIENT: RUTH J. WHITNEY
DSGN. BY: Bgp APPD. BY: Bgp	DWG. TITLE: FIGURE 3 FIELD EXPLORATION LOCATION PLAN
SCALE: 1"=40'	
DATE: 12/15/88	


24" CULVERT UNDER ROAD
MDC SEWER EASEMENT
SEWER EASEMENT
CITY OF WOBURN
STONE BERM
WOOD BLDG.
CARS
COVERED EQUIPMENT
FENCED STORAGE
CARS
20 GAL. TANK
SALEM STREET
CARS
MAIN BUILDING
OLD BOILER ROOM
DUMPSTER
500 GAL. TANK
TRAILERS & TANK TRUCKS
50 GAL. TANK
CARS & TRUCKS
6000 GAL. TANK
CONSTRUCTION EQUIPMENT & TRUCKS
CARS & TRUCKS
EDGE OF WETLANDS
LEGEND:
MANHOLE
STOCKADE FENCE
CHAIN LINK FENCE
CORRUGATED FENCE
SNOW FENCE
DEBRIS PILE
RECENT ASPHALT PATCH PAVEMENT
BITUMINOUS CONCRETE PAVEMENT
FORMER BUILDING LOCATION
WETLANDS
℘ - PROPERTY LINE
N
GHR
ENGINEERING ASSOCIATES, INC.
1050 WALTHAM STREET
LEXINGTON, MA. 02173
DWN. BY: MCR
CHK. BY: Kan
DSGN. BY: Gyo
APPD. BY: Gyo
SCALE: 1" = 40'
DATE: 12/13/88
PROJECT
WHITNEY BARREL COMPANY
WOBURN, MA
CLIENT
RUTH J. WHITNEY
DWG. TITLE
FIGURE 4
SITE SKETCH



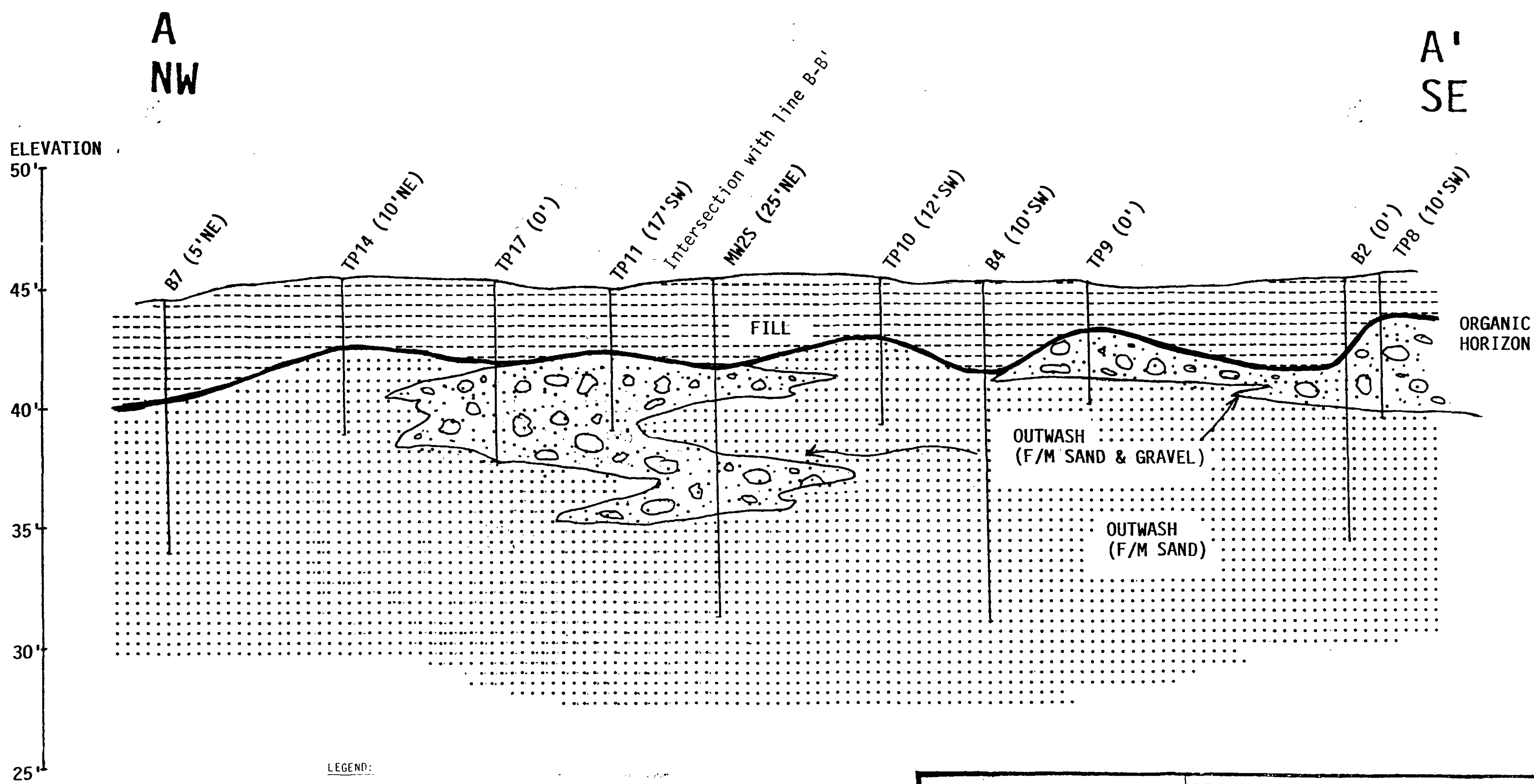
GHR ENGINEERING ASSOCIATES, INC.
1050 WALTHAM STREET
LEXINGTON, MA. 02173

PROJECT: WHITNEY BARREL COMPANY, WOBURN, MA

CLIENT: RUTH J. WHITNEY

DWN. BY: MCR CHK. BY: Karl
DSGN. BY: [signature] APPD. BY: [signature]
SCALE: 1" = 40'
DATE: 12/8/88

DWG. TITLE: FIGURE 5
LOCATION OF SITE UTILITIES



SCALE
5'
40'

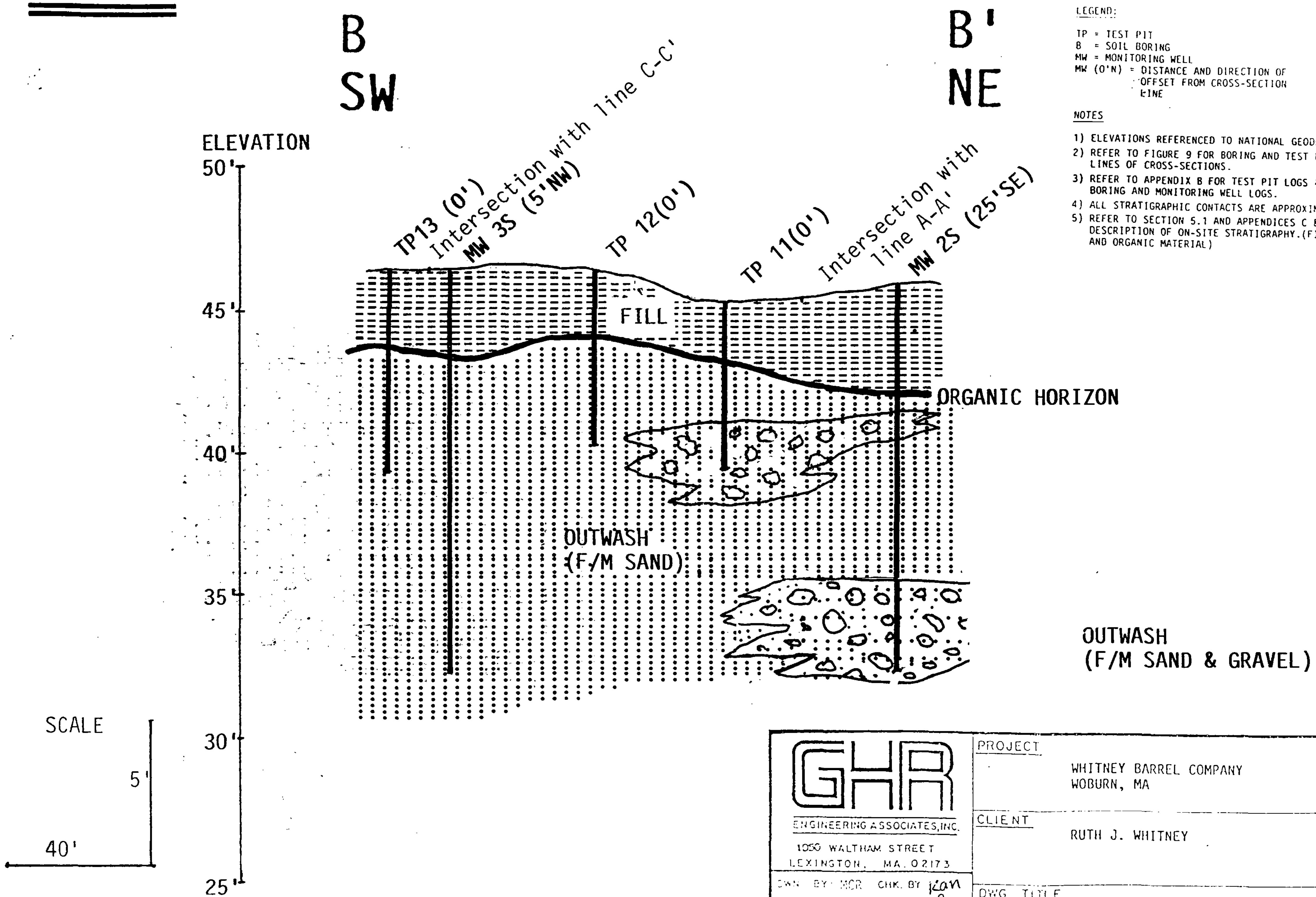
LEGEND:

TP = TEST PIT
B = SOIL BORING
MW = MONITORING WELL
MW (O'N) = DISTANCE AND DIRECTION OF OFFSET FROM CROSS-SECTION LINE

NOTES

1) ELEVATIONS REFERENCED TO NATIONAL GEODETIC VERTICAL DATUM
2) REFER TO FIGURE 9 FOR BORING AND TEST PIT LOCATIONS AND LINES OF CROSS-SECTIONS.
3) REFER TO APPENDIX B FOR TEST PIT LOGS AND APPENDIX C FOR BORING AND MONITORING WELL LOGS.
4) ALL STRATIGRAPHIC CONTACTS ARE APPROXIMATE ONLY.
5) REFER TO SECTION 5.1 AND APPENDICES C & D FOR A DETAILED DESCRIPTION OF ON-SITE STRATIGRAPHY. (FILL, ORGANIC HORIZON AND ORGANIC MATERIAL)

GHR ENGINEERING ASSOCIATES, INC. 1050 WALTHAM STREET LEXINGTON, MA. 02173	PROJECT: WHITNEY BARREL COMPANY WOBURN, MA
	CLIENT: RUTH J. WHITNEY
DWN. BY: MCR CHK. BY: Kan DSGN. BY: Kan APPD. BY: [illegible] SCALE: DATE: 12/15/88	DWG. TITLE: FIGURE 6 SCHEMATIC STRATIGRAPHIC CROSS-SECTION A-A' WHITNEY BARREL COMPANY



LEGEND:

TP = TEST PIT
B = SOIL BORING
MW = MONITORING WELL
MW (O'N) = DISTANCE AND DIRECTION OF OFFSET FROM CROSS-SECTION LINE

NOTES

1) ELEVATIONS REFERENCED TO NATIONAL GEODETIC VERTICAL DATUM
2) REFER TO FIGURE 9 FOR BORING AND TEST PIT LOCATIONS AND LINES OF CROSS-SECTIONS.
3) REFER TO APPENDIX B FOR TEST PIT LOGS AND APPENDIX C FOR BORING AND MONITORING WELL LOGS.
4) ALL STRATIGRAPHIC CONTACTS ARE APPROXIMATE ONLY.
5) REFER TO SECTION 5.1 AND APPENDICES C & D FOR A DETAILED DESCRIPTION OF ON-SITE STRATIGRAPHY.(FILL, ORGANIC HORIZON AND ORGANIC MATERIAL)

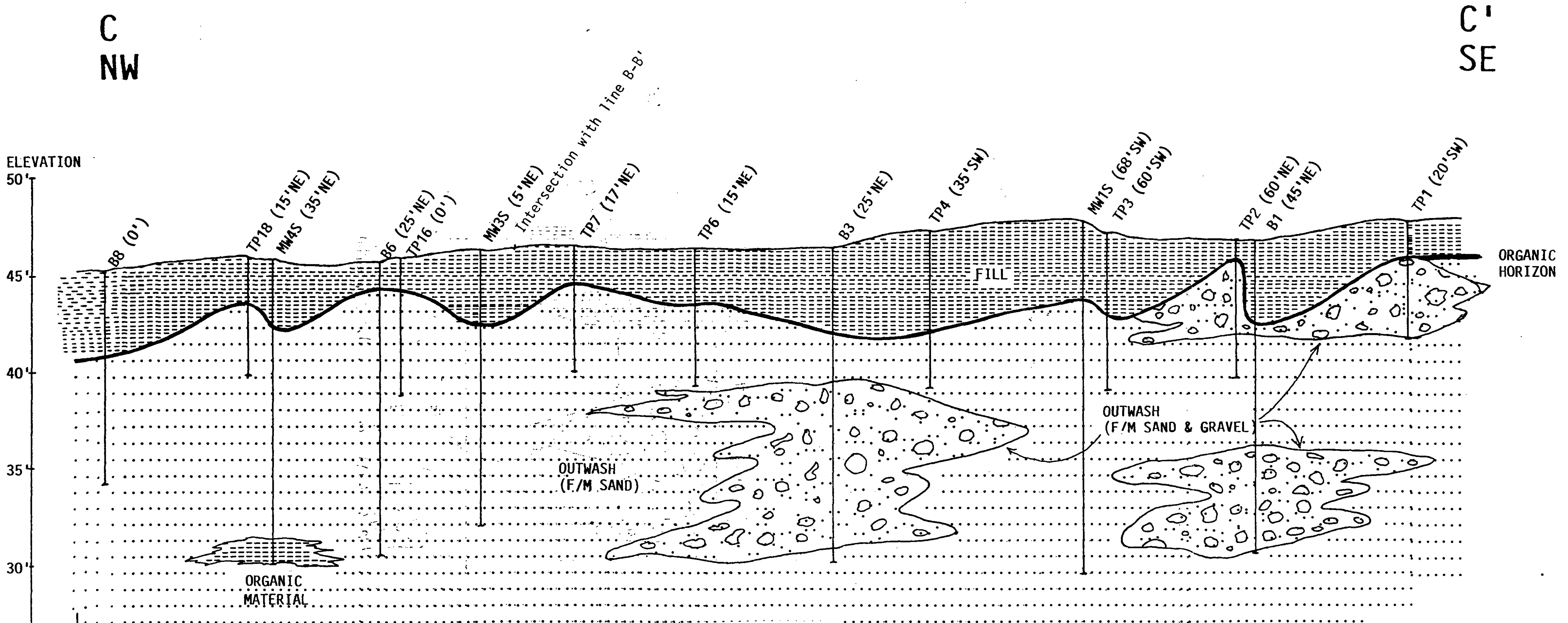
GHR ENGINEERING ASSOCIATES, INC.
1050 WALTHAM STREET
LEXINGTON, MA. 02173

DWN. BY: MCR CHK. BY Kan
DSGN BY Kan APPD BY [illegible]
SCALE
DATE: 12/15/88

PROJECT
WHITNEY BARREL COMPANY
WOBURN, MA

CLIENT
RUTH J. WHITNEY

DWG. TITLE
FIGURE 7
SCHEMATIC STRATIGRAPHIC CROSS-SECTION B-B'
WHITNEY BARREL COMPANY



SCALE

5'

40'

LEGEND:

TP = TEST PIT
B = SOIL BORING
MW = MONITORING WELL
MW (0'N) = DISTANCE AND DIRECTION OF OFFSET FROM CROSS-SECTION LINE

NOTES

1) ELEVATIONS REFERENCED TO NATIONAL GEODETIC VERTICAL DATUM
2) REFER TO FIGURE 9 FOR BORING AND TEST PIT LOCATIONS AND LINES OF CROSS-SECTIONS.
3) REFER TO APPENDIX B FOR TEST PIT LOGS AND APPENDIX C FOR BORING AND MONITORING WELL LOGS.
4) ALL STRATIGRAPHIC CONTACTS ARE APPROXIMATE ONLY.
5) REFER TO SECTION 5.1 AND APPENDICES C & D FOR A DETAILED DESCRIPTION OF ON-SITE STRATIGRAPHY. (FILL, ORGANIC HORIZON AND ORGANIC MATERIAL)

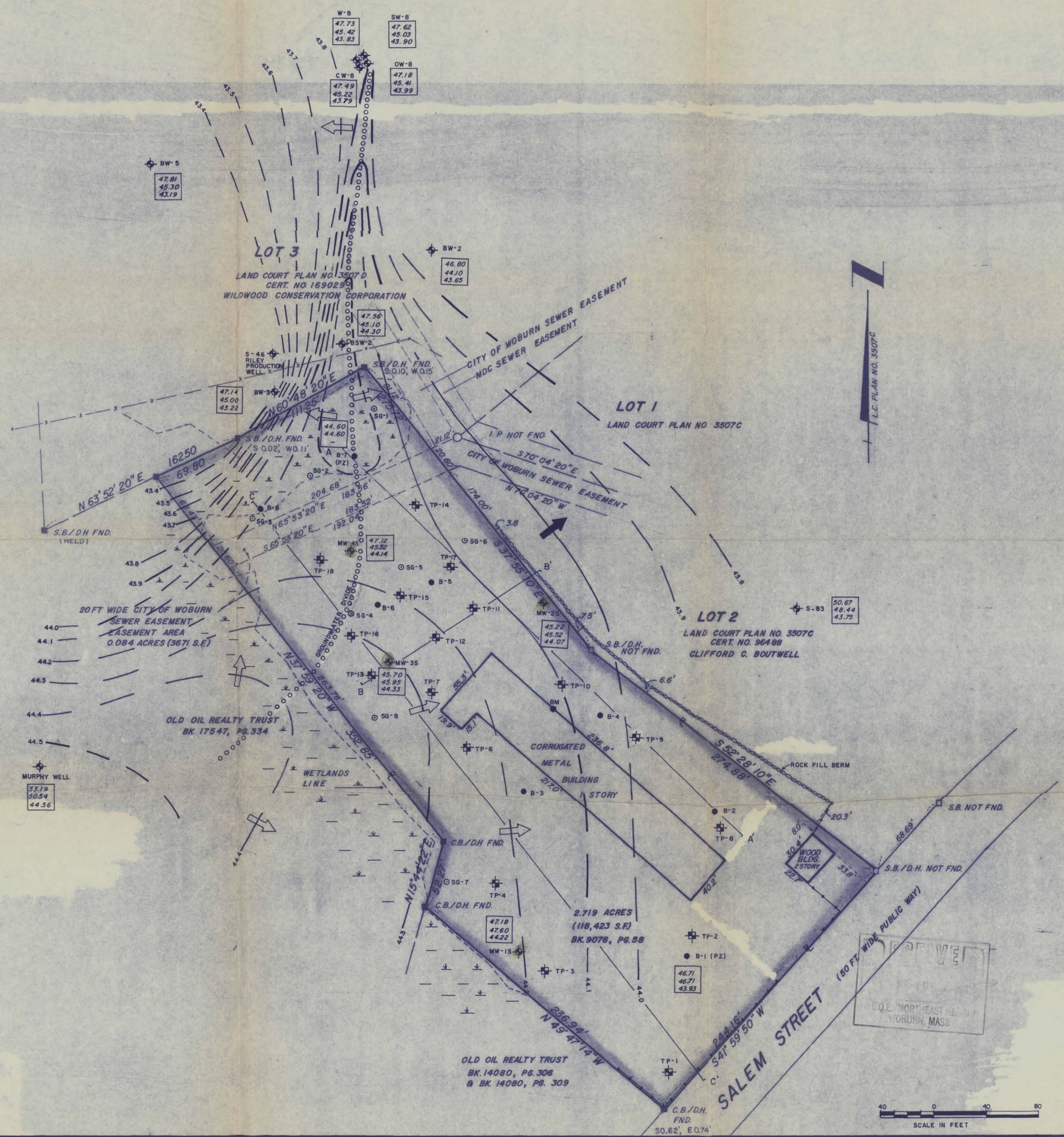
GHR ENGINEERING ASSOCIATES, INC.
1050 WALTHAM STREET
LEXINGTON, MA. 02173

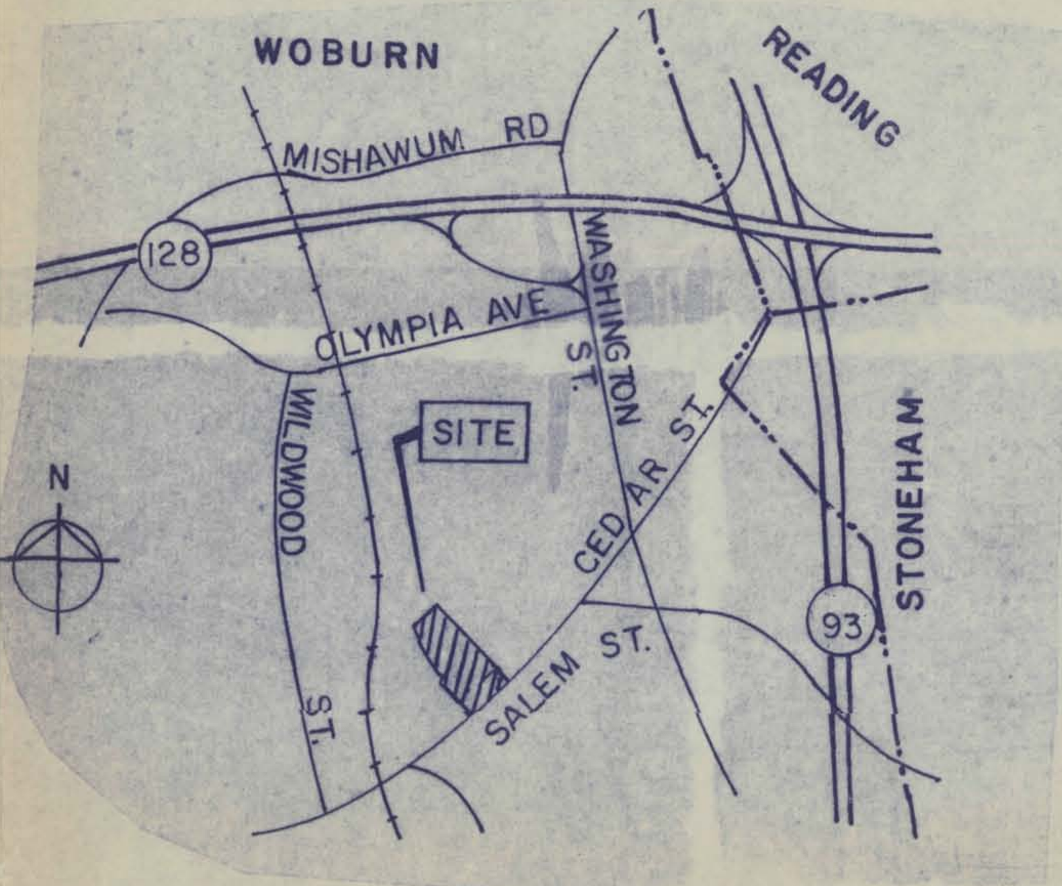
DWN. BY: MCR CHK. BY: Kan
DSGN. BY: Kan APPD. BY: [illegible]
SCALE:
DATE: 12/15/88

PROJECT
WHITNEY BARREL COMPANY
WOBURN, MA

CLIENT
RUTH J. WHITNEY

DWG. TITLE
FIGURE 8
SCHEMATIC STRATIGRAPHIC CROSS-SECTION C-C'
WHITNEY BARREL COMPANY





SITE LOCATION
1" = 1500'

LEGEND

- MONITORING WELL
- SOIL BORING
- TEST PIT
- 50.67 ELEVATION TOP OF PVC
- 48.44 ELEVATION AT GROUND SURFACE
- 43.75 ELEVATION OF WATER TABLE
- A —— A' CROSS-SECTION LINES
- (PZ) PIEZOMETER LOCATION
- oooo GROUNDWATER DIVIDE (INFERRED)
- WETLANDS
- FENCE
- MANHOLE
- SOIL GAS PROBE
- SB/DH STONE BOUND WITH DRILL HOLE
- CB/DH CONCRETE BOUND WITH DRILL HOLE
- BM BENCHMARK (BASED ON NATIONAL GEODETIC VERTICAL DATUM)
- ℄ PROPERTY LINE
- 43.8 GROUNDWATER CONTOUR AND FLOW DIRECTION (CONTOURS DASHED AND ARROW OPEN WHERE INFERRED)

NOTES:

1) Plan derived from GHR Property Line Survey Plan dated October 4, 1988.

2) Water table elevations are based on an assumed benchmark elevation referenced to National Geodetic Vertical Datum.

3) Water table elevations are based on measurements taken on November 4, 1988 during normal working hours. Information reviewed by GHR indicated that the Riley Production Well is pumped during normal working hours. It is therefore assumed that GHR water level measurements were made while the Riley Production Well was pumping.

4) Groundwater contours represent a single point in time. Groundwater levels may vary with time due to seasonal climatic changes or other factors.

5) Groundwater contours are interpolated between data points and inferred in other areas. Contours are dashed where inferred. Actual subsurface conditions in unexplored area may vary from those shown or interpreted.

6) Groundwater contours assume homogeneous and isotropic aquifer conditions and horizontal flow.

7) The groundwater divide is subject to change based upon the pumping capacity, frequency, and duration of the Riley Production Well.

GHR ENGINEERING ASSOCIATES, INC.
1050 WALTHAM STREET
LEXINGTON, MA. 02173

DWN. BY: MCR CHK. BY: KAM
DSGN. BY: BEM APPD. BY: BEM
SCALE: 1" = 40'
DATE: 12/21/88

PROJECT: WHITNEY BARREL COMPANY
WOBURN, MASSACHUSETTES

CLIENT: RUTH J. WHITNEY

DWG. TITLE: FIGURE 9
GROUNDWATER CONTOUR PLAN

PROJECT NO. 3661.002
DWG. NO.

Site - 3-0479

organic
horizon

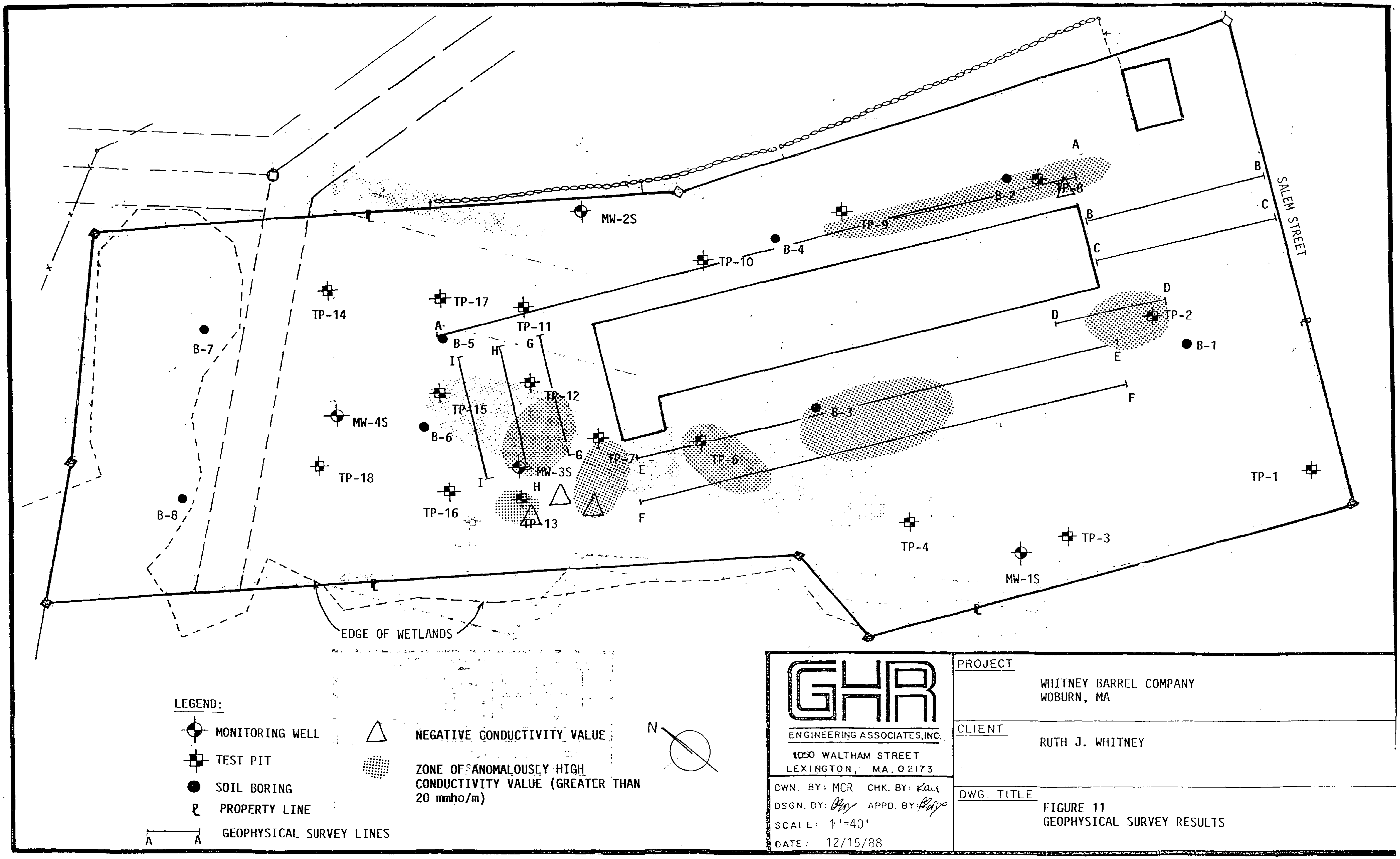
a) Fill material excavated from TP-15. Note dark organic layer at base of bucket. Total thickness shown is approximately 1 foot. (Refer to Figure 3 for location).

organic
horizon

b) Subsurface stratigraphy of TP-12. Fill material (sand and gravel) overlies dark organic layer. Fine to medium outwash sand underlies organic layer. Total depth is approximately 6 feet. (Refer to Figure 3 for location).

FIGURE 10

SUBSURFACE STRATIGRAPHY FROM TEST PIT EXCAVATIONS
WHITNEY BARREL COMPANY
WOBURN, MA



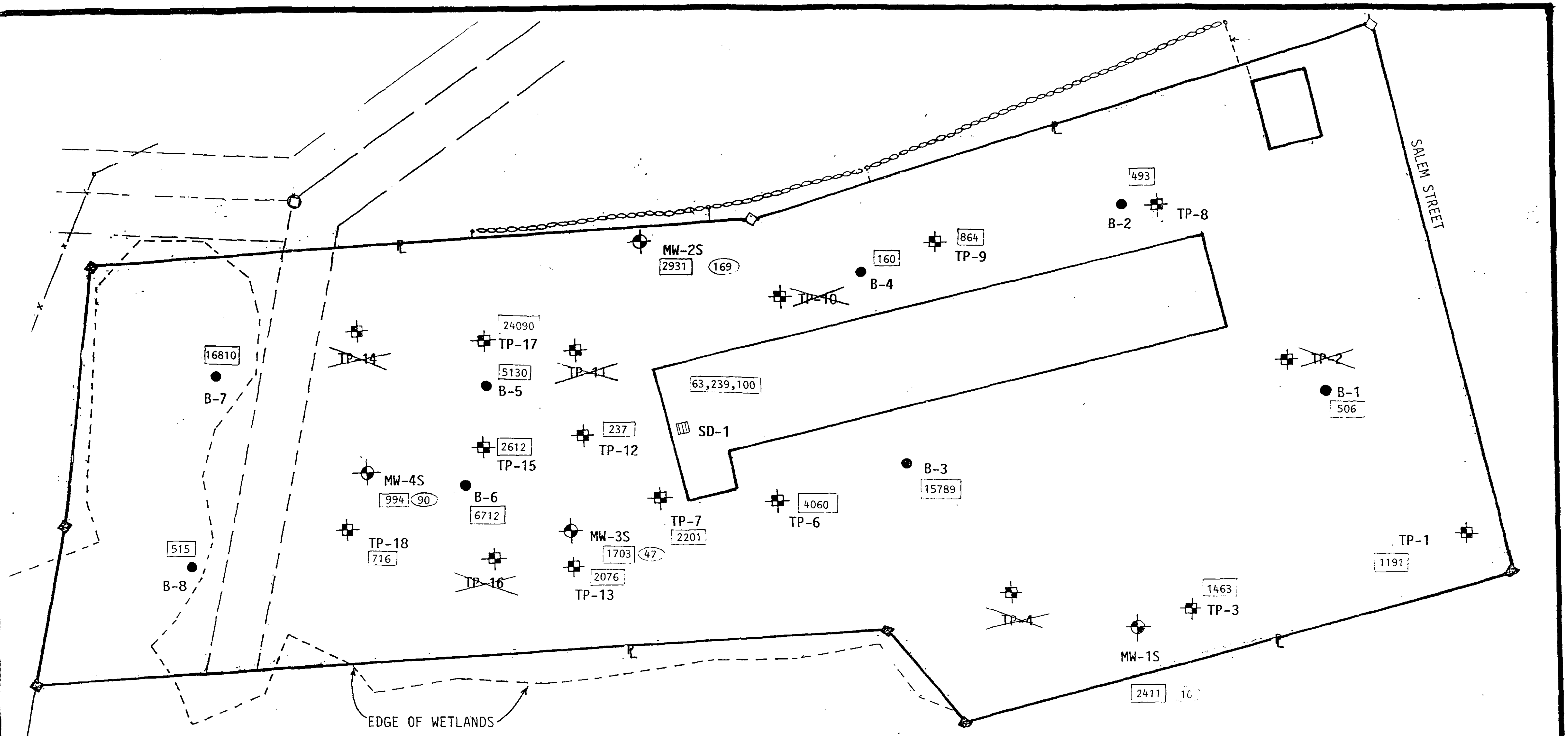
SALEM STREET
MW-2S
MW-4S
MW-3S
MW-1S
TP-1
TP-2
TP-3
TP-4
TP-6
TP-7
TP-8
TP-9
TP-10
TP-11
TP-12
TP-13
TP-14
TP-15
TP-16
TP-17
TP-18
B-1
B-2
B-3
B-4
B-5
B-6
B-7
B-8
EDGE OF WETLANDS
LEGEND:
MONITORING WELL
TEST PIT
SOIL BORING
PROPERTY LINE
GEOPHYSICAL SURVEY LINES
NEGATIVE CONDUCTIVITY VALUE
ZONE OF ANOMALOUSLY HIGH CONDUCTIVITY VALUE (GREATER THAN 20 mmho/m)
N
GHR
ENGINEERING ASSOCIATES, INC.
1050 WALTHAM STREET
LEXINGTON, MA. 02173
PROJECT
WHITNEY BARREL COMPANY
WOBURN, MA
CLIENT
RUTH J. WHITNEY
DWN. BY: MCR
CHK. BY: Kau
DSGN. BY:
APPD. BY:
SCALE: 1"=40'
DATE: 12/15/88
DWG. TITLE
FIGURE 11
GEOPHYSICAL SURVEY RESULTS

GHR ENGINEERING ASSOCIATES, INC.
1050 WALTHAM STREET
LEXINGTON, MA 02173

PROJECT	WHITNEY BARREL COMPANY WOBURN, MASSACHUSETTS
CLIENT	RUTH J. WHITNEY
DWG. TITLE	FIGURE 12 SOIL SCREENING RESULTS
PROJECT NO.	3661.002

DWN. BY: MCR CHK. BY: Kan
DSGN. BY: BAM APPD. BY: BAM
SCALE: 1" = 40'
DATE: 12/21/88

Site - 3-0479



LEGEND:

- MONITORING WELL
- TEST PIT
- SOIL BORING
- FLOOR DRAIN
- ℄ PROPERTY LINE
- TOTAL CONCENTRATION IN ug/l - GROUNDWATER
- TOTAL CONCENTRATION IN ug/kg - SOILS
- ~~TP-14~~ NOT ANALYZED

N

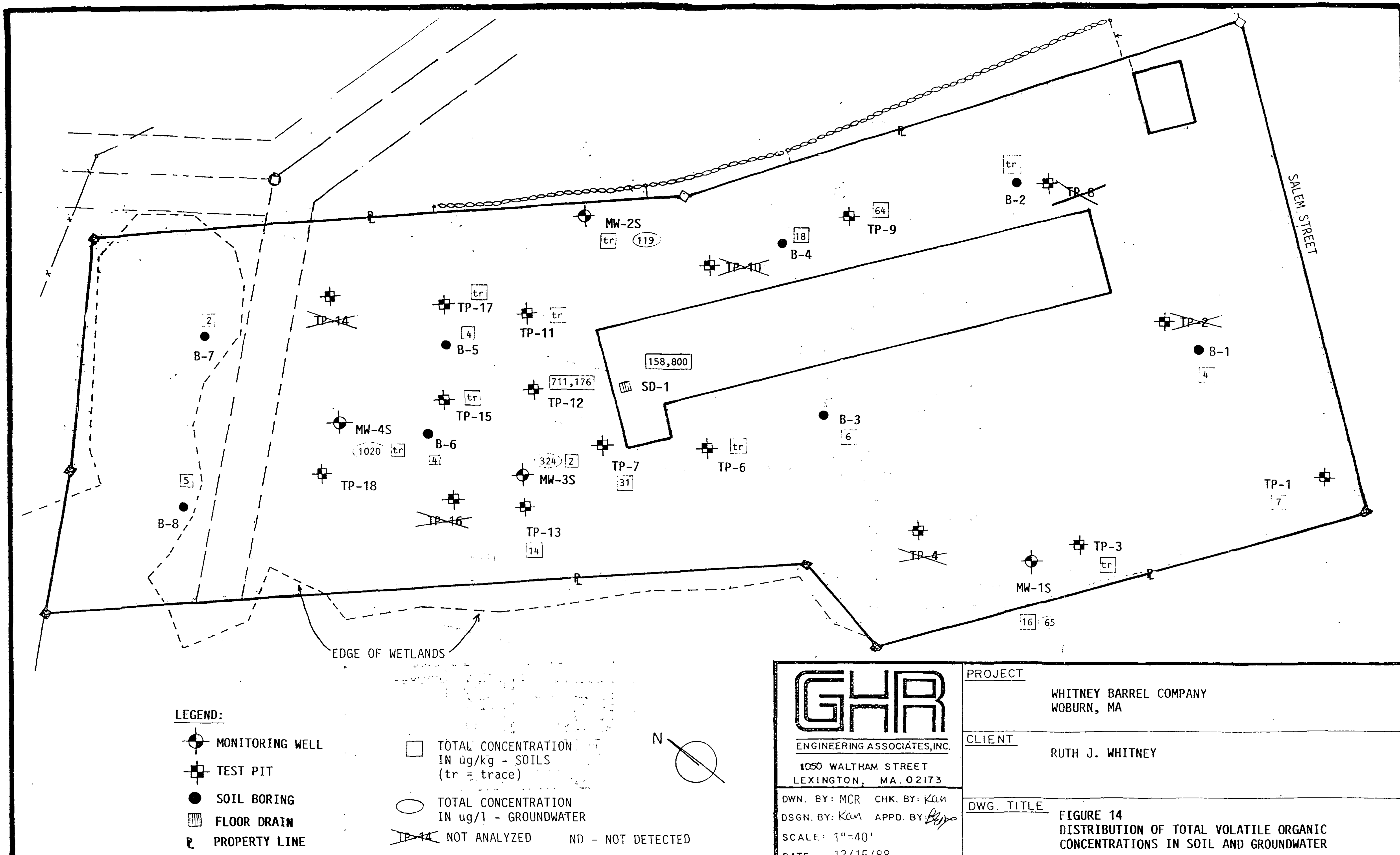
GHR ENGINEERING ASSOCIATES, INC.
1050 WALTHAM STREET
LEXINGTON, MA. 02173

DWN. BY: MCR	CHK. BY: Kau
DSGN. BY: Kau	APPD. BY: [illegible]
SCALE: 1"=40'	
DATE: 12/15/88	

PROJECT
WHITNEY BARREL COMPANY
WOBURN, MA

CLIENT
RUTH J. WHITNEY

DWG. TITLE
FIGURE 13
DISTRIBUTION OF TOTAL BASE NEUTRAL EXTRACTABLE COMPOUND CONCENTRATIONS IN SOIL AND GROUNDWATER



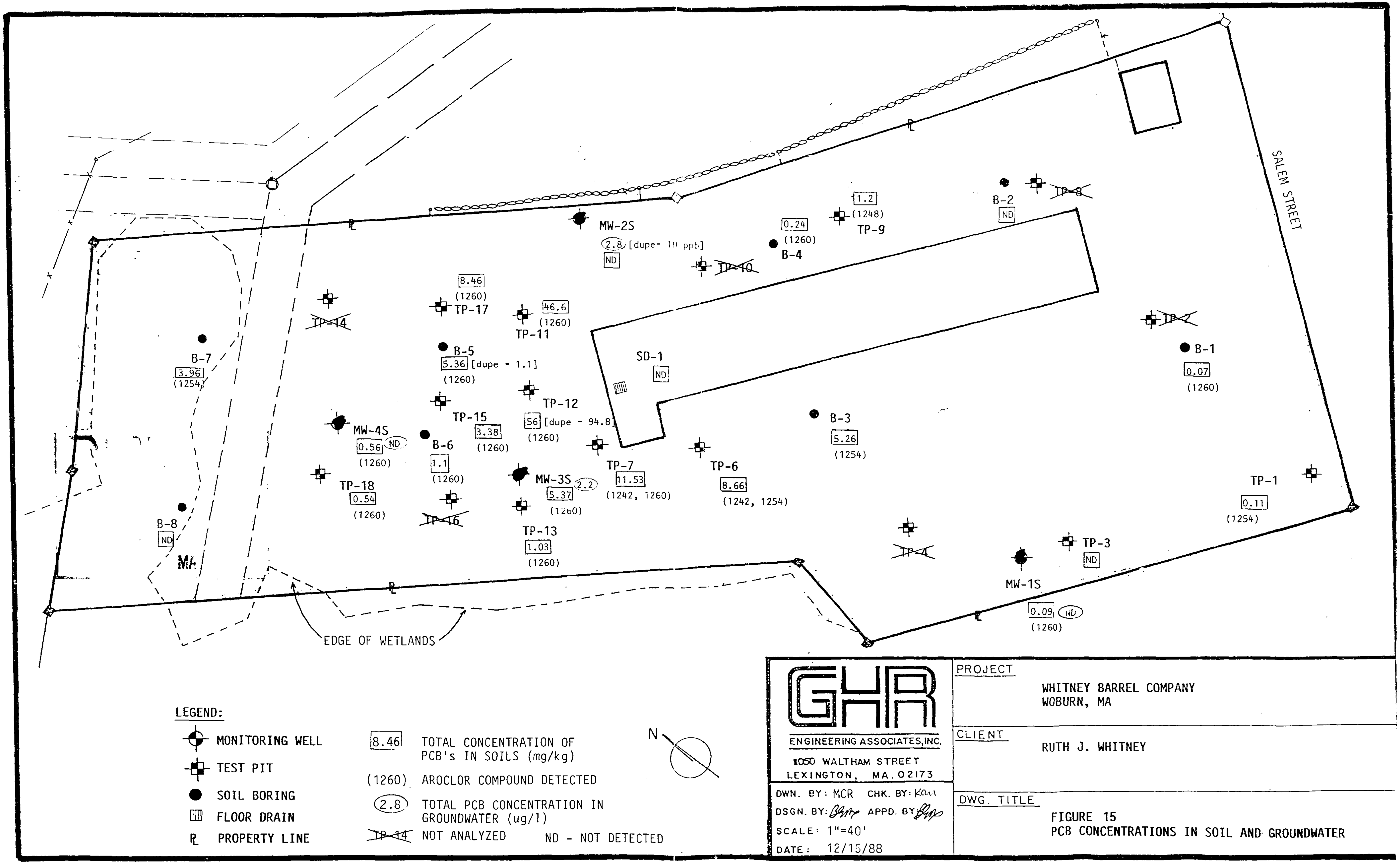
GHR ENGINEERING ASSOCIATES, INC.
1050 WALTHAM STREET
LEXINGTON, MA. 02173

DWN. BY: MCR CHK. BY: Kan
DSGN. BY: Kan APPD. BY:
SCALE: 1"=40'
DATE: 12/15/88

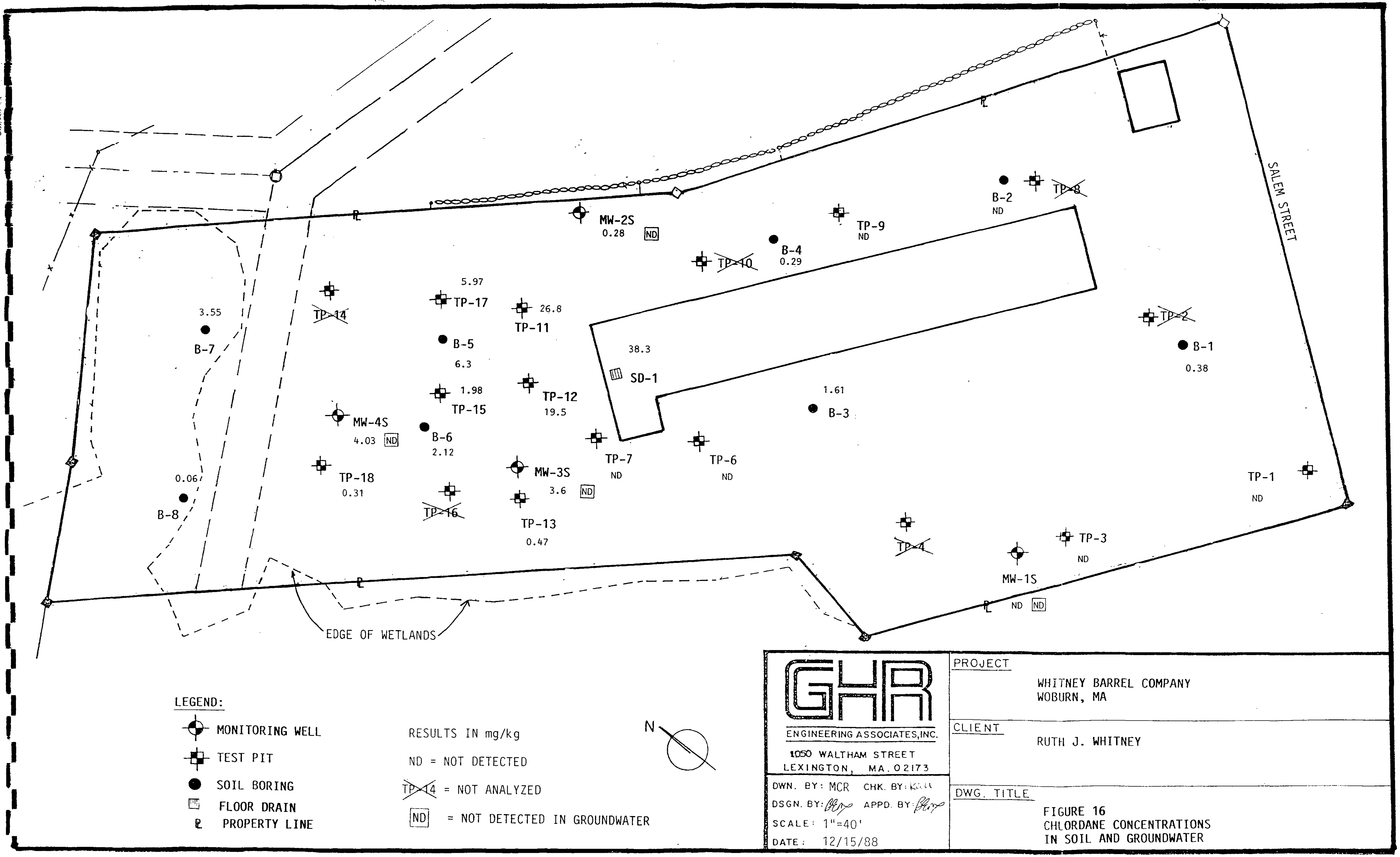
PROJECT: WHITNEY BARREL COMPANY, WOBURN, MA

CLIENT: RUTH J. WHITNEY

DWG. TITLE: FIGURE 14
DISTRIBUTION OF TOTAL VOLATILE ORGANIC CONCENTRATIONS IN SOIL AND GROUNDWATER



SALEM STREET
MW-2S
2.8 [dupe- 10 ppb]
ND
1.2
(1248)
TP-9
B-2
ND
TP-8
0.24
(1260)
B-4
TP-10
8.46
(1260)
TP-17
46.6
(1260)
TP-11
TP-14
B-7
3.96
(1254)
B-5
5.36 [dupe - 1.1]
(1260)
SD-1
ND
TP-2
B-1
0.07
(1260)
TP-12
56 [dupe - 94.8]
(1260)
TP-15
3.38
(1260)
MW-4S
0.56 ND
(1260)
B-6
1.1
(1260)
B-3
5.26
(1254)
TP-7
11.53
(1242, 1260)
TP-6
8.66
(1242, 1254)
MW-3S
2.2
5.37
(1260)
TP-18
0.54
(1260)
TP-16
TP-13
1.03
(1260)
TP-1
0.11
(1254)
B-8
ND
MA
TP-4
TP-3
ND
MW-1S
0.09 ND
(1260)
EDGE OF WETLANDS
LEGEND:
MONITORING WELL
TEST PIT
SOIL BORING
FLOOR DRAIN
PROPERTY LINE
8.46 TOTAL CONCENTRATION OF PCB's IN SOILS (mg/kg)
(1260) AROCLOR COMPOUND DETECTED
2.8 TOTAL PCB CONCENTRATION IN GROUNDWATER (ug/l)
TP-14 NOT ANALYZED
ND - NOT DETECTED
N
GHR
ENGINEERING ASSOCIATES,INC.
1050 WALTHAM STREET
LEXINGTON, MA. 02173
DWN. BY: MCR CHK. BY: Kau
DSGN. BY: APPD. BY:
SCALE: 1"=40'
DATE: 12/15/88
PROJECT
WHITNEY BARREL COMPANY
WOBURN, MA
CLIENT
RUTH J. WHITNEY
DWG. TITLE
FIGURE 15
PCB CONCENTRATIONS IN SOIL AND GROUNDWATER



SALEM STREET
MW-2S 0.28 ND
B-2 ND
TP-8
TP-9 ND
B-4 0.29
TP-10
TP-14
5.97 TP-17
26.8 TP-11
3.55 B-7
B-5 6.3
38.3 SD-1
TP-2
B-1 0.38
1.98 TP-15
TP-12 19.5
1.61 B-3
MW-4S 4.03 ND
B-6 2.12
TP-7 ND
TP-6 ND
0.06 B-8
TP-18 0.31
MW-3S 3.6 ND
TP-16
TP-13 0.47
TP-1 ND
TP-4
TP-3 ND
MW-1S ND ND
EDGE OF WETLANDS
LEGEND:
MONITORING WELL
TEST PIT
SOIL BORING
FLOOR DRAIN
PROPERTY LINE
RESULTS IN mg/kg
ND = NOT DETECTED
TP-14 = NOT ANALYZED
ND = NOT DETECTED IN GROUNDWATER
N
GHR
ENGINEERING ASSOCIATES, INC.
1050 WALTHAM STREET
LEXINGTON, MA. 02173
DWN. BY: MCR CHK. BY:
DSGN. BY: APPD. BY:
SCALE: 1"=40'
DATE: 12/15/88
PROJECT
WHITNEY BARREL COMPANY
WOBURN, MA
CLIENT
RUTH J. WHITNEY
DWG. TITLE
FIGURE 16
CHLORDANE CONCENTRATIONS
IN SOIL AND GROUNDWATER

TABLES

TABLE 1

VICINITY GROUNDWATER QUALITY DATA SUMMARY
WHITNEY BARREL COMPANY, 256 SALEM ST., WOBURN, MA
(ug/l)

Sample Locations

Compounds Detected	BW-3	BW-2	BSW-2	S-83	Riley Production Well S-46
Vinyl Chloride	ND-26	ND<2	33-360	ND	ND<10
1,1-Dichloroethene	ND<1	ND<1	ND-3	ND	ND<5
1,1-Dichloroethane	5-36	ND<1	28-35	ND	8-9
trans-1,2-Dichloroethene	20-37	4.3-5	920-2500	ND-110	24-28
1,1,1-Trichloroethane	8-15	ND-4.5	26-120	ND	25-26
Trichloroethene	80-200	14-32	130-840	440-1400	220
Tetrachloroethene	6.6-7	ND-3	14-34	ND-15	12
1,2-Dichloroethane	4	ND<1	ND<1	ND<1	ND<1
Bis(2-Ethylhexyl)Phthalate	NA	NA	NA	19	NA
Aluminum	ND<590	NA	NA	710	NA
Barium	ND<120	NA	NA	30	NA
Cadmium	ND<1.9	NA	NA	8	NA
Calcium	26200	NA	NA	62000	NA
Cobalt	ND<3.3	NA	NA	7.4	NA
Iron	ND<690	NA	NA	2000	NA
Magnesium	5620	NA	NA	12000	NA
Manganese	538	NA	NA	740	NA
Mercury	0.20	NA	NA	ND<0.1	NA
Potassium	2300	NA	NA	4900	NA
Sodium	33100	NA	NA	85000	NA
Zinc	ND<475	NA	NA	35	NA

Notes:

All data compiled from sampling rounds conducted by NUS/FIT in 1985

ND = Not Detected

NA = Not Analyzed

<u>TABLE 2</u>
CHRONOLOGICAL OWNERSHIP HISTORY
WHITNEY BARREL CO. SITE
256 SALEM STREET, WOBURN, MASSACHUSETTS

Year	Site Owner
1919 - 1938	Hugh Quinn
1938 - 1950	Daniel J. Quinn
1950 - 1953	City of Woburn - Held Tax Title for John E. Whitney, Sr. and Helen T. Whitney
1954 - 1964	City released 1950 Tax Title to John E. Whitney Sr. and Helen T. Whitney
1964 - 1972	Helen T. Whitney
1972 - 1976	John E. Whitney, Jr. and Walter W. Whitney
1976 - 1978	John E. Whitney, Jr. and Helen R. Whitney
1978 - 1984	John E. Whitney, Jr.
1984 - Present	Ruth J. Whitney

Notes:

1. Information derived from files at Middlesex County Registry of Deeds and John E. Whitney, III, 1988.

<u>TABLE 3</u>
CHRONOLOGICAL HISTORICAL SUMMARY
1919 - 1988
256 SALEM STREET, WOBURN, MASSACHUSETTS

1919 - 1938	Unknown use (rumored use for opium production in 1920's and 1930's) lot vacant. No buildings.
1938 - 1949	Storage. No buildings.
1950 - 1985	Whitney Barrel Co., use for barrel and tank reconditioning and scrap metal junkyard.
1950 or 1951	Floor drain and on-Site sewer believed installed.
1960's	Hero Chemical, use of building extension for glue manufacturing.
March, 1960	Fire report, barrel ruptured.
1965	Fire on-Site.
1967	Fire report, gas tank fire attributed to careless burning.
1970's	Use of building extension for analytical chemistry research.
1972	Fire report, spontaneous ignition in paint spray booth.
1973	Fire on-Site.
May, 1977	Fire on-Site originating in wash room destroyed "raw warehouse".
June, 1978	MDC Industrial Inspection Report
November, 1978	MDC Industrial Investigation Report - MDC representatives left an MDC User Permit Application and a copy of the applicable regulations. Reported no barrel cleaning, just barrel retail.
December, 1978	Kingston Steel Barrel Co., alleged to have discharged rinsewater into MDC manhole near Whitney property.
April, 1979	Massachusetts Water Pollution Control (MWPC) files suit against Whitney Barrel Co. for disposal of wastewater by Kingston Steel Barrel Co. into MDC storm sewer without a discharge permit.

<u>TABLE 3</u>

CHRONOLOGICAL HISTORICAL SUMMARY (CONT'D)

May, 1979	Fire on-Site destroyed main building and contents Drum reconditioning volume reduced afterwards.
June, 1979	MWPC inspected the Site and reported that oil and hazardous material spilled on the ground from tanks and barrels.
1980	E&E PA and SI concluded there are no apparent environmental problems on-Site.
1980	Reconstruction of main building.
April, 1981	RCRA Inspection Report: 300 drums washed per week; no drums observed to contain more than 1" of residue. Violations: no training plan, no position descriptions, no contingency plan. Inspection for RCRA notification/status.
April 15, 1981	RCRA notification date. Whitney Barrel received RCRA status as a non-regulated small quantity generator and handler.
September, 1981	Industrial Investigation Follow-up Reports. Inspection performed for permit information.
April, 1983	MDC Industrial Investigation and Sampling Reports: Wash 150 barrels per day, 2 days per week. Sampled for oil and grease and metals analysis; no results available. Violation: elevated pH of discharged water.
1985	Whitney Barrel Co. ceased junk and barrel reclaiming operations.
February 3, 1985	NUS attempts to install well on-Site for EPA Wells G & H study. Total Volatile Organic Compound concentration detected at 250 ppm during air monitoring conducted at the borehole during drilling.
January 3, 1986	Rubber Fire
January 13, 1986	Tank fire; 2,000 gallon tank was being cut for scrap when torch ignited residue (petroleum product). Reported that some petroleum product spilled on ground surface. Also fire control liquid was sprayed on ground surface.

TABLE 3

CHRONOLOGICAL HISTORICAL SUMMARY (CONT'D)

December 1, 1986	DEQE issued NOR to Whitney Barrel Co.
January 15, 1987	Whitney Barrel Co. Site first listed by DEQE as a confirmed uncharacterized hazardous waste Site.
October, 1987	DEQE's contractor, E.C. Jordan, proposes Scope of Work for a Phase I investigation of Whitney Site.
January, 1988	GHR Engineering, consultants to Ruth Whitney, submitted to DEQE a revised Site investigation work plan based on the earlier E.C. Jordan plan.
February, 1988	DEQE agrees to enter into an Administrative Consent Order with Ruth Whitney under which GHR would conduct the Site investigation.
July 6, 1988	Administrative Consent Order signed.

TABLE 4

MONITORING WELL INFORMATION
WHITNEY BARREL COMPANY, 256 SALEM ST., WOBURN, MA

Well Number	Date Completed	Driller (Consultant)	Well Diameter (in)	Well Depth (ft)	Boring Depth (ft)	Screened Interval (ft)	Formation Screened (1)	Ground Elevation (ft)	Top of PVC Elevation (ft)	Steel Casing Elevation (ft)	Static Water Level(2) (ft)	Notes
MW-1S	8/30/88	GeoLogic (GHR)	2.0	15.5	18	5.5-15.5	sand	47.60(3)	47.18(3)	47.74(3)	44.22	
MW-2S	8/31/88	GeoLogic (GHR)	2.0	14.5	14	4.5-15.5	sand, tr. gravel	45.52(3)	45.22(3)	45.70(3)	44.07	
MW-3S	9/2/88	GeoLogic (GHR)	2.0	14	14	4-14	sand	45.95(3)	45.70(3)	46.17(3)	44.33	
MW-4S	9/2/88	GeoLogic (GHR)	2.0	15.5	15.5	5.5-15.5	sand, tr. gravel	45.52(3)	47.12(3)	47.47(3)	44.14	
Murphy Well	-	- (Clean Harbors)	1.5	17.4(3)	-	-	-	50.54(3)	53.19(3)	53.19(3)	44.56	
S83	2/28/85	NEBC (NUS)	1.5	80	87	70-80	sand, silt, tr. gravel	48.09	50.67(3)	51.70(3)	43.75	
S46	1958	- -	-	-	51	-	-	55.00	-	-	-	Riley Industrial Well (pump rate est. 700 gpm)
OW-8	10/4/85	Guild (Weston)	2.0	13	14	8-13	sand, tr. gravel	45.41(3)	47.18(3)	47.46(3)	43.99	
SW-8	10/4/85	Guild (Weston)	2.0	23	24	18-23	sand, tr. gravel	45.03	47.62(3)	47.62	43.90	
CW-8	10/3/85	Guild (Weston)	2.0	58	59	53-58	sand, gravel cobbles	45.22	47.49(3)	47.84	43.79	
W-8	10/1/85	Guild (Weston)	2.0	76	77	66-76	bedrock	45.42	47.73(3)	47.80	43.83	Bedrock Surface at 61.5 ft depth
BSW-2	8/30/83	- (Woodward-Clyde)	2.0	20	20	10-20	sand	45.10	47.56	48.00(3)	44.30	
SW-2	8/19/83	- (Woodward-Clyde)	2.0	44.5	47	34.5-44.5	sand, gravel	44.10	46.80	46.80(3)	43.65	
BW-3	8/26/83	- (Woodward-Clyde)	2.0	43.8	47	33.8-43.8	sand, gravel	45.00	47.14	47.38(3)	43.22	
BW-5	9/24/83	- (Woodward-Clyde)	2.0	40	41	30-40	sand, gravel	45.30	47.81	48.34(3)	43.19	

Notes: Unless otherwise noted, all information derived from original well logs. All elevations referenced to National Geodetic Vertical Datum. Depths are below ground surface.

\- Information unavailable

(1) Soil types encountered listed in decreasing percentage of occurrence.

(2) Static Water Levels referenced to National Geodetic Vertical Datum
All water level measurements collected by GHR on 11/3/88

(3) Elevations from GHR survey data collected August and September, 1988

TABLE 5

SUMMARY OF RESULTS OF HNu-101 FIELD SCREENING OF SOIL VAPOR PROBES
WHITNEY BARREL COMPANY, 256 SALEM ST., WOBURN, MA
(ppm)

Screening Location	SG-1	SG-2	SG-3	SG-4	SG-5	SG-6	SG-7	SG-8
HNu-101 Total Volatile Organic Screening Date								
June 23, 1988	BDL	BDL	2	75	300	1	BDL	7
June 27, 1988	NA	NA	6	20	150	NA	NA	5
June 28, 1988	7	6	NA	NA	NA	6	6	NA
July 12, 1988	BDL	BDL	5.2	1.2	42	0.5	BDL	BDL
July 25, 1988	NA	0.5	2.0	0.4	9	0.3	0.4	1.2

Notes:

BDL = Below Detection Limit (0.1 ppm)

NA = Not Analyzed

TABLE 6

SUMMARY OF ANALYTICAL RESULTS OF SOIL SAMPLES FROM TEST PITS
WHITNEY BARREL COMPANY, 256 SALEM ST., WOBURN, MA

Sample Locations Lab ID Number Remarks	TP-1 84975	TP-3 84976	TP-6 84977	TP-7 84978	TP-9 84979	TP-11 84980	TP-12 84981	TP-12 DUP 84986 (TP-19)	TP-13 84982	TP-15 84983	TP-17 84984	TP-18 84985	Natural Background Range in Soils(1)
Inorganic Compounds (mg/kg)													
Aluminum	7760	4930	4080	5350	3260	4210	4530	4360	4670	4200	3710	3590	10,000-300,000
Antimony	27	22	32	26	24	–	–	–	–	–	–	–	0.6-10
Arsenic	4.40	2.02	3.10	4.16	2.50	4.90	415	375	4.00	4.90	3.80	2.80	1-50
Barium	38	17	17	20	–	13	–	10	17	22	56	–	100-3000
Calcium	556	856	869	748	538	634	392	424	779	872	1500	422	7,000-500,000
Chromium	22.0	8.1	10.0	19.8	5.9	18.0	7.0	10.0	10.0	38.0	420	12.0	1-1,000
Cobalt	6.0	–	–	5.9	–	–	–	–	–	–	–	–	1-40
Copper	14.0	5.0	10.0	15.8	3.9	6.0	4.0	3.0	10.0	20.0	13.0	4.0	2-100
Iron	9,270	4,770	6,610	10,000	4,770	5,140	3,500	3,490	6,530	8,170	4,980	3,450	7,000-550,000
Lead	78.0	17.2	42.0	101	12.2	32.0	10.0	–	52.0	72.0	252	10.0	2-200
Magnesium	1870	1300	1290	1010	846	936	882	980	781	1060	1070	846	600-6,000
Manganese	72.0	68.7	70.0	81.2	41.7	57.0	45.0	42.0	50.0	74.0	62.0	34.0	20-3,000
Mercury	0.42	0.45	0.44	0.53	0.62	0.7	0.40	0.60	0.5	0.34	0.66	0.48	0.01-0.3
Nickel	10.0	10.1	10	9.9	8.3	8.0	8.0	6.0	8.0	10.0	8.0	8.0	5-500
Potassium	509	552	509	396	378	357	321	379	307	457	393	293	400-30,000
Sodium	36.0	68.7	98.0	129	56.9	62.0	90.0	100	72.0	66.0	78.0	33.0	750-7,500
Zinc	29.0	17.2	28.0	59.4	15.7	30.0	12.0	10.0	56.0	69.0	66.0	15.0	10-300
Volatile Organic Compounds (ug/kg)													
Chlorobenzene	–	–	–	–	–	–	250	280	–	–	–	–	
1,1,1-Trichloroethane	–	–	–	–	–	–	26	2,000	5	–	–	–	
1,2-Dichloroethene	–	–	–	–	–	–	–	32	–	–	–	–	
Ethylbenzene	–	–	–	–	–	–	3,900	3,900	–	–	–	–	
Methylene Chloride	LCB	LCB	LCB	LCB	LCB	LCB	LCB	LCB	LCB	LCB	LCB	LCB	
Tetrachloroethene	3 J	–	–	13	2 J	–	320,000	130,000	7	–	–	–	
Toluene	–	–	–	–	–	–	31,000	26,000	–	–	–	–	
Trichloroethene	4 J	–	–	18	–	–	330,000	120,000	–	–	–	–	
Acetone	LCB	LCB	LCB	LCB	62 C	LCB	LCB	LCB	LCB	LCB	LCB	LCB	
2-Butanone (2)	–	–	–	LCB	–	–	LCB	LCB	LCB	LCB	–	–	
4-Methyl-2-Pentanone (2)	–	–	–	LCB	–	–	–	–	–	–	–	–	
Total Xylenes	–	–	–	–	–	–	26,000	28,000	2 J	–	–	–	

Notes:
- J — Quantitation approximate due to limitations identified in the laboratory report (Appendix F).
- LCB — Compound was found but at low concentration comparable to the blank. Quantitation is not possible.
- (1) — Developed from Lindsay(1979) Concentrations given in ppm.
- C — The result has been corrected for presence of the compound in the blank
- – — Below Detection Limit for compounds as listed in laboratory report(Appendix F).

TABLE 6 (cont.)

SUMMARY OF ANALYTICAL RESULTS OF SOIL SAMPLES FROM TEST PITS
WHITNEY BARREL COMPANY, 256 SALEM ST., WOBURN, MA

Sample Locations Lab ID Number Remarks	TP-1 84975	TP-3 84976	TP-6 84977	TP-7 84978	TP-9 84979	TP-11 84980	TP-12 84981	TP-12 84986 (TP-19)	TP-13 84982	TP-15 84983	TP-17 84984	TP-18 84985
Base/Neutral Extractables (ug/kg)												
Acenaphthene	-	-	-	-	-	130 J	5 J	5 J	98 J	-	2300	-
1,2,4-Trichlorobenzene	-	-	-	170 J	-	2000	96	79	110 J	100 J	170 J	71 J
1,2-Dichlorobenzene	-	-	-	-	-	73 J	7 J	7 J	-	-	-	-
1,3-Dichlorobenzene	-	-	-	-	-	300 J	-	-	-	-	360	-
1,4-Dichlorobenzene	-	-	-	81 J	-	900	3 J	3 J	-	200 J	920	-
Fluoranthene	150 J	260 J	270 J	130 J	-	100 J	-	-	88 J	130 J	2600	80 J
Naphthalene	-	-	590	-	-	210 J	14	14	77 J	130 J	3900	-
Bis-(2-Ethylhexyl) Phthalate	510	93 J	1000	390	390	1300	38	38	540	790	580	310 J
Benzyl Butyl Phthalate	-	-	130 J	-	-	-	-	-	-	-	-	-
Di-N-Butyl Phthalate	-	-	-	-	-	-	13	13	-	-	-	-
Diethyl Phthalate	-	-	-	-	-	-	10	10	-	-	-	-
Benzo(A)Anthracene	71 J	150 J	160 J	110 J	-	-	-	-	-	110 J	640	-
Benzo(A)Pyrene	66 J	140 J	200 J	170 J	-	-	-	-	68 J	96 J	440	-
Benzo(B)Fluoranthene	110 J	160 J	320 J	130 J	-	75 J	-	-	-	88 J	560	-
Benzo(K)Fluoranthene	-	-	-	120 J	-	-	-	-	-	67 J	290 J	-
Chrysene	80 J	150 J	200 J	140 J	-	-	-	-	75 J	220 J	800	-
Acenaphthylene	-	-	-	-	-	-	-	-	-	-	200 J	-
Anthracene	-	-	-	-	-	-	-	-	-	170 J	1400	-
Benzo(GHI)Perylene	-	70 J	130 J	150 J	-	-	-	-	-	69 J	320 J	-
Fluorene	-	-	-	-	74 J	73 J	4 J	4 J	170 J	-	1600	-
Phenanthrene	84 J	140 J	190 J	75 J	120 J	110 J	5 J	5 J	340	190 J	2400	97 J
Dibenzo(AH)Anthracene	-	-	-	65 J	-	-	-	-	-	-	180 J	-
Indeno(1,1,3-CD)Pyrene	-	-	110 J	110 J	-	-	-	-	-	-	290 J	-
Pyrene	120 J	300 J	360	260 J	70 J	120 J	2 J		100 J	160 J	2500	83 J
Dibenzofuran	-	-	-	-	-	66 J	4 J	3 J	110 J	-	820	-
2-Methylnaphthalene	-	-	400	-	210 J	72 J	36	36	300 J	92 J	820	75 J
Acid Extractables (ug/kg)												
2,4,5-Trichlorophenol (2)	-	-	-	-	-	-	16 J	17 J	-	93 J	-	-
Pesticides/PCBs (mg/kg)												
Chlordane	-	-	-	-	-	26.8	17.6	19.5	0.47	1.98	5.97	0.31
PCB-1242	-	-	7.26	4.52	-	-	-	-	-	-	-	-
PCB-1254	0.11	-	11.4	-	-	-	-	-	-	-	-	-
PCB-1248	-	-	-	-	1.2	-	-	-	-	-	-	-
PCB-1260	-	-	-	7.01	-	46.6	56	94.8	1.03	3.38	8.46	0.54

Notes:

J Quantitation is approximate due to limitations identified in the laboratory report (Appendix F).

\- Below Detection Limits for compounds as listed in the laboratory report (Appendix F).

TABLE 7

SUMMARY OF ANALYTICAL RESULTS OF SOIL SAMPLES FROM TEST PITS
WHITNEY BARREL COMPANY, 256 SALEM ST., WOBURN, MA

Sample Locations Lab ID Number Remarks	MW-1s 85267 comp.	MW-2s 85268 comp.	MW-3s 85269 comp.	MW-4s 85270 comp.	B-1 85271 comp.	B-2 85272 comp.	B-3 85273 comp.	B-4 85274 comp.	B-5 85275 comp.	B-6 85276 comp.	B-6 rep 85277 comp.	B-7 85278 comp.	B-8 85279 comp.	Natural Background Range in Soils(1)
Inorganic Compounds (mg/kg)														
Aluminum	5,660	3,490	3,570	3,490	6,200	3,770	5,110	3,960	4,650	3,820	3,140	4,850	3,450	10,000-300,000
Antimony	-	24	-	24	-	22	-	-	22	-	30	-	-	0.6-10
Arsenic	2.90	2.67	7.62	2.25	4.16	3.10	4.70	2.38	3.52	4.20	2.57	4.06	3.30	1-50
Barium	18	12	21	17	26	10	40	-	18	21	-	20	14	100-3,000
Calcium	1,500	909	1,230	890	993	799	1,540	697	1,150	904	661	1,750	596	7,000-500,000
Chromium	16.0	7.9	23.8	23.5	20.8	8.0	28.0	9.4	51.0	58.0	19.8	450	71.0	1-1,000
Cobalt	-	-	-	-	5.9	-	6	-	5.9	-	-	-	-	1-40
Copper	10.0	5.9	17.8	33.3	23.8	6.0	39.0	5.9	11.8	19.0	7.9	15.8	9.5	2-100
Iron	7,330	4,940	7,440	5,200	6,980	4,390	20,200	4,600	5,590	11,000	4,440	4,920	6,370	7,000-550,000
Lead	54.0	13.9	95.0	35.3	19.8	11.0	233	16.3	33.3	82.0	21.8	61.3	51.5	2-200
Magnesium	1,830	1,230	1,190	1,040	1,340	942	1,630	1,130	1,300	1,110	887	767	728	600-6,000
Manganese	102	65.3	74.3	56.9	82.2	50.0	143	53.4	74.5	83.0	44.6	50.5	47.5	20-3,000
Mercury	0.31	-	0.36	-	-	-	0.52	-	-	-	0.28	-	-	0.01-0.3
Nickel	10.0	8.9	9.9	7.8	14.8	10.0	14.0	7.4	9.8	10.0	9.9	9.9	9.0	5-500
Potassium	518	532	495	490	954	471	639	559	554	479	425	283	336	400-30,000
Sodium	112	65.4	103	58.8	85.1	50.0	95.0	36.6	64.7	62.0	49.5	42.6	31.5	750-7,500
Zinc	22.0	15.8	66.3	41.2	33.7	92.0	170	32.7	27.4	60.0	22.8	45.5	47.0	10-300
Volatile Organic Compounds (ug/kg)														
Methylene Chloride	LCB	LCB	LCB	LCB	4 JC	LCB	3 JC	LCB	4 JC	4 JC	LCB	LCB	5 JC	-
Tetrachloroethene	13	-	2 J	-	-	-	3 J	-	-	-	-	-	-	-
Trichloroethene	3 J	-	-	-	-	-	-	-	-	-	-	-	-	-
Acetone	LCB	LCB	LCB	LCB	LCB	LCB	LCB	17 C	LCB	LCB	-	LCB	LCB	-
2-Butanone	-	LCB	-	LCB	LCB	-	LCB	LCB	LCB	LCB	-	LCB	LCB	-
Carbon Disulfide	-	-	-	-	-	-	-	1 J	-	-	-	-	-	-
Toluene	-	-	-	-	-	-	-	-	-	-	-	2 J	-	-

Notes:
- J — Quantitation is approximate due to limitations identified in the laboratory report (Appendix F).
- C — The result has been corrected for the presence of the compound in the blank.
- LCB — Compound was found but at low concentration, comparable to the blank. Quantitation is not possible.
- \- — Below Detection Limit for compound as listed in laboratory report (Appendix F).
- (1) — Developed from Lindsay(1979). Concentration given in ppm.

TABLE 7 (cont.)

SUMMARY OF ANALYTICAL RESULTS OF SOIL SAMPLES FROM SOIL BORINGS
WHITNEY BARREL COMPANY, 256 SALEM ST., WOBURN, MA

Sample Locations	MW-1s	MW-2s	MW-3s	MW-4s	B-1	B-2	B-3	B-4	B-5	B-6	B-6 rep	B-7	B-8
Lab ID Number	85267	85268	85269	85270	85271	85272	85273	85274	85275	85276	85277	85278	85279
Remarks	comp.	comp.	comp.	comp.	comp.	comp.	comp.	comp.	comp.	comp.	comp.	comp.	comp.
Base/Neutral Extractables (ug/kg)													
Acenaphthene	-	-	-	-	-	-	230 J	-	-	1000	450	-	-
1,3-Dichlorobenzene	-	-	-	-	-	-	-	-	170 J	-	-	-	-
1,4-Dichlorobenzene	-	-	-	-	-	-	-	-	490	-	-	-	-
Fluoranthene	370	95 J	-	140 J	100 J	100 J	2000	-	72 J	1900	1400	-	92 J
Naphthalene	160 J	-	-	-	-	-	-	-	-	-	100 J	-	-
Bis-(2-Ethylhexyl) Phthalate	200 J	1900	430	-	230 J	220 J	600	-	1400	460	410	11000	96 J
Benzyl Butyl Phthalate	-	740	-	-	-	-	-	160 J	-	-	-	5700	-
Di-N-Butyl Phthalate	-	-	-	-	-	-	-	-	2900	-	-	110 J	94 J
Benzo(A)Anthracene	160 J	-	110 J	92 J	-	-	1100	-	-	370	370	-	69 J
Benzo(A)Pyrene	-	-	130 J	98 J	-	-	1200	-	-	220 J	310 J	-	-
Benzo(B)Fluoranthene	130 J	-	130 J	74 J	-	-	960	-	-	200 J	250 J	-	-
Benzo(K)Fluoranthene	150 J	-	88 J	68 J	-	-	640	-	-	260 J	360	-	-
Chrysene	210 J	100 J	150 J	170 J	81 J	-	1400	-	-	560	500	-	-
Acenaphthylene	-	-	-	-	-	-	120 J	-	-	-	-	-	-
Anthracene	71 J	-	-	-	-	-	400	-	-	92 J	190 J	-	-
Benzo(GHI)Perylene	-	-	210 J	92 J	-	82 J	1000	-	-	-	180 J	-	-
Fluorene	120 J	-	-	-	-	-	230 J	-	-	280 J	180 J	-	-
Phenanthrene	220 J	-	95 J	-	-	-	2000	-	-	290 J	670	-	64 J
Dibenzo(AH)Anthracene	-	-	-	-	-	-	240 J	-	-	-	80 J	-	-
Indeno(1,1,3-CD)Pyrene	-	-	150 J	-	-	-	600	-	-	-	170 J	-	-
Pyrene	410	96 J	210 J	260 J	95 J	91 J	3000	-	98 J	840	830	-	100 J
2-Methylnaphthalene	210 J	-	-	-	-	-	69 J	-	-	-	-	-	-
Dibenzofuran	-	-	-	-	-	-	-	-	-	240 J	130 J	-	-
Acid Extractables (ug/kg)													
none detected													
Pesticides/PCBs (mg/kg)													
Chlordane	-	0.28	3.60	4.03	0.38	-	1.61	0.29	6.30	2.12	1.89	3.55	0.06
PCB-1254	-	-	-	-	-	-	5.26	-	-	-	-	3.96	-
PCB-1260	0.09	-	5.37	0.56	0.07	-	-	0.24	5.36	1.10	0.96	-	-

Notes:

J Quantitation is approximate due to limitations identified in the laboratory report (Appendix F).

\- Below Detection Limit for compound as listed in laboratory report (Appendix F).

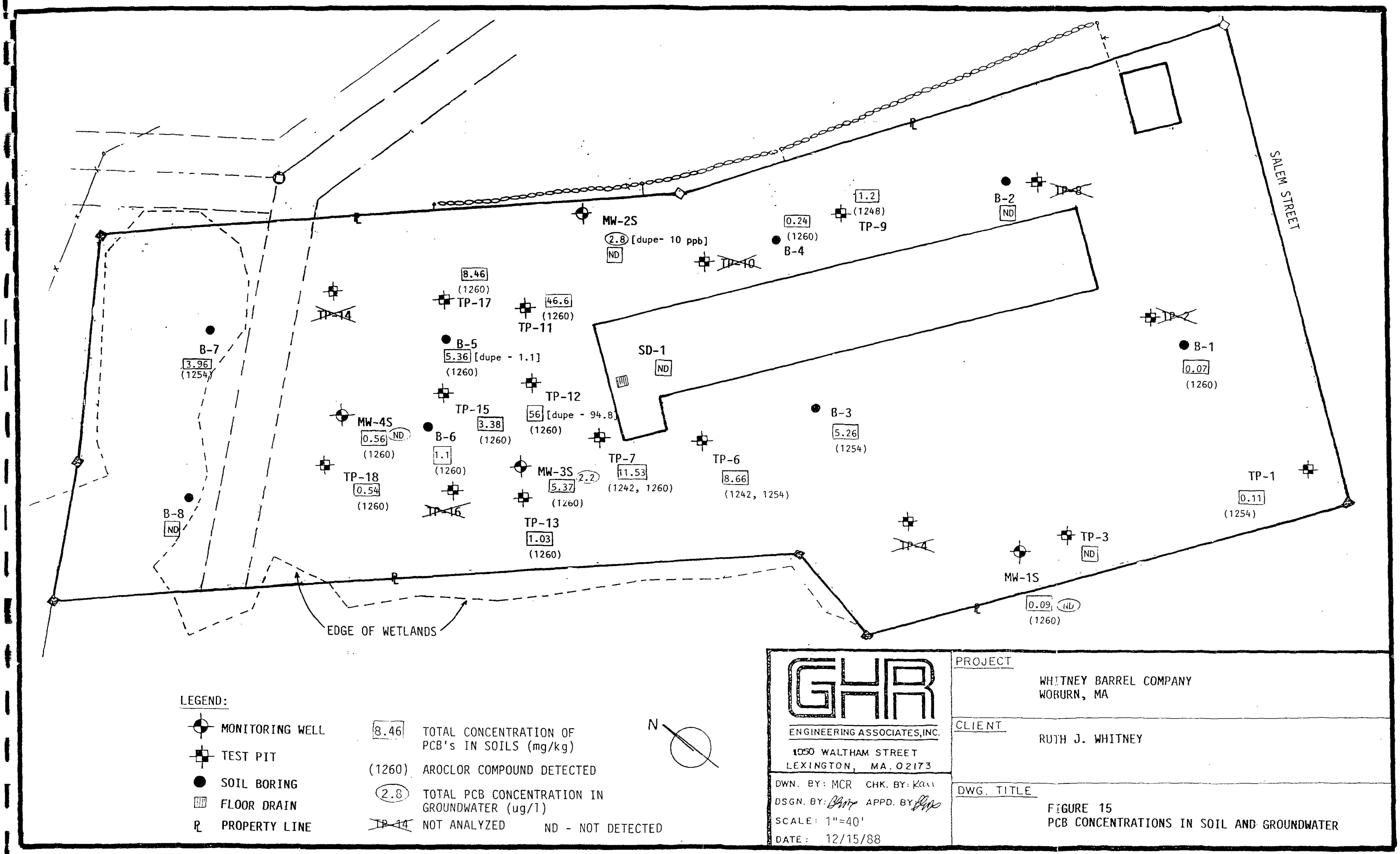

SALEM STREET
MW-2S
2.8 [dupe- 10 ppb]
ND
B-2
ND
TP-8
1.2
(1248)
TP-9
0.24
(1260)
B-4
TP-10
8.46
(1260)
TP-17
46.6
(1260)
TP-11
TP-14
B-7
3.96
(1254)
B-5
5.36 [dupe - 1.1]
(1260)
SD-1
ND
TP-2
B-1
0.07
(1260)
TP-12
56 [dupe - 94.8]
(1260)
TP-15
3.38
(1260)
MW-4S
0.56 ND
(1260)
B-6
1.1
(1260)
B-3
5.26
(1254)
TP-7
11.53
(1242, 1260)
TP-6
8.66
(1242, 1254)
MW-3S 2.2
5.37
(1260)
TP-18
0.54
(1260)
TP-16
TP-13
1.03
(1260)
B-8
ND
TP-1
0.11
(1254)
TP-4
TP-3
ND
MW-1S
0.09 ND
(1260)
EDGE OF WETLANDS
LEGEND:
MONITORING WELL
TEST PIT
SOIL BORING
FLOOR DRAIN
PROPERTY LINE
8.46 TOTAL CONCENTRATION OF PCB's IN SOILS (mg/kg)
(1260) AROCLOR COMPOUND DETECTED
2.8 TOTAL PCB CONCENTRATION IN GROUNDWATER (ug/l)
TP-14 NOT ANALYZED
ND - NOT DETECTED
N
GHR
ENGINEERING ASSOCIATES, INC.
1050 WALTHAM STREET
LEXINGTON, MA. 02173
PROJECT
WHITNEY BARREL COMPANY
WOBURN, MA
CLIENT
RUTH J. WHITNEY
DWN. BY: MCR
CHK. BY: KaU
DSGN. BY:
APPD. BY
SCALE: 1"=40'
DATE: 12/15/88
DWG. TITLE
FIGURE 15
PCB CONCENTRATIONS IN SOIL AND GROUNDWATER

TABLE 8

SUMMARY OF ANALYTICAL RESULTS OF GROUNDWATER SAMPLES
WHITNEY BARREL COMPANY, 256 SALEM ST., WOBURN, MA

Sample Locations Lab ID Number Remarks	MW-1s 87489	MW-2s 87490	MW-2s DUP 87493 (MW-5)	MW-3s 87491	MW-4s 87492	FIELD BLANK 87494	MMCL / MMGQS* (1)
Inorganic Compounds (mg/l)							
Aluminum	5.6	1.4	-	-	1.3	-	-
Arsenic	0.011	0.003	-	0.062	-	-	0.05
Calcium	62.4	23.8	34.8	60.8	45.4	4.14	-
Copper	-	-	-	-	-	0.06	1*
Iron	13.5	4.2	5.58	35.0	12.0	0.30	0.3*
Magnesium	6.1	2.04	2.66	10.9	3.56	0.62	-
Manganese	1.78	0.68	0.94	1.52	0.74	-	0.05*
Potassium	6.7	11.1	15.5	12.8	8.3	0.7	-
Sodium	34.6	50.8	68.1	185	92.2	9.8	20
Zinc	0.06	-	0.02	0.06	0.03	-	5*
Volatile Organic Compounds (ug/l)							
Benzene	5	-	2 J	12	63	-	5(2)
Chlorobenzene	3 J	39	35	2 J	6 J	-	4300*
1,1,1-Trichloroethane	-	-	-	-	99	-	200
1,1-Dichloroethane	-	-	-	43	300	-	-
Chloroethane	-	-	-	-	2 J	-	-
Chloroform	-	-	-	-	-	7	-
1,2-Dichloroethene	39	49	45	77	31	-	1000*
Ethylbenzene	2 J	7	10	31	90	-	486*
Methylene Chloride	LCB	LCB	LCB	LCB	LCB	LCB	5*
Toluene	-	1 J	1 J	26	66	-	2000*
Vinyl Chloride	11	18	13	32	15 J	-	2(2)
Acetone	LCB	-	LCB	LCB	140 C	LCB	700*
2-Butanone	LCB	-	LCB	LCB	16 JC	LCB	-
4-Methyl-2-Pentanone	-	-	-	5 J	12 J	-	-
Total Xylenes	5	5	4 J	96	180	22	620*

Notes:
- J — Quantitation is approximate due to limitations identified in the laboratory report (Appendix F).
- LCB — Compound was found, but at low concentration, comparable to the blank. Quantitation is not possible.
- \- — Below Detection Limit for compound as listed in the laboratory report (Appendix F).
- C — The result has been corrected for the presence in the blank.
- (1) — Represents Massachussetts Maximum Contaminant Levels(MMCL) as set forth in 310 CMR 22.06 or Massachussetts Minimum Groundwater Quality Standards(MMGQS) For Class I and II Groundwaters as set forth in 314 CMR 6.06 Dash indicates standard not established.
- (2) — Proposed as MMCL, but is Federal MCL as set forth in 40 CFR.
- * — Designates MMGQS

TABLE 8 (cont.)

SUMMARY OF ANALYTICAL RESULTS OF GROUNDWATER SAMPLES
WHITNEY BARREL COMPANY, 256 SALEM ST., WOBURN, MA

Sample Locations Lab ID Number Remarks	MW-1s 87489	MW-2s 87490	MW-2s DUP 87493 (MW-5)	MW-3s 87491	MW-4s 87492	FIELD BLANK 87494	MMCL/MMGQS* (1)
Base/Neutral Extractables (ug/l)							
1,2,4-Trichlorobenzene	-	-	-	-	17 J	-	-
1,2-Dichlorobenzene	-	-	-	17 J	21	-	600*
1,3-Dichlorobenzene	-	29	29	6 J	9 J	-	-
1,4-Dichlorobenzene	-	140	140	8 J	24	-	5*
Naphthalene	-	-	-	11 J	6 J	-	-
Bis-(2-Ethylhexyl) Phthalate	10 JC	-	-	-	5 JC	-	-
Diethyl Phthalate	-	-	-	-	8 JC	-	-
2-Methylnaphthalene	-	-	-	5 J	-	-	-
Acid Extractables (ug/l)							
2,4-Dimethylphenol	-	-	-	-	25	-	-
Phenol	-	-	-	-	15 J	-	-
2-Methylphenol	-	-	-	-	39	-	-
4-Methylphenol	-	-	-	6 J	30	-	-
Pesticides/PCBs (ug/l)							
PCB-1260	-	2.8	10	2.2	-	-	-

Notes:

- \- Below Detection Limit for compound as listed in the laboratory report (Appendix F).
- J Quantitation is approximate due to limitations identified in the laboratory report (Appendix F).
- C The result has been corrected for the presence in the blank.
- (1) Represents Massachussetts Maximum Contamination Levels(MMCLs) as set forth in 310 CMR 22.06 or Massachussetts Minimum Groundwater Quality Standards(MMGQS) for Class I and II Groundwaters as set forth in 314 CMR 6.06

TABLE 9

SUMMARY OF ANALYTICAL RESULTS FROM FLOOR DRAIN SEDIMENT SAMPLE
WHITNEY BARREL COMPANY, 256 SALEM ST., WOBURN, MA
Sample Location SD-1
Lab ID Number 85280

Base/Neutral Extractables (ug/kg)		
Naphthalene	6,600	J
Bis-(2-Ethylhexyl) Phthalate	40,000,000	
Benzyl Butyl Phthalate	23,000,000	
Di-N-Butyl Phthalate	52,000	
Di-N-Octyl Phthalate	75,000	
Diethyl Phthalate	18,000	
Phenanthrene	5,000	J
Benzyl Alcohol	76,000	J
2-Methylnaphthalene	6,500	J

Acid Extractables (ug/kg)	
Phenol	110,000

Pesticides/PCBs (mg/Kg)	
Chlordane	38.3

Inorganic Compounds (mg/kg)		Natural Background Range in Soils (1)
Aluminum	4,700	10,000-300,000
Arsenic	15.0	1-50
Barium	301	100-3,000
Cadmium	24.8	0.01-0.7
Calcium	7,970	7,000-500,000
Chromium	225	1-1,000
Cobalt	18.1	1-40
Copper	179	2-100
Iron	46,700	7,000-550,000
Lead	1,500	2-200
Magnesium	3,040	600-6,000
Manganese	267	20-3,000
Mercury	1.4	0.01-0.3
Nickel	32.8	5-500
Potassium	1,090	400-30,000
Sodium	836	750-7,500
Zinc	581	10-300

Volatile Organic Compounds (ug/kg)		
Chlorobenzene	7,500	
1,1,1-Trichloroethane	1,400	J
1,1-Dichloroethane	1,900	J
Ethylbenzene	9,900	
Methylene Chloride	LCB	
Tetrachloroethene	2,100	J
Toluene	90,000	C
Acetone	LCB	
2-Butanone	LCB	
Total Xylenes	46,000	

Notes:
- J Quantitation is approximate due to limitations identified in the laboratory report (Appendix F).
- C The result has been corrected for the presence of the compound in the blank.
- LCB Compound was found but at low concentration, comparable to the blank. Quantitation is not possible.
- (1) Developed from Lindsay (1979). Concentrations given in ppm.

Detection Limits for each compound included in laboratory reports (Appendix F).

Site Assessment Report
of the

Former Whitney Barrel Company Site
256 Salem Street
Woburn, Massachusetts

Vol. 2

Prepared by:

GHR Engineering Associates, Inc.
1050 Waltham Street
Lexington, Massachusetts 02173

Prepared for:

Ruth J. Whitney
No. 4 Campground Road
Boxford, Massachusetts 01921

Appendix A

Administrative Consent Order

COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENVIRONMENTAL QUALITY ENGINEERING

received
JUL 29 1988

IN THE MATTER OF: THE WHITNEY BARREL CO., INC. 256 SALEM STREET WOBURN, MA 01801	ADMINISTRATIVE CONSENT ORDER

RECEIVED
JUN 22 1988
GENERAL COUNSEL
DEQE

THE PARTIES

1. The Department of Environmental Quality Engineering (the "Department") is charged with the implementation and enforcement of the Massachusetts Oil and Hazardous Material Release Prevention and Response Act, M.G.L. c. 21E, §§1-15 ("Chapter 21E"), and has authority thereunder to enter into this Consent Order.

2. This Consent Order is agreed to by the Whitney Barrel Co., Inc. ("Whitney"), which formerly occupied the land located at 256 Salem Street, Woburn, Massachusetts.

3. This Consent Order is entered into by Whitney and the Department because they have agreed that it is in the public interest, and in their respective interests, to proceed promptly with the measures called for in this Consent Order.

DEFINITIONS

1. Delay shall mean any unforeseen and unavoidable event or incident which would result in noncompliance with any of the performance dates established in this Order.

2. The Disposal Site shall mean the land located at 256 Salem Street, Woburn, Massachusetts (the "site").

3. Hazardous Material shall have the meaning given to it by Section 2 of Chapter 21E.

4. Oil shall have the meaning given to it by Section 2 of Chapter 21E.

5. Proposal (the "proposal") shall mean the proposal prepared by GHR Engineering Associates, Inc. entitled, Phase I Site Investigation Work Plan, Whitney Property, 256 Salem Street, Woburn, Massachusetts, dated January 1988. A copy of said proposal is attached hereto as Appendix A.

6. Short-Term Measures shall mean response actions to abate or mitigate an imminent hazard, as that term is defined by Section 3A(e) of Chapter 21 E.

7. Remedial Action Alternatives shall mean those remedial alternatives identified by Whitney during and/or following performance of the proposal, to control, mitigate, and/or eliminate releases and/or threatened releases of oil and/or hazardous material from or at the Disposal Site.

8. Interim Remedial Response Action shall have the meaning given by Section 3A(f) of Chapter 21E.

STATEMENT OF FACTS

1. Ruth J. Whitney is the widow of John E. Whitney, Jr., the late owner of Whitney, and is the current owner of the site.

2. Whitney Barrel Co., Inc. maintained a place of business at 256 Salem Street in Woburn Massachusetts (the "site") from approximately 1950 until going out of business in early 1985.

3. Whitney was in the business of reconditioning barrels, tanks, drums, etc., which consisted of washing, painting and storage until resold.

4. In February 1985, while installing a groundwater monitoring well on the site, the U.S. Environmental Protection Agency encountered a sludge-like substance at a depth of 3.5 feet and reported a volatile organic vapor reading of approximately 250 ppm through air monitoring of the borehole with an organic vapor meter.

5. On December 1, 1986, the Department issued a Notice of Responsibility letter to Whitney as the potentially responsible party under Chapter 21E for the release of hazardous material at the site.

6. The letter dated December 1, 1986 also stated that Whitney had to engage the services of an environmental consultant to conduct a site investigation.

7. By letter dated December 9, 1986, from Attorney Frederick J. Connors, Whitney requested an additional 10 days to adequately respond to the December 1, 1986 letter.

8. The Department notified Whitney, by letter dated July 8, 1987, of its intent to engage the Massachusetts Field Investigation Team to conduct an investigation of the site if Whitney did not respond before July 10, 1987.

9. The Department notified Whitney, by letter dated September 11, 1987, of their failure to comply with the requirements of the July 8, 1987 letter and that E.C. Jordan Company had

been tasked by the Department to conduct an investigation of the site to evaluate the release of hazardous material pursuant to Chapter 21E.

10. In early December 1987, the Department was securing access to the site for E.C. Jordan when John E. Whitney, III, son of Ruth J. Whitney, informed the Department that he had retained GHR Engineering to conduct an investigation of the site.

11. On December 11, 1987, the Department met with John E. Whitney, III, Attorney Frederick J. Connors and Richard G. DiNitto, GHR Engineering. The Department agreed to allow Whitney to undertake the investigation using GHR Engineering provided the following conditions were met:

    1) Demonstration of financial capability to implement the study;
    2) The proposed investigation be at least equivalent to an October 1987 scope of work proposed by E.C. Jordan;
    3) The work be conducted in the same time frame as that proposed by E.C. Jordan;
    4) The Department be reimbursed for past costs incurred by engaging the FIT contractor (E.C. Jordan);
    5) All automobiles be removed from the site allowing access to the property.

12. On January 19, 1988, the proposal prepared by GHR Engineering was submitted to the Department.

13. On January 21, 1988, the Department met with John E. Whitney, III, Attorney John J. Gushue, representing Ruth J. Whitney, and Richard G. DiNitto. Available records and invoices of Whitney were provided to the Department in order to identify other potentially responsible parties. The Department reiterated and clarified the nature of the financial disclosure required to determine the capability of Whitney to finance the investigation. The costs incurred by the Department in tasking E.C. Jordan to perform work relating to the site were discussed.

14. On February 17, 1988, the Department received a financial statement for Ruth J. Whitney indicating capability to finance the proposed investigation.

FINDINGS

1. This Consent Order concerns a Disposal Site within the meaning of Section 2 of Chapter 21E, which site is located at 256 Salem Street, Woburn, Massachusetts. This site is listed on the Department's January 15, 1987 list of confirmed disposal sites issued pursuant to Section 3A of Chapter 21E.

2. The Department has determined that an investigation of the site is necessary to identify potential releases and threatened releases of oil and/or hazardous material at and from the site. The Department asserts that Whitney will be liable pursuant to Section 5 of Chapter 21E for any costs incurred by the Department in conducting such an assessment.

3. The Department has determined that there are four Phases to the response actions required to be taken under Chapter 21E with regard to the releases and/or threatened releases of oil and/or hazardous material at and from the site. Phase I consists of a site investigation within the meaning of Section 3A (d) (2) of Chapter 21E. Phase II consists of a full evaluation within the meaning of Section 3A (d) (3) or (4) of Chapter 21E. Phase III consists of the identification of remedial action alternatives and the preparation of a report identifying said alternatives and recommending a preferred interim remedial response action and/or permanent solution, as described in Section 3A of Chapter 21E. Phase IV consists of the implementation of the interim remedial response action alternative(s) and/or permanent solution(s) approved by the Department.

4. GHR Engineering has submitted to the Department a proposal prepared by Richard G. DiNitto, Senior Hydrogeologist. The Department has approved this proposal and has determined that implementation of the proposal is necessary to assess the nature and extent of releases and/or threatened releases of oil and/or hazardous material at and from the site, and to identify response actions that may be necessary to control, mitigate or eliminate hazards posed to public health, safety and welfare or the environment. Based upon the information now available to it, the Department believes that upon completion of the work proposed by GHR Engineering, Phases I and II of the response actions for the Disposal Site will be completed.

5. Section 3A(f) of Chapter 21E provides that where the Department finds that a permanent solution is feasible at a priority disposal site and that the immediate implementation of such solution would be more cost-effective than phased implementation of temporary and permanent solutions, the Department may require the implementation of such permanent solution within the deadline for an interim remedial response action. Accordingly, where required by this Order to identify interim remedial response actions, Whitney may identify and propose for implementation a permanent solution that meets the criteria of Chapter 3A(f) of Chapter 21E.

6. Whitney's consent to this Order shall not be construed as an admission of any liability under any law or regulation, nor shall Whitney's consent to this Order be construed as a waiver of any defenses which Whitney might assert in any future proceeding.

7. The Department expressly reserves the right to issue, in addition to this Order, any other order with respect to the subject matter of this Order, pursuant to the Department s authority under Chapter 21E or any other law. To the extent possible and practicable, the Department agrees to discuss the subject matter of any additional order with Whitney prior to issuing such order.

8. Nothing in this Order shall be construed as affecting in any way any other claim, action, suit, cause of action, or demand which the Department or any other person may initiate with respect to the subject matter covered by this Order.

9. Whitney understands and expressly waives the right to an adjudicatory hearing before the Department on, and judicial review by the courts of, the issuance of this Order and any of its terms, except those relating to payments to the Department for costs incurred by the Department/at the disposal site. Whitney expressly reserves the right to contest any other order issued by the Department, or any other claim, action, suit, cause of action or demand which the Department or any other person has initiated or may intitiate with respect to the subject matter covered by this Order.

or on the Department's behalf *

(* added by mutual agreement of John Gushue, attorney for Ruth Whitney, and Henry Guzman, attorney for the Department, 6/2/88)

ORDER

Based on the foregoing Findings and pursuant to its authority under Section 9 of Chapter 21E, the Department orders and Whitney consents to the following:

1. The provisions of this Order shall apply to and be binding upon Whitney, its successors and assigns, all of its officers, emplcyees, and agents and servants, and those persons in active concert or participation with Whitney who have notice of this Order.

2. A sum of ($12,000) twelve thousand dollars shall be paid to the Department within seven (7) days of the effective date of this Order as a partial reimbursement to the Department for costs incurred by the Department or on the Department s behalf, at the disposal site. The Department expressly retains the right to seek further reimbursement from Whitney for additional costs incurred by the Department or on its behalf at the disposal site, prior or subsequent to the effective date of this Order.

3. The proposed investigation shall be implemented in conformance with the schedule presented below modifying the Proposal attached hereto. Projections reflect weeks after the date of execution of this Administrative Consent Order by both parties:

Task 1	Project Planning	1 week
Task 2	Background Information Review	3 weeks
Task 3	Geophysical Survey	4 weeks
Task 4	Test Pit Excavations	5 weeks
	Analytical Results	9 weeks
Task 5	Soil Borings and Monitoring Well Installation	7 weeks
	Analytical Results	11 weeks
Task 6	Groundwater Sampling	12 weeks
	Analytical Results	16 weeks
Task 7	Final Site Survey	10 weeks
Task 8	Final Report	21 weeks

4. Since any number of chemical products could have been handled at the site, a wide range of analyses are necessary to identify onsite contamination. The following analyses, in modification of the Proposal, are, therefore, required:

   a) Ten (10) soil samples collected during the test pit program must be analyzed for HSL metals, volatile organics, base/neutral extractable organic compounds, pesticides and PCB's;

   b) Ten (10) soil samples colelcted during the boring and well installation program must be analyzed for the same HSL parameters;

   c) At least three (3) groundwater samples must be analyzed for the HSL parameters designated above. It is not necessary to sample these monitoring wells under pumping and non-pumping conditions of the Riley production well.

5. If any event occurs which delays or will delay the Final Report performance date established by this Order and which could not have been prevented or avoided by the exercise of due care, foresight, or due diligence on the part of Whitney, then Whitney shall immediately notify the Department in writing of the anticipated length of delay, the cause of the delay, and the steps or measures to be taken to prevent or minimize the delay and the timetable by which Whitney intends to implement those steps or measures. Whitney shall adopt measures to avoid or minimize any delay. Financial inability or increased costs or expenses associated with the implementation of action called for by this Order shall not be considered circumstances beyond Whitney's control. Delay in the achievement on any deadline in this Order shall not automatically defer achievement of any subsequent deadline.

6. If the Department agrees that the delay or anticipated delay in compliance with this Order has been or will be caused by circumstances beyond the control of Whitney which cannot be overcome by due diligence, the time for performance hereunder may be extended for a period no

longer than the delay resulting from such circumstances. In such event, the Department shall stipulate in writing to such extension of time.

7. If at any point during the investigation required by this Order, Whitney identifies an imminent hazard that requires or may require the immediate performance of a short-term measure, Whitney shall immediately notify the Department and shall indicate whether Whitney will perform or arrange for the performance of the short-term measure. Prior to implementation to any short-term measure at or in connection with the Disposal Site, Whitney shall obtain the Department's approval. In the event that Whitney does not agree to perform the short-term measure(s) within the time-frame set by the Department, the Department will undertake said measure(s) pursuant to its authority under Section 4 of Chapter 21E.

8. All documents required to be submitted under this Order shall be sent to Rodene DeRice, Division of Hazardous Waste in the Department's Northeast Region Office, 5 Commonwealth Avenue, Woburn, Massachusetts 01801, and copies shall be sent to Henry Guzman, Assistant General Counsel, Office of General Counsel, One Winter Street, Boston, Massachusetts 02108.

9. Within ten (10) days of signing this Order, Whitney shall notify the Department in writing of the identity and address of the person who will act as Whitney's designated representative for purposes of implementing this Order and through whom all contact with the Department shall occur.

10. The parties retain the right to seek relief in addition to the enforcement of this Order as may be appropriate to further address conditions at the Disposal Site. The parties, by entering into this Order, do not waive any claims or release any persons from liability under Chapter 21E or any other law.

11. If Whitney violates any of the terms or conditions of this Order, then Whitney will pay to the Department a stipulated penalty in the amount of $1000 per day for each day of violation after notice of such violation is received by Whitney. The penalty shall be paid by certified check or money order within (10) ten days of receipt of written notice, to be sent by certified mail, from the Department that this Order has been violated.

12. There shall be one original of this Order, signed by all parties hereto, which will be kept in the files of the Department's Northeast Region Office, Division of Hazardous Waste, 5 Commonwealth Avenue, Woburn, Massachusetts.

13. The Order is hereby entered and deemed consented to as to the last date set forth below.:

6-10-88
Date

Ruth J. Whitney
Ruth J. Whitney

7-7-88
Date

Richard J. Chalpin
Richard J. Chalpin
Deputy Regional
Environmental Engineer

Approved As To Form:

Henry Guzman
Henry Guzman
Assistant General Counsel
Department of Environmental
Quality Engineering

HG/md
0039J

APPENDIX A

TO ADMINISTRATIVE CONSENT ORDER IN
THE MATTER OF WHITNEY BARREL CO., INC.
256 Salem Street
Woburn, MA

Note: The following Site Investigation Work Plan prepared by GHR Engineering, dated January 1988, was modified by paragraphs 3 and 4 of the "Order" section of the Administrative Consent Order.

PHASE I SITE INVESTIGATION WORK PLAN

WHITNEY PROPERTY
256 SALEM STREET
WOBURN, MASSACHUSETTS

Submitted To:

Massachusetts Department of Environmental
Quality Engineering
Northeast Regional Office
5 Commonwealth Avenue
Woburn, Massachusetts

Prepared By:

GHR Engineering Associates, Inc.
1050 Waltham Street
Lexington, Massachusetts 02173

JANUARY 1988

PHASE I SITE INVESTIGATION WORK PLAN

WHITNEY PROPERTY
256 SALEM STREET
WOBURN, MASSACHUSETTS

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FIGURES

PHASE I SITE INVESTIGATION WORK PLAN

WHITNEY PROPERTY
256 SALEM STREET
WOBURN, MASSACHUSETTS

1.00 INTRODUCTION AND BACKGROUND

The Whitney Property (the Site) is located at 256 Salem Street in the City of Woburn, Massachusetts. The Site is approximately 2.67 acres in size and is bordered by Murphy's Waste Oil to the west, J.J. Riley/Beatrice property to the north, Aberjona Auto Parts, Inc. and City sewer easements to the east, and Salem Street to the south (see Figure 1).

The Whitney Barrel Company, established in 1949, reclaimed and reconditioned 55 gallon drums, tanks, boilers, and various machinery until it closed in 1985. In truckloads, drums and other items were driven in from Salem Street, brought to the back of the large on-Site building and unloaded. The materials were then cleaned, reconditioned, and stored until they were resold.

The Site is situated on the Aberjona River Valley and associated floodplain, approximately 600 feet southwest of the river itself. The Site is essentially flat at an elevation of approximately 47 feet above Mean Sea Level (MSL). To the west, the land surface rises sharply towards bedrock and till highlands. To the northeast, approximately 2,000 feet and on the other side of the Aberjona River, are two former municipal drinking water wells (G & H) owned by the City of Woburn. These two wells were shut down in 1979 due to volatile organic contamination alleged to have originated at other industrial properties in the general area.

Previous work at the Site by U.S. Environmental Protection Agency (EPA) contractors included a Preliminary Assessment conducted in 1980 by Ecology & Environment. No field investigations were done during the 1980 preliminary study. In February 1985, the Remedial Investigation contractor for the Wells G & H study, NUS Corporation, attempted to install a well on the Whitney property. NUS reported encountering a black sludge-like material during drilling at a depth of 3.5 feet. Air

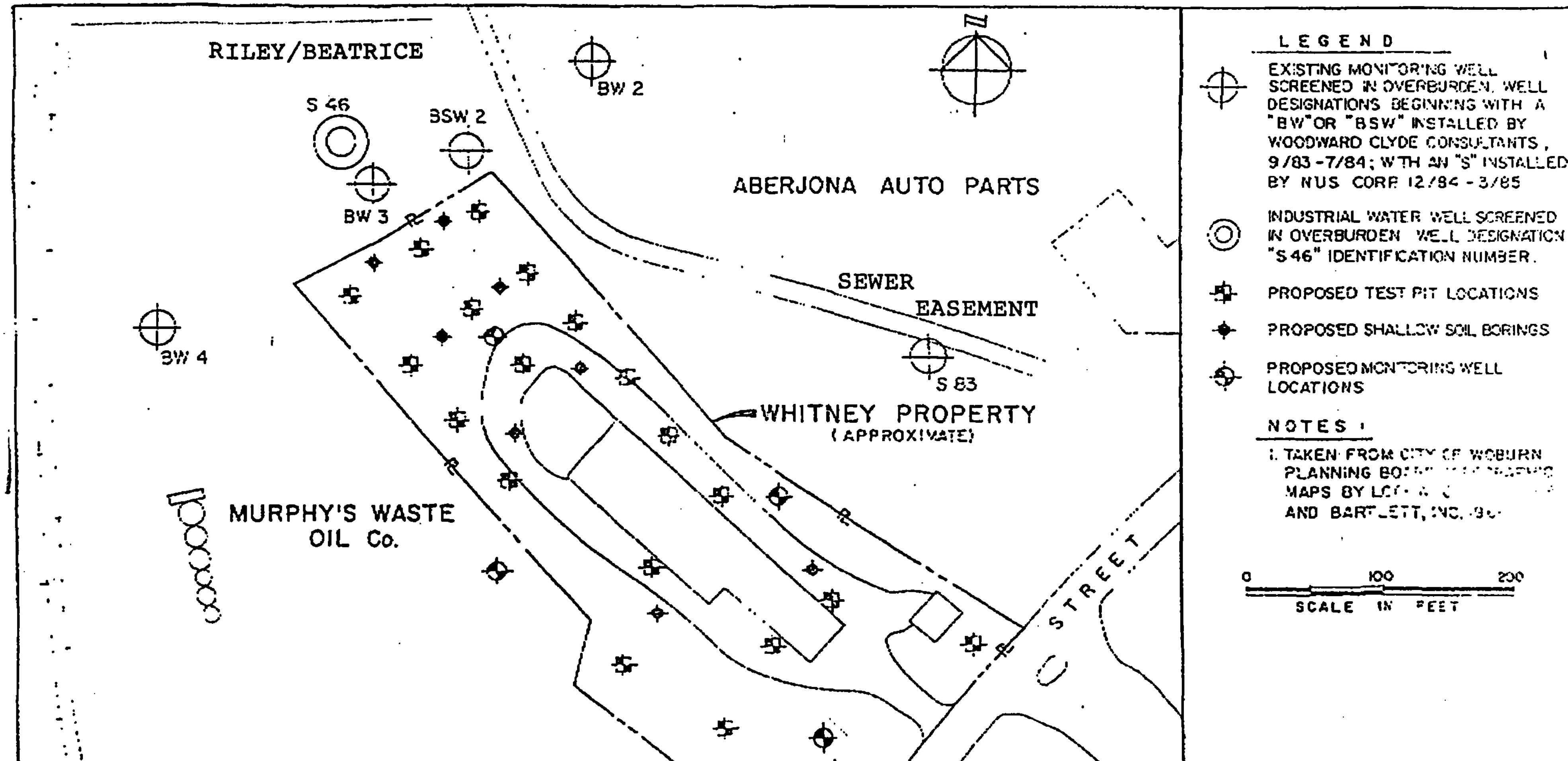


FIGURE 1

SITE PLAN FOR THE FORMER WHITNEY BARREL Co.

GHR ENGINEERING ASSOCIATES, INC.
1050 WALTHAM ST. LEXINGTON, MA 02173

monitoring of the borehole also detected volatile organic compound (VOC) vapors at a concentration of approximately 250 parts per million (ppm). The hole was abandoned by NUS and the Massachusetts Department of Environmental Quality Engineering (DEQE) was notified.

Subsequently, the DEQE issued a Notice of Responsibility (NOR) in December 1986 to the Whitney Barrel Company regarding the apparent presence of hazardous material at the Site. The sludge-like material and high VOC content were cited as evidence of a release. The NOR stated that a "Phase I" Site Assessment must be implemented for the Site. In October of 1987, the E.C. Jordan Company of Wakefield, Massachusetts submitted a Work and cost Plan for a Phase I Site Assessment of the Site at DEQE's request. After further discussions with the DEQE, the Site owner agreed to hire an environmental consultant to perform the work as required by DEQE.

This Work Plan was prepared at the request of the Site owner by GHR Engineering Associates, Inc. (GHR) for incorporation into a Consent Agreement with DEQE. The Work Plan details the Scope of Work proposed by GHR and procedures involved in conducting the Phase I Site Assessment.

2.00 PURPOSE AND OBJECTIVE OF SITE INVESTIGATION

The primary purpose of this study is to evaluate conditions at the Site in order to confirm the existence and establish the extent of the alleged release of oil and/or hazardous material as described in the DEQE NOR letter. The proposed sampling and analysis program will provide the information needed to classify the Site (i.e., Disposal Site or Priority Disposal Site) under MGL, Chapter 21E.

The objectives of the study are as follows:

- Development of a Site characterization based on background information review and field investigation. The characterization will include the history of Site use and the geologic and hydrogeologic regime of the Site.

- Definition of the presence, nature and extent of oil and/or hazardous materials in the groundwater and/or soil on-Site. The determination will be made by means of an extensive field investigation and comprehensive laboratory analysis. Potential exposure pathways for human and environmental receptors near the Site will also be identified.

- Determination of the need for any short-term (immediate) remedial measures and for any further Site assessment, as required by DEQE.

The proposed Phase I Site Investigation conforms to the requirements of the Massachusetts Contingency Plan, Public Hearing Draft, December 1987 (MCP).

3.00 PROJECT SCOPE

The work required to meet the objectives of the project has been subdivided into eight major Tasks, which are described in detail in Sections 3.10 through 3.80. Tasks are numbered in order of commencement and work on earlier Tasks may be performed concurrently with that of later Tasks. The results of each Task will be reviewed and used to modify any subsequent Task. For example, the sample locations as shown in Figure 1 are tentative. Final sample locations will not be chosen until the background information review and geophysical survey have been completed to optimize the selection of sample locations.

The scope of the GHR Work Plan is essentially the same as that of the October 1987 E.C. Jordan plan. THe GHR Work Plan will focus on on-Site sampling and broad-based laboratory analyses resulting in the information needed to evaluate the Site pursuant to the MCP.

The Tasks required to complete the project objectives are as follows:

- Task 1 - Develop Work Plan
- Task 2 - Background Information Review
- Task 3 - Geophysical Survey
- Task 4 - Test Pit Investigation
- Task 5 - Soil Boring and Monitoring Well Installation
- Task 6 - Groundwater Sampling and Analysis
- Task 7 - Final Site Survey
- Task 8 - Final Report

For easy reference, Table 1 presents a summary of the proposed Phase I Site Investigation sample analysis plan.

3.10 Task 1 - Develop Work Plan

Development of the Work Plan will include preparation of a detailed Task plan (Sections 3.10 through 3.80) and management plan (Section 4.00), a Health and Safety Plan (Section 4.50), a Quality Assurance/Quality Control Plan (Section 4.40), and a project schedule (Section 5.00). Approval of the Work Plan (this report) by DEQE will complete Task 1. The Health and Safety Plan will be prepared prior to commencement of field activities.

3.20 Task 2 - Background Information Review

GHR will gather all pertinent and relevant information pertaining to the property at 256 Salem Street and adjacent parcels. This Task will involve a search of DEQE Northeast Regional Office files, review of MDC sewer line records and plans, any local permits held by the property owner, and reports prepared for the EPA. Relevant records maintained by the City of Woburn will also be researched.

The purpose of this Task is to develop a clear understanding of Site conditions and history of the property and surrounding terrain. In addition, GHR will compile existing analytical data of nearby soil and

TABLE 1

SUMMARY OF PHASE I SITE INVESTIGATION SAMPLING AND ANALYSIS PLAN FOR WHITNEY SITE

SAMPLE TYPE	ESTIMATED NO. OF SAMPLES	EST. NO. OF SAMPLES TO BE ANALYZED FOR(2) FULL HSL(1)	VOC-only	METALS-only	A/BN and PEST/PCBs-only
TEST PIT SOILS	16	6(+2)(2)	--	4	4
BORING SOILS	16	8(+2)	6	--	--
OTHER SOIL/SEDIMENT (ex., floor drain sediment)	2	2	--	--	--
GROUNDWATER					
4 new wells	10	2(+2)	6	--	--
3 existing wells off-Site	6	--	6	--	--
TOTALS	50	24	18	4	4

NOTES

(1) Full HSL includes analyses for volatiles, metals, acid and base-neutral extractables, and pesticides and PCBs.

(2) QA/QC samples are shown in parenthesis: (+1) = 1 replicate or blank; (+2) = 1 replicabe + 1 blank; (+3) = 1 replicate + 1 blank + 1 tool rinse.

groundwater to evaluate the extent, type and degree of contamination on adjacent properties which may be migrating onto or through the property at 256 Salem Street.

Task 2 will also include compilation of available records concerning generators of oil and/or hazardous materials that may have been transported to the Site along with reclaimable materials, transporters of same, and Site users since the closing of Whitney Barrel Company. A list of the potential responsible parties will be developed.

Information gathered during this Task relative to land uses, sewer lines, etc. will be used to develop a Site Plan, as discussed in Section 3.70.

3.30 Task 3 - Geophysical Survey

As an initial measure to determine potential locations of buried metallic objects, GHR will conduct a geophysical survey of the Site.

An electromagnetic (EM) survey will be conducted at the Site to determine if any buried metal objects, such as drums, may be located there. The electromagnetic survey technique utilizes induced magnetic fields in the subsurface environment to determine the conductivity of the ground. The ground conductivity is substantially higher than normal in areas containing buried ferrous metal objects.

The EM technique is more appropriate for this Site than the magnetometer/metal detector survey proposed by E.C. Jordan. EM has a relatively low sensitivity to "noise" produced by surface metal, which is common to this Site. Magnetometers and metal detectors are influenced by surface metal up to 20 feet away, while EM equipment is affected only when within a few feet of surface metal.

The electromagnetic survey will be conducted with parallel EM lines at intervals of 20 feet aligned perpendicular to the southern property line with individual station readings every 12 feet. End points of the survey lines will be marked with a labeled survey stake indicating the line number. Any anomalous areas encountered during the initial grid survey will be staked for location and investigated further via test pits. Once the EM investigation has been completed, the stakes will be surveyed for location and plotted on a Site Plan. All data points will then be added to the plan and a contour map showing the areal distribution of conductivity readings will be produced.

3.40 Task 4 - Test Pit Investigation

An estimated 20 test pits, approximately 5 feet in length, will be excavated on the Site. A GHR geologist will observe and log each excavation. Soils encountered during test pitting will be described according to the Burmister Classification System. Pits will be excavated to the water table or to a maximum depth of 10 feet. Tentative test pit locations are shown on Figure 1. Locations were chosen to provide data on the horizontal extent of possible Site contamination. Modification of test pit locations may occur if results from the EM survey and background information review warrant it, or if field observations during the excavation operation suggest relocating or eliminating/adding excavation locations.

The materials excavated from each pit will be placed on a heavy weight polyethylene sheet, then returned to the pit after sampling and logging. This procedure should substantially eliminate contact of surface soils by excavated subsurface material. Each trench will be examined for buried objects, soil staining, soil character, odors, etc. These observations will be recorded in the field log. If waste containers are encountered in any pit, no further work will continue at that location until DEQE has been notified and required actions are specified. Following sampling and logging, the excavated material will be returned to its hole and the corners of each pit staked and flagged. The excavated pit locations will be noted on a Site Plan.

To insure that excavation methodology (i.e., mixing of soils during excavation and smearing of soils from different depths on excavation sidewalls) will not prevent the gathering of representative samples, the following sampling procedure will be followed. Upon completion of the test pit, a sampling depth is selected and recorded. The sidewall of the test pit at the selected depth will be knocked away with the backhoe bucket. The teeth of the bucket then will be inserted into the cleared sidewall. The bucket will be pulled directly out and raised to the surface. The loose soil will be cleared away with a clean sampling spatula in order to retrieve a representative soil sample. Care will be taken not to collect soil immediately adjacent to the backhoe bucket.

During excavation, all soils excavated from the test pits and soil samples collected for further analysis will be screened for the presence of volatile organic vapors with an HNu Model 101 portable organic vapor meter, referenced to a benzene standard. For health and safety purposes, the air in and around the test pit will be continuously monitored with the HNu Model 101 for volatile vapors and levels recorded in the field log. Levels of volatile organics detected with the HNu Model 101 from the soils in the test pits will also be recorded on the test pit logs.

Two representative portions of each sample will be preserved in screw top airtight, clear glass jars. One will be saved for possible lab analysis and the other will be screened for volatile organics. The jars will be labeled with date, sample locations and sample number. Fourteen soil samples will be selected based on field observations and measurements for analysis of the following constituents: heavy metals, acid base extractable organics, PCB's, pesticides, and volatile organic compounds. Duplicate samples and field blanks are included in the analytical plan. Samples to be analyzed for volatile organics will be chosen based on the results of HNu 101 screening. Soil samples selected for detailed analysis will be delivered to GHR Analytical following chain of custody protocol. All sampling equipment used to collect soil samples (i.e., shovels and spatulas) will be cleaned between samples by washing with clean water, washing with Alconox, rinsing with methanol, and finally rinsing with clean water.

3.50 Task 5 - Soil Borings and Monitoring Well Installations

In this Task, 12 soil borings will be executed for the purpose of soil characterization, sampling and analysis in the tentative locations shown on Figure 1. Field screening and laboratory analyses will be the same as described for test pit soil samples. In 4 of the borings, groundwater monitoring wells will be installed, including in the single boring proposed to be located on the Murphy Waste Oil property to the west of the Site. The soil borings will be extended to a depth of 15 feet below land surface, and split-spoon sampling will be conducted at the surface and at 5-foot intervals or at stratigraphy changes if encountered at lesser intervals. The monitoring well screens will be 15 feet in length and will be set to intercept the water table and extend 7 to 10 feet below the water table.

Soil samples collected via split-spoon procedures will be visually classified and logged by the GHR geologist and the drilling foreman, using a standard boring/monitoring well log form. Representative portions of each split-spoon sample will be preserved in screw top, airtight, clear-glass. The specimens will be placed in the jars as soon as they are taken in order to preserve the original moisture content. The jars will be tightly capped and suitably boxed, marked and identified with legible labels or by inscriptions on the jar cap. The well location number, sample number, depth at which the sample was taken, record of number of blows for each 6-inch drive increment, length of sample recovery, and sampling date will be recorded on each jar.

A portion of each split-spoon sample will be stored in a sealed container and field tested for the presence of volatile organic compounds using the HNu 101 organic vapor analyzer. The results of this screening process will be recorded on the drilling log. Fourteen soil samples will be submitted for further analysis to GHR Analytical, as outlined in Section 3.40. Samples selected for analysis will include surficial (0 to 2 feet) samples as well as composite samples collected from the entire depth of a boring. This sample selection will provide definition of the vertical extent of on-Site contamination.

The split-spoon sampler will be cleaned by the drillers before each sample is taken. The cleaning process will consist of initially rinsing the split-spoon sampler with clean wash water, then with methanol and finally with water.

Prior to arriving at the Site, the equipment to be used in drilling and monitoring well installation will be cleaned to remove possible contaminants encountered during drilling at previous jobs. All equipment which is to come in contact with the soil and rock, as well as water tanks, drill tools, pumps and hoses will be cleaned with a steam cleaning/clean water rinse.

While working at the Site, the drilling equipment will be decontaminated, using the procedure detailed above, between separate boreholes and drilling locations to prevent cross-contamination of boreholes.

Four soil borings will be completed for installation of shallow groundwater monitoring wells. The borings will be drilled, using hollow stem augers with a split-spoon sampler, to depths sufficient to intercept the water table. The proposed well locations are shown on Figure 1. One well will be located off-Site on Murphy's Waste Oil property to establish upgradient groundwater conditions, and three wells will be located on-Site to determine groundwater flow direction and on-Site groundwater quality. The exact locations of the wells will be determined after evaluation of geophysical and test pit data.

The wells will be constructed of Schedule 40 2-inch diameter PVC riser pipe attached by flush-threaded joints to 15 foot long slotted PVC 0.010 inch screens. The screens will be set to intercept the water table.

Ottawa sand will be set around the screened sections in order to minimize siltation. A minimum of 2 feet of bentonite pellets will be installed on top of the sand pack in order to prevent infiltration of surface water into the well. Each well will be fitted with a curb box or locking protective pipe sealed in cement flush with the ground surface in order to protect against vandalism and the elements. A schematic of the typical construction of a monitoring well is presented in Figure 2. The wells will be developed after installation and allowed to equilibrate for at least one week before being sampled. Rising head bail tests may be performed in the wells prior to sampling, depending on recharge conditions.

3.60 Task 6 - Groundwater Sampling and Analysis

At least one week after receipt of analytical data from the test pit and boring soils, the monitoring wells and up to three accessible, previously existing monitoring wells near the Site (see Figure 1) will be sampled. A production well on the Riley/Beatrice property reportedly has great influence on groundwater flow near the Site. Two sampling rounds are proposed, one under pumping conditions at the production well and one under non-pumping conditions. If feasible, rising head bail tests will be performed in the on-Site wells at this time.

Monitoring wells will be sampled in accordance with EPA protocol as outlined in EPA document entitled RCRA Ground-Water Monitoring Technical Enforcement Guidance Document dated September 1986. The following sampling procedures will be exercised at each monitoring well:

1. Identify the well and record the well number on the three (3) sampling documents (Master Log, Chain of Custody, Request for Analysis Form).

2. Open the well cap, measure and record organic vapor levels at the wellhead with the use of a portable organic vapor analyzer (HNu 101).

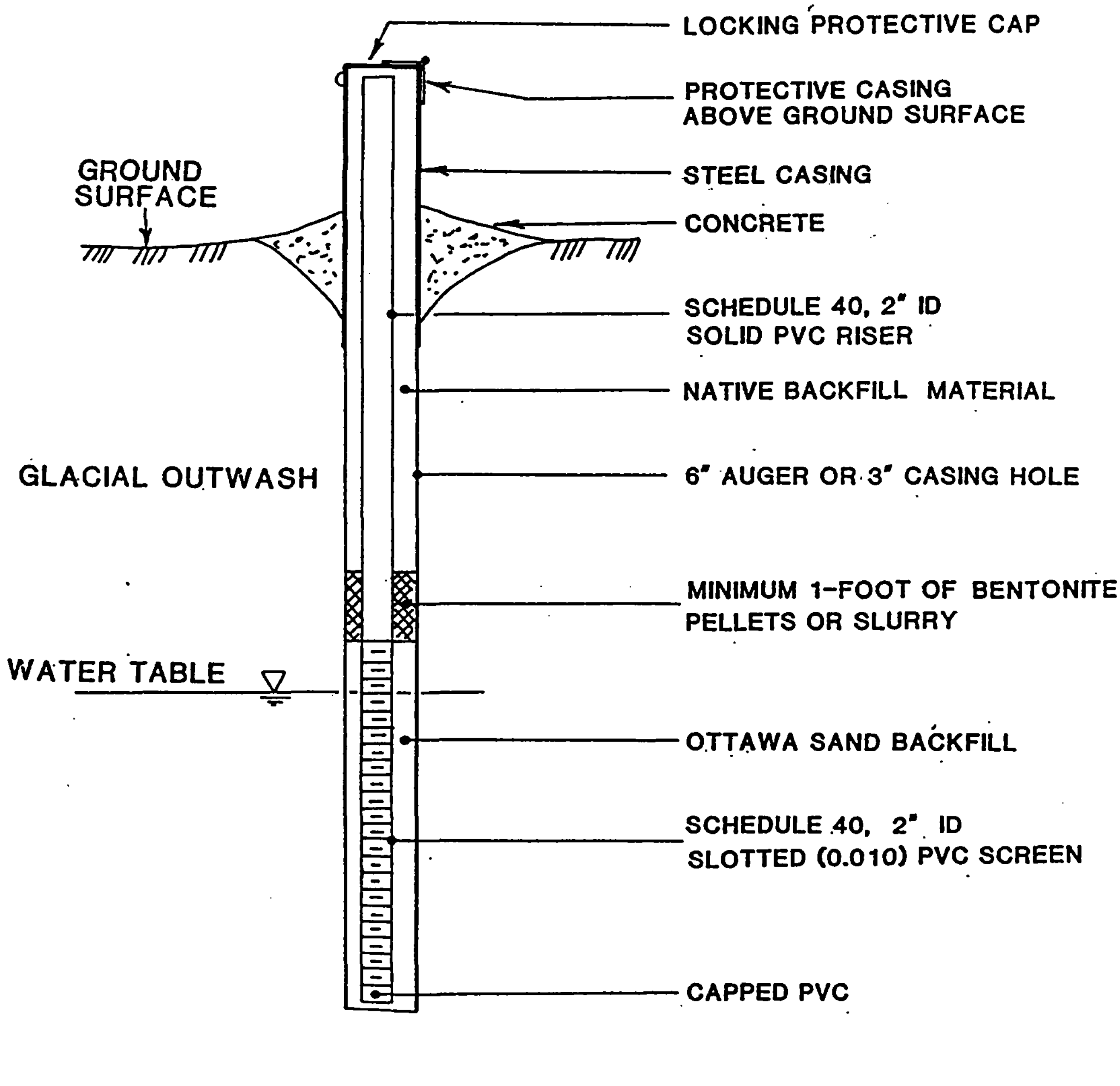


FIGURE 2

MONITORING WELL CONSTRUCTION DETAILS

3. Measure and record groundwater level to the nearest 0.01 foot from the top of the protective casing using an electric water level indicator. Water level indicators will be decontaminated between wells.

4. To insure representative sampling of the in-situ groundwater quality at the monitoring well, the water standing in the well will be removed prior to sampling. The procedure used for well evacuation depends on the hydraulic yield characteristics of the well. If the well has a high recharge rate which makes it impossible to evacuate to dryness, three casing volumes (previously calculated and recorded) of water will be removed prior to sampling. Well volumes will be purged by means of an approved, non-contaminating pump. Separate pre-cleaned polypropylene tubing will be used in each well.

5. Samples will be collected using a stainless steel or PVC bailer, then transferred from the bailer and poured into the appropriate containers. During the first groundwater sampling round, two on-Site samples will be analyzed for volatiles, metals, acid and base neutral extractables, and pesticides/PCBs. All other samples will be tested for volatile organics only. Testing for other compounds such as acid-base extractable organics, PCBs and pesticides will be considered based on the results obtained from the test pit and boring soil samples. A duplicate sample for each constituent, and one field blank will also be collected for each round.

6. Sample containers will be properly labeled with tags. Samples will be logged in on the three (3) sample documents, and delivered to GHR Analytical for analysis.

7. Samples taken for trace metal analysis will be filtered in the field by passing through Millipore 0.45 micron or equivalent.

8. To prevent cross-contamination of groundwater samples, stainless steel bailers will be decontaminated as follows: The bailers will be washed with tap water an Alconox, sprayed with methanol, and then washed with water. Each batch of decontamination water will be checked with the HNu 101 for the presence of volatile contaminants. Decontamination of bailers will take place in the field. Upon completion of decontamination, each bailer will be wrapped in aluminum foil to keep it clean until it is used for sampling.

3.70 Task 7 - Final Site Survey

After completion of all field activities at the Site, a GHR survey team will conduct a Site survey. All geophysical data points, test pits, soil borings and monitoring wells will be surveyed for location (nearest 0.1 ft.) and elevation (0.01 ft.). The locations of these data points, along with property lines, buildings, utility lines, and any other important features, as identified during the Background Information Review or during the field investigation, will be included on a final Site Plan. All locations and elevations will be in relation to an established on-Site reference point unless mean sea level (MSL) can be determined. If so, elevation will be recorded as feet above MSL.

3.80 Task 8 - Final Report

Upon receipt of all analytical data, GHR will evaluate the data along with existing information about the Site and surrounding property and in reference to state and federal standards and criteria. After the evaluation, a report of the Phase I Site Investigation will be prepared. The report will include but not be limited to the following:

- Site description;
- Site activity and operation and ownership history;
- Waste/Wastewater management practices;

- Analysis of surrounding properties and uses, including a review of any analytical information available;

- Description of field sampling procedures;

- An assessment of the sources and extent of contamination (if observed) that may be attributable to past activities at the Whitney Barrel Company;

- An assessment of potential environmental receptors/impacts adjacent to and/or downgradient of the Site;

- Recommendations for further Site assessments and/or remedial activities, if needed; and

- Appendices including geophysical data, analytical data, boring logs, test pit data, Site plans displaying the analytical data, and well installation forms.

4.00 MANAGEMENT PLAN

Presented in this Section is a detailed overview of the management, structure, and procedures to be followed for the performance of the Whitney Property Phase I Site Investigation. Section 4.00 outlines project managers and Site workers for the study and Section 4.20 describes how the assessment will be executed. Procedures for coordination and product review with the DEQE, Quality Assurance and Quality Control for work performed by GHR and Health and Safety are also discussed.

4.10 Team Organization

The Whitney Property study will be managed from GHR Engineering's Lexington, MA branch office. Mr. Richard G. DiNitto, Director of the Groundwater Division in Lexington will be directly responsible for all activities undertaken by GHR during the project, and will act as the

Project Manager. Staff geologists Kim Nelson and Duff Collins will provide the main support for all field activities, test pit and drilling oversight and Site sampling. Jim Soukup of GHR Engineering's Lakeville, MA branch office will manage and conduct the geophysical survey.

Mr. Allen F. Davis, P.E., GHR's Environmental Sciences Group Vice President, will serve as Principal-In-Charge. He will conduct periodic, typically bi-weekly to monthly, project reviews with the Project Manager. A Technical Advisory Committee, consisting of Mr. William R. Norman (Groundwater Division Director, Lakeville), and Mr. Marc W. Slechta (GHR's 21E Program Manager) will also be established to review work plans, procedures, and reports and provide the Whitney project team with technical guidance and assistance.

4.20 Task Management

For each major Task within this project, the Project Manager will select an individual to act as a Task Manager for that activity, in essence breaking up the study into several discrete smaller projects. The Task Manager will be responsible for coordinating and performing the work necessary to complete the Task in accordance with this Work Plan and assist the Project Manager in the overall study. Furthermore, the Task Manager will review the results of work completed on previous Tasks of the project to determine if changes or modifications to the next Task are appropriate. In this manner, the project remains dynamic and can be modified quickly to reflect new data, ensuring the overall quality of the project. If significant modifications or changes to this Work Plan are made, the Task Manager will first prepare a modified Task Work Plan for review and approval by the Project Manager, the Client and the DEQE. Until a finalized approved Task Work Plan is completed, the Task will be not begin.

4.30 Coordination with DEQE

Meetings will be scheduled with appropriate DEQE personnel at appropriate project milestones. These will include, but are not limited to a pre-investigation Work Plan review, a post-field investigation review, a post analytical review, and a draft report review. Section 5.00 contains a project timetable, including proposed meetings.

If, at any time during the field investigation, a release of potential for release of hazardous material occurs (for example, the excavation of buried drums while test pitting), all work will be suspended at the Site until further notice, and the GHR field team leader will notify the Site owner and DEQE.

Coordination of field activities with DEQE will also be maintained as necessary. All field activities will be conducted in accordance with DEQE standards. A copy of GHR's Health and Safety Plan will be provided to DEQE for reference, prior to the start of field work.

4.40 Quality Assurance/Quality Control Plan

GHR has developed a company-wide quality assurance/quality control (QA/QC) program to ensure that activities on any project are conducted efficiently and accurately. The main objectives of the quality assurance program are:

- to ensure that all field investigations, laboratory analyses and technical reports are executed within approved guidelines;
- to maintain the evidentiary value of information produced for litigation and cost accounting purposes;
- to ensure the activities of all subcontractors, and other support organizations are in accordance with GHR procedures and level of quality; and
- to foster good QA practices among GHR personnel.

There are two main divisions to the QA/QC plan: (1) analytical or laboratory quality; and (2) the technical or project management quality.

The requirements of the two divisions are inter-related and inter-dependent. Thus, the integrity of the project as a whole is maintained.

Quality assurance through project management is achieved by several means. The project Work Plan (this report) is the controlling QA document, and as such, provides technical direction and quality assurance for each Task, as detailed in Section 3.00. Any Task requiring the generation of environmental data requires a QC plan for that Task, as well. Details of QA/QC have been discussed on a per Task basis in Section 3.00.

Several QA controls apply to the Work Plan as a whole. The Work Plan was developed in accordance with GHR's QA/QC Plan and Standard Operating Procedure (SOP) Manual for Site Assessments, both of which incorporate DEQE requirements. The management concept of team organization and Task managers, as discussed in Sections 4.10 and 4.20 provides a framework for quality auditing of the project at any level. The work itself will be carried out as set forth in the Project Scope (Section 3.00). Practices including standardized sampling procedures, logging of chain-of-custody forms and sample numbers from the Lexington office, and documentation of all field activities in a project log book assure that quality is maintained for each Task, and thus, for the project as a whole.

The second phase of QA involves the processing and evaluation of environmental data collected per the Work Plan. GHR maintains an in-house environmental testing laboratory, GHR Analytical, for evaluation of environmental data. GHR Analytical is certified by the Massachusetts DEQE and follows all state and federal QA/QC guidelines, in addition to GHR's in-house policies. The laboratory runs field, trip and lab blanks: field and lab relicates, and spikes and matrix spikes with each batch of ten samples analyzed. The laboratory participates in all EPA certification performance evaluation studies and performs its own in-house quality control through the analysis of EPA and ERA specially prepared spiked samples submitted to laboratory personnel along with regular samples.

Acceptance criteria are set for all analyses by the QA/QC Director following guidelines established by the EPA. Performance is monitored through spike, relicate and blind spike analyses to assure accurate and precise results. Quality control for ongoing projects is also monitored by consulting historical data compiled in the laboratory computer system.

All field equipment such as the HNu 101 meter, sample containers, water level indicators, and coolers are logged by the lab. Equipment is calibrated prior to leaving the lab and upon return, and when possible, daily field recalibration is performed by qualified GHR field personnel. Environmental samples submitted for testing are logged in using chain-of-custody forms and request for analysis forms as discussed in individual Task descriptions.

4.50 Health and Safety Plan

Prior to the start of any on-Site activities, GHR will prepare a Site-specific Health and Safety Plan (HASP) the HASP will be developed by the team Health and Safety Officer (HSO) in coordination with GHR's corporate HSL. All on-Site Tasks will be covered under the Plan, including the geophysical survey, test pit investigation, soil boring and monitoring well installation, groundwater sampling, and the topographic survey.

The HASP will include the following:

- Site description;
- work objectives;
- on-Site organization and coordination;
- on-Site control, including contingency plan for protection level modification;
- hazard evaluation;

- personal protective equipment, including respiratory protection;
- on-Site work plans;
- communication procedures;
- emergency planning information, including evacuation procedures;
- environmental and personal monitoring program;
- hazardous substance information forms.

All GHR on-Site personnel are health and safety certified in accordance with OSHA regulations. DEQE will be provided with a copy of the HASP prior to any on-Site activity.

5.00 PROJECT SCHEDULE

The estimated project schedule is presented below. This schedule is subject to change due to backhoe and driller availability, geophysical equipment availability, subsurface conditions encountered, weather conditions and laboratory turn-around time. Projections reflect weeks after receipt of DEQE approval of the Work Plan.

Task 1 - Develop Work Plan.................................. 1 week

Task 2 - Background Information Review...................... 4 weeks

Task 3 - Geophysical Survey................................. 5 weeks

Task 4 - Test Pit Excavations............................... 7 weeks
Analytical Results......................Approx. 11 weeks

Task 5 - Soil Borings and Monitoring
Well Installation................................ 9 weeks
Analytical Results......................Approx. 13 weeks

Task 6 - Groundwater Sampling...............................14 weeks
Analytical Results (Pumping)............Approx. 17 weeks
Analytical Results (Non-Pumping)........Approx. 23 weeks

Task 7 - Final Site Survey..................................14 weeks

Task 8 - Final Report.......................5 weeks after receipt of analytical results from Task 6

Appendix B

Site Health and Safety Plan

HEALTH & SAFETY PLAN
FOR THE
WHITNEY BARREL COMPANY
WOBURN, MA

GHR Certified Industrial Hygenist/Corporate Health and Safety Officer

Thomas E. Hamilton

Thomas E. Hamilton, CIH

Date: Aug. 16, 1988

SITE HEALTH AND SAFETY PLAN

FORMER WHITNEY BARREL FACILITY
256 Salem Street
Woburn, Massachusetts

A. SITE DESCRIPTION

Dates of On-Site Activities: August 25 - September 2, 1988
Location: Woburn, MA
Hazards: Unknown, possible volatile and semi-volatile organic compounds, metals, PCB's
Area Affected: Total site area is approximately 2.67 acres. Likely area of greatest potential soil and/or ground water contamination is the rear 1/4 portion of the Site (see Figure 1).
Surrounding Population: Residential and commercial
Topography: Site and surrounding area is essentially flat, with some wetland areas.
Anticipated weather conditions: Summer, mild to hot temperature conditions, possible rain or thundershower

B. **WORK OBJECTIVE** - The objective of the entry to the site is to conduct 18 test pit excavations and to advance 12 soil borings, install four monitoring wells in the soil borings, and sample the four monitoring wells at the preliminary locations as outined on Figure 1.

C. **ONSITE ORGANIZATION AND COORDINATION** - The following personnel are designated to carry out the stated job functions on site. (Note: One person may carry out more than one job function.)

PROJECT TEAM LEADER:	Richard G. DiNitto
SITE SAFETY OFFICER:	Barbara Myers
GHR HEALTH AND SAFETY DIRECTOR:	Tom Hamilton
SCIENTIFIC ADVISOR(S):	Richard G. DiNitto, William R. Norman
RECORDKEEPER:	R. Duff Collins
FIELD TEAM LEADER:	Barbara Myers
FIELD TEAM MEMBERS:	R. Duff Collins, Michael Rooney, Kim A. Nelson
WHITNEY BARREL REP:	Jack Whitney
DEQE REP:	Rodine DeRice

All personnel arriving or departing the site should check in and out with the Recordkeeper. All activities on site must be cleared through the Project Team Leader.

D. ONSITE CONTROL

GHR Engineering Associates, Inc. has been designated to coordinate access control and security on site and control boundaries. A safe perimeter has been established at the entrance to the Site from Salem Street (refer to Figure 1).

The onsite staging area and Support Zone has been established at the entrance to the site.

The Personal Contamination Reduction Zone has been established adjacent to the Support Zone on the east side of the Site near the entrance. This area has been established as the final decontamination area prior to personnel leaving the Site.

During the intrusive work (test pit excavations and advancement of soil borings) the Exclusion Area and Decontamination Reduction Zone will be defined as follows:

The Exclusion Area has been established as the immediate area (12 to 15 feet radius) surrounding test pit excavation and soil boring locations.

The Decontamination Reduction Zone, or the Decon Zone, has been established as 5 feet away from the Exclusion Zone perimeter at each location of test pit excavation and soil boring.

These sub-regions of Onsite Control have been established in order to reduce potential cross contamination and proliferation of contamination by potentially contaminated equipment and personal protective equipment.

E. HAZARD EVALUATION

A soil gas survey was performed at a portion of the Site (refer to Figure 1 for soil gas probe locations) in order to attempt to characterize potential volatile organic contamination on Site that may be encountered during the subsurface investigation. Analytical results of the soil gas survey are presented in Appendix A. Analysis of the soil gas samples collected did not detect any volatile organic compounds via EPA Methods 601/602.

During the soil gas survey, an HNu Model 101 photoionizing detector was utilized to screen soil gas samples prior to collection of the samples for submittal to the analytical laboratory. Readings by the Hnu 101 from air within the soil gas probes ranged from ambient air background levels (0.3 to 0.8 ppm) to 250 ppm total volatile organics expressed as benzene.

Based on the observations obtained from the HNu 101, after receipt of the negative laboratory analytical results for volatile organic compounds via Methods 601/602 the soil gas probes were tested for hydrogen sulfide (H_2S) content using Draeger tube methodology.

The draeger tube screening did not indicate the presence of hydrogen sulfide in any of the soil gas samples at [illegible] ppm detection limits.

Although it is unknown at this time what hazardous substances may be onsite, the following chemicals have been detected in monitoring wells directly adjacent to the site. The analytical data reported below is derived from the Wells G & H Site Remedial Investigation Report, Woburn, MA, written by NUS Corporation for the Region I EPA Waste Management Division. Sampling and analysis were performed in 1985.

Substances Involved	Concentrations	Primary Hazards
trichloroethene	14 to 460 ppb	groundwater
tetrachloroethene	3 to 14 ppb	groundwater
trans 1,2-dichloroethene	ND to [illegible] ppb	groundwater
1,1,1-trichloroethane	ND to 26 ppb	groundwater
1,1-dichloroethane	ND to 28 ppb	groundwater
1,2-dichloroethane	ND to 4 ppb	groundwater
vinyl chloride	ND to [illegible] ppb	groundwater

The following additional potential hazards are expected on site: backhoe operation, drill rig operation, subsurface contact with buried objects such as metal or drums during subsurface investigation, surface objects and debris such as junked automobiles and scrap piles, biting insects, heat exposure, [illegible] weather.

F. PERSONAL PROTECTIVE EQUIPMENT

Based on evaluation of potential hazards, the following levels of personal protection have been designated for the applicable work areas or tasks:

Location	Job Function	Level of Protection
Exclusion Zone	Backhoe Operation and Soil Sampling, Drill Rig Operation and Soil Sampling, and Groundwater Sampling	C, D
Contamination Reduction Zone	Decontamination	C, D

Specific protective equipment for each level of protection is as follows:

Level C:
- Full Face Respirator
- Saranex Tyvek Coveralls
- Outer Rubber Slush Boots
- Hard hat
- Chemical Resistant Neoprene Gloves
- Inner Surgical Gloves

Modified Level D:
- Saranex Tyvek Coveralls
- Outer Rubber Slush Boots
- Hard hats
- Gloves (Chemical Resistant)
- Inner Surgical Gloves

Initial entry to the site will be at Modified Level D, with a contingency to upgrade to Level C if neccesary as determined by on-site monitoring. If air purifying respirators are necessary, MSA Full Face Respirator with GMC-H Cartridges are appropriate for use with the involved substances and concentrations. The Site Safety Officer will determine if a lower level respiratory protection can be used during the time of construction activities.

NO CHANGES TO THE SPECIFIED LEVELS OF PROTECTION SHALL BE MADE WITHOUT THE APPROVAL OF SITE SAFETY OFFICER AND THE PROJECT TEAM LEADER

G. ONSITE WORK PLANS

Work party(s) consisting of 1-4 persons will perform the following tasks:

		(function)
Project Team Leader:	Richard G. DiNitto	Overall Project Supervision
Work Party #1:	R. Duff Collins Barbara Myers Michael Rooney Greene Co.	Test Pit Excavation
Work Party #2:	R. Duff Collins Barbara Myers Kim A. Nelson Michael Rooney GeoLogic	Soil Boring, Monitoring Well Installation and Groundwater Sampling

The work party(s) were briefed on the contents of this plan at GHR Engineering Associates, Inc.

H. COMMUNICATION PROCEDURES - The Field Team Leader is responsible for clearing the site and obtaining assistance if it is necessary.

I. DECONTAMINATION PROCEDURES

The following decontamination equipment is required: Alconox, methanol, and clean water for decontamination solutions. Buckets, scrub brush, and spray bottle to contain solutions, steam generator for steam cleaning of the intrusive equipment. Decontamination procedure will consist of: Steam cleaning of the backhoe and drilling equipment, including tires and all other mechanical equipment that comes into contact with native material from the Site. Decontamination of personal protective and sampling equipment will consist of an initial rinse and wash with clean water and an alconox solution followed by a methanol rinse and completed by a final rinse in clean water.

J. SITE SAFETY AND HEALTH PLAN

1. Barbara Myers is the designated Site Safety Officer and is directly responsible to the Project Team Leader for safety recommendations on site.

2. Emergency Medical Care
Choate Hospital, 22 Warren Avenue, Woburn, MA, Telephone 617-933-6700. The Hospital is located approximately 1.75 miles southwest of the site. Follow Salem Street west from the site to Main Street (approx .1 mi). Turn right (south) onto Main Street to the rotary at the center of Woburn (approx. 1.4 mi.). Follow Lexington Street west from the rotary at the center of town and make a left turn at the third intersection onto

List of emergency phone numbers:

Agency/Facility	Phone #	Contact
Police (Woburn)	911, 933-1212	-------
Fire (Woburn)	933-3131	-------
Hospital (Choate Hosp.)	933-6700	-------
DEQE Incident Response	935-2160	Anyone available, mention that the Site is a case of Rodine DeRice; 1986 case # 3-354

3. Environmental Monitoring

The following environmental monitoring instruments will be used on site at the specified intervals.

Before the commencement of work each day and continuously during intrusive activity, the HNu Model 101 Photoionization detector will be used to monitor total volatile organic levels in breathing space air.

If monitoring with the HNu indicates breathing zone air is below 5 ppm total volatile organics, workers may operate at a modified level D protection. If the HNu registers a steady reading above 5 ppm for at least 10 minutes all Site workers will operate under full Level C protection. If the detector registers a steady reading above 50 ppm for at least 10 minutes in the breathing space air, or if workers experience difficulty, the work area will be evacuated until the levels have lowered to below 50 ppm. If the levels remain above 50 ppm for more than one half hour, all activities in that work area will cease until a new health and safety program can be developed.

4. Emergency Procedures (should be modified as required by incident)

The following standard emergency procedures will be used by onsite personnel. The Site Safety Officer shall be notified of any onsite emergencies and be responsible for ensuring that the appropriate procedures are followed.

Personnel Injury in the Exclusion Zone: Upon notification of an injury in the Exclusion Zone, a rescue team will enter the Exclusion Zone (if required) to remove the injured person to the hotline. The Site Safety Officer and Project Team Leader should evaluate the nature of the injury, and the affected person should be decontaminated to the extent possible prior to movement to the Support Zone. The onsite Project Team Leader shall arrange for appropriate first aid, and contact should be made for an ambulance and with the designated medical facility (if required). No persons shall reenter the Exclusion Zone until the cause of the injury or symptoms are determined.

Merriam Avenue. The hospital is on the right (west) side of Merriam Avenue..

First-aid equipment is available on site at the following locations:

First-aid kit: GHR Field Vehicle

Personnel Injury in the Support Zone: Upon notification of an injury in the Support Zone, the Project Team Leader and Site Safety Officer will assess the nature of the injury. If the cause of the injury or loss of the injured person does not affect the performance of site personnel, operations may continue, with the onsite Project Team Leader initiating the appropriate first aid and necessary follow-up as stated above. If the injury increases the risk to others, all site personnel shall move to the decontamination line for further instructions. Activities on site will stop until the added risk is removed or minimized.

Fire/Explosion: Upon notification of a fire or explosion on site, all site personnel will assemble at the decontamination line. The fire department shall be alerted and all personnel moved to a safe distance from the involved area.

Personal Protective Equipment Failure: If any site worker experiences a failure or alteration of protective equipment that affects the protection factor, that person and his/her buddy shall immediately leave the Exclusion Zone. Reentry shall not be permitted until the equipment has been repaired or replaced.

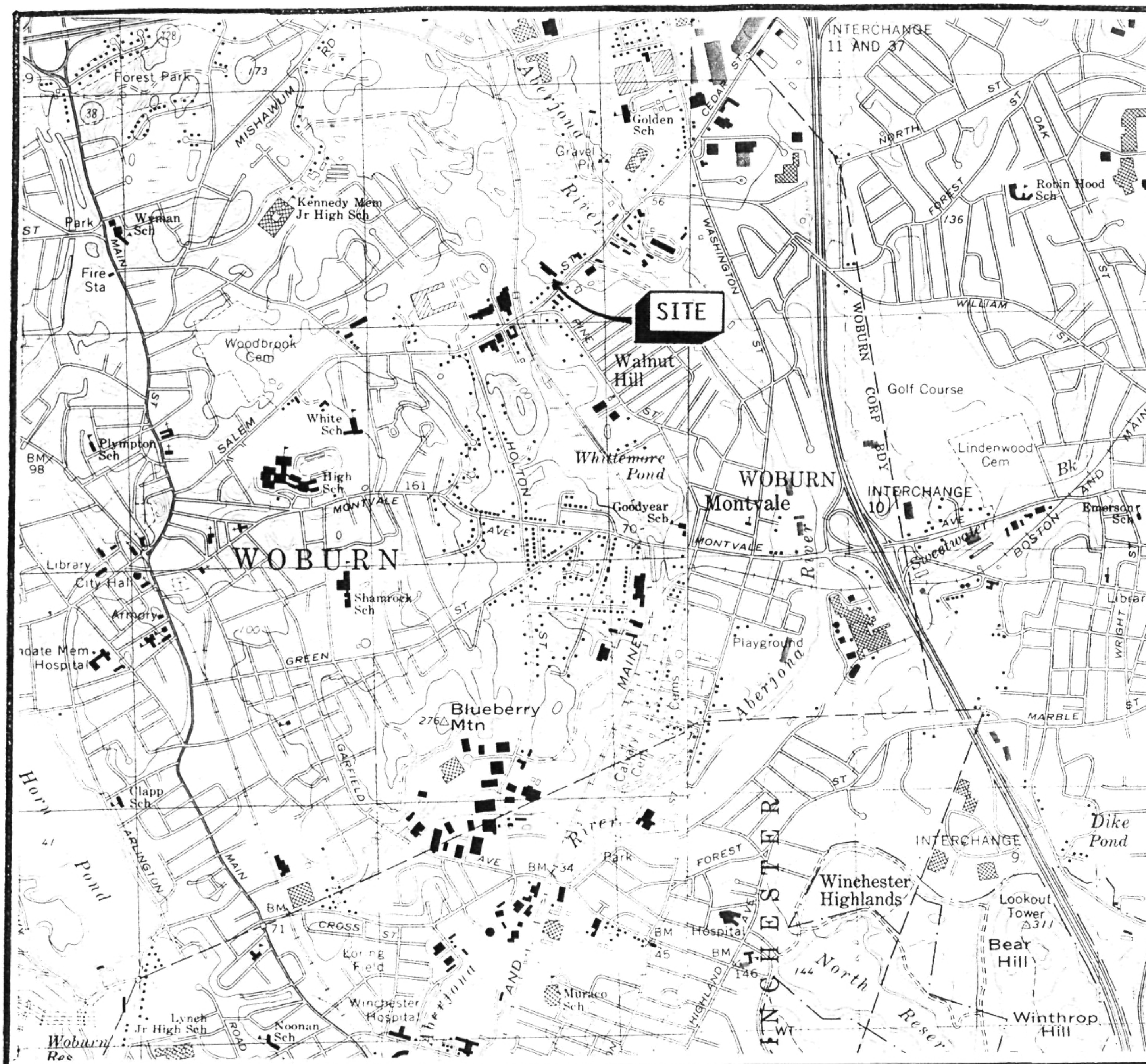
Other Equipment Failure: If any other equipment on site fails to operate properly, the Project Team Leader and Site Safety Officer shall be notified and then determine the effect of this failure on continuing operations on site. If the failure affects the safety of personnel or prevents completion of the Work Plan tasks, all personnel shall leave the Exclusion Zone until the situation is evaluated and appropriate actions taken.

In all situations, when an onsite emergency results in evacuation of the Exclusion Zone, personnel shall not reenter until:

1. The conditions resulting in the emergency have been corrected.
2. The hazards have been reassessed.
3. The Site Safety plan has been reviewed.
4. Site personnel have been briefed on any changes in the Site Safety Plan.

All site personnel have read the above plan and are familiar with its provisions.

	Name	Signature
GHR Health and Safety Director	*Tom Hamilton*	
Site Safety Officer	Barbara Myers	Barbara E Myers
Project Team Leader	Richard G. DiNitto	
Other Site Personnel	R. Duff Collins	R Duff Coll[illegible]
	Kim A. Nelson	Kim A. Nelson
	Michael Rooney	Michael Rooney
	Greene Co.	[illegible]
	GeoLogic	[illegible]
	Marcel Hawiger GHR	Marcel Hawiger



SCALE 1:25 000

1 ½ 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 .5 0 1 KILOMETER

CONTOUR INTERVAL 10 FEET

NATIONAL GEODETIC VERTICAL DATUM OF 1929

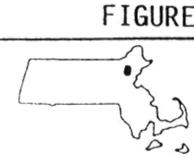
N

PROJECT: WHITNEY BARREL COMPANY
SALEM STREET, WOBURN, MA

CLIENT: RUTH J. WHITNEY

TITLE: SITE LOCUS
FIGURE 1

GHR
ENGINEERING ASSOCIATES, INC.
1050 Waltham Street
Lexington, MA 02173



QUADRANGLE LOCATIONS

BOSTON NORTH, 1979
LEXINGTON, 1971

QUADRANGLE NAMES

PROJECT NUMBER
3661.002

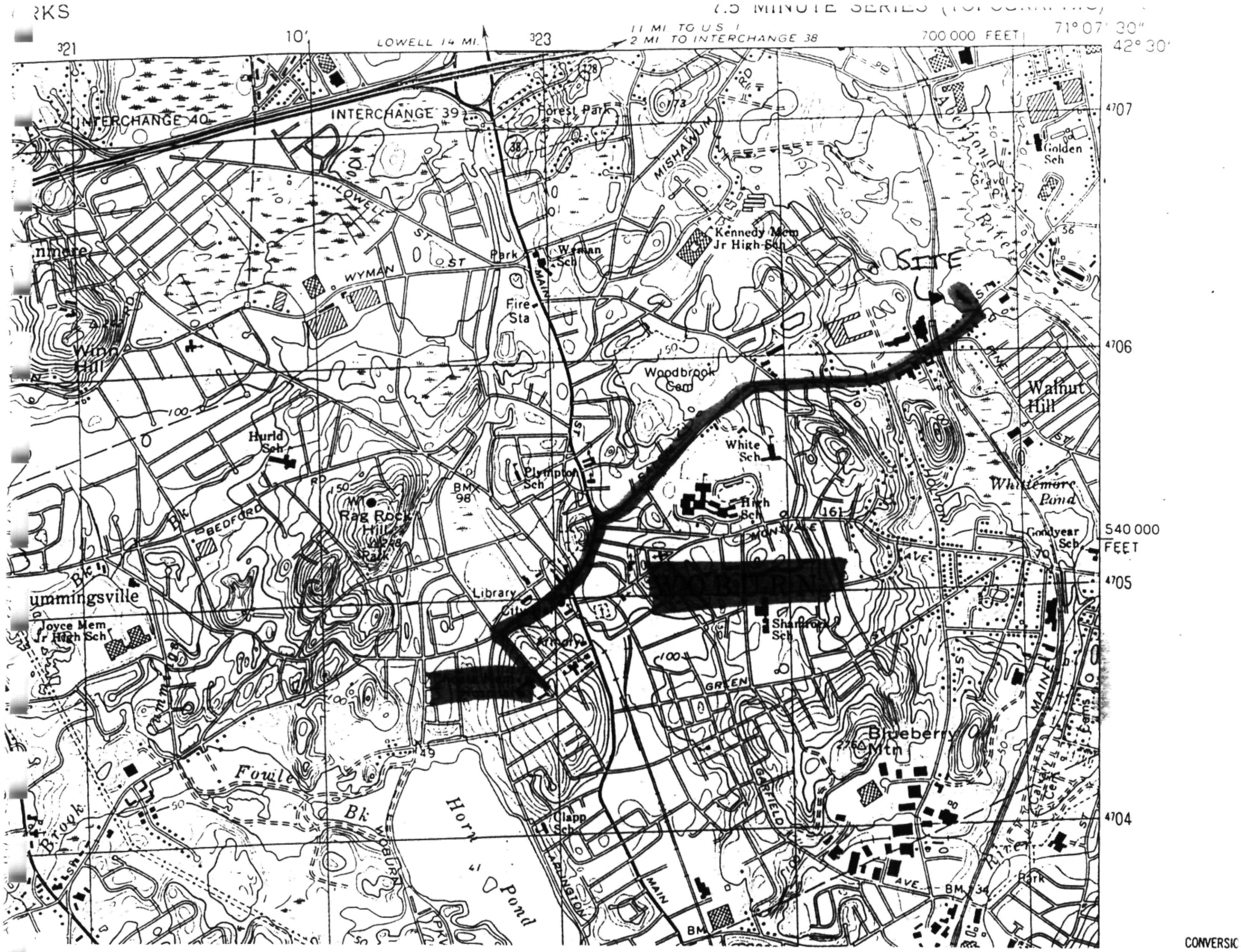


FIGURE 2

ROUTE TO EMERGENCY MEDICAL CARE

SITE HEALTH AND SAFETY PLAN
FORMER WHITNEY BARREL FACILITY
256 SALEM STREET
WOBURN, MASSACHUSETTS

Appendix C

Test Pit Field Logs

TEST PIT FIELD LOG

TEST PIT NO. TP-1
JOB NO. 3661.002

PROJECT Whitney Barrel Site Assessment
ADDRESS 256 Salem St., Woburn, MA
LOCATION See Site Plan
CLIENT Ruth Whitney
GHR GEOLOGIST D. Collins, B. Myers

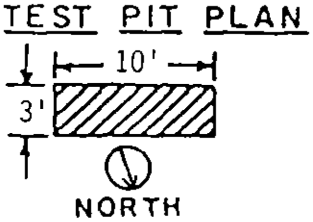
CONTRACTOR Greene Co.
TIME STARTED 1335
TIME COMPLETED 1355
DATE 8/25/88

GHR

DEPTH	SOIL DESCRIPTION		EXCAV EFFORT	BOULDER COUNT QTY. CLASS	FIELD TESTING	NOTES
0–1'	TOPSOIL / FILL	Brown to Black Organic Material - F SAND and Organic Silt, C GRAVEL Cobbles, and Boulders	M	30% A,B+	BDL	1., 2.
1'–2'			E	None		
2'–3'	OUTWASH SAND AND GRAVEL	Brown F/M SAND, trace F/C GRAVEL and Cobbles	E	None		
3'–4'			M	None		
4'–5'		Grey to Brown F/C SAND, some F/M Gravel, trace C Gravel, and Cobbles	M	None		
5'–6'			M	None		3.
6'–14'		Bottom of test pit @ 6' Ground Elevation = 47.71' (Referenced to National Geodetic Vertical Datum)				

NOTES:
1. Field testing values represent total organic vapor levels (referenced to a benzene standard) measured in the head space of sealed soil sample jars with an HNu Model P-101 photoionization detector. Results reported in parts per million. Instrument detection limit 0.1 parts per million. BDL = Below detection limit. Unless otherwise indicated, value is for composite soil sample only.
2. Composite soil sample submitted for laboratory analysis.
3. No water encountered.

TEST PIT PLAN



VOLUME = ~6.7 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E — EASY
M — MODERATE
D — DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS) G.W.L.

TEST PIT FIELD LOG

TEST PIT NO. TP-2
JOB NO. 3661.002

PROJECT Whitney Barrel Site Assessment
ADDRESS 256 Salem St., Woburn, MA
LOCATION See Site Plan
CLIENT Ruth Whitney
GHR GEOLOGIST D. Collins, B. Myers
CONTRACTOR Greene Co.
TIME STARTED 1535
TIME COMPLETED 1545
DATE 8/25/88

GHR

DEPTH		SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS	FIELD TESTING	NOTES
0–1'	FILL	Brown F/C SAND, F/C Gravel, Little Cobbles	M	None	4.8	1.,2. 3.
1'		← 2" Black Organic F SAND and SILT				
1'–2'	OUTWASH SAND	Grey to Lt. Bn. F/M SAND, little C SAND and F Gravel	E	None		
2'–3'			E	None		
3'	AND	← 3" Black Organic F/M SAND				
3'–4'	GRAVEL	Dk. Red Bn. F/M SAND, trace C SAND and F Gravel	E	None		
4'–5'		Grades to	E	None		
5'–6'	▽ 0.3	Lt. Grey to Bn. F SAND, little M SAND, trace C SAND (well-stratified), some lenses Bn. SAND	E	None		
6'–7'			E	None		
7'		Bottom of test pit @ 7'				
8'–14'						

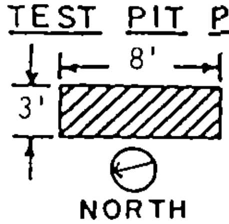
Ground Elevation = 46.68'

(Referenced to National Geodetic Vertical Datum)

NOTES:

1. Field testing values represent total organic vapor levels (referenced to a benzene standard) measured in the head space of sealed soil sample jars with an HNu Model P-101 photoionization detector. Results reported in parts per million. Instrument detection limit 0.1 parts per million. BDL = Below detection limit. Unless otherwise indicated, value is for composite soil sample only.
2. Composite soil sample submitted for laboratory analysis.
3. Slight fuel oil odor. Intermittent H_2S odor.

TEST PIT PLAN



VOLUME = ~6.2 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE	(TR)	0 - 10%
LITTLE	(LI.)	10 - 20%
SOME	(SO.)	20 - 35%
AND		35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E — EASY
M — MODERATE
D — DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS) ▽ G.W.L.

TEST PIT FIELD LOG

TEST PIT NO. TP-3
JOB NO. 3661.002

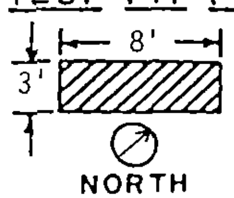
PROJECT Whitney Barrel Site Assessment
ADDRESS 256 Salem St., Woburn, MA
LOCATION See Site Plan
CLIENT Ruth Whitney
GHR GEOLOGIST D. Collins, B. Myers
CONTRACTOR Greene Co.
TIME STARTED 1555
TIME COMPLETED 1620
DATE 8/25/88

GHR

DEPTH		SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS	FIELD TESTING	NOTES
0	FILL	3" Broken asphalt pavement				
1'		Bn. to Grey F/C SAND, F/M Gravel	M	None	45.6	1., 2.
2'		←Nylon netting - (Soil Stabilizer)	E	None		3.
3'		Dk. Bn. F/C SAND, F/C Gravel, tr. Wood, Bricks	M	30% A		
4'			E	None		
5'	OUTWASH SAND	←Dk. Brown Stain Grey F SAND and SILT, tr. C SAND and F/M Gravel	E	None	77	4.
6'	▽0.3		E	None	120	4.
7'		Bn. F/M SAND with interbedded 2"-3" thick Dk. Bn. F/M SAND layers	E	None	82	4.
8'			E	None		
9'		Bottom of test pit @ 8'				
10'						
11'		Ground Elevation = 46.99' (Referenced to National Geodetic Vertical Datum)				
12'						
13'						
14'						

NOTES:
1. Field testing values represent total organic vapor levels (referenced to a benzene standard) measured in the head space of sealed soil sample jars with an HNu Model P-101 photoionization detector. Results reported in parts per million. Instrument detection limit 0.1 parts per million. BDL = Below detection limit. Unless otherwise indicated, value is for composite soil sample only.
2. Composite soil sample submitted for laboratory analysis.
3. Water infiltration from surface puddle.
4. Fuel oil odor. HNu readings from headspace analysis of discrete samples.

TEST PIT PLAN



VOLUME = ~7.1 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6"-18"	A
18"-36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE	(TR)	0 - 10%
LITTLE	(LI.)	10 - 20%
SOME	(SO)	20 - 35%
AND		35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E — EASY
M — MODERATE
D — DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS) ▽ G.W.L.

TEST PIT FIELD LOG

TEST PIT NO. TP-4
JOB NO. 3661.002

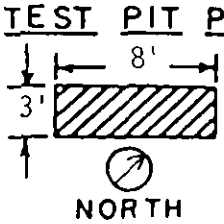
GHR

PROJECT Whitney Barrel Site Assessment
ADDRESS 256 Salem St., Woburn, MA
LOCATION See Site Plan
CLIENT Ruth Whitney
GHR GEOLOGIST D. Collins, B. Myers
CONTRACTOR Greene Co.
TIME STARTED 1640
TIME COMPLETED 1705
DATE 8/25/88

DEPTH		SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS	FIELD TESTING	NOTES
0 – 1'	FILL	2" Wood Chips F/C SAND, F/C Gravel, Plastic, Wire, Wood, Metal and Rubber Scraps	E	None	13.8	1., 2.
1' – 2'			M	None		3.
2' – 3'			M	None		4.
3' – 4'		Grey to Black SILT, and F SAND, little M/C Sand, F/C Gravel	E	None		
4' – 5'		— Dk. Bn. Stain —	E	None		
5' – 6'	OUTWASH	Bn. F/M SAND interbedded with 2"-4" Dk. Bn. F/M SAND, tr. Black Silt lenses and Laminae	E	None		
6' – 7'	▽0.3		E	None		
7' – 8'	SAND		E	None		
8'		Bottom of Test Pit @ 8' Ground Elevation = 47.05' (Referenced to National Geodetic Vertical Datum)				
9' – 14'						

NOTES:
1. Field testing values represent total organic vapor levels (referenced to a benzene standard) measured in the head space of sealed soil sample jars with an HNu Model P-101 photoionization detector. Results reported in parts per million. Instrument detection limit 0.1 parts per million. BDL = Below detection limit. Unless otherwise indicated, value is for composite soil sample only.
2. Composite soil sample submitted for laboratory analysis.
3. Water seeping in from surface.
4. H_2S odor, possible fuel oil odor. HNu readings 1.5-4.2 ppm from test pit excavation.

TEST PIT PLAN



VOLUME = ~7.1 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E — EASY
M — MODERATE
D — DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS) ▽ G.W.L.

TEST PIT FIELD LOG

TEST PIT NO. TP-6
JOB NO. 3661.002

GHR

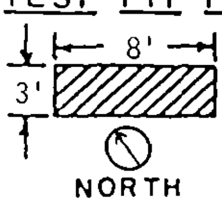
PROJECT Whitney Barrel Site Assessment
ADDRESS 256 Salem St., Woburn, MA
LOCATION See Site Plan
CLIENT Ruth Whitney
GHR GEOLOGIST D. Collins, B. Myers
CONTRACTOR Greene Co.
TIME STARTED 1705
TIME COMPLETED 1730
DATE 8/25/88

DEPTH	SOIL	DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS	FIELD TESTING	NOTES
0–1'	FILL	Grey to Bn. F/C SAND, Wood and Brick Fragments, Black ash horizons, little F/C Gravel and Boulders	M	None	259.7	1.,2. 3.
1'–2'			E	None		
2'–3'			E	None		
3'–4'	OUTWASH SAND	Lt. Grey to Tan F/M SAND	E	None		
4'–5'			E	None		
5'–6'	▽ 0.3		E	None		
6'–7'			E	None		
7'–14'		Bottom of test pit @ 7'				

Ground Elevation = 46.15'
(Referenced to National Geodetic Vertical Datum)

NOTES:
1. Field testing values represent total organic vapor levels (referenced to a benzene standard) measured in the head space of sealed soil sample jars with an HNu Model P-101 photoionization detector. Results reported in parts per million. Instrument detection limit 0.1 parts per million. BDL = Below detection limit. Unless otherwise indicated, value is for composite soil sample only.
2. Composite soil sample submitted for laboratory analysis.
3. Fuel oil odor; occasionally strong H_2S odor.

TEST PIT PLAN



VOLUME = ~6.2 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E — EASY
M — MODERATE
D — DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS) ▽ G.W.L.

TEST PIT FIELD LOG

TEST PIT NO. TP-7
JOB NO. 3661.002

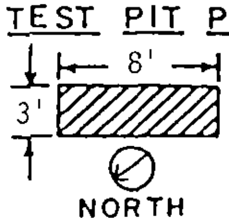
PROJECT Whitney Barrel Site Assessment
ADDRESS 256 Salem St., Woburn, MA
LOCATION See Site Plan
CLIENT Ruth Whitney
GHR GEOLOGIST D. Collins, B. Myers
CONTRACTOR Greene Co.
TIME STARTED 1220
TIME COMPLETED 1240
DATE 8/26/88

GHR

DEPTH		SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS	FIELD TESTING	NOTES
0–1'	FILL	Bn. F/C SAND, F/C Gravel, trace Wood	M	None	54.5	1.,2. 3.
1'–2'		Grey F/C SAND and F/M Gravel Black F/C SAND and F Gravel (Brittle)	M	None		
2'–3'	OUTWASH SAND	Brown F/M SAND (18")	E	None		
3'–4'		Grading to	E	None		
4'–5'		Lt. Grey F/M SAND	E	None		
5'–6'	▽ 0.3		E	None		
6'–7'		Bottom of test pit @ 6.5'	E	None		
7'–8'						
8'–9'		Ground Elevation = 46.30'				
9'–10'		(Referenced to National Geodetic Vertical Datum)				
10'–11'						
11'–12'						
12'–13'						
13'–14'						

NOTES:
1. Field testing values represent total organic vapor levels (referenced to a benzene standard) measured in the head space of sealed soil sample jars with an HNu Model P-101 photoionization detector. Results reported in parts per million. Instrument detection limit 0.1 parts per million. BDL = Below detection limit. Unless otherwise indicated, value is for composite soil sample only.
2. Composite soil sample submitted for laboratory analysis.
3. Slight odor.

TEST PIT PLAN



VOLUME = ~ 6 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE	(TR)	0 - 10%
LITTLE	(LI.)	10 - 20%
SOME	(SO)	20 - 35%
AND		35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E — EASY
M — MODERATE
D — DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS) ▽ G.W.L.

TEST PIT FIELD LOG

TEST PIT NO. TP-8
JOB NO. 3661.002

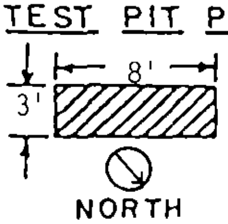
GHR

PROJECT Whitney Barrel Site Assessment
ADDRESS 256 Salem St., Woburn, MA
LOCATION See Site Plan
CLIENT Ruth Whitney
GHR GEOLOGIST D. Collins, B. Myers
CONTRACTOR Greene Co.
TIME STARTED 1300
TIME COMPLETED 1310
DATE 8/25/88

DEPTH	SOIL DESCRIPTION		EXCAV. EFFORT	BOULDER COUNT QTY. CLASS	FIELD TESTING	NOTES
0 – 1'	FILL	F/C SAND and F/C Gravel	M	None	2.9	1., 2.
1' – 2'		Bn. F/C SAND, little M/F Gravel	E	None		3.
2' – 3'	OUTWASH SAND	Bn. to Black Organic SILT and F SAND, little M SAND	E	None		3.
3' – 4'		Red Bn. F/M SAND	E	None		3., 4.
4' – 5'	▽0.3 AND	to	E	5% A		
5' – 6'	GRAVEL	Red Bn. F/M SAND, some F/C Gravel	E	5%A		
6'		Bottom of Test Pit @ 6'				
7'						
8'						
9'		Ground Elevation = 47.71' (Referenced to National Geodetic Vertical Datum)				
10'						
11'						
12'						
13'						
14'						

NOTES:
1. Field testing values represent total organic vapor levels (referenced to a benzene standard) measured in the head space of sealed soil sample jars with an HNu Model P-101 photoionization detector. Results reported in parts per million. Instrument detection limit 0.1 parts per million. BDL = Below detection limit. Unless otherwise indicated, value is for composite soil sample only.
2. Composite soil sample submitted for laboratory analysis.
3. H_2S odor.
4. From 4' to 6' - up to 10ppm (HNu rdg.) in breathing zone from fresh bucket sample.

TEST PIT PLAN



VOLUME = ~5.3 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E — EASY
M — MODERATE
D — DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS) ▽ G.W.L.

TEST PIT FIELD LOG

TEST PIT NO. TP-9
JOB NO. 3661.002

PROJECT Whitney Barrel . . . Site Assessment
ADDRESS 256 Salem St., Woburn, MA
LOCATION See Site Plan
CLIENT Ruth Whitney
GHR GEOLOGIST D. Collins, B. Myers
CONTRACTOR Greene Co.
TIME STARTED 1410
TIME COMPLETED 1435
DATE 8/25/88

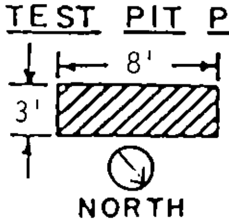
GHR

DEPTH		SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS	FIELD TESTING	NOTES
0–1'	FILL	Bn. F/C SAND, some F/C Gravel, trace Wood	E	None	35.7	1., 2.
1'–2'		Lenses of Bn. to Blk. F/M Sand from 1.5' to 2' (oil stained)	E	None	2-4	3.
2'–3'	OUTWASH SAND	Lt. Bn. F/M SAND, trace C SAND and F Gravel	E	None		
3'–4'		Lt. Grey to Bn. F/M SAND, trace C SAND	E	None		
4'–5'	▽ 0.3		E	None		4.
5'		Bottom of test pit @ 5'				

Ground Elevation = 45.31'
(Referenced to National Geodetic Vertical Datum)

NOTES:
1. Field testing values represent total organic vapor levels (referenced to a benzene standard) measured in the head space of sealed soil sample jars with an HNu Model P-101 photoionization detector. Results reported in parts per million. Instrument detection limit 0.1 parts per million. BDL = Below detection limit. Unless otherwise indicated, value is for composite soil sample only.
2. Composite soil sample submitted for laboratory analysis.
3. HNu reading at 2' in pit.
4. Foam and sheen on water surface; fuel oil odor.

TEST PIT PLAN



VOLUME = ~4.4 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E — EASY
M — MODERATE
D — DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS) ▽ G.W.L.

TEST PIT FIELD LOG

TEST PIT NO. TP- 10
JOB NO. 3661.002

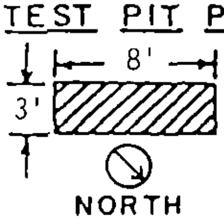
PROJECT Whitney Barrel Site Assessment
ADDRESS 256 Salem St., Woburn, MA
LOCATION See Site Plan
CLIENT Ruth Whitney
GHR GEOLOGIST D. Collins, B. Myers
CONTRACTOR Greene Co.
TIME STARTED 1445
TIME COMPLETED 1500
DATE 8/25/88

GHR

DEPTH		SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS	FIELD TESTING	NOTES
0 - 1'	FILL	Bn. F/C SAND, F/C Gravel, Cobbles, Wood Fragments, Asphalt Pavement Pieces, Metal Scraps (Barrel Lids)	M	None	1.3	1., 2.
1' - 2'			E	None		
2' - 3'	OUTWASH SAND	Lt. Grey to Bn. Cross-Stratified F/M SAND	E	None		
3' - 4'			E	None		3.
4' - 5'	▽ 0.3		E	None		
5' - 6'			E	None		
6' - 14'		Bottom of Test Pit @ 6' Ground Elevation = 45.42' (Referenced to National Geodetic Vertical Datum)				

NOTES:
1. Field testing values represent total organic vapor levels (referenced to a benzene standard) measured in the head space of sealed soil sample jars with an HNu Model P-101 photoionization detector. Results reported in parts per million. Instrument detection limit 0.1 parts per million. BDL = Below detection limit. Unless otherwise indicated, value is for composite soil sample only.
2. Composite soil sample submitted for laboratory analysis.
3. Slight fuel oil odor.

TEST PIT PLAN



VOLUME = ~5.3 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE	(TR)	0 - 10%
LITTLE	(LI.)	10 - 20%
SOME	(SO.)	20 - 35%
AND		35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E — EASY
M — MODERATE
D — DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS) ▽ G.W.L.

TEST PIT FIELD LOG

TEST PIT NO. TP-11
JOB NO. 3661.002

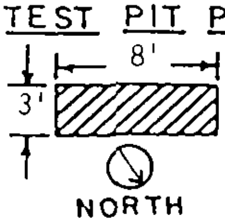
PROJECT Whitney Barrel Site Assessment
ADDRESS 256 Salem St., Woburn, MA
LOCATION See Site Plan
CLIENT Ruth Whitney
GHR GEOLOGIST D. Collins, B. Myers
CONTRACTOR Greene Co.
TIME STARTED 1515
TIME COMPLETED 1530
DATE 8/25/88

GHR

DEPTH		SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS	FIELD TESTING	NOTES
0–1'	FILL	Bn. F/C SAND, Metal & Wire Scraps, F/C Gravel and Cobbles	M	None	46.4	1., 2.
1'–2'			E	None		
2'–3'		Black Ash, F/S SAND and Gravel	E	None		3.
3'–4'	OUTWASH SAND	Lt. Bn. to Grey F SAND, some M SAND, trace C SAND and F Gravel Interlayered Black Sand (mm scale)	E	None		3.
4'–5'	▽0.3		E	None		3.
5'–6'			E	None		
6'–14'		Bottom of Test Pit @ 5.75' Ground Elevation = 44.93' (Referenced to National Geodetic Vertical Datum)				

NOTES:
1. Field testing values represent total organic vapor levels (referenced to a benzene standard) measured in the head space of sealed soil sample jars with an HNu Model P-101 photoionization detector. Results reported in parts per million. Instrument detection limit 0.1 parts per million. BDL = Below detection limit. Unless otherwise indicated, value is for composite soil sample only.
2. Composite soil sample submitted for laboratory analysis.
3. Intermittant strong H_2S odor; fuel odor at times. HNu reading up to 2 in pit at times.

TEST PIT PLAN



VOLUME = ~5.1 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6"-18"	A
18"-36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E — EASY
M — MODERATE
D — DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS) ▽ G.W.L.

TEST PIT FIELD LOG

TEST PIT NO. TP-12
JOB NO. 3661.002

PROJECT Whitney Barrel Site Assessment
ADDRESS 256 Salem St., Woburn, MA
LOCATION See Site Plan
CLIENT Ruth Whitney
GHR GEOLOGIST D. Collins, B. Myers
CONTRACTOR Greene Co.
TIME STARTED 1005
TIME COMPLETED 1040
DATE 8/26/88

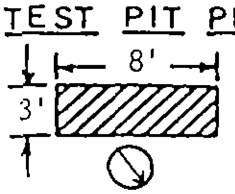
GHR

DEPTH		SOIL DESCRIPTION	EXCAV EFFORT	BOULDER COUNT QTY. CLASS	FIELD TESTING	NOTES
0–1'	FILL	Dk. Bn. F/C SAND and F/C GRAVEL	M	None	200	1.,2. 3.,4.
1'–2'		Bn. F/C SAND and F/C GRAVEL	E	None		
2'–3'		Black F SAND and SILT, some M/C SAND and F Gravel	E	None		
3'–4'	OUTWASH SAND	Tan to Grey F/M SAND	E	None	250 (tan sand only)	1.
4'–5'			E	None	320 (grey sand only)	1.
5'–6'			E	None		5.
6'		Bottom of Test Pit @ 6'				
7'–14'		Ground Elevation = 46.00' (Referenced to National Geodetic Vertical Datum)				

NOTES:

1. Field testing values represent total organic vapor levels (referenced to a benzene standard) measured in the head space of sealed soil sample jars with an HNu Model P-101 photoionization detector. Results reported in parts per million. Instrument detection limit 0.1 parts per million. BDL = Below detection limit. Unless otherwise indicated, value is for composite soil sample only.
2. Composite soil sample submitted for laboratory analysis.
3. Strong sewage odor. HNu readings 5-30 ppm in breathing zone throughout excavation time. Upgraded to Level C from 1000-1040.
4. HNu readings up to 200 ppm from test pit excavation.
5. No water encountered. Test pit backfilled and covered with four buckets of clean fill.

TEST PIT PLAN



VOLUME = ~ 5.3 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E — EASY
M — MODERATE
D — DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS) ▽ G.W.L.

TEST PIT FIELD LOG

TEST PIT NO. TP-13
JOB NO. 3661.002

GHR

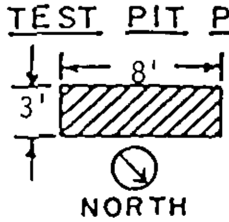
PROJECT Whitney Barrel Site Assessment
ADDRESS 256 Salem St., Woburn, MA
LOCATION See Site Plan
CLIENT Ruth Whitney
GHR GEOLOGIST D. Collins, B. Myers
CONTRACTOR Greene Co.
TIME STARTED 1150
TIME COMPLETED 1210
DATE 8/26/88

DEPTH		SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS	FIELD TESTING	NOTES
0–1'	FILL	Bn. F/C SAND, F/C Gravel, some Metal Fragments, Wood Chips, Cement Blocks	M	None	219.5	1.,2. 3.
1'–2'		Black F/C SAND, some F/M Gravel (3")	M	None	7-20	4.
2'–3'			E	None		
3'–4'	OUTWASH SAND	Bn. to Lt. Grey F/M SAND	E	None	25-30	4.
4'–5'		Black F/M SAND in laminae and cross-stratification throughout	E	None		
5'–6'	▽ 0.3		E	None	45-50	4.
6'–7'			E	None		
7'–14'		Bottom of Test Pit @ 7' Ground Elevation = 45.99' (Referenced to National Geodetic Vertical Datum)				

NOTES:

1. Field testing values represent total organic vapor levels (referenced to a benzene standard) measured in the head space of sealed soil sample jars with an HNu Model P-101 photoionization detector. Results reported in parts per million. Instrument detection limit 0.1 parts per million. BDL = Below detection limit. Unless otherwise indicated, value is for composite soil sample only.
2. Composite soil sample submitted for laboratory analysis.
3. HNu readings 5-20 ppm in breathing zone throughout excavation time. Upgraded to Level C from 1155-1215.
4. HNu reading from soil in backhoe bucket.

TEST PIT PLAN



VOLUME = ~6.2 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E — EASY
M — MODERATE
D — DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS) ▽ G.W.L.

TEST PIT FIELD LOG

TEST PIT NO. TP-14
JOB NO. 3661.002

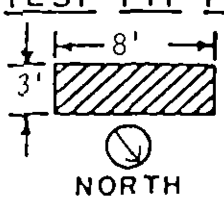
PROJECT Whitney Barrel Site Assessment
ADDRESS 256 Salem St., Woburn, MA
LOCATION See Site Plan
CLIENT Ruth Whitney
GHR GEOLOGIST D. Collins, B. Myers
CONTRACTOR Greene Co.
TIME STARTED 0810
TIME COMPLETED 0830
DATE 8/26/88

GHR

DEPTH	SOIL	DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS	FIELD TESTING	NOTES
0–1'	FILL	Bn. to Dk. Bn. F/C SAND, Wood Fragments, some F/C Gravel, Bricks	M	None	0.8	1., 2.
1'–2'			E	None		
2'–3'		Bn. F/C SAND and F/M GRAVEL	E	None		
3'–4'	OUTWASH SAND	Tan F/M SAND, trace Bn. Silt Black F/M SAND in Laminae and cross-stratification throughout	E	None		
4'–5'			E	None		
5'–6'	▽0.3		E	None		3.
6'–7'			E	None		
7'–14'		Bottom of Test Pit @ 7' Ground Elevation = 45.44' (Referenced to National Geodetic Vertical Datum)				

NOTES:
1. Field testing values represent total organic vapor levels (referenced to a benzene standard) measured in the head space of sealed soil sample jars with an HNu Model P-101 photoionization detector. Results reported in parts per million. Instrument detection limit 0.1 parts per million. BDL = Below detection limit. Unless otherwise indicated, value is for composite soil sample only.
2. Composite soil sample submitted for laboratory analysis.
3. Fuel oil type odor.

TEST PIT PLAN



VOLUME = ~6.2 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E — EASY
M — MODERATE
D — DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS) ▽ G.W.L.

TEST PIT FIELD LOG

TEST PIT NO. TP-15
JOB NO. 3661.002

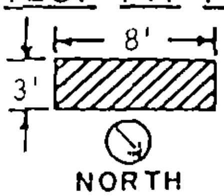
PROJECT Whitney Barrel : Site Assessment
ADDRESS 256 Salem St., Woburn, MA
LOCATION See Site Plan
CLIENT Ruth Whitney
GHR GEOLOGIST D. Collins, B. Myers
CONTRACTOR Greene Co.
TIME STARTED 0930
TIME COMPLETED 0950
DATE 8/26/88

GHR

DEPTH		SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS	FIELD TESTING	NOTES
0–1'	FILL	Dk. Bn. to Grey F/C SAND and F/C GRAVEL, some Wood Fragments	M	None	119.8	1.,2. 3.
1'–2'			E	None		
2'–3'	OUTWASH SAND	Blk. F/C SAND and F/M GRAVEL (6"). Gradiational lower contact	E	None	87.7(black) 28.8 (tan)	4. 4.
3'–4'		Tan F/M SAND (10") Lt. Grey F/M SAND	E	None	24.7 (grey)	4.
4'–5'		Black F/M SAND in laminae and cross-stratification	M	None		
5'–6'	∇0.3		M	None		
6'–14'		Bottom of Test Pit @ 6.5' Ground Elevation = 45.45' (Referenced to National Geodetic Vertical Datum)				

NOTES:
1. Field testing values represent total organic vapor levels (referenced to a benzene standard) measured in the head space of sealed soil sample jars with an HNu Model P-101 photoionization detector. Results reported in parts per million. Instrument detection limit 0.1 parts per million. BDL = Below detection limit. Unless otherwise indicated, value is for composite soil sample only.
2. Composite soil sample submitted for laboratory analysis.
3. Very strong sewer/solvent odors. HNu readings 3-5 in excavation; 0-4 in breathing zone. Upgraded to Level C from 0930-0950.
4. HNu reading from discrete sample headspace only.

TEST PIT PLAN



VOLUME = ~5.8 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E — EASY
M — MODERATE
D — DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS) ∇ G.W.L.

TEST PIT FIELD LOG

TEST PIT NO. TP-16
JOB NO. 3661.002

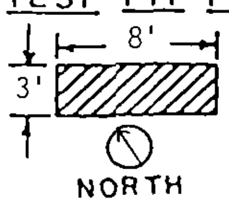
PROJECT Whitney Barrel Site Assessment
ADDRESS 256 Salem St., Woburn, MA
LOCATION See Site Plan
CLIENT Ruth Whitney
GHR GEOLOGIST D. Collins, B. Myers
CONTRACTOR Greene Co.
TIME STARTED 1120
TIME COMPLETED 1140
DATE 8/26/88

GHR

DEPTH		SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS	FIELD TESTING	NOTES
0–1'	FILL	Bn. SAND, Metal Plastic and Wood Fragments (6"), F/C Gravel, some Cobbles.	M	None	44.5	1.,2. 3.
1'–2'	OUTWASH SAND AND GRAVEL	Grey SILT and F/C SAND, some M/C SAND and F/C Gravel	E	None		4.
2'–3'		Black F/M SAND, trace C SAND and F Gravel	E	None		
3'–4'		Tan to Grey F/M SAND, trace F Gravel (4.5'-7')	E	None		
4'–5'			E	None		
5'–6'			E	None		
6'–7'	▽ 0.3		E	None		
7'–14'		Bottom of Test Pit @ 7' Ground Elevation = 45.62' (Referenced to National Geodetic Vertical Datum)				

NOTES:
1. Field testing values represent total organic vapor levels (referenced to a benzene standard) measured in the head space of sealed soil sample jars with an HNu Model P-101 photoionization detector. Results reported in parts per million. Instrument detection limit 0.1 parts per million. BDL = Below detection limit. Unless otherwise indicated, value is for composite soil sample only.
2. Composite soil sample submitted for laboratory analysis.
3. Slight solvent odor. HNu readings up to 2 ppm in breathing zone throughout excavation time.
4. HNu readings from excavation up to 12 ppm.

TEST PIT PLAN



VOLUME = ~6.2 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE	(TR)	0 - 10%
LITTLE	(LI.)	10 - 20%
SOME	(SO.)	20 - 35%
AND		35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E — EASY
M — MODERATE
D — DIFFICULT

GROUNDWATER
ELAPSED TIME TO READING (HRS) ▽ G.W.L.

TEST PIT FIELD LOG

TEST PIT NO. TP-17
JOB NO. 3661.002

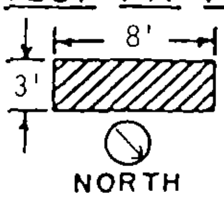
PROJECT Whitney Barrel Site Assessment
ADDRESS 256 Salem St., Woburn, MA
LOCATION See Site Plan
CLIENT Ruth Whitney
GHR GEOLOGIST D. Collins, B. Myers
CONTRACTOR Greene Co.
TIME STARTED 0835
TIME COMPLETED 0855
DATE 8/26/88

GHR

DEPTH		SOIL DESCRIPTION	EXCAV EFFORT	BOULDER COUNT QTY. CLASS	FIELD TESTING	NOTES
0–1'	FILL	Dk. Bn. F/C SAND, Wood, F/C Gravel, Metal and Plastic Fragments (0-6")	M	None	67.6	1., 2.
1'–2'		Tan F/C SAND, little F/C Gravel (6"-1.75') Black Ashy F/C SAND (1.75'-2.0')	M	None		
2'–3'		Bn. F/C SAND and F/M GRAVEL	M	None		
3'–4'		Black Ashy F/C SAND, little Silt (3'-3.25')				
	OUTWASH SAND and GRAVEL	Grey F/M SAND, trace F Gravel	M	None		3.
4'–5'		Black Silty lenses throughout (½ mm scale)	M	None		
5'–6'	▽ 0.3		M	None		
6'–7'			M	None		
7'–8'		Bottom of Test Pit @ 7.5'				
8'–14'		Ground Elevation = 45.31' (Referenced to National Geodetic Vertical Datum)				

NOTES:
1. Field testing values represent total organic vapor levels (referenced to a benzene standard) measured in the head space of sealed soil sample jars with an HNu Model P-101 photoionization detector. Results reported in parts per million. Instrument detection limit 0.1 parts per million. BDL = Below detection limit. Unless otherwise indicated, value is for composite soil sample only.
2. Composite soil sample submitted for laboratory analysis.
3. Very strong H_2S odor in black ash layer and grey sand below. HNu readings 2-7 from excavation and 0-1.5 in breathing zone.

TEST PIT PLAN



VOLUME = ~6.7 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E — EASY
M — MODERATE
D — DIFFICULT

GROUNDWATER

▽ G.W.L.
ELAPSED TIME TO READING (HRS)

TEST PIT FIELD LOG

TEST PIT NO. TP-18
JOB NO. 3661.002

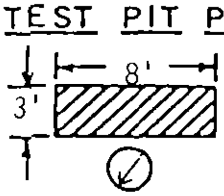
PROJECT Whitney Barrel Site Assessment
ADDRESS 256 Salem St., Woburn, MA
LOCATION See Site Plan
CLIENT Ruth Whitney
GHR GEOLOGIST D. Collins, B. Myers
CONTRACTOR Greene Co.
TIME STARTED 0905
TIME COMPLETED 0920
DATE 8/26/88

GHR

DEPTH	SOIL DESCRIPTION		EXCAV EFFORT	BOULDER COUNT QTY. CLASS	FIELD TESTING	NOTES
0 – 1'	FILL	Dk. Bn. Organic F/C SAND, trace Wood ←1" Black F/C SAND	M	None	84.4	1., 2.
1' – 2'		Bn. F/C SAND, some F/M Gravel 2" Black F/M SAND, little Silt	E	None		
2' – 3'	OUTWASH SAND	Grey F/M SAND	E	None		3.
3' – 4'		Black F/M SAND in laminae and cross-stratification throughout	E	None	>20	4.
4' – 5'	∇ 0.3		E	None		
5' – 6'			E	None		
6'		Bottom of Test Pit @ 6' Ground Elevation = 45.66' (Referenced to National Geodetic Vertical Datum)				
7'						
8'						
9'						
10'						
11'						
12'						
13'						
14'						

NOTES:
1. Field testing values represent total organic vapor levels (referenced to a benzene standard) measured in the head space of sealed soil sample jars with an HNu Model P-101 photoionization detector. Results reported in parts per million. Instrument detection limit 0.1 parts per million. BDL = Below detection limit. Unless otherwise indicated, value is for composite soil sample only.
2. Composite soil sample submitted for laboratory analysis.
3. Very strong solvent odor in grey sand. Up to 4 ppm in breathing zone (HNu reading).
4. HNu readings from excavation.

TEST PIT PLAN



VOLUME = ~ 5.3 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E — EASY
M — MODERATE
D — DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS) ∇ G.W.L.

Appendix D

Soil Boring/Monitoring Well

Installation Logs

BORING / MONITORING WELL LOG

GHR

PROJECT: WHITNEY BARREL SITE ASSESSMENT
ADDRESS: 256 SALEM ST., WOBURN, MA
CLIENT: RUTH WHITNEY
GHR FIELD GEOLOGIST: M. HAWIGER
BORING CONTRACTOR: GEOLOGIC, INC.
FOREMAN: D. GREEN

BORING No. MW-1S
LOCATION: See Site Plan
SHEET No. 1 OF 1
JOB No. 3661.002
DATE (S): 8/30/88

GROUND ELEV.[1] = 47.60'
TOP OF CASING ELEV = 47.18' (PVC)

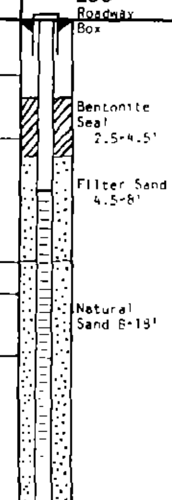
CASING		SAMPLER	
SIZE:	4 1/4" ID HSA	TYPE:	1 3/8" ID SPLIT SPOON
HAMMER:	-	HAMMER:	140 lbs.
FALL:	-	FALL:	30 "

GROUNDWATER LEVEL READINGS

DATE	DEPTH
11/3/88	2.96' (from top of PVC)

DEPTH	CAS. BL./FT.	SAMPLE No.	PEN./REC.	SAMPLE DEPTH	BLOWS/6"	GEN. STRATA DESC.	SAMPLE DESCRIPTION	FIELD TESTING	NOTES
		S-1	24"/14"	0' - 2'	13/21/27/38	FILL	Black F/M SAND and F/C GRAVEL, little Silt	9.4	2
5		S-2	24"/24"	4' - 6'	2/10/15/16		Black F SAND, little Silt, little M SAND (oily odor) (10") Reddish Brown M SAND, little F SAND grading to Olive Grey M SAND(14")	170	
10		S-3	24"/24"	9' - 11'	4/6/9/17	OUTWASH SAND	Lt. Olive Grey F/M SAND	20	
15									3

INSTALLATION LOG



Bottom of Boring @ 18'
2" ID PVC WELL INSTALLED
Well Screen 5.5 - 15.5'

NOTES:
1. Elevations referenced to National Geodetic Vertical Datum (NGVD).
2. Field testing values represent total organic vapor levels (referenced to a benzene standard) measured in the head space of sealed soil sample jars with an HNu P-101 photoionization detector. Results reported in parts per million. Instrument detection limit 0.1 parts per million. BDL = Below Instrument Detection Limit.
3. No sample due to running sand.

BORING / MONITORING WELL LOG

GHR

PROJECT WHITNEY BARREL SITE ASSESSMENT
ADDRESS 256 SALEM ST., WOBURN, MA
CLIENT RUTH WHITNEY
GHR FIELD GEOLOGIST M. HAWIGER
BORING CONTRACTOR GEOLOGIC, INC.
FOREMAN D. GREEN

BORING No. MW-3S
LOCATION See Site Plan
SHEET No. 1 OF 1
JOB No. 3661.002
DATE (S) 9/2/88

GROUND ELEV [1] = 45.95'
TOP OF CASING ELEV = 45.70' (PVC)

CASING
SIZE: 4 1/4" ID HSA
HAMMER: -
FALL: -

SAMPLER
TYPE: 1 3/8" ID SPLIT SPOON
HAMMER: 140 lbs.
FALL: 30 "

GROUNDWATER LEVEL READINGS
DATE 11/3/88 DEPTH 1.37' (from top of PVC)

DEPTH	CAS. BL. /FT.	SAMPLE No.	PEN./REC.	DEPTH	BLOWS/6"	GEN. STRATA DESC.	SAMPLE DESCRIPTION	FIELD TESTING	INSTALLATION LOG	NOTES
		S-1	24"/20"	0' - 2'	14/22/23/16	Topsoil / FILL	Brown to Black F/M SAND, little Silt, little F GRAVEL, trace Organic Material (0-3"), Chunk of Coal Cinder (9"), Grey F/C SAND and F/M GRAVEL, trace Silt (8"), Grey to Black F/M SAND, trace Silt (odor) (3")	46	Roadway Box; Bentonite Seal 1-2'	2
5		S-2	24"/17"	4' - 6'	6/13/16/19	OUTWASH SAND	Lt. Grey F/M SAND	9	Filter Sand 2-14'	
10		S-3	24"/24"	9' - 11'	6/9/10/17		Olive Grey F/M SAND	7		
									Bottom of Boring @ 14'; Well Screen 4' - 14'	3
15										

NOTES:
1. Elevations referenced to National Geodetic Vertical Datum (NGVD).
2. Field testing values represent total organic vapor levels (referenced to a benzene standard) measured in the head space of sealed soil sample jars with an HNu P-101 photoionization detector. Results reported in parts per million. Instrument detection limit 0.1 parts per million. BDL = Below Instrument Detection Limit.
3. No sample due to running sand.

BORING / MONITORING WELL LOG

GHR

PROJECT: WHITNEY BARREL SITE ASSESSMENT
ADDRESS: 256 SALEM ST., WOBURN, MA
CLIENT: RUTH WHITNEY
GHR FIELD GEOLOGIST: M. HAWIGER
BORING CONTRACTOR: GEOLOGIC, INC.
FOREMAN: D. GREEN

BORING No. MW-2S
LOCATION: See Site Plan
SHEET No. 1 OF 1
JOB No. 3661.002
DATE (S): 8/31/88

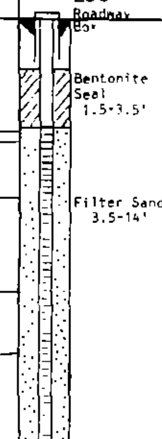
GROUND ELEV [1] = 45.52'
TOP OF CASING ELEV = 46.22' (PVC)

CASING		SAMPLER	
SIZE:	4 1/4" ID HSA	TYPE:	1 3/8" ID SPLIT SPOON
HAMMER:	-	HAMMER:	140 lbs.
FALL:	-	FALL:	30 "

GROUNDWATER LEVEL READINGS

DATE	DEPTH
11/3/88	1.15' (from top of PVC)

DEPTH	CAS. BL. /FT.	SAMPLE No.	PEN./REC.	DEPTH	BLOWS/6"	GEN. STRATA DESC.	SAMPLE DESCRIPTION	FIELD TESTING	INSTALLATION LOG	NOTES
		S-1	24"/7"	0' - 2'	9/26/31/24	Topsoil	Black F/C SAND, little Silt, little Organic Material (2")			2
						FILL	Black F/M SAND and M/C GRAVEL, trace C SAND, little Silt, Cobble lodged in tip of spoon (5")	0.7		
5		S-2	24"/18"	4' - 6'	6/9/9/10	OUTWASH SAND	Dk. Grey F/M SAND, trace Organic Material ("Septic" Odor)	9.4		
10		S-3	24"/24"	9' - 11'	13/14/17/15		Grey F/M SAND, trace M Gravel (Subrounded)	2.3		
15									Bottom of Boring @ 14' 2" ID PVC WELL INSTALLED Well Screen 4.5'-14.5'	



NOTES:

1. Elevations referenced to National Geodetic Vertical Datum (NGVD).
2. Field testing values represent total organic vapor levels (referenced to a benzene standard) measured in the head space of sealed soil sample jars with an HNu P-101 photoionization detector. Results reported in parts per million. Instrument detection limit 0.1 parts per million. BDL = Below Instrument Detection Limit.

BORING / MONITORING WELL LOG

GHR

PROJECT	WHITNEY BARREL SITE ASSESSMENT
ADDRESS	256 SALEM ST., WOBURN, MA
CLIENT	RUTH WHITNEY
GHR FIELD GEOLOGIST	M. HAWIGER
BORING CONTRACTOR	GEOLOGIC, INC.
FOREMAN	D. GREEN
BORING No.	MW-4S
LOCATION	See Site Plan
SHEET No.	1 OF 1
JOB No.	3661.002
DATE (S)	9/2/88
GROUND ELEV. [1]	= 45.52'
TOP OF CASING ELEV	= 47.19' (PVC)

CASING		SAMPLER	
SIZE:	4 1/4" ID HSA	TYPE:	1 3/8" ID SPLIT SPOON
HAMMER:	-	HAMMER:	140 lbs.
FALL:	-	FALL:	30 "

GROUNDWATER LEVEL READINGS

DATE	DEPTH
11/3/88	2.98' (from top of PVC)

DEPTH	CAS. BL. /FT.	SAMPLE No.	PEN./REC.	DEPTH	BLOWS/6"	GEN. STRATA DESC.	SAMPLE DESCRIPTION	FIELD TESTING	INSTALLATION LOG	NOTES
		S-1	24"/18"	0' - 2'	8/13/15/24	FILL	Brown F/M SAND, little F GRAVEL, trace Silt (3"), Black F/M SAND and F/M GRAVEL, trace Silt (2"), Olive Grey F/C SAND, some F/M GRAVEL (7"), Black F SAND, trace silt (odor) (6")	95	LPP; Bentonite Seal 2-3.5'	2
5		S-2	24"/16"	4' - 6'	6/11/14/16	OUTWASH SAND	Dark Grey F/M SAND, wet	35	Filter Sand and Natural Material 3.5-15.5'	
10		S-3	24"/23"	9' - 11'	3/5/6/14		Dk. Grey F/M SAND (11") grading to Olive F SAND, some M SAND (12")	15		
15		S-4	18"/18"	14'-15.5'	1/5/5		Grey F/M SAND, trace Organic Material	5		
									Bottom of Boring @ 15.5' 2" ID PVC WELL INSTALLED Well Screen 5.5-15.5'	

NOTES:

1. Elevations referenced to National Geodetic Vertical Datum (NGVD).
2. Field testing values represent total organic vapor levels (referenced to a benzene standard) measured in the head space of sealed soil sample jars with an HNu P-101 photoionization detector. Results reported in parts per million. Instrument detection limit 0.1 parts per million. BDL = Below Instrument Detection Limit.

BORING / MONITORING WELL LOG

GHR

PROJECT WHITNEY BARREL SITE ASSESSMENT
ADDRESS 256 SALEM ST., WOBURN, MA
CLIENT RUTH WHITNEY
GHR FIELD GEOLOGIST M. HAWIGER
BORING CONTRACTOR GEOLOGIC, INC.
FOREMAN D. GREEN

BORING No. B-1
LOCATION See Site Plan
SHEET No. 1 OF 1
JOB No. 3661.002
DATE (S) 8/30/88

GROUND ELEV.[1] = 46.71'
TOP OF CASING ELEV = 46.71' (PVC)

CASING		SAMPLER	
SIZE:	4 1/4" ID HSA	TYPE:	1 3/8" ID SPLIT SPOON
HAMMER:	-	HAMMER:	140 lbs.
FALL:	-	FALL:	30 "

GROUNDWATER LEVEL READINGS

DATE	DEPTH
11/3/88	2.78' (from top of PVC)

DEPTH	CAS. BL. /FT.	SAMPLE No.	PEN./REC.	DEPTH	BLOWS/6"	GEN. STRATA DESC.	SAMPLE DESCRIPTION	FIELD TESTING	INSTALLATION LOG	NOTES
		S-1	24"/4"	0' - 2'	21/26/17/15	FILL	Dk. Brown F/M SAND and M/C GRAVEL, little Silt	BDL	Natural Material 0-16'	2
5		S-2	24"/20"	4' - 6'	8/12/12/15	OUTWASH SAND AND GRAVEL	Black F/M SAND, little Silt, little M/C GRAVEL (4") Olive VF/F SAND, some M SAND, Stratified (wet)	2		
10		S-3	24"/20"	9' - 11'	5/8/26/58		Grey VF/F SAND, little M SAND to M/C GRAVEL @ 12'	BDL	Boring backfilled with natural material to 7'	
15		S-4	24"/20"	14' - 16'	10/11/11/13		Grey F SAND (4"), Grey M/C SAND and M GRAVEL (1"), Grey VF SAND, trace Silt (15")	BDL		
									Bottom of Boring @ 16' ¾" ID PVC PIEZOMETER INSTALLED SCREEN 4'-7'	

NOTES:
1. Elevations referenced to National Geodetic Vertical Datum (NGVD).
2. Field testing values represent total organic vapor levels (referenced to a benzene standard) measured in the head space of sealed soil sample jars with an HNu P-101 photoionization detector. Results reported in parts per million. Instrument detection limit 0.1 parts per million. BDL = Below Instrument Detection Limit.

BORING / MONITORING WELL LOG

GHR

PROJECT: WHITNEY BARREL SITE ASSESSMENT
ADDRESS: 256 SALEM ST., WOBURN, MA
CLIENT: RUTH WHITNEY
GHR FIELD GEOLOGIST: M. HAWIGER
BORING CONTRACTOR: GEOLOGIC, INC.
FOREMAN: D. GREEN

BORING No. B-2
LOCATION: See Site Plan
SHEET No. 1 OF 1
JOB No. 3661.002
DATE (S): 8/31/88

GROUND ELEV.[1] = 45.43'
TOP OF CASING ELEV. = 46.83' (PVC)

CASING		SAMPLER	
SIZE:	4 1/4" ID HSA	TYPE:	1 3/8" ID SPLIT SPOON
HAMMER:	-	HAMMER:	140 lbs.
FALL:	-	FALL:	30 "

GROUNDWATER LEVEL READINGS

DATE	DEPTH
11/3/88	N/A

DEPTH	CAS. BL /FT.	SAMPLE No.	PEN./REC.	DEPTH	BLOWS/6"	GEN. STRATA DESC.	SAMPLE DESCRIPTION	FIELD TESTING	INSTALLATION LOG	NOTES
		S-1	18"/10"	0.5 - 2'	6/11/9	FILL	Tan F/C SAND, some F/M Gravel (3") Black F/M SAND, little Silt, little F/M Gravel (1") Dk. Bn. F/M SAND (6")	BDL	Natural Material 0-11'	2
5		S-2	24"/19"	4 - 6'	6/10/13/15	OUTWASH SAND	Olive Grey F/M SAND, trace F Gravel slightly stratified, wet	BDL		
10		S-3	24"/16"	9 - 11'	3/8/12/10		Olive F SAND, Very Uniform	BDL	Boring Backfilled to 9'	
									Bottom of Boring @ 11' ½" ID PVC PIEZOMETER INSTALLED SCREEN 6-9'	
15										

NOTES:

1. Elevations referenced to National Geodetic Vertical Datum (NGVD).
2. Field testing values represent total organic vapor levels (referenced to a benzene standard) measured in the head space of sealed soil sample jars with an HNu P-101 photoionization detector. Results reported in parts per million. Instrument detection limit 0.1 parts per million. BDL = Below Instrument Detection Limit.

BORING / MONITORING WELL LOG

GHR

PROJECT	WHITNEY BARREL SITE ASSESSMENT
ADDRESS	256 SALEM ST., WOBURN, MA
CLIENT	RUTH WHITNEY
GHR FIELD GEOLOGIST	M. HAWIGER
BORING CONTRACTOR	GEOLOGIC, INC.
FOREMAN	D. GREEN
BORING No.	B-3
LOCATION	See Site Plan
SHEET No.	1 OF 1
JOB No.	3661.002
DATE (S)	8/30/88
GROUND ELEV. [1]	= 46.20'
TOP OF CASING ELEV	= N/A

CASING		SAMPLER	
SIZE:	4 1/4" ID HSA	TYPE:	1 3/8" ID SPLIT SPOON
HAMMER:	-	HAMMER:	140 lbs.
FALL:	-	FALL:	30 "

GROUNDWATER LEVEL READINGS

DATE	DEPTH

DEPTH	CAS. BL./FT.	SAMPLE No.	PEN./REC	DEPTH	BLOWS/6"	GEN. STRATA DESC.	SAMPLE DESCRIPTION	FIELD TESTING	INSTALLATION LOG	NOTES
		S-1	24"/17"	0' - 2'	20/25 20/19	FILL	Dk.Bn. to Blk. F/C SAND and F/M GRAVEL, slightly stratified (16") Black Silt and F SAND	1		2
5		S-2	24"/20"	4' - 6'	2/8/17/21	OUTWASH SAND AND GRAVEL	Dk.Grey F/M SAND (1") Dk.Bn.F SAND, some Silt (1") Bn. F/M SAND Grading to Olive Grey M SAND, some F SAND(18")	0.2	Boring Backfilled Upon Completion, No Well Installed	
10		S-3	24"/15"	9'-11'	1/2/3/5		Dk.Bn. F/M SAND, little Silt, little F/M Gravel (2"), Olive Grey F SAND (13")	1		
15		S-4	24"/8"	14'-16'	2/3/4/4		Dk.Bn. F/M SAND, trace Silt, trace F Gravel (2") Olive Grey F SAND (8")	1		3.
									Bottom of Boring @ 16'	

NOTES:
1. Elevations referenced to National Geodetic Vertical Datum (NGVD).
2. Field testing values represent total organic vapor levels (referenced to a benzene standard) measured in the head space of sealed soil sample jars with an HNu P-101 photoionization detector. Results reported in parts per million. Instrument detection limit 0.1 parts per million. BDL = Below Instrument Detection Limit.
3. Wash in split spoon. Stopped Sampling.

BORING / MONITORING WELL LOG

GHR

PROJECT: WHITNEY BARREL SITE ASSESSMENT
ADDRESS: 256 SALEM ST., WOBURN, MA
CLIENT: RUTH WHITNEY
GHR FIELD GEOLOGIST: M. HAWIGER
BORING CONTRACTOR: GEOLOGIC, INC.
FOREMAN: D. GREEN

BORING No.: B-4
LOCATION: See Site Plan
SHEET No. 1 OF 1
JOB No. 3661.002
DATE (S): 8/31/88

GROUND ELEV[1] = 45.31'
TOP OF CASING ELEV = BROKEN (11/3/88)

CASING	SAMPLER
SIZE: 4 1/4" ID HSA	TYPE: 1 3/8" ID SPLIT SPOON
HAMMER: -	HAMMER: 140 lbs.
FALL: -	FALL: 30 "

GROUNDWATER LEVEL READINGS

DATE	DEPTH
11/3/88	N/A

DEPTH	CAS. BL. /FT.	SAMPLE No.	PEN./REC.	DEPTH	BLOWS/6"	GEN. STRATA DESC.	SAMPLE DESCRIPTION	FIELD TESTING	INSTALLATION LOG	NOTES
		S-1	24"/16"	0' - 2'	9/13/14/13	FILL	Blk. F/M SAND, little F/M Gravel, little C SAND, trace Silt (6"). Lt. Bn. F/M SAND, some F/C Gravel (4"). Blk. F/M SAND, little C SAND, Thin lenses of Bn. F/M SAND (Oil Odor) (6")	250	Natural Material 0-10.5'	2
5		S-2	24"/18"	4' - 6'	6/10/13/14	OUTWASH SAND	Olive F SAND, little M SAND, trace Black F SAND	22		
10		S-3	18"/18"	9'-10.5'	8/47/24		Olive Grey F SAND, little M SAND	2.6	Boring Backfilled to 9'	3
									Bottom of Boring @ 10.5'	
									½" ID PVC PIEZOMETER INSTALLED	
15									SCREEN 6-9'	

NOTES:
1. Elevations referenced to National Geodetic Vertical Datum (NGVD).
2. Field testing values represent total organic vapor levels (referenced to a benzene standard) measured in the head space of sealed soil sample jars with an HNu P-101 photoionization detector. Results reported in parts per million. Instrument detection limit 0.1 parts per million. BDL = Below Instrument Detection Limit.
3. Wash in Split spoon. Stopped sampling.

BORING / MONITORING WELL LOG

GHR

PROJECT: WHITNEY BARREL SITE ASSESSMENT
ADDRESS: 256 SALEM ST., WOBURN, MA
CLIENT: RUTH WHITNEY
GHR FIELD GEOLOGIST: M. HAWIGER
BORING CONTRACTOR: GEOLOGIC, INC.
FOREMAN: D. GREEN

BORING No. B-5
LOCATION: See Site Plan
SHEET No. 1 OF 1
JOB No. 3661.002
DATE (S) 8/31/88

GROUND ELEV[1] = 45.28'
TOP OF CASING ELEV = N/A

CASING		SAMPLER	
SIZE:	4 1/4" ID HSA	TYPE:	1 3/8" ID SPLIT SPOON
HAMMER:	-	HAMMER:	140 lbs.
FALL:	-	FALL:	30 "

GROUNDWATER LEVEL READINGS

DATE	DEPTH

DEPTH	CAS. BL./FT.	SAMPLE No.	PEN./REC.	DEPTH	BLOWS/6"	GEN. STRATA DESC.	SAMPLE DESCRIPTION	FIELD TESTING	INSTALLATION LOG	NOTES
		S-1	24"/16"	0' - 2'	10/20/17/18	FILL	Bn. to Grey F/M SAND and F/M GRAVEL some C Sand (12"). Black F SAND, trace Silt (4") (Fuel Oil Odor)	125	Boring Backfilled Upon Completion; No Well Installed	2
5		S-2	24"/15"	4' - 6'	8/13/17/16	OUTWASH SAND	Grey F SAND, some M Sand	64		
10		S-3	18"/18"	9'-10.5'	4/8/23		Dk. Grey F/M SAND	10		
									Bottom of Boring @ 10.5'	
15										

NOTES:
1. Elevations referenced to National Geodetic Vertical Datum (NGVD).
2. Field testing values represent total organic vapor levels (referenced to a benzene standard) measured in the head space of sealed soil sample jars with an HNu P-101 photoionization detector. Results reported in parts per million. Instrument detection limit 0.1 parts per million. BDL = Below Instrument Detection Limit.

BORING / MONITORING WELL LOG

GHR

PROJECT: WHITNEY BARREL SITE ASSESSMENT
ADDRESS: 256 SALEM ST., WOBURN, MA
CLIENT: RUTH WHITNEY
GHR FIELD GEOLOGIST: M. HAWIGER
BORING CONTRACTOR: GEOLOGIC, INC.
FOREMAN: D. GREEN

BORING No. B-6
LOCATION: See Site Plan
SHEET No. 1 OF 1
JOB No. 3661.002
DATE (S): 9/2/88

GROUND ELEV [1] = 45.36'
TOP OF CASING ELEV = N/A

CASING		SAMPLER	
SIZE:	4 1/4" ID HSA	TYPE:	1 3/8" ID SPLIT SPOON
HAMMER:	-	HAMMER:	140 lbs.
FALL:	-	FALL:	30 "

GROUNDWATER LEVEL READINGS

DATE	DEPTH

DEPTH	CAS. BL./FT.	SAMPLE No.	PEN./REC.	DEPTH	BLOWS/6"	GEN. STRATA DESC.	SAMPLE DESCRIPTION	FIELD TESTING	INSTALLATION LOG	NOTES
		S-1	24"/22"	0' - 2'	10/18/16/14	FILL	Dk.Bn. to Blk.F/M SAND, some F/C Gravel, little Silt (5"); V.DK.Grey F/M SAND, some F/C Gravel, little C Sand, tr.Silt, broken cobble(12") Olive F/M SAND (5")	25		2
5		S-2	24"/17"	4' - 6'	6/12/13/16	OUTWASH SAND	Dk. Grey F/M SAND	7.5	Boring Backfilled Upon Completion: No Well Installed	
10		S-3	24"/24"	9'-11'	3/4/7/14		Dk. Olive Grey F/M SAND	8.5		
15		S-4	12"/12"	14'-15'	6/14		Olive Grey F/M SAND	18.5	Bottom of Boring @ 15'	

NOTES:
1. Elevations referenced to National Geodetic Vertical Datum (NGVD).
2. Field testing values represent total organic vapor levels (referenced to a benzene standard) measured in the head space of sealed soil sample jars with an HNu P-101 photoionization detector. Results reported in parts per million. Instrument detection limit 0.1 parts per million. BDL = Below Instrument Detection Limit.

BORING / MONITORING WELL LOG

GHR

PROJECT WHITNEY BARREL SITE ASSESSMENT
ADDRESS 256 SALEM ST., WOBURN, MA
CLIENT RUTH WHITNEY
GHR FIELD GEOLOGIST M. HAWIGER
BORING CONTRACTOR GEOLOGIC, INC.
FOREMAN D. GREEN

BORING No. B-7
LOCATION See Site Plan
SHEET No. 1 OF 1
JOB No. 3661.002
DATE (S) 9/1/88

GROUND ELEV. [1] = 44.60'
TOP OF CASING ELEV. = 44.62' (PVC)

CASING	SAMPLER
SIZE: 4 1/4" ID HSA	TYPE: 1 3/8" ID SPLIT SPOON
HAMMER: -	HAMMER: 140 lbs.
FALL: -	FALL: 30 "

GROUNDWATER LEVEL READINGS

DATE	DEPTH
11/3/88	0' (Piezometer in standing surface water)

DEPTH	CAS. BL. /FT.	SAMPLE No.	PEN./REC.	DEPTH	BLOWS/6"	GEN. STRATA DESC.	SAMPLE DESCRIPTION	FIELD TESTING	INSTALLATION LOG	NOTES
		S-1	24"/22"	0' - 2'	3/3/6/9	TOPSOIL FILL	3" soil Blk. F SAND, some M SAND, tr. Silt Grading to Bn.F/M SAND, tr. Silt	BDL	Natural Material 0-10.5'	2
5		S-2	24"/17"	4' - 6'	4/9/13/15	OUTWASH SAND	Bn.F/M SAND (3"), Blk.F SAND, some Silt, some Organic Material (3") Bn. F/M SAND (11")	BDL		
10		S-3	18"/18"	9'-10.5'	4/6/23		Olive Grey F/M SAND	<1	Boring Backfilled to 8'	
15									Bottom of Boring @ 10.5' ½" ID PVC PIEZOMETER INSTALLED SCREEN 5-8'	

NOTES:
1. Elevations referenced to National Geodetic Vertical Datum (NGVD).
2. Field testing values represent total organic vapor levels (referenced to a benzene standard) measured in the head space of sealed soil sample jars with an HNu P-101 photoionization detector. Results reported in parts per million. Instrument detection limit 0.1 parts per million. BDL = Below Instrument Detection Limit.

BORING / MONITORING WELL LOG

GHR

PROJECT WHITNEY BARREL SITE ASSESSMENT
ADDRESS 256 SALEM ST., WOBURN, MA
CLIENT RUTH WHITNEY
GHR FIELD GEOLOGIST M. HAWIGER
BORING CONTRACTOR GEOLOGIC, INC.
FOREMAN D. GREEN

BORING No. B-8
LOCATION See Site Plan
SHEET No. 1 OF 1
JOB No. 3661.002
DATE (S) 9/1/88

GROUND ELEV.[1] = 45.00'
TOP OF CASING ELEV = N/A

CASING		SAMPLER	
SIZE:	4 1/4" ID HSA	TYPE:	1 3/8" ID SPLIT SPOON
HAMMER:	-	HAMMER:	140 lbs.
FALL:	-	FALL:	30 "

GROUNDWATER LEVEL READINGS

DATE	DEPTH

DEPTH	CAS. BL./FT.	SAMPLE No.	PEN./REC.	DEPTH	BLOWS/6"	GEN. STRATA DESC.	SAMPLE DESCRIPTION	FIELD TESTING	INSTALLATION LOG	NOTES
		S-1	24"/18"	0' - 2'	2/3/4/5	Topsoil FILL	Blk. F SAND, little Silt (8") Bn. F/M SAND (10")	BDL	Boring Backfilled Upon Completion, No Well Installed	2
5		S-2	24"/17"	4' - 6'	1/7/10/11	OUTWASH SAND	Blk.F SAND, some Silt, Organic Material (1"), Bn.F/M SAND (1"), Olive Grey F/M SAND (15")	2.5		
10		S-3	24"/24"	9'-11'	3/4/9/18		Olive Grey F/M SAND	2.0		
									Bottom of Boring @ 11'	
15										

NOTES:
1. Elevations referenced to National Geodetic Vertical Datum (NGVD).
2. Field testing values represent total organic vapor levels (referenced to a benzene standard) measured in the head space of sealed soil sample jars with an HNu P-101 photoionization detector. Results reported in parts per million. Instrument detection limit 0.1 parts per million. BDL = Below Instrument Detection Limit.

Appendix E

Monitoring Well Sampling Logs

Project: Whitney Barrel
Client:

Job #: 3661-002

MONITORING WELL SAMPLING LOG

Well ID: MW-1

Date: 10/17/88
Time: 1410

Personnel: RDC/BEM

Weather:

Initial HNU/OVA readings (ppm): 0

Interior Diameter (id) (inches): 2

Radius (r = 1/2 id) (inches): 1

Stick-up (ft from ground surface to TOC): roadbox. ~1/2" abv. g.s. pvc too low. Measured from TOC.

Well Depth (d) (ft from TOC): 14.85

Static Water Level (w) (ft from TOC): 5.4'

Static Water Height (h = d-w) (ft): 9.45'

Static Water Volume Calculation (V = r² h(0.163) (gal)):

1xV =

2xV =

3xV = 5 gal.

Purging Method: bail

Time: 1410 - 1423

	Vol 1	Vol 2	
Conductivity (umhos/cm)			0.63
pH (standard units)			6.6
Temperature (°C)			15°

Total Volume Purged: 5 gal.

Static Water Level After Purging (ft from TOC): 5.5'

Sample #: LX-238

Chain Of Custody #: LX-043

Sample Collection Time: 1425

Analyses: VOA BNA PCB/Pesticide

PAH Inorganic Cyanide

Other (specify) Full TCL

REMARKS:

GHR

Project: Whitney Barrel Job #: 3661-002
Client:

MONITORING WELL SAMPLING LOG

Well ID: MW-2 / MW-5 (dupe MW-2) Date: 10/17/88
Time: 1230
Personnel: RDC/BEM Weather:

Initial HNu/OVA readings (ppm):

Interior Diameter (id) (inches): 2

Radius (r = 1/2 id) (inches): 1 5 1/4' pvc to TOC

Stick-up (ft from ground surface to TOC): Road box ~ 7/8"

Well Depth (d) (ft from ~~TOC~~ PVC): 12.65'

Static Water Level (w) (ft from ~~TOC~~ PVC): 3.3'

12.'65
3.30
8.75

Static Water Height (h = d-w) (ft): 9'

Static Water Volume Calculation V = $\pi r^2 h$ (0.163) (gal):
1xV =
2xV =
3xV = 4.4 gal

Purging Method: bailing
Time: 1230-1247

	Vol 1	Vol 2	Vol 3
Conductivity (umhos/cm)			0.58
pH (standard units)			6.8
Temperature (°C)			16°

Total Volume Purged: 4.5 gal

Static Water Level After Purging (ft from TOC): 3.45'

Sample #: LX-235 / MW-286 (MW-5 (Dupe MW-2)) / (MW-2) Chain Of Custody #: LX-043

Sample Collection Time: 1305 / 1248
MW-5 MW-2

Analyses: VOA BNA PCB/Pesticide

PHC Inorganic Cyanide

Other (specify) Full TCL

REMARKS:

GHR

Project: Whitney Barrel
Client:

Job #: 3661-002

MONITORING WELL SAMPLING LOG

Well ID: MW-3

Date: 10/17
Time: 1143
Weather:

Personnel: RDC/BEM

Initial HNu/OVA readings (ppm): 0 ppm

Interior Diameter (id) (inches):

TOC to pvc 5 7/8"

Radius (r = 1/2 id) (inches): 1

Stick-up (ft from ground surface to TOC): Roadbox. (~2")

Well Depth (d) (ft from ~~TOC~~ pvc): 13.25 9.8

Static Water Level (w) (ft from ~~TOC~~ pvc): 3.4

Static Water Height (h = d-w) (ft): 9.8

Static Water Volume Calculation V = r² h(0.163) (gal):
1xV =
2xV =
3xV = 4.79

Purging Method: bailing
Time: 1145 - 1156

HNu to 2.5 ppm during bailing

	Vol 1	Vol 2	Vol 3
Conductivity (umhos/cm)			1.61
pH (standard units)			6.3
Temperature (°C)			16.5°

Total Volume Purged: 5 gal

Static Water Level After Purging (ft from ~~TOC~~ pvc): 3.45

Sample #: LX-237 Chain Of Custody #: LX-043

Sample Collection Time: 1200

Analyses: VOA BNA PCB/Pesticide

Full TCL PHC Inorganic Cyanide

Other (specify)

REMARKS:

GHR

Project: Whitney Barrel

Client: Ruth Whitney

Job #: 3661-002

MONITORING WELL SAMPLING LOG

Well ID: MW-4 (~~MW-5~~ Dupe)

Date: 10/17/88

Time: 1030

Personnel: RDC, BGM

Weather: Cloudy, 50s

Initial HNu/OVA readings (ppm): 0 ppm abv. bkg.

Interior Diameter (id) (inches): 2

Radius (r = 1/2 id) (inches): 1

Stick-up (ft from ground surface to TOC):

Well Depth (d) (ft from ~~TOC~~ PVC): 15.7

Static Water Level (w) (ft from ~~TOC~~ PVC): 5.0

Static Water Height (h = d-w) (ft): 10.7 (11)

Static Water Volume Calculation $V = r^2 h(0.163)$ (gal):

1xV =

2xV =

3xV = ~5.38

g.s. To survey ⊼ = 15½"

g.s. To TOC = 23¼"

TOC to Top PVC = 3⅜"

Purging Method: bailing

Time: 1100 - 1115

	Vol 1	Vol 2	Vol 3
Conductivity (umhos/cm)			0.97
pH (standard units)			6.7
Temperature (°C)			15°

Total Volume Purged: 6 gal.

Static Water Level After Purging (ft from ~~TOC~~ PVC): 5.1'

Sample #: LX-234 / ~~LX-235~~
MW-4 ~~MW-4 Dupe (MW-5)~~

Chain Of Custody #: LX-043

Sample Collection Time: 1115

Analyses: VOA ___ BNA ___ PCB/Pesticide ___

PHC ___ Inorganic ___ Cyanide ___

Other (specify)

Full TCL

REMARKS:

Field Blank (Lexington tap water; use for decon)

1100 hrs. MW-6 (LX-239)

GHR

Appendix F

Laboratory Analytical Results

Includes Analytical
Results for:

Soil Vapor
Test Pit Soils
Boring Soils
Floor Drain Sediment
Groundwater

SOIL VAPOR ANALYTICAL REPORTS

AUGUST, 1988

SAMPLES COLLECTED
JUNE 27, 1988
JUNE 28, 1988
AUGUST 1,1988

FINAL REPORT

GHR Engineering Associates, Inc.
1050 Waltham Street
Lexington, MA 02173
Attention: Barbara Myers

PROJECT: Whitney Barrel

GHR ANALYTICAL JOB NUMBER: 36-784

PREPARED BY: GHR Analytical

DATE PREPARED: August 16, 1988

GHR ANALYTICAL
36 MAIN STREET
LAKEVILLE, MA
02347
617 947 6077
617 763 8401

GHR ANALYTICAL
A DIVISION OF GHR ENGINEERING ASSOCIATES, INC.
26 MAIN STREET
LAKEVILLE, MA 02347
(508) 947-5077

REPORT OF ANALYSIS

Purgeable Halocarbons Scan

Client: GHR Engineering Associates, Inc. Job No.: 36-784
Project: Whitney Barrel
JN 3661-002

Date Collected: August 1, 1988 Date Analyzed: August 1, 1988
Collected by: BEM/RDC Analyzed by: RLP

Sample Location: SG-5 soil gas
GHR Lab ID: 83651

Parameter	Concentration in ppm
Chloromethane	BDL (1)
Bromomethane	BDL
Dichlorodifluoromethane	BDL
Vinyl Chloride	BDL
Chloroethane	BDL
Methylene Chloride	BDL
Trichlorofluoromethane	BDL
1,1-Dichloroethene	BDL
1,1-Dichloroethane	BDL
1,2-Dichloroethene	BDL
Chloroform	BDL
1,2-Dichloroethane	BDL
1,1,1-Trichloroethane	BDL
Carbon Tetrachloride	BDL
Bromodichloromethane	BDL
1,2-Dichloropropane	BDL
Cis-1,3-Dichloropropene	BDL
Trichloroethene	BDL
Dibromochloromethane	BDL
1,1,2-Trichloroethane	BDL
Trans-1,3-Dichloropropene	BDL
2-Chloroethylvinyl Ether	BDL
Bromoform	BDL
1,1,2,2-Tetrachloroethane	BDL
Tetrachloroethene	BDL

(1) BDL = Below Detection Limit.
Detection Limit= 0.5 ppm.

Note: Values reported for 1,2-Dichloroethene include cis and/or trans isomers.
See attached sheet for GC Operating Conditions.

GHR ANALYTICAL
A DIVISION OF GHR ENGINEERING ASSOCIATES, INC.
26 MAIN STREET
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REPORT OF ANALYSIS

Purgeable Aromatics Scan

Client: GHR Engineering Associates, Inc. Job No.: 36-784
Project: Whitney Barrel
JN 3662-003

Date Collected: August 1, 1988 Date Analyzed: August 1, 1988
Collected by: BEM/RDC Analyzed by: RLP

Sample Location:	SG-5 soil gas
GHR Lab ID:	83651

Parameter	Concentration in ppm
Benzene	BDL (1)
Toluene	BDL
Ethylbenzene	BDL
Chlorobenzene	BDL
1,2-Dichlorobenzene	BDL
1,3-Dichlorobenzene	BDL
1,4-Dichlorobenzene	BDL
Xylenes	BDL

(1) BDL = Below Detection Limit.
Detection Limit = 0.5 ppm.

See attached sheet for GC Operating Conditions.

Job No. 36-784

PURGEABLE HALOCARBONS SCAN
PURGEABLE AROMATICS SCAN

GAS CHROMATOGRAPHY ANALYTICAL PROCEDURE

Type of Instrument: Tracor 540 Gas Chromatograph

Column: 8' x 1/4" glass, 1% SP-1000 on 60/80 Carbopack B

Detector 1: Photoionization Detector (PID)

Detector 2: Hall Electrolytic Conductivity Detector

Chromatographic Conditions:

Injector Temperature: 200° C

Detector Temperature: 200° C

Column Temperature: 45 initial T (°C) hold 3 minutes

8 Rate (°C/min)

220 Final T (°C) hold 15 minutes

Carrier Gas: Helium at 40 ml/min.

Analyte Concentration determined by External Standard Method - Peak Area.

Sample Preparation:

Soil Gas Samples: 5 ml or appropriate aliquot of sample was purged on a Tekmar LSC-2 Concentrator, then desorbed onto the GC at above conditions. (1)

Method Reference:

(1) U.S. EPA, 1982. Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater. EPA-600/4-82-057. EPA, EMSL, Cincinnati, OH.

GHR ANALYTICAL
A DIVISION OF GHR ENGINEERING ASSOCIATES, INC.
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Certification of Results

The enclosed results of analyses are representative of the sample(s) as received by the laboratory. GHR Analytical makes no representations or certifications as to the method of sample collection, sample identification or transportation/handling procedures used prior to the receipt of samples by GHR Analytical.

To the best of my knowledge, the information contained in this report is accurate and complete.

Approved by: Stephen O'Neil
Stephen O'Neil
Assistant Laboratory Director

Date: August 16, 1988

FINAL REPORT

GHR Engineering Associates, Inc.
1050 Waltham Street
Lexington, MA 02173
Attention: Barbara Myers

PROJECT: Whitney Barrel JN 3661001

GHR ANALYTICAL JOB NUMBER: 36-383

PREPARED BY: GHR Analytical

DATE PREPARED: August 8, 1988

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02347
617 947 5077
617 763 8404

GHR ANALYTICAL
A DIVISION OF GHR ENGINEERING ASSOCIATES, INC.
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(508) 947-5077

REPORT OF ANALYSIS

Purgeable Halocarbons Scan

Client: GHR Engineering Associates, Inc. Job No.: 36-784
Project: Whitney Barrel
JN 3661-002

Date Collected: August 1, 1988 Date Analyzed: August 1, 1988
Collected by: BEM/RDC Analyzed by: RLP

Sample Location: SG-5
soil gas
GHR Lab ID: 83651

Parameter	Concentration in ppm
Chloromethane	BDL (1)
Bromomethane	BDL
Dichlorodifluoromethane	BDL
Vinyl Chloride	BDL
Chloroethane	BDL
Methylene Chloride	BDL
Trichlorofluoromethane	BDL
1,1-Dichloroethene	BDL
1,1-Dichloroethane	BDL
1,2-Dichloroethene	BDL
Chloroform	BDL
1,2-Dichloroethane	BDL
1,1,1-Trichloroethane	BDL
Carbon Tetrachloride	BDL
Bromodichloromethane	BDL
1,2-Dichloropropane	BDL
Cis-1,3-Dichloropropene	BDL
Trichloroethene	BDL
Dibromochloromethane	BDL
1,1,2-Trichloroethane	BDL
Trans-1,3-Dichloropropene	BDL
2-Chloroethylvinyl Ether	BDL
Bromoform	BDL
1,1,2,2-Tetrachloroethane	BDL
Tetrachloroethene	BDL

(1) BDL = Below Detection Limit.
Detection Limit= 0.5 ppm.

Note: Values reported for 1,2-Dichloroethene include cis and/or trans isomers.
See attached sheet for GC Operating Conditions.

GHR ANALYTICAL
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(508) 947-5077

REPORT OF ANALYSIS

Purgeable Aromatics Scan

Client: GHR Engineering Associates, Inc. Job No.: 36-784
Project: Whitney Barrel
JN 3662-003

Date Collected: August 1, 1988 Date Analyzed: August 1, 1988
Collected by: BEM/RDC Analyzed by: RLP

Sample Location: SG-5 soil gas
GHR Lab ID: 83651

Parameter	Concentration in ppm
Benzene	BDL (1)
Toluene	BDL
Ethylbenzene	BDL
Chlorobenzene	BDL
1,2-Dichlorobenzene	BDL
1,3-Dichlorobenzene	BDL
1,4-Dichlorobenzene	BDL
Xylenes	BDL

(1) BDL = Below Detection Limit.
Detection Limit = 0.5 ppm.

See attached sheet for GC Operating Conditions.

PURGEABLE HALOCARBONS SCAN
PURGEABLE AROMATICS SCAN

GAS CHROMATOGRAPHY ANALYTICAL PROCEDURE

Type of Instrument: Tracor 540 Gas Chromatograph

Column: 8' x 1/4" glass, 1% SP-1000 on 60/80 Carbopack B

Detector 1: Photoionization Detector (PID)

Detector 2: Hall Electrolytic Conductivity Detector

Chromatographic Conditions:

Injector Temperature: 200° C

Detector Temperature: 200° C

Column Temperature: 45 initial T (°C) hold 3 minutes

8 Rate (°C/min)

220 Final T (°C) hold 15 minutes

Carrier Gas: Helium at 40 ml/min.

Analyte Concentration determined by External Standard Method - Peak Area.

Sample Preparation:

Soil Gas Samples: 5 ml or appropriate aliquot of sample was purged on a Tekmar LSC-2 Concentrator, then desorbed onto the GC at above conditions.

Method Reference:

U.S. EPA, 1982. Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater. EPA-600/4-82-057. EPA, EMSL, Cincinnati, OH.

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Certification of Results

The enclosed results of analyses are representative of the sample(s) as received by the laboratory. GHR Analytical makes no representations or certifications as to the method of sample collection, sample identification or transportation/handling procedures used prior to the receipt of samples by GHR Analytical.

To the best of my knowledge, the information contained in this report is accurate and complete.

Approved by: Stephen O'Neil
Stephen O'Neil
Assistant Laboratory Director

Date: August 8, 1988

FINAL REPORT

GHR Engineering Associates, Inc.
1050 Waltham Street
Lexington, MA 02173
Attention: Barbara Myers

PROJECT: Whitney Barrel JN 3661001

GHR ANALYTICAL JOB NUMBER: 36-397

PREPARED BY: GHR Analytical

DATE PREPARED: August 8, 1988

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REPORT OF ANALYSIS

Purgeable Halocarbons Scan

Client: GHR Engineering Associates, Inc. Job No.: 36-397
Project: Whitney Barrel JN 3661001 Date: August 8, 1988

Date Collected: June 28, 1988 Date Analyzed: June 28, 1988
Collected by: RDC Analyzed by: RLP

Sample ID:	SG-1 soil gas	SG-2 soil gas	SG-6 soil gas	SG-7 soil gas
GHR Lab ID:	81766	81767	81768	81769
Parameter	**Concentration in ppm**			
Chloromethane	BDL (1)	BDL	BDL	BDL
Bromomethane	BDL	BDL	BDL	BDL
Dichlorodifluoromethane	BDL	BDL	BDL	BDL
Vinyl Chloride	BDL	BDL	BDL	BDL
Chloroethane	BDL	BDL	BDL	BDL
Methylene Chloride	BDL	BDL	BDL	BDL
Trichlorofluoromethane	BDL	BDL	BDL	BDL
1,1-Dichloroethene	BDL	BDL	BDL	BDL
1,1-Dichloroethane	BDL	BDL	BDL	BDL
1,2-Dichloroethene	BDL	BDL	BDL	BDL
Chloroform	BDL	BDL	BDL	BDL
1,2-Dichloroethane	BDL	BDL	BDL	BDL
1,1,1-Trichloroethane	BDL	BDL	BDL	BDL
Carbon Tetrachloride	BDL	BDL	BDL	BDL
Bromodichloromethane	BDL	BDL	BDL	BDL
1,2-Dichloropropane	BDL	BDL	BDL	BDL
Cis-1,3-Dichloropropene	BDL	BDL	BDL	BDL
Trichloroethene	BDL	BDL	BDL	BDL
Dibromochloromethane	BDL	BDL	BDL	BDL
1,1,2-Trichloroethane	BDL	BDL	BDL	BDL
Trans-1,3-Dichloropropene	BDL	BDL	BDL	BDL
2-Chloroethylvinyl Ether	BDL	BDL	BDL	BDL
Bromoform	BDL	BDL	BDL	BDL
1,1,2,2-Tetrachloroethane	BDL	BDL	BDL	BDL
Tetrachloroethene	BDL	BDL	BDL	BDL

(1) BDL = Below Detection Limit.
Detection Limit = 0.5 ppm.

Note: Values reported for 1,2-Dichloroethene include cis and/or trans isomers.
See attached sheet for GC Operating Conditions.

GHR ANALYTICAL
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REPORT OF ANALYSIS

Purgeable Aromatics Scan

Client: GHR Engineering Associates, Inc. Job No.: 36-397
Project: Whitney Barrel JN 3661001 Date: August 8, 1988

Date Collected: June 28, 1988 Date Analyzed: June 28, 1988
Collected by: RDC Analyzed by: RLP

Sample ID:	SG-1 soil gas	SG-2 soil gas	SG-6 soil gas	SG-7 soil gas
GHR Lab ID:	81766	81767	81768	81769

Parameter	Concentration in ppm			
Benzene	BDL (1)	BDL	BDL	BDL
Toluene	BDL	BDL	BDL	BDL
Ethylbenzene	BDL	BDL	BDL	BDL
Chlorobenzene	BDL	BDL	BDL	BDL
1,2-Dichlorobenzene	BDL	BDL	BDL	BDL
1,3-Dichlorobenzene	BDL	BDL	BDL	BDL
1,4-Dichlorobenzene	BDL	BDL	BDL	BDL
Xylenes	BDL	BDL	BDL	BDL

(1) BDL = Below Detection Limit.
Detection Limit = 0.5 ppm.
See attached sheet for GC Operating Conditions.

PURGEABLE HALOCARBONS SCAN
PURGEABLE AROMATICS SCAN

GAS CHROMATOGRAPHY ANALYTICAL PROCEDURE

Type of Instrument: Tracor 540 Gas Chromatograph

Column: 8' x 1/4" glass, 1% SP-1000 on 60/80 Carbopack B

Detector 1: Photoionization Detector (PID)

Detector 2: Hall Electrolytic Conductivity Detector

Chromatographic Conditions:

Injector Temperature: 200° C

Detector Temperature: 200° C

Column Temperature: 45 initial T (°C) hold 3 minutes

8 Rate (°C/min)

220 Final T (°C) hold 15 minutes

Carrier Gas: Helium at 40 ml/min.

Analyte Concentration determined by External Standard Method - Peak Area.

Sample Preparation:

Soil Gas Samples: 5 ml or appropriate aliquot of sample was purged on a Tekmar LSC-2 Concentrator, then desorbed onto the GC at above conditions.

Method Reference:
U.S. EPA, 1982. Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater. EPA-600/4-82-057. EPA, EMSL, Cincinnati, OH.

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Certification of Results

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To the best of my knowledge, the information contained in this report is accurate and complete.

Approved by: Stephen O'Neil
Stephen O'Neil
Assistant Laboratory Director

Date: August 8, 1988

SOILS ANALYTICAL REPORTS
(TEST PITS)

OCTOBER, 1988

SAMPLES COLLECTED
AUGUST 25-26, 1988

GHR ANALYTICAL
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26 MAIN STREET
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REPORT OF ANALYSIS
EPA METHOD 8240 - VOLATILE ORGANICS

Client: GHR Engineering Associates, Inc. Job No.: 37-130
Project: Whitney Barrel JN 3661002
Date Received: September 2, 1988 Date Analyzed: September 28 & October 5, 1988
Collected by: M. Haviger Analyzed by: Aquatec, Inc.

Sample ID:	B-6 Soil composite 0-2', 4-6, 9-11', 14-15'	B-6 (Rep.) Soil composite 0-2', 4-6', 9-11', 14-15'
Date Collected:	9/2/88	9/2/88
GHR Lab ID:	85276	85277

Parameter	Concentration in ug/kg (ppb)	
Benzene	BDL (1)	BDL
Carbon Tetrachloride	BDL	BDL
Chlorobenzene	BDL	BDL
1,2-Dichloroethane	BDL	BDL
1,1,1-Trichloroethane	BDL	BDL
1,1-Dichloroethane	BDL	BDL
1,1,2-Trichloroethane	BDL	BDL
1,1,2,2-Tetrachloroethane	BDL	BDL
Chloroethane (2)	BDL	BDL
2-Chloroethyl Vinyl Ether (2)	BDL	BDL
Chloroform	BDL	BDL
1,1-Dichloroethene	BDL	BDL
1,2-Dichloroethene	BDL	BDL
1,2-Dichloropropane	BDL	BDL
Trans-1,3-Dichloropropene	BDL	BDL
Cis-1,3-Dichloropropene	BDL	BDL
Ethylbenzene	BDL	BDL
Methylene Chloride	4JC	LCB
Chloromethane (2)	BDL	BDL
Bromomethane (2)	BDL	BDL
Bromoform	BDL	BDL
Bromodichloromethane	BDL	BDL
Dibromochloromethane	BDL	BDL
Tetrachloroethene	BDL	BDL
Toluene	BDL	BDL
Trichloroethene	BDL	BDL
Vinyl Chloride (2)	BDL	BDL
Acetone (2)	LCB	BDL
2-Butanone (2)	LCB	BDL
Carbon Disulfide	BDL	BDL
2-Hexanone (2)	BDL	BDL
4-Methyl-2-Pentanone (2)	BDL	BDL
Styrene	BDL	BDL
Vinyl Acetate (2)	BDL	BDL
Total Xylenes	BDL	BDL

(1) BDL = Below Detection Limit. (2) Detection Limit for these compounds = 10 ug/kg(ppb). Detection Limit= 5 ug/kg (ppb). LCB = Compound was found but at low concentration, comparable to that in the blank. Quantitation is not possible. J = An estimated value. The mass spectrum indicates the presence of the compound, but the calculated result is less than the reliable detection limit for this compound. C = The result has been corrected for the presence of the compound in the blank.

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REPORT OF ANALYSIS

EPA METHOD 8270 - SEMI-VOLATILE ORGANICS

Client: GHR Engineering Associates, Inc. Job No.: 37-130
Project: Whitney Barrel JN 3661002

Date Received: September 2, 1988 Date Extracted: September 13, 1988
Collected by: M. Hawiger Analyzed by: Aquatec, Inc.

Sample ID:	B-6 Soil composite 0-2', 4-6', 9-11', 14-15'	B-6 (Rep.) Soil composite 0-2', 4-6', 9-11', 14-15'
Date Collected:	9/2/88	9/2/88
GHR Lab ID:	85276	85277

Parameter	Concentration in ug/kg (ppb)	
Acenaphthene	1,000	450
1,2,4-Trichlorobenzene	BDL (1)	BDL
Hexachlorobenzene	BDL	BDL
Hexachloroethane	BDL	BDL
Bis (2-Chloroethyl) Ether	BDL	BDL
2-Chloronaphthalene	BDL	BDL
1,2-Dichlorobenzene	BDL	BDL
1,3-Dichlorobenzene	BDL	BDL
1,4-Dichlorobenzene	BDL	BDL
3,3-Dichlorobenzidine (2)	BDL	BDL
2,4-Dinitrotoluene	BDL	BDL
2,6-Dinitrotoluene	BDL	BDL
Fluoranthene	1,900	1,400
4-Chlorophenyl Phenyl Ether	BDL	BDL
4-Bromophenyl Phenyl Ether	BDL	BDL
Bis (2-Chloroisopropyl) Ether	BDL	BDL
Bis (2-Chloroethoxy) Methane	BDL	BDL
Hexachlorobutadiene	BDL	BDL
Hexachlorocyclopentadiene	BDL	BDL
Isophorone	BDL	BDL
Naphthalene	BDL	100J
Nitrobenzene	BDL	BDL
N-Nitrosodiphenylamine	BDL	BDL
N-Nitrosodi-N-Propylamine	BDL	BDL
Bis-(2-Ethylhexyl) Phthalate	460	410

(1) BDL = Below Detection Limit.
Detection Limit = 330 ug/kg (ppb).
(2) Detection Limit for 3,3-Dichlorobenzidine = 660 ug/kg (ppb).

J = An estimated value. The mass spectrum indicates the presence of the compound, but the calculated result is less than the reliable detection limit for this compound.

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A DIVISION OF GHR ENGINEERING ASSOCIATES, INC.
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REPORT OF ANALYSIS

EPA METHOD 8270 - SEMI-VOLATILE ORGANICS

Client: GHR Engineering Associates, Inc. Job No.: 37-130
Project: Whitney Barrel JN 3661002

Date Received: September 2, 1988 Date Extracted: September 13, 1988
Collected by: M. Hawiger Analyzed by: Aquatec, Inc.

Sample ID:	B-6 Soil composite 0-2', 4-6', 9-11', 14-15'	B-6 (Rep.) Soil composite 0-2', 4-6', 9-11', 14-15'
Date Collected:	9/2/88	9/2/88
GHR Lab ID:	85276	85277

Parameter	Concentration in ug/kg (ppb)	
Benzyl Butyl Phthalate	BDL(1)	BDL
Di-N-Butyl Phthalate	BDL	BDL
Di-N-Octyl Phthalate	BDL	BDL
Diethyl Phthalate	BDL	BDL
Dimethyl Phthalate	BDL	BDL
Benzo(A)Anthracene	370	370
Benzo(A)Pyrene	220J	310J
Benzo(B)Fluoranthene	200J	250J
Benzo(K)Fluoranthene	260J	360
Chrysene	560	500
Acenaphthylene	BDL	BDL
Anthracene	92J	190J
Benzo(GHI)Perylene	BDL	180J
Fluorene	280J	180J
Phenanthrene	290J	670
Dibenzo(AH)Anthracene	BDL	80J
Indeno(1,2,3-CD)Pyrene	BDL	170J
Pyrene	840	830
Benzyl Alcohol	BDL	BDL
4-Chloroaniline	BDL	BDL
Dibenzofuran	240J	130J
2-Methylnaphthalene	BDL	BDL
2-Nitroaniline (2)	BDL	BDL
3-Nitroaniline (2)	BDL	BDL
4-Nitroaniline (2)	BDL	BDL

(1) BDL = Below Detection Limit.
Detection Limit = 330 ug/kg (ppb).
(2) Detection Limit for these compounds = 1,600 ug/kg (ppb).

J = An estimated value. The mass spectrum indicates the presence of the compound, but the calculated result is less than the reliable detection limit for this compound.

GHR ANALYTICAL
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(508) 947-5077

REPORT OF ANALYSIS

ACID EXTRACTABLES

Client: GHR Engineering Associates, Inc. Job No.: 37-130
Project: Whitney Barrel JN 3661002

Date Received: September 2, 1988 Date Extracted: September 13, 1988
Collected by: M. Haviger Analyzed by: Aquatec, Inc.

Sample ID:	B-6 Soil composite 0-2', 4-6', 9-11', 14-15'	B-6 (Rep.) Soil composite 0-2', 4-6', 9-11', 14-15'
Date Collected:	9/2/88	9/2/88
GHR Lab ID:	85276	85277

Parameter	Concentration in ug/kg (ppb)	
2,4,6-Trichlorophenol	BDL (1)	BDL
P-Chloro-m-Cresol	BDL	BDL
2-Chlorophenol	BDL	BDL
2,4-Dichlorophenol	BDL	BDL
2,4-Dimethylphenol	BDL	BDL
2-Nitrophenol	BDL	BDL
4-Nitrophenol (2)	BDL	BDL
2,4-Dinitrophenol (2)	BDL	BDL
4,6-Dinitro-2-Methylphenol (2)	BDL	BDL
Pentachlorophenol (2)	BDL	BDL
Phenol	BDL	BDL
Benzoic Acid (2)	BDL	BDL
2-Methylphenol	BDL	BDL
4-Methylphenol	BDL	BDL
2,4,5-Trichlorophenol (2)	BDL	BDL

(1) BDL = Below Detection Limit.
Detection Limit = 330 ug/kg (ppb).
(2) Detection Limit for these compounds = 1,600 ug/kg (ppb).

A DIVISION OF GHR ENGINEERING ASSOCIATES, INC.
26 MAIN STREET
LAKEVILLE, MA 02347
(508) 947-5077

REPORT OF ANALYSIS
EPA METHOD 8240 - VOLATILE ORGANICS

Client: GHR Engineering Associates, Inc. Job No.: 37-130
Project: Whitney Barrel JN 3661002
Date Received: September 2, 1988 Date Analyzed: October 1, 1988
Collected by: M. Hawiger Analyzed by: Aquatec, Inc.

Sample ID:	B-7 Soil composite 0-2', 4-6', 9-11'	B-8 Soil composite
Date Collected:	9/1/88	9/1/88
GHR Lab ID:	85278	85279

Parameter	Concentration in ug/kg (ppb)	
Benzene	BDL(1)	BDL
Carbon Tetrachloride	BDL	BDL
Chlorobenzene	BDL	BDL
1,2-Dichloroethane	BDL	BDL
1,1,1-Trichloroethane	BDL	BDL
1,1-Dichloroethane	BDL	BDL
1,1,2-Trichloroethane	BDL	BDL
1,1,2,2-Tetrachloroethane	BDL	BDL
Chloroethane (2)	BDL	BDL
2-Chloroethyl Vinyl Ether (2)	BDL	BDL
Chloroform	BDL	BDL
1,1-Dichloroethene	BDL	BDL
1,2-Dichloroethene	BDL	BDL
1,2-Dichloropropane	BDL	BDL
Trans-1,3-Dichloropropene	BDL	BDL
Cis-1,3-Dichloropropene	BDL	BDL
Ethylbenzene	BDL	BDL
Methylene Chloride	LCB	5JC
Chloromethane (2)	BDL	BDL
Bromomethane (2)	BDL	BDL
Bromoform	BDL	BDL
Bromodichloromethane	BDL	BDL
Dibromochloromethane	BDL	BDL
Tetrachloroethene	BDL	BDL
Toluene	2J	BDL
Trichloroethene	BDL	BDL
Vinyl Chloride (2)	BDL	BDL
Acetone (2)	LCB	LCB
2-Butanone (2)	LCB	LCB
Carbon Disulfide	BDL	BDL
2-Hexanone (2)	BDL	BDL
4-Methyl-2-Pentanone (2)	BDL	BDL
Styrene	BDL	BDL
Vinyl Acetate (2)	BDL	BDL
Total Xylenes	BDL	BDL

(1) BDL = Below Detection Limit. (2) Detection Limit for these compounds = 10 ug/kg(ppb). Detection Limit= 5 ug/kg (ppb). LCB = Compound was found but at low concentration, comparable to that in the blank. Quantitation is not possible. J = An estimated value. The mass spectrum indicates the presence of the compound, but the calculated result is less than the reliable detection limit for this compound. C = The result has been corrected for the presence of the compound in the blank.

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REPORT OF ANALYSIS

EPA METHOD 8270 - SEMI-VOLATILE ORGANICS

Client: GHR Engineering Associates, Inc. Job No.: 37-130
Project: Whitney Barrel JN 3661002

Date Received: September 2, 1988 Date Extracted: October 13, 1988
Collected by: M. Haviger Analyzed by: Aquatec, Inc.

Sample ID:	B-7 Soil composite 0-2', 4-6', 9-11'	B-8 Soil composite
Date Collected:	9/1/88	9/1/88
GHR Lab ID:	85278	85279

Parameter	Concentration in ug/kg (ppb)	
Acenaphthene	BDL (1)	BDL
1,2,4-Trichlorobenzene	BDL	BDL
Hexachlorobenzene	BDL	BDL
Hexachloroethane	BDL	BDL
Bis (2-Chloroethyl) Ether	BDL	BDL
2-Chloronaphthalene	BDL	BDL
1,2-Dichlorobenzene	BDL	BDL
1,3-Dichlorobenzene	BDL	BDL
1,4-Dichlorobenzene	BDL	BDL
3,3-Dichlorobenzidine (2)	BDL	BDL
2,4-Dinitrotoluene	BDL	BDL
2,6-Dinitrotoluene	BDL	BDL
Fluoranthene	BDL	92J
4-Chlorophenyl Phenyl Ether	BDL	BDL
4-Bromophenyl Phenyl Ether	BDL	BDL
Bis (2-Chloroisopropyl) Ether	BDL	BDL
Bis (2-Chloroethoxy) Methane	BDL	BDL
Hexachlorobutadiene	BDL	BDL
Hexachlorocyclopentadiene	BDL	BDL
Isophorone	BDL	BDL
Naphthalene	BDL	BDL
Nitrobenzene	BDL	BDL
N-Nitrosodiphenylamine	BDL	BDL
N-Nitrosodi-N-Propylamine	BDL	BDL
Bis-(2-Ethylhexyl) Phthalate	11,000	96J

(1) BDL = Below Detection Limit.
Detection Limit = 330 ug/kg (ppb).
(2) Detection Limit for 3,3-Dichlorobenzidine = 660 ug/kg (ppb).

J = An estimated value. The mass spectrum indicates the presence of the compound, but the calculated result is less than the reliable detection limit for this compound.

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REPORT OF ANALYSIS

TRACE METALS

Client: GHR Engineering Associates, Inc. Job No: 37-130
Project: Whitney Barrel JN 3661002

Date Received: September 2, 1988
Collected by: M. Hawiger

Sample ID:	B-7 Soil composite 0-2', 4-6', 9-11'	B-8 Soil composite	Detection Limit
Date Collected:	9/1/88	9/1/88	
GHR Lab ID:	85278	85279	

Parameter	Test Results in mg/kg (ppm) dry wt.		
Aluminum	4,850	3,450	
Antimony	BDL (1)	BDL	20
Arsenic	4.06	3.30	
Barium	20	14	
Beryllium	BDL	BDL	2.0
Cadmium	BDL	BDL	1.00
Calcium	1,750	596	
Chromium	450	71.0	
Cobalt	BDL	BDL	5.0
Copper	15.8	9.5	
Iron	4,920	6,370	
Lead	61.3	51.5	
Magnesium	767	728	
Manganese	50.5	47.5	
Mercury	BDL	BDL	0.25

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REPORT OF ANALYSIS

TRACE METALS

Client: GHR Engineering Associates, Inc. Job No: 37-130
Project: Whitney Barrel JN 3661002

Date Received: September 2, 1988
Collected by: M. Haviger

Sample ID:	B-7 Soil composite 0-2', 4-6', 9-11'	B-8 Soil composite	Detection Limit
Date Collected:	9/1/88	9/1/88	
GHR Lab ID:	85278	85279	

Parameter	Test Results in mg/kg (ppm) dry wt.		
Nickel	9.9	9.0	
Potassium	283	336	
Selenium	BDL (1)	BDL	0.50
Silver	BDL	BDL	1.0
Sodium	42.6	31.5	
Thallium	BDL	BDL	10
Vanadium	BDL	BDL	20
Zinc	45.5	47.0	

(1) BDL = Below Detection Limit.

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REPORT OF ANALYSIS

EPA METHOD 8080 - PESTICIDES & PCB'S

Client: GHR Engineering Associates, Inc. Job No.: 37-130
Project: Whitney Barrel JN 3661002

Date Received: September 2, 1988 Date Extracted: September 9, 1988
Collected by: M. Haviger Extracted by: DMJ

Sample ID:	B-7 Soil composite 0-2', 4-6, 9-11'	Detection Limit	B-8 Soil composite	Detection Limit
Date Collected:	9/1/88		9/1/88	
GHR Lab ID:	85278		85279	
Parameter	**Concentration in mg/kg (ppm) dry wt.**			
Aldrin	BDL (1)	0.10	BDL	0.001
Alpha-BHC	BDL	0.10	BDL	0.001
Beta-BHC	BDL	0.10	BDL	0.001
Gamma-BHC	BDL	0.10	BDL	0.001
Delta-BHC (Lindane)	BDL	0.10	BDL	0.001
Chlordane	3.55	1.0	0.06	0.1
4,4'-DDT	BDL	0.10	BDL	0.001
4,4'-DDE	BDL	0.10	BDL	0.001
4,4'-DDD	BDL	0.10	BDL	0.001
Dieldrin	BDL	0.10	BDL	0.001
Alpha-Endosulfan	BDL	0.10	BDL	0.001
Beta-Endosulfan	BDL	0.10	BDL	0.001
Endosulfan Sulfate	BDL	0.10	BDL	0.001
Endrin	BDL	0.10	BDL	0.001
Endrin Aldehyde	BDL	0.10	BDL	0.001
Heptachlor	BDL	0.10	BDL	0.001
Heptachlor Epoxide	BDL	0.10	BDL	0.001
Methoxychlor	BDL	1.0	BDL	0.1
Toxaphene	BDL	1.0	BDL	0.1
PCB-1242	BDL	1.0	BDL	0.1
PCB-1254	3.96	1.0	BDL	0.1
PCB-1221	BDL	1.0	BDL	0.1
PCB-1232	BDL	1.0	BDL	0.1
PCB-1248	BDL	1.0	BDL	0.1
PCB-1260	BDL	1.0	BDL	0.1
PCB-1016	BDL	1.0	BDL	0.1

(1) BDL = Below Detection Limit.

See attached sheet for GC Operating Conditions.

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REPORT OF ANALYSIS

TRACE METALS

Client: GHR Engineering Associates, Inc. Job No: 37-130
Project: Whitney Barrel JN 3661002

Date Received: September 2, 1988
Collected by: M. Haviger

Sample ID:	SD-1 Soil	Detection Limit
Date Collected:	9/1/88	
GHR Lab ID:	85280	
Parameter	Test Results in mg/kg (ppm) dry wt.	
Nickel	32.8	
Potassium	1,090	
Selenium	BDL (1)	1.00
Silver	BDL	1.0
Sodium	836	
Thallium	BDL	10
Vanadium	BDL	20
Zinc	581	

(1) BDL = Below Detection Limit.

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REPORT OF ANALYSIS

TRACE METALS

Client: GHR Engineering Associates, Inc. Job No: 37-130
Project: Whitney Barrel JN 3661002

Date Received: September 2, 1988
Collected by: M. Haviger

Sample ID:	SD-1 Soil	Detection Limit
Date Collected:	9/1/88	
GHR Lab ID:	85280	

Parameter	Test Results in mg/kg (ppm) dry wt.	
Aluminum	4,700	
Antimony	BDL (1)	20
Arsenic	15.0	
Barium	301	
Beryllium	BDL	2.0
Cadmium	24.8	
Calcium	7,970	
Chromium	225	
Cobalt	18.1	
Copper	179	
Iron	46,700	
Lead	1,500	
Magnesium	3,040	
Manganese	267	
Mercury	1.4	

(1) BDL = Below Detection Limit.

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REPORT OF ANALYSIS

EPA METHOD 8080 - PESTICIDES & PCB'S

Client: GHR Engineering Associates, Inc. Job No.: 37-130
Project: Whitney Barrel JN 3661002

Date Received: September 2, 1988 Date Extracted: September 9, 1988
Collected by: M. Hawiger Extracted by: DMJ

Sample ID:	SD-1 Soil	Detection Limit
Date Collected:	9/1/88	
GHR Lab ID:	85280	

Parameter	Concentration in mg/kg (ppm) dry wt.	
Aldrin	BDL (1)	1.0
Alpha-BHC	BDL	1.0
Beta-BHC	BDL	1.0
Gamma-BHC	BDL	1.0
Delta-BHC (Lindane)	BDL	1.0
Chlordane	38.3	10
4,4'-DDT	BDL	1.0
4,4'-DDE	BDL	1.0
4,4'-DDD	BDL	1.0
Dieldrin	BDL	1.0
Alpha-Endosulfan	BDL	1.0
Beta-Endosulfan	BDL	1.0
Endosulfan Sulfate	BDL	1.0
Endrin	BDL	1.0
Endrin Aldehyde	BDL	1.0
Heptachlor	BDL	1.0
Heptachlor Epoxide	BDL	1.0
Methoxychlor	BDL	10
Toxaphene	BDL	10
PCB-1242	BDL	10
PCB-1254	BDL	10
PCB-1221	BDL	10
PCB-1232	BDL	10
PCB-1248	BDL	10
PCB-1260	BDL	10
PCB-1016	BDL	10

(1) BDL = Below Detection Limit.

See attached sheet for GC Operating Conditions.

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METHODS OF ANALYSIS

PARAMETER	METHOD REFERENCE	METHOD DESCRIPTION
Aluminum	Method 202.1 (1)	Atomic Absorption, Flame
Antimony	Method 204.1 (1)	Atomic Absorption, Flame
Arsenic	Method 206.2 (1)	Atomic Absorption, Furnace
Barium	Method 208.1 (1)	Atomic Absorption, Flame
Beryllium	Method 210.1 (1)	Atomic Absorption, Flame
Cadmium	Method 213.1 (1)	Atomic Absorption, Flame
Calcium	Method 215.1 (1)	Atomic Absorption, Flame
Chromium-Total	Method 218.1 (1)	Atomic Absorption, Flame
Cobalt	Method 219.1 (1)	Atomic Absorption, Flame
Copper	Method 220.1 (1)	Atomic Absorption, Flame
Iron	Method 236.1 (1)	Atomic Absorption, Flame
Lead	Method 239.1 (1)	Atomic Absorption, Flame
Magnesium	Method 242.1 (1)	Atomic Absorption, Flame
Manganese	Method 243.1 (1)	Atomic Absorption, Flame
Mercury	Method 245.1 (1)	Manual Cold Vapor
Nickel	Method 249.1 (1)	Atomic Absorption, Flame
Potassium	Method 258.1 (1)	Atomic Flame
Selenium	Method 270.2 (1)	Atomic Absorption, Furnace
Silver	Method 272.1 (1)	Atomic Absorption, Flame
Sodium	Method 273.1 (1)	Atomic Absorption, Flame
Thallium	Method 279.1 (1)	Atomic Absorption, Flame
Vanadium	Method 286.1 (1)	Atomic Absorption, Flame
Zinc	Method 289.1 (1)	Atomic Absorption, Flame

Volatile Analysis

Volatile Organics - soil	Method 8240 (2)	Purge and trap, gas chromatography/mass spectrometry
Semi-Volatile Organics - soil	Method 8270 (2)	Soxhlet extraction, gas chromatography/, mass spectrometry
Pesticides & PCB's - soil	Method 8080 (2)	Soxhlet extraction, gas chromatography/electron capture detection

(1) U.S. EPA, 1979. "Methods for Chemical Analysis of Water and Wastes". EPA 600/4-79-020, EPA/EMSL, Cincinnati, Ohio.

(2) U.S. EPA, 1986. "Test Methods for Evaluating Solid Waste" SW-846.Volumes 1 & 2: Laboratory Manual Physical/Chemical Methods, Third Edition; Office of Solid Waste and Emergency Response, Washington, D.C.

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Certification of Results

The enclosed results of analyses are representative of the sample(s) as received by the laboratory. GHR Analytical makes no representations or certifications as to the method of sample collection, sample identification or transportation/handling procedures used prior to the receipt of samples by GHR Analytical.

To the best of my knowledge, the information contained in this report is accurate and complete.

Approved by: Stephen O'Neil
Stephen O'Neil
Assistant Laboratory Director

Date: October 11, 1988

FINAL REPORT

GHR Engineering Associates, Inc.
1050 Waltham Street
Lexington, MA 02173

PROJECT: Whitney Barrel JN 3661-002

GHR ANALYTICAL JOB NUMBER: 37-130

PREPARED BY: GHR Analytical

DATE PREPARED: October 27, 1988

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REPORT OF ANALYSIS
EPA METHOD 8240 - VOLATILE ORGANICS

Client: GHR Engineering Associates, Inc. Job No.: 37-130
Project: Whitney Barrel JN 3661002
Date Received: September 2, 1988 Date Analyzed: September 26 & 28, 1988
Collected by: M. Hawiger Analyzed by: Aquatec, Inc.

Sample ID:	MW-1S Soil composite 0-2', 4-6, 9-11'	MW-2S Soil composite 0-2', 4-6', 9-11'
Date Collected:	8/30/88	8/31/88
GHR Lab ID:	85267	85268

Parameter	Concentration in ug/kg (ppb)	
Benzene	BDL (1)	BDL
Carbon Tetrachloride	BDL	BDL
Chlorobenzene	BDL	BDL
1,2-Dichloroethane	BDL	BDL
1,1,1-Trichloroethane	BDL	BDL
1,1-Dichloroethane	BDL	BDL
1,1,2-Trichloroethane	BDL	BDL
1,1,2,2-Tetrachloroethane	BDL	BDL
Chloroethane (2)	BDL	BDL
2-Chloroethyl Vinyl Ether (2)	BDL	BDL
Chloroform	BDL	BDL
1,1-Dichloroethene	BDL	BDL
1,2-Dichloroethene	BDL	BDL
1,2-Dichloropropane	BDL	BDL
Trans-1,3-Dichloropropene	BDL	BDL
Cis-1,3-Dichloropropene	BDL	BDL
Ethylbenzene	BDL	BDL
Methylene Chloride	LCB	LCB
Chloromethane(2)	BDL	BDL
Bromomethane (2)	BDL	BDL
Bromoform	BDL	BDL
Bromodichloromethane	BDL	BDL
Dibromochloromethane	BDL	BDL
Tetrachloroethene	13	BDL
Toluene	BDL	BDL
Trichloroethene	3J	BDL
Vinyl Chloride (2)	BDL	BDL
Acetone (2)	LCB	LCB
2-Butanone (2)	BDL	LCB
Carbon Disulfide	BDL	BDL
2-Hexanone (2)	BDL	BDL
4-Methyl-2-Pentanone (2)	BDL	BDL
Styrene	BDL	BDL
Vinyl Acetate (2)	BDL	BDL
Total Xylenes	BDL	BDL

(1) BDL= Below Detection Limit.
Detection Limit = 5 ug/kg (ppb).
(2) Detection Limit for these compounds = 10 ug/kg.
J = An estimated value. The mass spectrum indicates the presence of the compound, but the calculated result is less than the reliable detection limit for this compound.

LCB = Compound was found but at low concentration, comparable to that in the blank. Quantitation is not possible.

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REPORT OF ANALYSIS

EPA METHOD 8270 - SEMI-VOLATILE ORGANICS

Client: GHR Engineering Associates, Inc. Job No.: 37-130
Project: Whitney Barrel JN 3661002

Date Received: September 2, 1988 Date Extracted: September 13, 1988
Collected by: M. Hawiger Analyzed by: Aquatec, Inc.

Sample ID:	MW-1S Soil composite 0-2', 4-6, 9-11'	MW-2S Soil composite 0-2', 4-6', 9-11'
Date Collected:	8/30/88	8/31/88
GHR Lab ID:	85267	85268

Parameter	Concentration in ug/kg (ppb)	
Acenaphthene	BDL (1)	BDL
1,2,4-Trichlorobenzene	BDL	BDL
Hexachlorobenzene	BDL	BDL
Hexachloroethane	BDL	BDL
Bis (2-Chloroethyl) Ether	BDL	BDL
2-Chloronaphthalene	BDL	BDL
1,2-Dichlorobenzene	BDL	BDL
1,3-Dichlorobenzene	BDL	BDL
1,4-Dichlorobenzene	BDL	BDL
3,3-Dichlorobenzidine (2)	BDL	BDL
2,4-Dinitrotoluene	BDL	BDL
2,6-Dinitrotoluene	BDL	BDL
Fluoranthene	370	95J
4-Chlorophenyl Phenyl Ether	BDL	BDL
4-Bromophenyl Phenyl Ether	BDL	BDL
Bis (2-Chloroisopropyl) Ether	BDL	BDL
Bis (2-Chloroethoxy) Methane	BDL	BDL
Hexachlorobutadiene	BDL	BDL
Hexachlorocyclopentadiene	BDL	BDL
Isophorone	BDL	BDL
Naphthalene	160J	BDL
Nitrobenzene	BDL	BDL
N-Nitrosodiphenylamine	BDL	BDL
N-Nitrosodi-N-Propylamine	BDL	BDL
Bis-(2-Ethylhexyl) Phthalate	200J	1,900

(1) BDL = Below Detection Limit.
Detection Limit = 330 ug/kg (ppb).
(2) Detection Limit for 3,3-Dichlorobenzidine = 660 ug/kg (ppb).

J = An estimated value. The mass spectrum indicates the presence of the compound, but the calculated result is less than the reliable detection limit for this compound.

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REPORT OF ANALYSIS

EPA METHOD 8270 - SEMI-VOLATILE ORGANICS

Client: GHR Engineering Associates, Inc. Job No.: 37-130
Project: Whitney Barrel JN 3661002

Date Received: September 2, 1988 Date Extracted: September 13, 1988
Collected by: M. Haviger Analyzed by: Aquatec, Inc.

Sample ID:	MW-1S Soil composite 0-2', 4-6, 9-11'	MW-2S Soil composite 0-2', 4-6', 9-11'
Date Collected:	8/30/88	8/31/88
GHR Lab ID:	85267	85268

Parameter	Concentration in ug/kg(ppb)	
Benzyl Butyl Phthalate	BDL (1)	740
Di-N-Butyl Phthalate	BDL	BDL
Di-N-Octyl Phthalate	BDL	BDL
Diethyl Phthalate	BDL	BDL
Dimethyl Phthalate	BDL	BDL
Benzo(A)Anthracene	160J	BDL
Benzo(A)Pyrene	BDL	BDL
Benzo(B)Fluoranthene	130J	BDL
Benzo(K)Fluoranthene	150J	BDL
Chrysene	210J	100J
Acenaphthylene	BDL	BDL
Anthracene	71J	BDL
Benzo(GHI)Perylene	BDL	BDL
Fluorene	120J	BDL
Phenanthrene	220J	BDL
Dibenzo(AH)Anthracene	BDL	BDL
Indeno(1,2,3-CD)Pyrene	BDL	BDL
Pyrene	410	96J
Benzyl Alcohol	BDL	BDL
4-Chloroaniline	BDL	BDL
Dibenzofuran	BDL	BDL
2-Methylnaphthalene	210J	BDL
2-Nitroaniline (2)	BDL	BDL
3-Nitroaniline (2)	BDL	BDL
4-Nitroaniline (2)	BDL	BDL

(1) BDL = Below Detection Limit.
Detection Limit = 330 ug/kg (ppb).
(2) Detection Limit for these compounds = 1,600 ug/kg (ppb).

J = An estimated value. The mass spectrum indicates the presence of the compound, but the calculated result is less than the reliable detection limit for this compound.

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REPORT OF ANALYSIS

ACID EXTRACTABLES

Client: GHR Engineering Associates, Inc. Job No.: 37-130
Project: Whitney Barrel JN 3661002

Date Received: September 2, 1988 Date Extracted: September 13 & 21, 1988
Collected by: M. Hawiger Analyzed by: Aquatec, Inc.

Sample ID:	SD-1
	Soil
Date Collected:	9/1/88
GHR Lab ID:	85280

Parameter	Concentration in ug/kg (ppb)
2,4,6-Trichlorophenol	BDL (1)
P-Chloro-m-Cresol	BDL
2-Chlorophenol	BDL
2,4-Dichlorophenol	BDL
2,4-Dimethylphenol	BDL
2-Nitrophenol	BDL
4-Nitrophenol (2)	BDL
2,4-Dinitrophenol (2)	BDL
4,6-Dinitro-2-Methylphenol (2)	BDL
Pentachlorophenol (2)	BDL
Phenol	110,000
Benzoic Acid (2)	BDL
2-Methylphenol	BDL
4-Methylphenol	BDL
2,4,5-Trichlorophenol (2)	BDL

(1) BDL = Below Detection Limit.
Detection Limit = 10,000 ug/kg (ppb).
(2) Detection Limit for these compounds = 50,000 ug/kg (ppb).

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Certification of Results

The enclosed results of analyses are representative of the sample(s) as received by the laboratory. GHR Analytical makes no representations or certifications as to the method of sample collection, sample identification or transportation/handling procedures used prior to the receipt of samples by GHR Analytical.

To the best of my knowledge, the information contained in this report is accurate and complete.

Approved by: Stephen O'Neil

Stephen O'Neil
Assistant Laboratory Director

Date: October 26, 1988

FINAL REPORT

GHR Engineering Associates, Inc.
1050 Waltham St.
Lexington, MA 02173

PROJECT: Whitney Barrel JN 3661002

GHR ANALYTICAL JOB NUMBER: 37-066

PREPARED BY: GHR Analytical

DATE PREPARED: October 11, 1988

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REPORT OF ANALYSIS

TRACE METALS

Client: GHR Engineering Associates, Inc. Job No: 37-066
Project: Whitney Barrel JN 3661002

Date Collected: August 25, 1988
Collected by: RDC/BEM

Sample ID:	TP-1 Soil	TP-3 Soil	TP-6 Soil	Detection Limit
GHR Lab ID:	84975	84976	84977	
Parameter	**Test Results in mg/kg (ppm) dry wt.**			
Aluminum	7,760	4,930	4,080	
Antimony	27	22	32	
Arsenic	4.40	2.02	3.10	
Barium	38	17	17	
Beryllium	BDL (1)	BDL	BDL	2.0
Cadmium	BDL	BDL	BDL	1.00
Calcium	556	856	869	
Chromium	22.0	8.1	10.0	
Cobalt	6.0	BDL	BDL	5.0
Copper	14.0	5.0	10.0	
Iron	9,270	4,770	6,610	
Lead	78.0	17.2	42.0	
Magnesium	1,870	1,300	1,290	
Manganese	72.0	68.7	70.0	
Mercury	0.42	0.45	0.44	

(1) BDL = Below Detection Limit.

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REPORT OF ANALYSIS

TRACE METALS

Client: GHR Engineering Associates, Inc. Job No: 37-066
Project: Whitney Barrel JN 3661002

Date Collected: August 25, 1988
Collected by: RDC/BEM

Sample ID:	TP-1 Soil	TP-3 Soil	TP-6 Soil	Detection Limit
GHR Lab ID:	84975	84976	84977	
Parameter	**Test Results in mg/kg (ppm) dry wt.**			
Nickel	10.0	10.1	10.0	
Potassium	509	552	509	
Selenium	BDL (1)	BDL	BDL	0.50
Silver	BDL	BDL	BDL	1.0
Sodium	36.0	68.7	98.0	
Thallium	BDL	BDL	BDL	10
Vanadium	BDL	BDL	BDL	20
Zinc	29.0	17.2	28.0	

(1) BDL = Below Detection Limit.

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REPORT OF ANALYSIS
EPA Method 8240

Client: GHR Engineering Associates, Inc. Job No.: 37-066
Project: Whitney Barrel JN 3661002

Date Collected: August 25, 1988 Date Analyzed: September 20 & 25, 1988
Collected by: RDC/BEM Analyzed by: Aquatec, Inc.

Sample ID:	TP-1 Soil	TP-3 Soil	TP-6 Soil
GHR Lab ID:	84975	84976	84977

VOLATILE ORGANICS	Concentration in ug/kg (ppb)		
Benzene	BDL (1)	BDL	BDL
Carbon Tetrachloride	BDL	BDL	BDL
Chlorobenzene	BDL	BDL	BDL
1,2-Dichloroethane	BDL	BDL	BDL
1,1,1-Trichloroethane	BDL	BDL	BDL
1,1-Dichloroethane	BDL	BDL	BDL
1,1,2-Trichloroethane	BDL	BDL	BDL
1,1,2,2-Tetrachloroethane	BDL	BDL	BDL
Chloroethane (2)	BDL	BDL	BDL
2-Chloroethyl Vinyl Ether (2)	BDL	BDL	BDL
Chloroform	BDL	BDL	BDL
1,1-Dichloroethene	BDL	BDL	BDL
1,2-Dichloroethene	BDL	BDL	BDL
1,2-Dichloropropane	BDL	BDL	BDL
Trans-1,3-Dichloropropene	BDL	BDL	BDL
Cis-1,3-Dichloropropene	BDL	BDL	BDL
Ethylbenzene	BDL	BDL	BDL
Methylene Chloride	LCB	LCB	LCB
Chloromethane (2)	BDL	BDL	BDL
Bromomethane (2)	BDL	BDL	BDL
Bromoform	BDL	BDL	BDL
Bromodichloromethane	BDL	BDL	BDL
Dibromochloromethane	BDL	BDL	BDL
Tetrachloroethene	3J	BDL	BDL
Toluene	BDL	BDL	BDL
Trichloroethene	4J	BDL	BDL
Vinyl Chloride (2)	BDL	BDL	BDL
Acetone (2)	LCB	LCB	LCB
2-Butanone (2)	BDL	BDL	BDL
Carbon Disulfide	BDL	BDL	BDL
2-Hexanone (2)	BDL	BDL	BDL
4-Methyl-2-Pentanone (2)	BDL	BDL	BDL
Styrene	BDL	BDL	BDL
Vinyl Acetate (2)	BDL	BDL	BDL
Total Xylenes	BDL	BDL	BDL

(1) BDL = Below Detection Limit. Detection Limit = 5 ug/kg (ppb).
(2) Detection Limit for these compounds = 10 ug/kg (ppb).
LCB = Compound was found but at low concentration, comparable to that in the blank. Quantitation is not possible.
J = An estimated value. The mass spectrum indicates the presence of the compound, but the calculated result is less than the reliable detection limit for this compound.

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REPORT OF ANALYSIS

EPA Method 8270

Client: GHR Engineering Associates, Inc. Job No.: 37-066
Project: Whitney Barrel JN 3661002

Date Collected: August 25, 1988 Date Extracted: September 1, 1988
Collected by: RDC/BEM Analyzed by: Aquatec, Inc.

Sample ID:	TP-1 Soil	TP-3 Soil	TP-6 Soil
GHR Lab ID:	84975	84976	84977

Parameter	Concentration in ug/kg (ppb)		
Acenaphthene	BDL (1)	BDL	BDL
1,2,4-Trichlorobenzene	BDL	BDL	BDL
Hexachlorobenzene	BDL	BDL	BDL
Hexachloroethane	BDL	BDL	BDL
Bis (2-Chloroethyl) Ether	BDL	BDL	BDL
2-Chloronaphthalene	BDL	BDL	BDL
1,2-Dichlorobenzene	BDL	BDL	BDL
1,3-Dichlorobenzene	BDL	BDL	BDL
1,4-Dichlorobenzene	BDL	BDL	BDL
3,3-Dichlorobenzidine (2)	BDL	BDL	BDL
2,4-Dinitrotoluene	BDL	BDL	BDL
2,6-Dinitrotoluene	BDL	BDL	BDL
Fluoranthene	150J	260J	270J
4-Chlorophenyl Phenyl Ether	BDL	BDL	BDL
4-Bromophenyl Phenyl Ether	BDL	BDL	BDL
Bis (2-Chloroisopropyl) Ether	BDL	BDL	BDL
Bis (2-Chloroethoxy) Methane	BDL	BDL	BDL
Hexachlorobutadiene	BDL	BDL	BDL
Hexachlorocyclopentadiene	BDL	BDL	BDL
Isophorone	BDL	BDL	BDL
Naphthalene	BDL	BDL	590
Nitrobenzene	BDL	BDL	BDL
N-Nitrosodiphenylamine	BDL	BDL	BDL
N-Nitrosodi-N-Propylamine	BDL	BDL	BDL
Bis-(2-Ethylhexyl) Phthalate	510	93J	1,000

(1) BDL = Below Detection Limit.
Detection Limit = 330 ug/kg (ppb).
(2) Detection Limit for 3,3-Dichlorobenzidine = 660 ug/kg (ppb).

J= An estimated value. The mass spectrum indicates the presence of the compound, but the calculated result is less than the reliable detection limit for this compound.

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REPORT OF ANALYSIS

EPA Method 8270

Client: GHR Engineering Associates, Inc. Job No.: 37-066
Project: Whitney Barrel JN 3661002

Date Collected: August 25, 1988 Date Extracted: September 1, 1988
Collected by: RDC/BEM Analyzed by: Aquatec, Inc.

Sample ID:	TP-1 Soil	TP-3 Soil	TP-6 Soil
GHR Lab ID:	84975	84976	84977

Parameter	Concentration in ug/kg (ppb)		
Benzyl Butyl Phthalate	BDL (1)	BDL	130J
Di-N-Butyl Phthalate	BDL	BDL	BDL
Di-N-Octyl Phthalate	BDL	BDL	BDL
Diethyl Phthalate	BDL	BDL	BDL
Dimethyl Phthalate	BDL	BDL	BDL
Benzo(A)Anthracene	71J	150J	160J
Benzo(A)Pyrene	66J	140J	200J
Benzo(B)Fluoranthene	110J	160J	320J
Benzo(K)Fluoranthene	BDL	BDL	BDL
Chrysene	80J	150J	200J
Acenaphthylene	BDL	BDL	BDL
Anthracene	BDL	BDL	BDL
Benzo(GHI)Perylene	BDL	70J	130J
Fluorene	BDL	BDL	BDL
Phenanthrene	84J	140J	190J
Dibenzo(AH)Anthracene	BDL	BDL	BDL
Indeno(1,2,3-CD)Pyrene	BDL	BDL	110J
Pyrene	120J	300J	360
Benzyl Alcohol	BDL	BDL	BDL
4-Chloroaniline	BDL	BDL	BDL
Dibenzofuran	BDL	BDL	BDL
2-Methylnaphthalene	BDL	BDL	400
2-Nitroaniline (2)	BDL	BDL	BDL
3-Nitroaniline (2)	BDL	BDL	BDL
4-Nitroaniline (2)	BDL	BDL	BDL

(1) BDL = Below Detection Limit.
Detection Limit = 330 ug/kg (ppb).
(2) Detection Limit for these compounds = 1,600 ug/kg (ppb).

J= An estimated value. The mass spectrum indicates the presence of the compound, but the calculated result is less than the reliable detection limit for this compound.

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REPORT OF ANALYSIS

EPA Method 8270

Client: GHR Engineering Associates, Inc. Job No.: 37-066
Project: Whitney Barrel JN 3661002

Date Collected: August 25, 1988 Date Extracted: September 1, 1988
Collected by: RDC/BEM Analyzed by: Aquatec, Inc.

Sample ID:	TP-1 Soil	TP-3 Soil	TP-6 Soil
GHR Lab No.:	84975	84976	84977
Parameter	**Concentration in ug/kg (ppb)**		
2,4,6-Trichlorophenol	BDL (1)	BDL	BDL
P-Chloro-m-Cresol	BDL	BDL	BDL
2-Chlorophenol	BDL	BDL	BDL
2,4-Dichlorophenol	BDL	BDL	BDL
2,4-Dimethylphenol	BDL	BDL	BDL
2-Nitrophenol	BDL	BDL	BDL
4-Nitrophenol (2)	BDL	BDL	BDL
2,4-Dinitrophenol (2)	BDL	BDL	BDL
4,6-Dinitro-2-Methylphenol (2)	BDL	BDL	BDL
Pentachlorophenol (2)	BDL	BDL	BDL
Phenol	BDL	BDL	BDL
Benzoic Acid (2)	BDL	BDL	BDL
2-Methylphenol	BDL	BDL	BDL
4-Methylphenol	BDL	BDL	BDL
2,4,5-Trichlorophenol (2)	BDL	BDL	BDL

(1) BDL = Below Detection Limit.
Detection Limit = 330 ug/kg (ppb).

(2) Detection Limit for these compounds = 1,600 ug/kg (ppb).

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REPORT OF ANALYSIS

EPA METHOD 8080 - PESTICIDES & PCB'S

Client: GHR Engineering Associates, Inc. Job No.: 37-066
Project: Whitney Barrel
JN 3661002

Date Collected: August 25, 1988 Date Extracted: August 29, 1988
Collected by: RDC/BEM Extracted by: DMJ

Sample ID:	TP-1 Soil	Detection Limit	TP-3 Soil	Detection Limit	TP-6 Soil	Detection Limit
GHR Lab ID:	84975		84976		84977	
Parameter	Concentration in mg/kg (ppm) dry wt.					
Aldrin	BDL(1)	0.001	BDL	0.001	BDL	0.1
Alpha-BHC	BDL	0.001	BDL	0.001	BDL	0.1
Beta-BHC	BDL	0.001	BDL	0.001	BDL	0.1
Gamma-BHC (Lindane)	BDL	0.001	BDL	0.001	BDL	0.1
Delta-BHC	BDL	0.001	BDL	0.001	BDL	0.1
Chlordane	BDL	0.01	BDL	0.01	BDL	1.0
4,4'-DDT	BDL	0.001	BDL	0.001	BDL	0.1
4,4'-DDE	BDL	0.001	BDL	0.001	BDL	0.1
4,4'-DDD	BDL	0.001	BDL	0.001	BDL	0.1
Dieldrin	BDL	0.001	BDL	0.001	BDL	0.1
Alpha-Endosulfan	BDL	0.001	BDL	0.001	BDL	0.1
Beta-Endosulfan	BDL	0.001	BDL	0.001	BDL	0.1
Endosulfan Sulfate	BDL	0.001	BDL	0.001	BDL	0.1
Endrin	BDL	0.001	BDL	0.001	BDL	0.1
Endrin Aldehyde	BDL	0.001	BDL	0.001	BDL	0.1
Heptachlor	BDL	0.001	BDL	0.001	BDL	0.1
Heptachlor Epoxide	BDL	0.001	BDL	0.001	BDL	0.1
Methoxychlor	BDL	0.01	BDL	0.01	BDL	1.0
Toxaphene	BDL	0.01	BDL	0.01	BDL	1.0
PCB-1242	BDL	0.01	BDL	0.01	7.26	1.0
PCB-1254	0.11	0.01	BDL	0.01	11.4	1.0
PCB-1221	BDL	0.01	BDL	0.01	BDL	1.0
PCB-1232	BDL	0.01	BDL	0.01	BDL	1.0
PCB-1248	BDL	0.01	BDL	0.01	BDL	1.0
PCB-1260	BDL	0.01	BDL	0.01	BDL	1.0
PCB-1016	BDL	0.01	BDL	0.01	BDL	1.0

(1) BDL = Below Detection Limit.
See attached sheet for GC Operating Conditions.

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REPORT OF ANALYSIS

TRACE METALS

Client: GHR Engineering Associates, Inc. Job No: 37-066
Project: Whitney Barrel JN 3661002

Collected by: RDC/BEM

Sample ID:	TP-7 Soil	TP-9 Soil	TP-11 Soil	Detection Limit
Date Collected:	8/26/88	8/25/88	8/25/88	
GHR Lab ID:	84978	84979	84980	

Parameter	Test Results in mg/kg (ppm) dry wt.			
Aluminum	5,350	3,260	4,210	
Antimony	26	24	BDL (1)	20
Arsenic	4.16	2.50	4.90	
Barium	20	BDL	13	10
Beryllium	BDL	BDL	BDL	2.0
Cadmium	BDL	BDL	BDL	1.00
Calcium	748	538	634	
Chromium	19.8	5.9	18.0	
Cobalt	5.9	BDL	BDL	5.0
Copper	15.8	3.9	6.0	
Iron	10,000	4,770	5,140	
Lead	101	12.2	32.0	
Magnesium	1,010	846	936	
Manganese	81.2	41.7	57.0	
Mercury	0.53	0.62	0.70	

(1) BDL = Below Detection Limit.

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REPORT OF ANALYSIS

TRACE METALS

Client: GHR Engineering Associates, Inc. Job No: 37-066
Project: Whitney Barrel JN 3661002

Collected by: RDC/BEM

Sample ID:	TP-7 Soil	TP-9 Soil	TP-11 Soil	Detection Limit
Date Collected:	8/26/88	8/25/88	8/25/88	
GHR Lab ID:	84978	84979	84980	

Parameter	Test Results in mg/kg (ppm) dry wt.			
Nickel	9.9	8.3	8.0	
Potassium	396	378	357	
Selenium	BDL (1)	BDL	BDL	0.50
Silver	BDL	BDL	BDL	1.0
Sodium	129	56.9	62.0	
Thallium	BDL	BDL	BDL	10
Vanadium	BDL	BDL	BDL	20
Zinc	59.4	15.7	30.0	

(1) BDL = Below Detection Limit.

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REPORT OF ANALYSIS
EPA Method 8240

Client: GHR Engineering Associates, Inc. Job No.: 37-066
Project: Whitney Barrel JN 3661002
Date Analyzed: September 22 & 25, 1988
Collected by: RDC/BEM Analyzed by: Aquatec, Inc.

Sample ID:	TP-7 Soil	TP-9 Soil	TP-11 Soil
Date Collected:	8/26/88	8/25/88	8/25/88
GHR Lab ID:	84978	84979	84980

VOLATILE ORGANICS	Concentration in ug/kg (ppb)		
Benzene	BDL (1)	BDL	BDL
Carbon Tetrachloride	BDL	BDL	BDL
Chlorobenzene	BDL	BDL	BDL
1,2-Dichloroethane	BDL	BDL	BDL
1,1,1-Trichloroethane	BDL	BDL	BDL
1,1-Dichloroethane	BDL	BDL	BDL
1,1,2-Trichloroethane	BDL	BDL	BDL
1,1,2,2-Tetrachloroethane	BDL	BDL	BDL
Chloroethane (2)	BDL	BDL	BDL
2-Chloroethyl Vinyl Ether (2)	BDL	BDL	BDL
Chloroform	BDL	BDL	BDL
1,1-Dichloroethene	BDL	BDL	BDL
1,2-Dichloroethene	BDL	BDL	BDL
1,2-Dichloropropane	BDL	BDL	BDL
Trans-1,3-Dichloropropene	BDL	BDL	BDL
Cis-1,3-Dichloropropene	BDL	BDL	BDL
Ethylbenzene	BDL	BDL	BDL
Methylene Chloride	LCB	LCB	LCB
Chloromethane (2)	BDL	BDL	BDL
Bromomethane (2)	BDL	BDL	BDL
Bromoform	BDL	BDL	BDL
Bromodichloromethane	BDL	BDL	BDL
Dibromochloromethane	BDL	BDL	BDL
Tetrachloroethene	13	2J	BDL
Toluene	BDL	BDL	BDL
Trichloroethene	18	BDL	BDL
Vinyl Chloride (2)	BDL	BDL	BDL
Acetone (2)	LCB	62C	LCB
2-Butanone (2)	LCB	BDL	BDL
Carbon Disulfide	BDL	BDL	BDL
2-Hexanone (2)	BDL	BDL	BDL
4-Methyl-2-Pentanone (2)	LCB	BDL	BDL
Styrene	BDL	BDL	BDL
Vinyl Acetate (2)	BDL	BDL	BDL
Total Xylenes	BDL	BDL	BDL

(1) BDL = Below Detection Limit. Detection Limit = 5 ug/kg (ppb).
(2) Detection Limit for these compounds = 10 ug/kg (ppb).
LCB = Compound was found but at low concentration, comparable to that in the blank. Quantitation is not possible.
J = An estimated value. The mass spectrum indicates the presence of the compound, but the calculated result is less than the reliable detection limit for this compound.
C = The result has been corrected for the presence of the compound in the blank.

GHR Engineering Associates, Inc.
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Lexington, MA 02173

PROJECT: Whitney Barrel JN 3661002

GHR ANALYTICAL JOB NUMBER: 37-130

PREPARED BY: GHR Analytical

DATE PREPARED: October 11, 1988

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617 763 8404

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REPORT OF ANALYSIS

TRACE METALS

Client: GHR Engineering Associates, Inc. Job No: 37-130
Project: Whitney Barrel JN 3661002

Date Received: September 2, 1988
Collected by: M. Haviger

Sample ID:	MW-1S Soil composite 0-2', 4-6, 9-11'	MW-2S Soil composite 0-2', 4-6', 9-11'	Detection Limit
Date Collected:	8/30/88	8/31/88	
GHR Lab ID:	85267	85268	

Parameter	Test Results in mg/kg (ppm) dry wt.		
Aluminum	5,660	3,490	
Antimony	BDL (1)	24	20
Arsenic	2.90	2.67	
Barium	18	12	
Beryllium	BDL	BDL	2.0
Cadmium	BDL	BDL	1.00
Calcium	1,500	909	
Chromium	16.0	7.9	
Cobalt	BDL	BDL	5.0
Copper	10.0	5.9	
Iron	7,330	4,940	
Lead	54.0	13.9	
Magnesium	1,830	1,230	
Manganese	102	65.3	
Mercury	0.31	BDL	0.25

(1) BDL = Below Detection Limit

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REPORT OF ANALYSIS

TRACE METALS

Client: GHR Engineering Associates, Inc. Job No: 37-130
Project: Whitney Barrel JN 3661002

Date Received: September 2, 1988
Collected by: M. Hawiger

Sample ID:	MW-1S Soil composite 0-2', 4-6, 9-11'	MW-2S Soil composite 0-2', 4-6', 9-11'	Detection Limit
Date Collected:	8/30/88	8/31/88	
GHR Lab ID:	85267	85268	

Parameter	Test Results in mg/kg (ppm) dry wt.		
Nickel	10.0	8.9	
Potassium	518	532	
Selenium	BDL (1)	BDL	0.50
Silver	BDL	BDL	1.0
Sodium	112	65.4	
Thallium	BDL	BDL	10
Vanadium	BDL	BDL	20
Zinc	22.0	15.8	

(1) BDL = Below Detection Limit.

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REPORT OF ANALYSIS

EPA METHOD 8270 - SEMI-VOLATILE ORGANICS

Client: GHR Engineering Associates, Inc. Job No.: 37-130
Project: Whitney Barrel JN 3661002

Date Received: September 2, 1988 Date Extracted: September 13, 1988
Collected by: M. Haviger Analyzed by: Aquatec, Inc.

Sample ID:	MW-3S Soil composite 0-2', 4-6, 9-11'	MW-4S Soil composite 0-2', 4-6', 9-11', 14-15.5'
Date Collected:	9/2/88	9/1/88
GHR Lab ID:	85269	85270

Parameter	Concentration in ug/kg (ppb)	
Acenaphthene	BDL (1)	BDL
1,2,4-Trichlorobenzene	BDL	BDL
Hexachlorobenzene	BDL	BDL
Hexachloroethane	BDL	BDL
Bis (2-Chloroethyl) Ether	BDL	BDL
2-Chloronaphthalene	BDL	BDL
1,2-Dichlorobenzene	BDL	BDL
1,3-Dichlorobenzene	BDL	BDL
1,4-Dichlorobenzene	BDL	BDL
3,3-Dichlorobenzidine (2)	BDL	BDL
2,4-Dinitrotoluene	BDL	BDL
2,6-Dinitrotoluene	BDL	BDL
Fluoranthene	BDL	140J
4-Chlorophenyl Phenyl Ether	BDL	BDL
4-Bromophenyl Phenyl Ether	BDL	BDL
Bis (2-Chloroisopropyl) Ether	BDL	BDL
Bis (2-Chloroethoxy) Methane	BDL	BDL
Hexachlorobutadiene	BDL	BDL
Hexachlorocyclopentadiene	BDL	BDL
Isophorone	BDL	BDL
Naphthalene	BDL	BDL
Nitrobenzene	BDL	BDL
N-Nitrosodiphenylamine	BDL	BDL
N-Nitrosodi-N-Propylamine	BDL	BDL
Bis-(2-Ethylhexyl) Phthalate	430	BDL

(1) BDL = Below Detection Limit.
Detection Limit = 330 ug/kg (ppb).
(2) Detection Limit for 3,3-Dichlorobenzidine = 660 ug/kg (ppb).

J = An estimated value. The mass spectrum indicates the presence of the compound, but the calculated result is less than the reliable detection limit for this compound.

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REPORT OF ANALYSIS

EPA METHOD 8270 - SEMI-VOLATILE ORGANICS

Client: GHR Engineering Associates, Inc. Job No.: 37-130
Project: Whitney Barrel JN 3661002

Date Received: September 2, 1988 Date Extracted: September 13, 1988
Collected by: M. Hawiger Analyzed by: Aquatec, Inc.

Sample ID:	MW-3S Soil composite 0-2', 4-6, 9-11'	MW-4S Soil composite 0-2', 4-6', 9-11', 14-15.5'
Date Collected:	9/2/88	9/1/88
GHR Lab ID:	85269	85270

Parameter	Concentration in ug/kg (ppb)	
Benzyl Butyl Phthalate	BDL(1)	BDL
Di-N-Butyl Phthalate	BDL	BDL
Di-N-Octyl Phthalate	BDL	BDL
Diethyl Phthalate	BDL	BDL
Dimethyl Phthalate	BDL	BDL
Benzo(A)Anthracene	110J	92J
Benzo(A)Pyrene	130J	98J
Benzo(B)Fluoranthene	130J	74J
Benzo(K)Fluoranthene	88J	68J
Chrysene	150J	170J
Acenaphthylene	BDL	BDL
Anthracene	BDL	BDL
Benzo(GHI)Perylene	210J	92J
Fluorene	BDL	BDL
Phenanthrene	95J	BDL
Dibenzo(AH)Anthracene	BDL	BDL
Indeno(1,2,3-CD)Pyrene	150J	BDL
Pyrene	210J	260J
Benzyl Alcohol	BDL	BDL
4-Chloroaniline	BDL	BDL
Dibenzofuran	BDL	BDL
2-Methylnaphthalene	BDL	BDL
2-Nitroaniline (2)	BDL	BDL
3-Nitroaniline (2)	BDL	BDL
4-Nitroaniline (2)	BDL	BDL

(1) BDL = Below Detection Limit.
Detection Limit = 330 ug/kg (ppb).
(2) Detection Limit for these compounds = 1,600 ug/kg (ppb).
J = An estimated value. The mass spectrum indicates the presence of the compound, but the calculated result is less than the reliable detection limit for this compound.

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REPORT OF ANALYSIS

ACID EXTRACTABLES

Client: GHR Engineering Associates, Inc. Job No.: 37-130
Project: Whitney Barrel JN 3661002

Date Received: September 2, 1988 Date Extracted: September 13, 1988
Collected by: M. Hawiger Analyzed by: Aquatec, Inc.

Sample ID:	MW-3S Soil composite 0-2', 4-6, 9-11'	MW-4S Soil composite 0-2', 4-6', 9-11', 14-15.5'
Date Collected:	9/2/88	9/1/88
GHR Lab ID:	85269	85270
Parameter	Concentration in ug/kg (ppb)	
2,4,6-Trichlorophenol	BDL (1)	BDL
P-Chloro-m-Cresol	BDL	BDL
2-Chlorophenol	BDL	BDL
2,4-Dichlorophenol	BDL	BDL
2,4-Dimethylphenol	BDL	BDL
2-Nitrophenol	BDL	BDL
4-Nitrophenol (2)	BDL	BDL
2,4-Dinitrophenol (2)	BDL	BDL
4,6-Dinitro-2-Methylphenol (2)	BDL	BDL
Pentachlorophenol (2)	BDL	BDL
Phenol	BDL	BDL
Benzoic Acid (2)	BDL	BDL
2-Methylphenol	BDL	BDL
4-Methylphenol	BDL	BDL
2,4,5-Trichlorophenol (2)	BDL	BDL

(1) BDL = Below Detection Limit.
Detection Limit = 330 ug/kg (ppb).
(2) Detection Limit for these compounds = 1,600 ug/kg (ppb).

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REPORT OF ANALYSIS
EPA METHOD 8240 - VOLATILE ORGANICS

Client: GHR Engineering Associates, Inc. Job No.: 37-130
Project: Whitney Barrel JN 3661002
Date Received: September 2, 1988 Date Analyzed: September 26, 1988
Collected by: M. Hawiger Analyzed by: Aquatec, Inc.

Sample ID:	B-1 Soil composite 0-2', 4-6, 9-11', 14-16'	B-2 Soil composite 0.5-2', 4-6', 9-11'
Date Collected:	8/30/88	8/31/88
GHR Lab ID:	85271	85272

Parameter	Concentration in ug/kg (ppb)	
Benzene	BDL (1)	BDL
Carbon Tetrachloride	BDL	BDL
Chlorobenzene	BDL	BDL
1,2-Dichloroethane	BDL	BDL
1,1,1-Trichloroethane	BDL	BDL
1,1-Dichloroethane	BDL	BDL
1,1,2-Trichloroethane	BDL	BDL
1,1,2,2-Tetrachloroethane	BDL	BDL
Chloroethane (2)	BDL	BDL
2-Chloroethyl Vinyl Ether (2)	BDL	BDL
Chloroform	BDL	BDL
1,1-Dichloroethene	BDL	BDL
1,2-Dichloroethene	BDL	BDL
1,2-Dichloropropane	BDL	BDL
Trans-1,3-Dichloropropene	BDL	BDL
Cis-1,3-Dichloropropene	BDL	BDL
Ethylbenzene	BDL	BDL
Methylene Chloride	4JC	LCB
Chloromethane (2)	BDL	BDL
Bromomethane (2)	BDL	BDL
Bromoform	BDL	BDL
Bromodichloromethane	BDL	BDL
Dibromochloromethane	BDL	BDL
Tetrachloroethene	BDL	BDL
Toluene	BDL	BDL
Trichloroethene	BDL	BDL
Vinyl Chloride (2)	BDL	BDL
Acetone (2)	LCB	LCB
2-Butanone (2)	LCB	BDL
Carbon Disulfide	BDL	BDL
2-Hexanone (2)	BDL	BDL
4-Methyl-2-Pentanone (2)	BDL	BDL
Styrene	BDL	BDL
Vinyl Acetate (2)	BDL	BDL
Total Xylenes	BDL	BDL

(1) BDL = Below Detection Limit. (2) Detection Limit for these compounds = 10 ug/kg (ppb).
Detection Limit= 5 ug/kg (ppb). LCB = Compound was found but at low concentration, comparable to that in the blank. Quantitation is not possible. J = An estimated value. The mass spectrum indicates the presence of the compound, but the calculated result is less than the reliable detection limit for this compound. C = The result has been corrected for the presence of the compound in the blank.

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REPORT OF ANALYSIS

EPA METHOD 8270 - SEMI-VOLATILE ORGANICS

Client: GHR Engineering Associates, Inc. Job No.: 37-130
Project: Whitney Barrel JN 3661002

Date Received: September 2, 1988 Date Extracted: September 13, 1988
Collected by: M. Haviger Analyzed by: Aquatec, Inc.

Sample ID:	B-1 Soil composite 0-2', 4-6, 9-11', 14-16'	B-2 Soil composite 0.5-2', 4-6', 9-11'
Date Collected:	8/30/88	8/31/88
GHR Lab ID:	85271	85272

Parameter	Concentration in ug/kg (ppb)	
Acenaphthene	BDL (1)	BDL
1,2,4-Trichlorobenzene	BDL	BDL
Hexachlorobenzene	BDL	BDL
Hexachloroethane	BDL	BDL
Bis (2-Chloroethyl) Ether	BDL	BDL
2-Chloronaphthalene	BDL	BDL
1,2-Dichlorobenzene	BDL	BDL
1,3-Dichlorobenzene	BDL	BDL
1,4-Dichlorobenzene	BDL	BDL
3,3-Dichlorobenzidine (2)	BDL	BDL
2,4-Dinitrotoluene	BDL	BDL
2,6-Dinitrotoluene	BDL	BDL
Fluoranthene	100J	100J
4-Chlorophenyl Phenyl Ether	BDL	BDL
4-Bromophenyl Phenyl Ether	BDL	BDL
Bis (2-Chloroisopropyl) Ether	BDL	BDL
Bis (2-Chloroethoxy) Methane	BDL	BDL
Hexachlorobutadiene	BDL	BDL
Hexachlorocyclopentadiene	BDL	BDL
Isophorone	BDL	BDL
Naphthalene	BDL	BDL
Nitrobenzene	BDL	BDL
N-Nitrosodiphenylamine	BDL	BDL
N-Nitrosodi-N-Propylamine	BDL	BDL
Bis-(2-Ethylhexyl) Phthalate	230J	220J

(1) BDL = Below Detection Limit.
Detection Limit = 330 ug/kg (ppb).
(2) Detection Limit for 3,3-Dichlorobenzidine = 660 ug/kg (ppb).

J = An estimated value. The mass spectrum indicated the presence of the compound, but the calculated result is less than the reliable detection limit for this compound.

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REPORT OF ANALYSIS

EPA METHOD 8270 - SEMI-VOLATILE ORGANICS

Client: GHR Engineering Associates, Inc. Job No.: 37-130
Project: Whitney Barrel JN 3661002

Date Received: September 2, 1988 Date Extracted: September 13, 1988
Collected by: M. Hawiger Analyzed by: Aquatec, Inc.

Sample ID:	B-1 Soil composite 0-2', 4-6, 9-11', 14-16'	B-2 Soil composite 0.5-2', 4-6', 9-11'
Date Collected:	8/30/88	8/31/88
GHR Lab ID:	85271	85272

Parameter	Concentration in ug/kg (ppb)	
Benzyl Butyl Phthalate	BDL(1)	BDL
Di-N-Butyl Phthalate	BDL	BDL
Di-N-Octyl Phthalate	BDL	BDL
Diethyl Phthalate	BDL	BDL
Dimethyl Phthalate	BDL	BDL
Benzo(A)Anthracene	BDL	BDL
Benzo(A)Pyrene	BDL	BDL
Benzo(B)Fluoranthene	BDL	BDL
Benzo(K)Fluoranthene	BDL	BDL
Chrysene	81J	BDL
Acenaphthylene	BDL	BDL
Anthracene	BDL	BDL
Benzo(GHI)Perylene	BDL	82J
Fluorene	BDL	BDL
Phenanthrene	BDL	BDL
Dibenzo(AH)Anthracene	BDL	BDL
Indeno(1,2,3-CD)Pyrene	BDL	BDL
Pyrene	95J	91J
Benzyl Alcohol	BDL	BDL
4-Chloroaniline	BDL	BDL
Dibenzofuran	BDL	BDL
2-Methylnaphthalene	BDL	BDL
2-Nitroaniline (2)	BDL	BDL
3-Nitroaniline (2)	BDL	BDL
4-Nitroaniline (2)	BDL	BDL

(1) BDL = Below Detection Limit.
Detection Limit = 330 ug/kg (ppb).
(2) Detection Limit for these compounds = 1,600 ug/kg (ppb).
J = An estimated value. The mass spectrum indicates the presence of the compound, but the calculated result is less than the reliable detection limit for this compound.

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REPORT OF ANALYSIS

ACID EXTRACTABLES

Client: GHR Engineering Associates, Inc. Job No.: 37-130
Project: Whitney Barrel JN 3661002

Date Received: September 2, 1988 Date Extracted: September 13, 1988
Collected by: M. Haviger Analyzed by: Aquatec, Inc.

Sample ID:	B-1 Soil composite 0-2', 4-6, 9-11', 14-16'	B-2 Soil composite 0.5-2', 4-6', 9-11'
Date Collected:	8/30/88	8/31/88
GHR Lab ID:	85271	85272
Parameter	Concentration in ug/kg (ppb)	
2,4,6-Trichlorophenol	BDL (1)	BDL
P-Chloro-m-Cresol	BDL	BDL
2-Chlorophenol	BDL	BDL
2,4-Dichlorophenol	BDL	BDL
2,4-Dimethylphenol	BDL	BDL
2-Nitrophenol	BDL	BDL
4-Nitrophenol (2)	BDL	BDL
2,4-Dinitrophenol (2)	BDL	BDL
4,6-Dinitro-2-Methylphenol (2)	BDL	BDL
Pentachlorophenol (2)	BDL	BDL
Phenol	BDL	BDL
Benzoic Acid (2)	BDL	BDL
2-Methylphenol	BDL	BDL
4-Methylphenol	BDL	BDL
2,4,5-Trichlorophenol (2)	BDL	BDL

(1) BDL = Below Detection Limit.
Detection Limit = 330 ug/kg (ppb).
(2) Detection Limit for these compounds = 1,600 ug/kg (ppb).

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REPORT OF ANALYSIS
EPA METHOD 8240 - VOLATILE ORGANICS

Client: GHR Engineering Associates, Inc. Job No: 37-130
Project: Whitney Barrel JN 3661002
Date Received: September 2, 1988 Date Analyzed: September 28, 1988
Collected by: M. Haviger Analyzed by: Aquatec, Inc.

Sample ID:	B-3 Soil composite 0-2', 4-6', 9-11', 14-16'	B-4 Soil composite 0-2', 4-6' 9-11'	B-5 Soil composite 0-2', 4-6' 9-11'
Date Collected:	8/30/88	8/31/88	8/31/88
GHR Lab ID:	85273	85274	85275

Parameter	Concentrations in ug/kg (ppb)		
Benzene	BDL (1)	BDL	BDL
Carbon Tetrachloride	BDL	BDL	BDL
Chlorobenzene	BDL	BDL	BDL
1,2-Dichloroethane	BDL	BDL	BDL
1,1,1-Trichloroethane	BDL	BDL	BDL
1,1-Dichloroethane	BDL	BDL	BDL
1,1,2-Trichloroethane	BDL	BDL	BDL
1,1,2,2-Tetrachloroethane	BDL	BDL	BDL
Chloroethane (2)	BDL	BDL	BDL
2-Chloroethyl Vinyl Ether (2)	BDL	BDL	BDL
Chloroform	BDL	BDL	BDL
1,1-Dichloroethene	BDL	BDL	BDL
1,2-Dichloroethene	BDL	BDL	BDL
1,2-Dichloropropane	BDL	BDL	BDL
Trans-1,3-Dichloropropene	BDL	BDL	BDL
Cis-1,3-Dichloropropene	BDL	BDL	BDL
Ethylbenzene	BDL	BDL	BDL
Methylene Chloride	3JC	LCB	4JC
Chloromethane(2)	BDL	BDL	BDL
Bromomethane (2)	BDL	BDL	BDL
Bromoform	BDL	BDL	BDL
Bromodichloromethane	BDL	BDL	BDL
Dibromochloromethane	BDL	BDL	BDL
Tetrachloroethene	3J	BDL	BDL
Toluene	BDL	BDL	BDL
Trichloroethene	BDL	BDL	BDL
Vinyl Chloride (2)	BDL	BDL	BDL
Acetone (2)	LCB	17C	LCB
2-Butanone (2)	LCB	LCB	LCB
Carbon Disulfide	BDL	1J	BDL
2-Hexanone (2)	BDL	BDL	BDL
4-Methyl-2-Pentanone (2)	BDL	BDL	BDL
Styrene	BDL	BDL	BDL
Vinyl Acetate (2)	BDL	BDL	BDL
Total Xylenes	BDL	BDL	BDL

(1) BDL = Below Detection Limit. (2) Detection Limit for these compounds = 10 ug/kg(ppb). Detection Limit= 5 ug/kg (ppb). LCB = Compound was found but at low concentration, comparable to that in the blank. Quantitation is not possible. J = An estimated value. The mass spectrum indicates the presence of the compound, but the calculated result is less than the reliable detection limit for this compound. C = The result has been corrected for the presence of the compound in the blank.

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REPORT OF ANALYSIS

EPA METHOD 8270 - SEMI-VOLATILE ORGANICS

Client: GHR Engineering Associates, Inc. Job No: 37-130
Project: Whitney Barrel JN 3661002

Date Received: September 2, 1988 Date Extracted: September 13, 1988
Collected by: M. Haviger Analyzed by: Aquatec, Inc.

Sample ID:	B-3 Soil composite 0-2', 4-6', 9-11', 14-16'	B-4 Soil composite 0-2', 4-6' 9-11'	B-5 Soil composite 0-2', 4-6' 9-11'
Date Collected:	8/30/88	8/31/88	8/31/88
GHR Lab ID:	85273	85274	85275
Parameter	**Concentrations in ug/kg (ppb)**		
Acenaphthene	230J	BDL(1)	BDL
1,2,4-Trichlorobenzene	BDL	BDL	BDL
Hexachlorobenzene	BDL	BDL	BDL
Hexachloroethane	BDL	BDL	BDL
Bis (2-Chloroethyl) Ether	BDL	BDL	BDL
2-Chloronaphthalene	BDL	BDL	BDL
1,2-Dichlorobenzene	BDL	BDL	BDL
1,3-Dichlorobenzene	BDL	BDL	170J
1,4-Dichlorobenzene	BDL	BDL	490
3,3-Dichlorobenzidine (2)	BDL	BDL	BDL
2,4-Dinitrotoluene	BDL	BDL	BDL
2,6-Dinitrotoluene	BDL	BDL	BDL
Fluoranthene	2,000	BDL	72J
4-Chlorophenyl Phenyl Ether	BDL	BDL	BDL
4-Bromophenyl Phenyl Ether	BDL	BDL	BDL
Bis (2-Chloroisopropyl) Ether	BDL	BDL	BDL
Bis (2-Chloroethoxy) Methane	BDL	BDL	BDL
Hexachlorobutadiene	BDL	BDL	BDL
Hexachlorocyclopentadiene	BDL	BDL	BDL
Isophorone	BDL	BDL	BDL
Naphthalene	BDL	BDL	BDL
Nitrobenzene	BDL	BDL	BDL
N-Nitrosodiphenylamine	BDL	BDL	BDL
N-Nitrosodi-N-Propylamine	BDL	BDL	BDL
Bis-(2-Ethylhexyl) Phthalate	600	BDL	1,400

(1) BDL = Below Detection Limit.
Detection Limit = 330 ug/kg (ppb).
(2) Detection Limit for 3,3-Dichlorobenzidine = 660 ug/kg (ppb).

J = An estimated value. The mass spectrum indicates the presence of the compound, but the calculated result is less than the reliable detection limit for this compound.

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REPORT OF ANALYSIS

ACID EXTRACTABLES

Client: GHR Engineering Associates, Inc. Job No.: 37-130
Project: Whitney Barrel JN 3661002

Date Received: September 2, 1988 Date Extracted: September 13, 1988
Collected by: M. Hawiger Analyzed by: Aquatec, Inc.

Sample ID:	MW-1S Soil composite 0-2', 4-6, 9-11'	MW-2S Soil composite 0-2', 4-6', 9-11'
Date Collected:	8/30/88	8/31/88
GHR Lab ID:	85267	85268
Parameter	Concentration in ug/kg (ppb)	
2,4,6-Trichlorophenol	BDL (1)	BDL
P-Chloro-m-Cresol	BDL	BDL
2-Chlorophenol	BDL	BDL
2,4-Dichlorophenol	BDL	BDL
2,4-Dimethylphenol	BDL	BDL
2-Nitrophenol	BDL	BDL
4-Nitrophenol (2)	BDL	BDL
2,4-Dinitrophenol (2)	BDL	BDL
4,6-Dinitro-2-Methylphenol (2)	BDL	BDL
Pentachlorophenol (2)	BDL	BDL
Phenol	BDL	BDL
Benzoic Acid (2)	BDL	BDL
2-Methylphenol	BDL	BDL
4-Methylphenol	BDL	BDL
2,4,5-Trichlorophenol (2)	BDL	BDL

(1) BDL = Below Detection Limit.
Detection Limit = 330 ug/kg (ppb).
(2) Detection Limit for these compounds = 1,600 ug/kg (ppb).

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REPORT OF ANALYSIS
EPA METHOD 8240 - VOLATILE ORGANICS

Client: GHR Engineering Associates, Inc. Job No.: 37-130
Project: Whitney Barrel JN 3661002
Date Received: September 2, 1988 Date Analyzed: September 26, 1988
Collected by: M. Haviger Analyzed by: Aquatec, Inc.

Sample ID:	MW-3S Soil composite 0-2', 4-6, 9-11'	MW-4S Soil composite 0-2', 4-6', 9-11', 14-15.5'
Date Collected:	9/2/88	9/1/88
GHR Lab ID:	85269	85270

Parameter	Concentration in ug/kg (ppb)	
Benzene	BDL(1)	BDL
Carbon Tetrachloride	BDL	BDL
Chlorobenzene	BDL	BDL
1,2-Dichloroethane	BDL	BDL
1,1,1-Trichloroethane	BDL	BDL
1,1-Dichloroethane	BDL	BDL
1,1,2-Trichloroethane	BDL	BDL
1,1,2,2-Tetrachloroethane	BDL	BDL
Chloroethane (2)	BDL	BDL
2-Chloroethyl Vinyl Ether (2)	BDL	BDL
Chloroform	BDL	BDL
1,1-Dichloroethene	BDL	BDL
1,2-Dichloroethene	BDL	BDL
1,2-Dichloropropane	BDL	BDL
Trans-1,3-Dichloropropene	BDL	BDL
Cis-1,3-Dichloropropene	BDL	BDL
Ethylbenzene	BDL	BDL
Methylene Chloride	LCB	LCB
Chloromethane (2)	BDL	BDL
Bromomethane (2)	BDL	BDL
Bromoform	BDL	BDL
Bromodichloromethane	BDL	BDL
Dibromochloromethane	BDL	BDL
Tetrachloroethene	2J	BDL
Toluene	BDL	BDL
Trichloroethene	BDL	BDL
Vinyl Chloride (2)	BDL	BDL
Acetone (2)	LCB	LCB
2-Butanone (2)	BDL	LCB
Carbon Disulfide	BDL	BDL
2-Hexanone (2)	BDL	BDL
4-Methyl-2-Pentanone (2)	BDL	BDL
Styrene	BDL	BDL
Vinyl Acetate (2)	BDL	BDL
Total Xylenes	BDL	BDL

(1) BDL = Below Detection Limit. Detection Limit= 5 ug/kg (ppb).
(2) Detection Limit for these compounds = 10 ug/kg (ppb).
LCB = Compound was found but at low concentration, comparable to that in the blank. Quantitation is not possible.
J = An estimated value. The mass spectrum indicates the presence of the compound, but the calculated result is less than the reliable detection limit for this compound.

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REPORT OF ANALYSIS

EPA METHOD 8080 - PESTICIDES & PCB'S

Client: GHR Engineering Associates, Inc. Job No.: 37-130
Project: Whitney Barrel JN 3661002

Date Received: September 2, 1988 Date Extracted: September 3, 1988
Collected by: M. Haviger Extracted by: DMJ

Sample ID:	MW-1S Soil composite 0-2', 4-6, 9-11'	Detection Limit	MW-2S Soil composite 0-2', 4-6', 9-11'	Detection Limit
Date Collected:	8/30/88		8/31/88	
GHR Lab ID:	85267		85268	
Parameter	Concentration in mg/kg (ppm) dry wt.			
Aldrin	BDL (1)	0.001	BDL	0.01
Alpha-BHC	BDL	0.001	BDL	0.01
Beta-BHC	BDL	0.001	BDL	0.01
Gamma-BHC	BDL	0.001	BDL	0.01
Delta-BHC (Lindane)	BDL	0.001	BDL	0.01
Chlordane	BDL	0.01	0.28	0.1
4,4'-DDT	BDL	0.001	BDL	0.01
4,4'-DDE	BDL	0.001	BDL	0.01
4,4'-DDD	BDL	0.001	BDL	0.01
Dieldrin	BDL	0.001	BDL	0.01
Alpha-Endosulfan	BDL	0.001	BDL	0.01
Beta-Endosulfan	BDL	0.001	BDL	0.01
Endosulfan Sulfate	BDL	0.001	BDL	0.01
Endrin	BDL	0.001	BDL	0.01
Endrin Aldehyde	BDL	0.001	BDL	0.01
Heptachlor	BDL	0.001	BDL	0.01
Heptachlor Epoxide	BDL	0.001	BDL	0.01
Methoxychlor	BDL	0.01	BDL	0.1
Toxaphene	BDL	0.01	BDL	0.1
PCB-1242	BDL	0.01	BDL	0.1
PCB-1254	BDL	0.01	BDL	0.1
PCB-1221	BDL	0.01	BDL	0.1
PCB-1232	BDL	0.01	BDL	0.1
PCB-1248	BDL	0.01	BDL	0.1
PCB-1260	0.09	0.01	BDL	0.1
PCB-1016	BDL	0.01	BDL	0.1

(1) BDL = Below Detection Limit.

See attached sheet for GC Operating Conditions.

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REPORT OF ANALYSIS

TRACE METALS

Client: GHR Engineering Associates, Inc. Job No: 37-130
Project: Whitney Barrel JN 3661002

Date Received: September 2, 1988
Collected by: M. Haviger

Sample ID:	MW-3S Soil composite 0-2', 4-6, 9-11'	MW-4S Soil composite 0-2', 4-6', 9-11', 14-15.5'	Detection Limit
Date Collected:	9/2/88	9/1/88	
GHR Lab ID:	85269	85270	

Parameter	Test Results in mg/kg (ppm) dry wt.		
Aluminum	3,570	3,490	
Antimony	BDL (1)	24	20
Arsenic	7.62	2.25	
Barium	21	17	
Beryllium	BDL	BDL	2.0
Cadmium	BDL	BDL	1.00
Calcium	1,230	890	
Chromium	23.8	23.5	
Cobalt	BDL	BDL	5.0
Copper	17.8	33.3	
Iron	7,440	5,200	
Lead	95.0	35.3	
Magnesium	1,190	1,040	
Manganese	74.3	56.9	
Mercury	0.36	BDL	0.25

(1) BDL = Below Detection Limit

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REPORT OF ANALYSIS

TRACE METALS

Client: GHR Engineering Associates, Inc. Job No: 37-130
Project: Whitney Barrel JN 3661002

Date Received: September 2, 1988
Collected by: M. Haviger

Sample ID:	MW-3S Soil composite 0-2', 4-6, 9-11'	MW-4S Soil composite 0-2', 4-6', 9-11', 14-15.5'	Detection Limit
Date Collected:	9/2/88	9/1/88	
GHR Lab ID:	85269	85270	

Parameter	Test Results in mg/kg (ppm) dry wt.		
Nickel	9.9	7.8	
Potassium	495	490	
Selenium	BDL (1)	BDL	0.50
Silver	BDL	BDL	1.0
Sodium	103	58.8	
Thallium	BDL	BDL	10
Vanadium	BDL	BDL	20
Zinc	66.3	41.2	

(1) BDL = Below Detection Limit.

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REPORT OF ANALYSIS

EPA METHOD 8080 - PESTICIDES & PCB'S

Client: GHR Engineering Associates, Inc. Job No.: 37-130
Project: Whitney Barrel JN 3661002

Date Received: September 2, 1988 Date Extracted: September 7 & 9, 1988
Collected by: M. Hawiger Extracted by: DMJ

Sample ID:	MW-3S Soil composite 0-2', 4-6, 9-11'	Detection Limit	MW-4S Soil composite 0-2', 4-6', 9-11', 14-15.5'	Detection Limit
Date Collected:	9/2/88		9/1/88	
GHR Lab ID:	85269		85270	

Parameter	Concentration in mg/kg (ppm) dry wt.			
Aldrin	BDL (1)	0.1	BDL	0.01
Alpha-BHC	BDL	0.1	BDL	0.01
Beta-BHC	BDL	0.1	BDL	0.01
Gamma-BHC	BDL	0.1	BDL	0.01
Delta-BHC (Lindane)	BDL	0.1	BDL	0.01
Chlordane	3.60	1.0	4.03	0.1
4,4'-DDT	BDL	0.1	BDL	0.01
4,4'-DDE	BDL	0.1	BDL	0.01
4,4'-DDD	BDL	0.1	BDL	0.01
Dieldrin	BDL	0.1	BDL	0.01
Alpha-Endosulfan	BDL	0.1	BDL	0.01
Beta-Endosulfan	BDL	0.1	BDL	0.01
Endosulfan Sulfate	BDL	0.1	BDL	0.01
Endrin	BDL	0.1	BDL	0.01
Endrin Aldehyde	BDL	0.1	BDL	0.01
Heptachlor	BDL	0.1	BDL	0.01
Heptachlor Epoxide	BDL	0.1	BDL	0.01
Methoxychlor	BDL	1.0	BDL	0.1
Toxaphene	BDL	1.0	BDL	0.1
PCB-1242	BDL	1.0	BDL	0.1
PCB-1254	BDL	1.0	BDL	0.1
PCB-1221	BDL	1.0	BDL	0.1
PCB-1232	BDL	1.0	BDL	0.1
PCB-1248	BDL	1.0	BDL	0.1
PCB-1260	5.37	1.0	0.56	0.1
PCB-1016	BDL	1.0	BDL	0.1

(1) BDL = Below Detection Limit.

See attached sheet for GC Operating Conditions.

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REPORT OF ANALYSIS

TRACE METALS

Client: GHR Engineering Associates, Inc. Job No: 37-130
Project: Whitney Barrel JN 3661002

Date Received: September 2, 1988
Collected by: M. Haviger

Sample ID:	B-1 Soil composite 0-2', 4-6', 9-11', 14-16'	B-2 Soil composite 0.5-2', 4-6', 9-11'	Detection Limit
Date Collected:	8/30/88	8/31/88	
GHR Lab ID:	85271	85272	
Parameter	**Test Results in mg/kg (ppm) dry wt.**		
Aluminum	6,200	3,770	
Antimony	BDL (1)	22	20
Arsenic	4.16	3.10	
Barium	26	10	
Beryllium	BDL	BDL	2.0
Cadmium	BDL	BDL	1.00
Calcium	993	799	
Chromium	20.8	8.0	
Cobalt	5.9	BDL	5.0
Copper	23.8	6.0	
Iron	6,980	4,390	
Lead	19.8	11.0	
Magnesium	1,340	942	
Manganese	82.2	50.0	
Mercury	BDL	BDL	0.25

(1) BDL = Below Detection Limit.

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REPORT OF ANALYSIS

TRACE METALS

Client: GHR Engineering Associates, Inc. Job No: 37-130
Project: Whitney Barrel JN 3661002

Date Received: September 2, 1988
Collected by: M. Haviger

Sample ID:	B-1 Soil composite 0-2', 4-6', 9-11', 14-16'	B-2 Soil composite 0.5-2', 4-6', 9-11'	Detection Limit
Date Collected:	8/30/88	8/31/88	
GHR Lab ID:	85271	85272	

Parameter	Test Results in mg/kg (ppm) dry wt.		
Nickel	14.8	10.0	
Potassium	954	471	
Selenium	BDL (1)	BDL	0.50
Silver	BDL	BDL	1.0
Sodium	85.1	50.0	
Thallium	BDL	BDL	10
Vanadium	BDL	BDL	20
Zinc	33.7	92.0	

(1) BDL = Below Detection Limit.

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REPORT OF ANALYSIS

EPA METHOD 8080 - PESTICIDES & PCB'S

Client: GHR Engineering Associates, Inc. Job No.: 37-130
Project: Whitney Barrel JN 3661002

Date Received: September 2, 1988 Date Extracted: September 7, 1988
Collected by: M. Haviger Extracted by: DMJ

Sample ID:	B-1 Soil composite 0-2', 4-6, 9-11', 14-16'	Detection Limit	B-2 Soil composite 0-2', 4-6', 9-11'	Detection Limit
Date Collected:	8/30/88		8/31/88	
GHR Lab ID:	85271		85272	

Parameter	Concentration in mg/kg (ppm) dry wt.			
Aldrin	BDL (1)	0.001	BDL	0.001
Alpha-BHC	BDL	0.001	BDL	0.001
Beta-BHC	BDL	0.001	BDL	0.001
Gamma-BHC	BDL	0.001	BDL	0.001
Delta-BHC (Lindane)	BDL	0.001	BDL	0.001
Chlordane	0.38	0.01	BDL	0.01
4,4'-DDT	BDL	0.001	BDL	0.001
4,4'-DDE	BDL	0.001	BDL	0.001
4,4'-DDD	BDL	0.001	BDL	0.001
Dieldrin	BDL	0.001	BDL	0.001
Alpha-Endosulfan	BDL	0.001	BDL	0.001
Beta-Endosulfan	BDL	0.001	BDL	0.001
Endosulfan Sulfate	BDL	0.001	BDL	0.001
Endrin	BDL	0.001	BDL	0.001
Endrin Aldehyde	BDL	0.001	BDL	0.001
Heptachlor	BDL	0.001	BDL	0.001
Heptachlor Epoxide	BDL	0.001	BDL	0.001
Methoxychlor	BDL	0.01	BDL	0.01
Toxaphene	BDL	0.01	BDL	0.01
PCB-1242	BDL	0.01	BDL	0.01
PCB-1254	BDL	0.01	BDL	0.01
PCB-1221	BDL	0.01	BDL	0.01
PCB-1232	BDL	0.01	BDL	0.01
PCB-1248	BDL	0.01	BDL	0.01
PCB-1260	0.07	0.01	BDL	0.01
PCB-1016	BDL	0.01	BDL	0.01

(1) BDL = Below Detection Limit.

See attached sheet for GC Operating Conditions.

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REPORT OF ANALYSIS

TRACE METALS

Client: GHR Engineering Associates, Inc. Job No: 37-130
Project: Whitney Barrel JN 3661002

Date Received: September 2, 1988
Collected by: M. Hawiger

Sample ID:	B-3 Soil composite 0-2', 4-6', 9-11', 14-16'	B-4 Soil composite 0-2', 4-6' 9-11'	B-5 Soil composite 0-2', 4-6' 9-11'	Detection Limit
Date Collected:	8/30/88	8/31/88	8/31/88	
GHR Lab ID:	85273	85274	85275	

Parameter	Test Results in mg/kg (ppm) dry wt.			
Aluminum	5,110	3,960	4,650	
Antimony	BDL (1)	BDL	22	20
Arsenic	4.70	2.38	3.52	
Barium	40	BDL	18	10
Beryllium	BDL	BDL	BDL	2.0
Cadmium	BDL	BDL	BDL	1.00
Calcium	1,540	697	1,150	
Chromium	28.0	9.4	51.0	
Cobalt	6.0	BDL	5.9	5.0
Copper	39.0	5.9	11.8	
Iron	20,200	4,600	5,590	
Lead	233	16.3	33.3	
Magnesium	1,630	1,130	1,300	
Manganese	143	53.4	74.5	
Mercury	0.52	BDL	BDL	0.25

(1) BDL = Below Detection Limit.

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REPORT OF ANALYSIS

TRACE METALS

Client: GHR Engineering Associates, Inc. Job No: 37-130
Project: Whitney Barrel JN 3661002

Date Received: September 2, 1988
Collected by: M. Haviger

Sample ID:	B-3 Soil composite 0-2', 4-6', 9-11', 14-16'	B-4 Soil composite 0-2', 4-6' 9-11'	B-5 Soil composite 0-2', 4-6' 9-11'	Detection Limit
Date Collected:	8/30/88	8/31/88	8/31/88	
GHR Lab ID:	85273	85274	85275	

Parameter	Test Results in mg/kg (ppm) dry wt.			
Nickel	14.0	7.4	9.8	
Potassium	639	559	554	
Selenium	BDL (1)	BDL	BDL	0.50
Silver	BDL	BDL	BDL	1.0
Sodium	95.0	36.6	64.7	
Thallium	BDL	BDL	BDL	10
Vanadium	BDL	BDL	BDL	20
Zinc	170	32.7	27.4	

(1) BDL = Below Detection Limit.

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REPORT OF ANALYSIS

EPA METHOD 608 - PESTICIDES & PCB'S

Client: GHR Engineering Associates, Inc. Job No.: 37-130
Project: Whitney Barrel JN 3661002

Date Collected: September 2, 1988 Date Extracted: September 3 & 7, 1988
Collected by: M. Haviger Extracted by: DMJ

Sample Location:	B-3 Soil 0-2', 4-6', 9-11', 14-16'	Detection Limit	B-4 Soil 0-2', 4-6', 9-11	Detection Limit	B-5 Soil 0-2', 4-6', 9-11'	Detection Limit
Date Collected:	8/30/88		8/31/88		8/31/88	
GHR Lab ID:	85273		85274		85275	
Parameter	Concentration in mg/kg (ppm) dry wt.					
Aldrin	BDL (1)	0.1	BDL	0.01	BDL	0.1
Alpha-BHC	BDL	0.1	BDL	0.01	BDL	0.1
Beta-BHC	BDL	0.1	BDL	0.01	BDL	0.1
Gamma-BHC (Lindane)	BDL	0.1	BDL	0.01	BDL	0.1
Delta-BHC	BDL	0.1	BDL	0.01	BDL	0.1
Chlordane	1.61	1.0	0.29	0.1	6.30	1.0
4,4'-DDT	BDL	0.1	BDL	0.01	BDL	0.1
4,4'-DDE	BDL	0.1	BDL	0.01	BDL	0.1
4,4'-DDD	BDL	0.1	BDL	0.01	BDL	0.1
Dieldrin	BDL	0.1	BDL	0.01	BDL	0.1
Alpha-Endosulfan	BDL	0.1	BDL	0.01	BDL	0.1
Beta-Endosulfan	BDL	0.1	BDL	0.01	BDL	0.1
Endosulfan Sulfate	BDL	0.1	BDL	0.01	BDL	0.1
Endrin	BDL	0.1	BDL	0.01	BDL	0.1
Endrin Aldehyde	BDL	0.1	BDL	0.01	BDL	0.1
Heptachlor	BDL	0.1	BDL	0.01	BDL	0.1
Heptachlor Epoxide	BDL	0.1	BDL	0.01	BDL	0.1
Methoxychlor	BDL	1.0	BDL	0.1	BDL	1.0
Toxaphene	BDL	1.0	BDL	0.1	BDL	1.0
PCB-1242	BDL	1.0	BDL	0.1	BDL	1.0
PCB-1254	5.26	1.0	BDL	0.1	BDL	1.0
PCB-1221	BDL	1.0	BDL	0.1	BDL	1.0
PCB-1232	BDL	1.0	BDL	0.1	BDL	1.0
PCB-1248	BDL	1.0	BDL	0.1	BDL	1.0
PCB-1260	BDL	1.0	0.24	0.1	5.36	1.0
PCB-1016	BDL	1.0	BDL	0.1	BDL	1.0

See attached sheet for GC Operating Conditions.

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REPORT OF ANALYSIS

TRACE METALS

Client: GHR Engineering Associates, Inc. Job No: 37-130
Project: Whitney Barrel JN 3661002

Date Received: September 2, 1988
Collected by: M. Haviger

Sample ID:	B-6 Soil composite 0-2', 4-6', 9-11', 14-15'	B-6 (Rep.) Soil composite 0-2', 4-6', 9-11', 14-15'	Detection Limit
Date Collected:	9/2/88	9/2/88	
GHR Lab ID:	85276	85277	

Parameter	Test Results in mg/kg (ppm) dry wt.		
Aluminum	3,820	3,140	
Antimony	BDL (1)	30	20
Arsenic	4.20	2.57	
Barium	21	BDL	10
Beryllium	BDL	BDL	2.0
Cadmium	BDL	BDL	1.00
Calcium	904	661	
Chromium	58.0	19.8	
Cobalt	BDL	BDL	5.0
Copper	19.0	7.9	
Iron	11,000	4,440	
Lead	82.0	21.8	
Magnesium	1,110	887	
Manganese	83.0	44.6	
Mercury	BDL	0.28	0.25

(1) BDL = Below Detection Limit.

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REPORT OF ANALYSIS

TRACE METALS

Client: GHR Engineering Associates, Inc. Job No: 37-130
Project: Whitney Barrel JN 3661002

Date Received: September 2, 1988
Collected by: M. Haviger

Sample ID:	B-6 Soil composite 0-2', 4-6', 9-11', 14-15'	B-6 (Rep.) Soil composite 0-2', 4-6', 9-11', 14-15'	Detection Limit
Date Collected:	9/2/88	9/2/88	
GHR Lab ID:	85276	85277	
Parameter	**Test Results in mg/kg (ppm) dry wt.**		
Nickel	10.0	9.9	
Potassium	479	425	
Selenium	BDL (1)	BDL	0.50
Silver	BDL	BDL	1.0
Sodium	62.0	49.5	
Thallium	BDL	BDL	10
Vanadium	BDL	BDL	20
Zinc	60.0	22.8	

(1) BDL = Below Detection Limit.

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REPORT OF ANALYSIS

EPA METHOD 8080 - PESTICIDES & PCB'S

Client: GHR Engineering Associates, Inc.   Job No.: 37-130
Project: Whitney Barrel JN 3661002

Date Received: September 2, 1988   Date Extracted: September 13, 1988
Collected by: M. Haviger   Extracted by: DMJ

Sample ID:	B-6 Soil composite 0-2', 4-6, 9-11', 14-16'	Detection Limit	B-6 (Rep.) Soil composite 0-2', 4-6', 9-11', 14-16'	Detection Limit
Date Collected:	9/2/88		9/2/88	
GHR Lab ID:	85276		85277	

Parameter	Concentration in mg/kg (ppm) dry wt.			
Aldrin	BDL (1)	0.01	BDL	0.01
Alpha-BHC	BDL	0.01	BDL	0.01
Beta-BHC	BDL	0.01	BDL	0.01
Gamma-BHC	BDL	0.01	BDL	0.01
Delta-BHC (Lindane)	BDL	0.01	BDL	0.01
Chlordane	2.12	0.10	1.89	0.10
4,4'-DDT	BDL	0.01	BDL	0.01
4,4'-DDE	BDL	0.01	BDL	0.01
4,4'-DDD	BDL	0.01	BDL	0.01
Dieldrin	BDL	0.01	BDL	0.01
Alpha-Endosulfan	BDL	0.01	BDL	0.01
Beta-Endosulfan	BDL	0.01	BDL	0.01
Endosulfan Sulfate	BDL	0.01	BDL	0.01
Endrin	BDL	0.01	BDL	0.01
Endrin Aldehyde	BDL	0.01	BDL	0.01
Heptachlor	BDL	0.01	BDL	0.01
Heptachlor Epoxide	BDL	0.01	BDL	0.01
Methoxychlor	BDL	0.10	BDL	0.10
Toxaphene	BDL	0.10	BDL	0.10
PCB-1242	BDL	0.10	BDL	0.10
PCB-1254	BDL	0.10	BDL	0.10
PCB-1221	BDL	0.10	BDL	0.10
PCB-1232	BDL	0.10	BDL	0.10
PCB-1248	BDL	0.10	BDL	0.10
PCB-1260	1.10	0.10	0.96	0.10
PCB-1016	BDL	0.10	BDL	0.10

(1) BDL = Below Detection Limit.

See attached sheet for GC Operating Conditions.

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REPORT OF ANALYSIS

EPA METHOD 8270 - SEMI-VOLATILE ORGANICS

Client: GHR Engineering Associates, Inc. Job No: 37-130
Project: Whitney Barrel JN 3661002

Date Received: September 2, 1988 Date Extracted: September 13, 1988
Collected by: M. Haviger Analyzed by: Aquatec, Inc.

Sample ID:	B-3 Soil composite 0-2', 4-6', 9-11', 14-16'	B-4 Soil composite 0-2', 4-6' 9-11'	B-5 Soil composite 0-2', 4-6' 9-11'
Date Collected:	8/30/88	8/31/88	8/31/88
GHR Lab ID:	85273	85274	85275
Parameter	**Concentration in ug/kg (ppb)**		
Benzyl Butyl Phthalate	BDL(1)	160J	BDL
Di-N-Butyl Phthalate	BDL	BDL	2,900
Di-N-Octyl Phthalate	BDL	BDL	BDL
Diethyl Phthalate	BDL	BDL	BDL
Dimethyl Phthalate	BDL	BDL	BDL
Benzo(A)Anthracene	1,100	BDL	BDL
Benzo(A)Pyrene	1,200	BDL	BDL
Benzo(B)Fluoranthene	960	BDL	BDL
Benzo(K)Fluoranthene	640	BDL	BDL
Chrysene	1,400	BDL	BDL
Acenaphthylene	120J	BDL	BDL
Anthracene	400	BDL	BDL
Benzo(GHI)Perylene	1,000	BDL	BDL
Fluorene	230J	BDL	BDL
Phenanthrene	2,000	BDL	BDL
Dibenzo(AH)Anthracene	240J	BDL	BDL
Indeno(1,2,3-CD)Pyrene	600	BDL	BDL
Pyrene	3,000	BDL	98J
Benzyl Alcohol	BDL	BDL	BDL
4-Chloroaniline	BDL	BDL	BDL
Dibenzofuran	BDL	BDL	BDL
2-Methylnaphthalene	69J	BDL	BDL
2-Nitroaniline (2)	BDL	BDL	BDL
3-Nitroaniline (2)	BDL	BDL	BDL
4-Nitroaniline (2)	BDL	BDL	BDL

(1) BDL = Below Detection Limit.
Detection Limit = 330 ug/kg (ppb).
(2) Detection Limit for these compounds = 1,600 ug/kg (ppb).
J = An estimated value. The mass spectrum indicates the presence of the compound, but the calculated result is less than the reliable detection limit for this compound.

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REPORT OF ANALYSIS

ACID EXTRACTABLES

Client: GHR Engineering Associates, Inc. Job No.: 37-130
Project: Whitney Barrel JN 3661002

Date Received: September 2, 1988 Date Extracted: September 13, 1988
Collected by: M. Hawiger Analyzed by: Aquatec, Inc.

Sample ID:	B-3 Soil composite 0-2', 4-6', 9-11', 14-16'	B-4 Soil composite 0-2', 4-6' 9-11'	B-5 Soil composite 0-2', 4-6' 9-11'
Date Collected:	8/30/88	8/31/88	8/31/88
GHR Lab ID:	85273	85274	85275

Parameter	Concentration in ug/kg (ppb)		
2,4,6-Trichlorophenol	BDL (1)	BDL	BDL
P-Chloro-m-Cresol	BDL	BDL	BDL
2-Chlorophenol	BDL	BDL	BDL
2,4-Dichlorophenol	BDL	BDL	BDL
2,4-Dimethylphenol	BDL	BDL	BDL
2-Nitrophenol	BDL	BDL	BDL
4-Nitrophenol (2)	BDL	BDL	BDL
2,4-Dinitrophenol (2)	BDL	BDL	BDL
4,6-Dinitro-2-Methylphenol (2)	BDL	BDL	BDL
Pentachlorophenol (2)	BDL	BDL	BDL
Phenol	BDL	BDL	BDL
Benzoic Acid (2)	BDL	BDL	BDL
2-Methylphenol	BDL	BDL	BDL
4-Methylphenol	BDL	BDL	BDL
2,4,5-Trichlorophenol (2)	BDL	BDL	BDL

(1) BDL = Below Detection Limit.
Detection Limit = 330 ug/kg (ppb).
(2) Detection Limit for these compounds = 1,600 ug/kg (ppb).

GROUNDWATER ANALYTICAL REPORTS

NOVEMBER, 1988

SAMPLES COLLECTED
OCTOBER 17,1988

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REPORT OF ANALYSIS

EPA Method 8270

Client: GHR Engineering Associates, Inc. Job No.: 37-066
Project: Whitney Barrel JN 3661002

Date Extracted: September 1, 1988
Collected by: RDC/BEM Analyzed by: Aquatec, Inc.

Sample ID:	TP-7 Soil	TP-9 Soil	TP-11 Soil
Date Collected:	8/26/88	8/25/88	8/25/88
GHR Lab No.:	84978	84979	84980

Parameter	Concentration in ug/kg (ppb)		
2,4,6-Trichlorophenol	BDL (1)	BDL	BDL
P-Chloro-m-Cresol	BDL	BDL	BDL
2-Chlorophenol	BDL	BDL	BDL
2,4-Dichlorophenol	BDL	BDL	BDL
2,4-Dimethylphenol	BDL	BDL	BDL
2-Nitrophenol	BDL	BDL	BDL
4-Nitrophenol (2)	BDL	BDL	BDL
2,4-Dinitrophenol (2)	BDL	BDL	BDL
4,6-Dinitro-2-Methylphenol (2)	BDL	BDL	BDL
Pentachlorophenol (2)	BDL	BDL	BDL
Phenol	BDL	BDL	BDL
Benzoic Acid (2)	BDL	BDL	BDL
2-Methylphenol	BDL	BDL	BDL
4-Methylphenol	BDL	BDL	BDL
2,4,5-Trichlorophenol (2)	BDL	BDL	BDL

(1) BDL = Below Detection Limit.
Detection Limit = 330 ug/kg (ppb).

(2) Detection Limit for these compounds = 1,600 ug/kg (ppb).

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REPORT OF ANALYSIS

EPA METHOD 8080 - PESTICIDES & PCB'S

Client: GHR Engineering Associates, Inc. Job No.: 37-066
Project: Whitney Barrel
JN 3661002

Date Extracted: August 29 & 30, 1988
Collected by: RDC/BEM Extracted by: DMJ

Sample ID:	TP-7 Soil	Detection Limit	TP-9 Soil	Detection Limit	TP-11 Soil	Detection Limit
Date Collected:	8/26/88		8/25/88		8/25/88	
GHR Lab ID:	84978		84979		84980	
Parameter	Concentration in mg/kg (ppm) dry wt.					
Aldrin	BDL (1)	0.1	BDL	0.01	BDL	1.0
Alpha-BHC	BDL	0.1	BDL	0.01	BDL	1.0
Beta-BHC	BDL	0.1	BDL	0.01	BDL	1.0
Gamma-BHC (Lindane)	BDL	0.1	BDL	0.01	BDL	1.0
Delta-BHC	BDL	0.1	BDL	0.01	BDL	1.0
Chlordane	BDL	1.0	BDL	0.1	26.8	10
4,4'-DDT	BDL	0.1	BDL	0.01	BDL	1.0
4,4'-DDE	BDL	0.1	BDL	0.01	BDL	1.0
4,4'-DDD	BDL	0.1	BDL	0.01	BDL	1.0
Dieldrin	BDL	0.1	BDL	0.01	BDL	1.0
Alpha-Endosulfan	BDL	0.1	BDL	0.01	BDL	1.0
Beta-Endosulfan	BDL	0.1	BDL	0.01	BDL	1.0
Endosulfan Sulfate	BDL	0.1	BDL	0.01	BDL	1.0
Endrin	BDL	0.1	BDL	0.01	BDL	1.0
Endrin Aldehyde	BDL	0.1	BDL	0.01	BDL	1.0
Heptachlor	BDL	0.1	BDL	0.01	BDL	1.0
Heptachlor Epoxide	BDL	0.1	BDL	0.01	BDL	1.0
Methoxychlor	BDL	1.0	BDL	0.1	BDL	10
Toxaphene	BDL	1.0	BDL	0.1	BDL	10
PCB-1242	4.52	1.0	BDL	0.1	BDL	10
PCB-1254	BDL	1.0	BDL	0.1	BDL	10
PCB-1221	BDL	1.0	BDL	0.1	BDL	10
PCB-1232	BDL	1.0	BDL	0.1	BDL	10
PCB-1248	BDL	1.0	1.2	0.1	BDL	10
PCB-1260	7.01	1.0	BDL	0.1	46.6	10
PCB-1016	BDL	1.0	BDL	0.1	BDL	10

(1) BDL = Below Detection Limit.

See attached sheet for GC Operating Conditions.

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REPORT OF ANALYSIS

TRACE METALS

Client: GHR Engineering Associates, Inc. Job No: 37-066
Project: Whitney Barrel JN 3661002

Date Collected: August 26, 1988
Collected by: RDC/BEM

Sample ID:	TP-12 Soil	TP-13 Soil	TP-15 Soil	Detection Limit
GHR Lab ID:	84981	84982	84983	
Parameter	**Test Results in mg/kg (ppm) dry wt.**			
Aluminum	4,530	4,670	4,200	
Antimony	BDL (1)	BDL	BDL	20
Arsenic	415	4.00	4.90	
Barium	BDL	17	22	10
Beryllium	BDL	BDL	BDL	2.0
Cadmium	BDL	BDL	BDL	1.00
Calcium	392	779	872	
Chromium	7.0	10.0	38.0	
Cobalt	BDL	BDL	BDL	5.0
Copper	4.0	10.0	20.0	
Iron	3,500	6,530	8,170	
Lead	10.0	52.0	72.0	
Magnesium	882	781	1,060	
Manganese	45.0	50.0	74.0	
Mercury	0.40	0.50	0.34	

(1) BDl = Below Detection Limit.

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REPORT OF ANALYSIS

TRACE METALS

Client: GHR Engineering Associates, Inc. Job No: 37-066
Project: Whitney Barrel JN 3661002

Date Collected: August 26, 1988
Collected by: RDC/BEM

Sample ID:	TP-12 Soil	TP-13 Soil	TP-15 Soil	Detection Limit
GHR Lab ID:	84981	84982	84983	

Parameter	Test Results in mg/kg (ppm) dry wt.			
Nickel	8.0	8.0	10.0	
Potassium	321	307	457	
Selenium	BDL (1)	BDL	BDL	0.50
Silver	BDL	BDL	BDL	1.0
Sodium	90.0	72.0	66.0	
Thallium	BDL	BDL	BDL	10
Vanadium	BDL	BDL	BDL	20
Zinc	12.0	56.0	69.0	

(1) BDL = Below Detection Limit.

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REPORT OF ANALYSIS
EPA Method 8240

Client: GHR Engineering Associates, Inc. Job No.: 37-066
Project: Whitney Barrell JN 3661002

Date Collected: August 26, 1988 Date Analyzed: September 22, 25 & 29, 1988
Collected by: RDC/BEM Analyzed by: Aquatec, Inc.

Sample ID:	TP-12 Soil	TP-13 Soil	TP-15 Soil
GHR Lab ID:	84981	84982	84983
VOLATILE ORGANICS	Concentration in ug/kg (ppb)		
Benzene	BDL (1)	BDL	BDL
Carbon Tetrachloride	BDL	BDL	BDL
Chlorobenzene	250	BDL	BDL
1,2-Dichloroethane	BDL	BDL	BDL
1,1,1-Trichloroethane	26	5	BDL
1,1-Dichloroethane	BDL	BDL	BDL
1,1,2-Trichloroethane	BDL	BDL	BDL
1,1,2,2-Tetrachloroethane	BDL	BDL	BDL
Chloroethane (2)	BDL	BDL	BDL
2-Chloroethyl Vinyl Ether (2)	BDL	BDL	BDL
Chloroform	BDL	BDL	BDL
1,1-Dichloroethene	BDL	BDL	BDL
1,2-Dichloroethene	BDL	BDL	BDL
1,2-Dichloropropane	BDL	BDL	BDL
Trans-1,3-Dichloropropene	BDL	BDL	BDL
Cis-1,3-Dichloropropene	BDL	BDL	BDL
Ethylbenzene	3,900	BDL	BDL
Methylene Chloride	LCB	LCB	LCB
Chloromethane (2)	BDL	BDL	BDL
Bromomethane (2)	BDL	BDL	BDL
Bromoform	BDL	BDL	BDL
Bromodichloromethane	BDL	BDL	BDL
Dibromochloromethane	BDL	BDL	BDL
Tetrachloroethene	320,000	7	BDL
Toluene	31,000	BDL	BDL
Trichloroethene	330,000	BDL	BDL
Vinyl Chloride (2)	BDL	BDL	BDL
Acetone (2)	LCB	LCB	LCB
2-Butanone (2)	LCB	LCB	LCB
Carbon Disulfide	BDL	BDL	BDL
2-Hexanone (2)	BDL	BDL	BDL
4-Methyl-2-Pentanone (2)	BDL	BDL	BDL
Styrene	BDL	BDL	BDL
Vinyl Acetate (2)	BDL	BDL	BDL
Total Xylenes	26,000	2J	BDL

(1) BDL = Below Detection Limit. Detection Limit = 5 ug/kg (ppb).
(2) Detection Limit for these compounds = 10 ug/kg (ppb).
LCB = Compound was found but at low concentration, comparable to that in the blank. Quantitation is not possible.
J = An estimated value. The mass spectrum indicates the presence of the compound, but the calculated result is less than the reliable detection limit for this compound.

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REPORT OF ANALYSIS

EPA Method 8270

Client: GHR Engineering Associates, Inc. Job No.: 37-066
Project: Whitney Barrel JN 3661002

Date Collected: August 26, 1988 Date Extracted: September 2, 1988
Collected by: RDC/BEM Analyzed by: Aquatec, Inc.

Sample ID: TP-12
Soil
GHR Lab ID: 84981

Parameter	Concentration in mg/kg (ppm)	
Acenaphthene	5J	
1,2,4-Trichlorobenzene	96	
Hexachlorobenzene		BDL(1)
Hexachloroethane		BDL
Bis (2-Chloroethyl) Ether		BDL
2-Chloronaphthalene		BDL
1,2-Dichlorobenzene	7J	
1,3-Dichlorobenzene		BDL
1,4-Dichlorobenzene	3J	
3,3-Dichlorobenzidine (2)		BDL
2,4-Dinitrotoluene		BDL
2,6-Dinitrotoluene		BDL
Fluoranthene		BDL
4-Chlorophenyl Phenyl Ether		BDL
4-Bromophenyl Phenyl Ether		BDL
Bis (2-Chloroisopropyl) Ether		BDL
Bis (2-Chloroethoxy) Methane		BDL
Hexachlorobutadiene		BDL
Hexachlorocyclopentadiene		BDL
Isophorone		BDL
Naphthalene	14	
Nitrobenzene		BDL
N-Nitrosodiphenylamine		BDL
N-Nitrosodi-N-Propylamine		BDL
Bis-(2-Ethylhexyl) Phthalate	38	

(1) BDL = Below Detection Limit.
Detection Limit = 10 mg/kg (ppm).
(2) Detection Limit for 3,3-Dichlorobenzidine = 20 mg/kg (ppm).

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REPORT OF ANALYSIS

EPA Method 8270

Client: GHR Engineering Associates, Inc. Job No.: 37-066
Project: Whitney Barrel JN 3661002

Date Collected: August 26, 1988 Date Extracted: September 2, 1988
Collected by: RDC/BEM Analyzed by: Aquatec, Inc.

Sample ID: TP-12
Soil
GHR Lab ID: 84981

Parameter	Concentration in mg/kg (ppm)
Benzyl Butyl Phthalate	BDL (1)
Di-N-Butyl Phthalate	13
Di-N-Octyl Phthalate	BDL
Diethyl Phthalate	10
Dimethyl Phthalate	BDL
Benzo(A)Anthracene	BDL
Benzo(A)Pyrene	BDL
Benzo(B)Fluoranthene	BDL
Benzo(K)Fluoranthene	BDL
Chrysene	BDL
Acenaphthylene	BDL
Anthracene	BDL
Benzo(GHI)Perylene	BDL
Fluorene	4J
Phenanthrene	5J
Dibenzo(AH)Anthracene	BDL
Indeno(1,2,3-CD)Pyrene	BDL
Pyrene	2J
Benzyl Alcohol	BDL
4-Chloroaniline	BDL
Dibenzofuran	4J
2-Methylnaphthalene	36
2-Nitroaniline (2)	BDL
3-Nitroaniline (2)	BDL
4-Nitroaniline (2)	BDL

(1) BDL = Below Detection Limit.
Detection Limit = 10 mg/kg (ppm).
(2) Detection Limit for these compounds = 50 mg/kg (ppm).

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REPORT OF ANALYSIS

EPA Method 8270

Client: GHR Engineering Associates, Inc. Job No.: 37-066
Project: Whitney Barrel JN 3661002

Date Collected: August 26, 1988 Date Extracted: September 2, 1988
Collected by: RDC/BEM Analyzed by: Aquatec, Inc.

Sample ID:	TP-12
	Soil
GHR Lab No.:	84981

Parameter	Concentration in mg/kg (ppm)
2,4,6-Trichlorophenol	BDL (1)
P-Chloro-m-Cresol	BDL
2-Chlorophenol	BDL
2,4-Dichlorophenol	BDL
2,4-Dimethylphenol	BDL
2-Nitrophenol	BDL
4-Nitrophenol (2)	BDL
2,4-Dinitrophenol (2)	BDL
4,6-Dinitro-2-Methylphenol (2)	BDL
Pentachlorophenol (2)	BDL
Phenol	BDL
Benzoic Acid (2)	BDL
2-Methylphenol	BDL
4-Methylphenol	BDL
2,4,5-Trichlorophenol (2)	16J

(1) BDL = Below Detection Limit.
Detection Limit = 10 mg/kg (ppm).
(2) Detection Limit for these compounds = 50 mg/kg (ppm).

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REPORT OF ANALYSIS

EPA Method 8270

Client: GHR Engineering Associates, Inc. Job No.: 37-066
Project: Whitney Barrel JN 3661002

Date Collected: August 26, 1988 Date Extracted: September 1, 1988
Collected by: RDC/BEM Analyzed by: Aquatec, Inc.

Sample ID:	TP-13 Soil	TP-15 Soil
GHR Lab ID:	84982	84983

Parameter	Concentration in ug/kg (ppb)	
Acenaphthene	98J	BDL (1)
1,2,4-Trichlorobenzene	110J	100J
Hexachlorobenzene	BDL	BDL
Hexachloroethane	BDL	BDL
Bis (2-Chloroethyl) Ether	BDL	BDL
2-Chloronaphthalene	BDL	BDL
1,2-Dichlorobenzene	BDL	BDL
1,3-Dichlorobenzene	BDL	BDL
1,4-Dichlorobenzene	BDL	200J
3,3-Dichlorobenzidine (2)	BDL	BDL
2,4-Dinitrotoluene	BDL	BDL
2,6-Dinitrotoluene	BDL	BDL
Fluoranthene	88J	130J
4-Chlorophenyl Phenyl Ether	BDL	BDL
4-Bromophenyl Phenyl Ether	BDL	BDL
Bis (2-Chloroisopropyl) Ether	BDL	BDL
Bis (2-Chloroethoxy) Methane	BDL	BDL
Hexachlorobutadiene	BDL	BDL
Hexachlorocyclopentadiene	BDL	BDL
Isophorone	BDL	BDL
Naphthalene	77J	130J
Nitrobenzene	BDL	BDL
N-Nitrosodiphenylamine	BDL	BDL
N-Nitrosodi-N-Propylamine	BDL	BDL
Bis-(2-Ethylhexyl) Phthalate	540	790

(1) BDL = Below Detection Limit.
Detection Limit = 330 ug/kg (ppb).
(2) Detection Limit for 3,3-Dichlorobenzidine = 660 ug/kg (ppb).
J = An estimated value. The mass spectrum indicates the presence of the compound, but the calculated result is less than the reliable detection limit for this compound.

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REPORT OF ANALYSIS

EPA Method 8270

Client: GHR Engineering Associates, Inc. Job No.: 37-066
Project: Whitney Barrel JN 3661002

Date Collected: August 26, 1988 Date Extracted: September 1, 1988
Collected by: RDC/BEM Analyzed by: Aquatec, Inc.

Sample ID:	TP-13 Soil	TP-15 Soil
GHR Lab ID:	84982	84983

Parameter	Concentration in ug/kg (ppb)	
Benzyl Butyl Phthalate	BDL (1)	BDL
Di-N-Butyl Phthalate	BDL	BDL
Di-N-Octyl Phthalate	BDL	BDL
Diethyl Phthalate	BDL	BDL
Dimethyl Phthalate	BDL	BDL
Benzo(A)Anthracene	BDL	110J
Benzo(A)Pyrene	68J	96J
Benzo(B)Fluoranthene	BDL	88J
Benzo(K)Fluoranthene	BDL	67J
Chrysene	75J	220J
Acenaphthylene	BDL	BDL
Anthracene	BDL	170J
Benzo(GHI)Perylene	BDL	69J
Fluorene	170J	BDL
Phenanthrene	340	190J
Dibenzo(AH)Anthracene	BDL	BDL
Indeno(1,2,3-CD)Pyrene	BDL	BDL
Pyrene	100J	160J
Benzyl Alcohol	BDL	BDL
4-Chloroaniline	BDL	BDL
Dibenzofuran	110J	BDL
2-Methylnaphthalene	300J	92J
2-Nitroaniline (2)	BDL	BDL
3-Nitroaniline (2)	BDL	BDL
4-Nitroaniline (2)	BDL	BDL

(1) BDL = Below Detection Limit.
Detection Limit = 330 ug/kg (ppb).
(2) Detection Limit for these compounds = 1,600 ug/kg (ppb).
J = An estimated value. The mass spectrum indicates the presence of the compound, but the calculated result is less than the reliable detection limit for this compound.

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REPORT OF ANALYSIS

EPA Method 8270

Client: GHR Engineering Associates, Inc. Job No.: 37-066
Project: Whitney Barrel JN 3661002

Date Collected: August 26, 1988 Date Extracted: September 1, 1988
Collected by: RDC/BEM Analyzed by: Aquatec, Inc.

Sample ID:	TP-13 Soil	TP-15 Soil
GHR Lab No.:	84982	84983
Parameter	**Concentration in ug/kg (ppb)**	
2,4,6-Trichlorophenol	BDL (1)	BDL
P-Chloro-m-Cresol	BDL	BDL
2-Chlorophenol	BDL	BDL
2,4-Dichlorophenol	BDL	BDL
2,4-Dimethylphenol	BDL	BDL
2-Nitrophenol	BDL	BDL
4-Nitrophenol (2)	BDL	BDL
2,4-Dinitrophenol (2)	BDL	BDL
4,6-Dinitro-2-Methylphenol (2)	BDL	BDL
Pentachlorophenol (2)	BDL	BDL
Phenol	BDL	BDL
Benzoic Acid (2)	BDL	BDL
2-Methylphenol	BDL	BDL
4-Methylphenol	BDL	BDL
2,4,5-Trichlorophenol (2)	93J	BDL

(1) BDL = Below Detection Limit.
Detection Limit = 330 ug/kg (ppb).

(2) Detection Limit for these compounds = 1,600 ug/kg (ppb).

J = An estimated value. The mass spectrum indicates the presence of the compound, but the calculated result is less than the reliable detection limit for this compound.

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REPORT OF ANALYSIS

EPA METHOD 8080 - PESTICIDES & PCB'S

Client: GHR Engineering Associates, Inc. Job No.: 37-066
Project: Whitney Barrel
JN 3661002

Date Collected: August 26, 1988 Date Extracted: August 30 & September 1, 1988
Collected by: RDC/BEM Extracted by: DMJ

Sample ID:	TP-12 Soil	Detection Limit	TP-13 Soil	Detection Limit	TP-15 Soil	Detection Limit
GHR Lab ID:	84981		84982		84983	
Parameter	**Concentration in mg/kg (ppm) dry wt.**					
Aldrin	BDL(1)	1.0	BDL	0.01	BDL	0.1
Alpha-BHC	BDL	1.0	BDL	0.01	BDL	0.1
Beta-BHC	BDL	1.0	BDL	0.01	BDL	0.1
Gamma-BHC (Lindane)	BDL	1.0	BDL	0.01	BDL	0.1
Delta-BHC	BDL	1.0	BDL	0.01	BDL	0.1
Chlordane	17.6	10	0.47	0.1	1.98	1.0
4,4'-DDT	BDL	1.0	BDL	0.01	BDL	0.1
4,4'-DDE	BDL	1.0	BDL	0.01	BDL	0.1
4,4'-DDD	BDL	1.0	BDL	0.01	BDL	0.1
Dieldrin	BDL	1.0	BDL	0.01	BDL	0.1
Alpha-Endosulfan	BDL	1.0	BDL	0.01	BDL	0.1
Beta-Endosulfan	BDL	1.0	BDL	0.01	BDL	0.1
Endosulfan Sulfate	BDL	1.0	BDL	0.01	BDL	0.1
Endrin	BDL	1.0	BDL	0.01	BDL	0.1
Endrin Aldehyde	BDL	1.0	BDL	0.01	BDL	0.1
Heptachlor	BDL	1.0	BDL	0.01	BDL	0.1
Heptachlor Epoxide	BDL	1.0	BDL	0.01	BDL	0.1
Methoxychlor	BDL	10	BDL	0.1	BDL	1.0
Toxaphene	BDL	10	BDL	0.1	BDL	1.0
PCB-1242	BDL	10	BDL	0.1	BDL	1.0
PCB-1254	BDL	10	BDL	0.1	BDL	1.0
PCB-1221	BDL	10	BDL	0.1	BDL	1.0
PCB-1232	BDL	10	BDL	0.1	BDL	1.0
PCB-1248	BDL	10	BDL	0.1	BDL	1.0
PCB-1260	56.0	10	1.03	0.1	3.38	1.0
PCB-1016	BDL	10	BDL	0.1	BDL	1.0

(1) BDL = Below Detection Limit.
See attached sheet for GC Operating Conditions.

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REPORT OF ANALYSIS

EPA Method 8270- SEMI-VOLATILE ORGANICS

Client: GHR Engineering Associates, Inc. Job No.: 37-613
Project: Whitney Barrel JN 3661-002

Date Collected: October 17, 1988 Date Extracted: October 25, 1988
Collected by: RDC/BEM Analyzed by: Aquatec, Inc.

Sample ID:	MW-1 water	MW-2 water	MW-3 water
GHR Lab ID:	87489	87490	87491

Parameter	Concentration in ug/l (ppb)		
Acenaphthene	BDL (1)	BDL	BDL
1,2,4-Trichlorobenzene	BDL	BDL	BDL
Hexachlorobenzene	BDL	BDL	BDL
Hexachloroethane	BDL	BDL	BDL
Bis (2-Chloroethyl) Ether	BDL	BDL	BDL
2-Chloronaphthalene	BDL	BDL	BDL
1,2-Dichlorobenzene	BDL	BDL	17J
1,3-Dichlorobenzene	BDL	29	6J
1,4-Dichlorobenzene	BDL	140	8J
3,3-Dichlorobenzidine (2)	BDL	BDL	BDL
2,4-Dinitrotoluene	BDL	BDL	BDL
2,6-Dinitrotoluene	BDL	BDL	BDL
Fluoranthene	BDL	BDL	BDL
4-Chlorophenyl Phenyl Ether	BDL	BDL	BDL
4-Bromophenyl Phenyl Ether	BDL	BDL	BDL
Bis (2-Chloroisopropyl) Ether	BDL	BDL	BDL
Bis (2-Chloroethoxy) Methane	BDL	BDL	BDL
Hexachlorobutadiene	BDL	BDL	BDL
Hexachlorocyclopentadiene	BDL	BDL	BDL
Isophorone	BDL	BDL	BDL
Naphthalene	BDL	BDL	11J
Nitrobenzene	BDL	BDL	BDL
N-Nitrosodiphenylamine	BDL	BDL	BDL
N-Nitrosodi-N-Propylamine	BDL	BDL	BDL
Bis-(2-Ethylhexyl) Phthalate	10JC	BDL	BDL

(1) BDL = Below Detection Limit.
Detection Limit = 20 ug/l.
(2) Detection Limit for 3,3-Dichlorobenzidine = 40 ug/l.
J = An estimated value. The mass spectrum indicates the presence of the compound, but the calculated result is less than the reliable detection limit for this compound. C = The result has been corrected for the presence of the compound in the blank.

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REPORT OF ANALYSIS

EPA Method 8270-SEMI-VOLATILE ORGANICS

Client: GHR Engineering Associates, Inc. Job No.: 37-613
Project: Whitney Barrel JN 3661-002

Date Collected: October 17, 1988 Date Extracted: October 25, 1988
Collected by: RDC/BEM Analyzed by: Aquatec, Inc.

Sample ID:	MW-1 water	MW-2 water	MW-3 water
GHR Lab ID:	87489	87490	87491

Parameter	Concentration in ug/l (ppb)		
Benzyl Butyl Phthalate	BDL (1)	BDL	BDL
Di-N-Butyl Phthalate	BDL	BDL	BDL
Di-N-Octyl Phthalate	BDL	BDL	BDL
Diethyl Phthalate	BDL	BDL	BDL
Dimethyl Phthalate	BDL	BDL	BDL
Benzo(A)Anthracene	BDL	BDL	BDL
Benzo(A)Pyrene	BDL	BDL	BDL
Benzo(B)Fluoranthene	BDL	BDL	BDL
Benzo(K)Fluoranthene	BDL	BDL	BDL
Chrysene	BDL	BDL	BDL
Acenaphthylene	BDL	BDL	BDL
Anthracene	BDL	BDL	BDL
Benzo(GHI)Perylene	BDL	BDL	BDL
Fluorene	BDL	BDL	BDL
Phenanthrene	BDL	BDL	BDL
Dibenzo(AH)Anthracene	BDL	BDL	BDL
Indeno(1,2,3-CD)Pyrene	BDL	BDL	BDL
Pyrene	BDL	BDL	BDL
Benzyl Alcohol	BDL	BDL	BDL
4-Chloroaniline	BDL	BDL	BDL
Dibenzofuran	BDL	BDL	BDL
2-Methylnaphthalene	BDL	BDL	5J
2-Nitroaniline (2)	BDL	BDL	BDL
3-Nitroaniline (2)	BDL	BDL	BDL
4-Nitroaniline (2)	BDL	BDL	BDL

(1) BDL = Below Detection Limit.
Detection Limit = 20 ug/l.
(2) Detection Limit for these compounds = 100 ug/l.

J = An estimated value. The mass spectrum indicates the presence of the compound, but the calculated result is less than the reliable detection limit for this compound.

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REPORT OF ANALYSIS

ACID EXTRACTABLES

Client: GHR Engineering Associates, Inc. Job No.: 37-613
Project: Whitney Barrel JN 3661-002

Date Collected: October 17, 1988 Date Extracted: October 25, 1988
Collected by: RDC/BEM Analyzed by: Aquatec, Inc.

Sample ID:	MW-1 water	MW-2 water	MW-3 water
GHR Lab No.:	87489	87490	87491

Parameter	Concentration in ug/l (ppb)		
2,4,6-Trichlorophenol	BDL (1)	BDL	BDL
P-Chloro-m-Cresol	BDL	BDL	BDL
2-Chlorophenol	BDL	BDL	BDL
2,4-Dichlorophenol	BDL	BDL	BDL
2,4-Dimethylphenol	BDL	BDL	BDL
2-Nitrophenol	BDL	BDL	BDL
4-Nitrophenol (2)	BDL	BDL	BDL
2,4-Dinitrophenol (2)	BDL	BDL	BDL
4,6-Dinitro-2-Methylphenol (2)	BDL	BDL	BDL
Pentachlorophenol (2)	BDL	BDL	BDL
Phenol	BDL	BDL	BDL
Benzoic Acid (2)	BDL	BDL	BDL
2-Methylphenol	BDL	BDL	BDL
4-Methylphenol	BDL	BDL	6J
2,4,5-Trichlorophenol (2)	BDL	BDL	BDL

(1) BDL = Below Detection Limit.
Detection Limit = 20 ug/l.
(2) Detection Limit for these compounds = 100 ug/l.

J = An estimated value. The mass spectrum indicates the presence of the compound, but the calculated result is less than the reliable detection limit for this compound.

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REPORT OF ANALYSIS

TRACE METALS

Client: GHR Engineering Associates, Inc. Job No: 37-613
Project: Whitney Barrel JN 3661-002

Date Collected: October 17, 1988
Collected by: RDC/BEM

Sample Location:	MW-4 water	MW-5 water	MW-6 Field Blank water	Detection Limit
GHR Lab ID:	87492	87493	87494	
Parameter	Test Results in mg/l			
Aluminum	1.3	BDL (1)	BDL	0.5
Antimony	BDL	BDL	BDL	0.2
Arsenic	BDL	BDL	BDL	0.002
Barium	BDL	BDL	BDL	0.1
Beryllium	BDL	BDL	BDL	0.02
Cadmium	BDL	BDL	BDL	0.010
Calcium	45.4	34.8	4.14	
Chromium	BDL	BDL	BDL	0.02
Cobalt	BDL	BDL	BDL	0.05
Copper	BDL	BDL	0.06	0.02
Iron	12.0	5.58	0.30	
Lead	BDL	BDL	BDL	0.10
Magnesium	3.56	2.66	0.62	
Manganese	0.74	0.94	BDL	0.02
Mercury	BDL	BDL	BDL	0.0002

(1) BDL = Below Detection Limit.

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REPORT OF ANALYSIS

TRACE METALS

Client: GHR Engineering Associates, Inc. Job No: 87-613
Project: Whitney Barrel JN 3661-002

Date Collected: October 17, 1988
Collected by: RDC/BEM

Sample Location:	MW-4	MW-5	MW-6 Field Blank	Detection
	water	water	water	Limit
GHR Lab ID:	87492	87493	87494	
Parameter	Test Results in mg/l			
Nickel	BDL (1)	BDL	BDL	0.04
Potassium	8.3	15.5	0.7	
Selenium	BDL	BDL	BDL	0.002
Silver	BDL	BDL	BDL	0.01
Sodium	92.2	68.1	9.8	
Thallium	BDL	BDL	BDL	0.1
Vanadium	BDL	BDL	BDL	0.2
Zinc	0.03	0.02	BDL	0.02

(1) BDL = Below Detection Limit.

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REPORT OF ANALYSIS

EPA METHOD 608 - PESTICIDES & PCB'S

Client: GHR Engineering Associates, Inc. Job No.: 37-613
Project: Whitney Barrel JN 3661-002

Date Collected: October 17, 1988 Date Extracted: October 19, 1988
Collected by: RDC/BEM Analyzed by: DMJ

Sample Location:	MW-4 water	MW-5 water	MW-6 Field Blank water	Detection Limit
GHR Lab ID:	87492	87493	87494	
Parameter	**Concentration in ug/l (ppb)**			
Aldrin	BDL(1)	BDL	BDL	0.1
Alpha-BHC	BDL	BDL	BDL	0.1
Beta-BHC	BDL	BDL	BDL	0.1
Gamma-BHC (Lindane)	BDL	BDL	BDL	0.1
Delta-BHC	BDL	BDL	BDL	0.1
Chlordane	BDL	BDL	BDL	1.0
4,4'-DDT	BDL	BDL	BDL	0.1
4,4'-DDE	BDL	BDL	BDL	0.1
4,4'-DDD	BDL	BDL	BDL	0.1
Dieldrin	BDL	BDL	BDL	0.1
Alpha-Endosulfan	BDL	BDL	BDL	0.1
Beta-Endosulfan	BDL	BDL	BDL	0.1
Endosulfan Sulfate	BDL	BDL	BDL	0.1
Endrin	BDL	BDL	BDL	0.1
Endrin Aldehyde	BDL	BDL	BDL	0.1
Heptachlor	BDL	BDL	BDL	0.1
Heptachlor Epoxide	BDL	BDL	BDL	0.1
Methoxychlor	BDL	BDL	BDL	1.0
Toxaphene	BDL	BDL	BDL	1.0
PCB-1242	BDL	BDL	BDL	1.0
PCB-1254	BDL	BDL	BDL	1.0
PCB-1221	BDL	BDL	BDL	1.0
PCB-1232	BDL	BDL	BDL	1.0
PCB-1248	BDL	BDL	BDL	1.0
PCB-1260	BDL	10	BDL	1.0
PCB-1016	BDL	BDL	BDL	1.0

(1) BDL = Below Detection Limit.

See attached sheet for GC Operating Conditions.

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REPORT OF ANALYSIS
EPA Method 8240-VOLATILE ORGANICS

Client: GHR Engineering Associates, Inc. Job No.: 37-613
Project: Whitney Barrel JN 3661-002
Date Collected: October 17, 1988 Date Analyzed: October 20 & 27, 1988
Collected by: RDC/BEM Analyzed by: Aquatec, Inc.

Sample Location:	MW-4 water	MW-5 water	MW-6 Field Blank water
GHR Lab ID:	87492	87493	87494
VOLATILE ORGANICS	Concentration in ug/l (ppb)		
Benzene	63	2J	BDL(1)
Carbon Tetrachloride	BDL	BDL	BDL
Chlorobenzene	6J	35	BDL
1,2-Dichloroethane	BDL	BDL	BDL
1,1,1-Trichloroethane	99	BDL	BDL
1,1-Dichloroethane	300	BDL	BDL
1,1,2-Trichloroethane	BDL	BDL	BDL
1,1,2,2-Tetrachloroethane	BDL	BDL	BDL
Chloroethane (2)	2J	BDL	BDL
2-Chloroethyl Vinyl Ether (2)	BDL	BDL	BDL
Chloroform	BDL	BDL	7
1,1-Dichloroethene	BDL	BDL	BDL
1,2-Dichloroethene	31	45	BDL
1,2-Dichloropropane	BDL	BDL	BDL
Trans-1,3-Dichloropropene	BDL	BDL	BDL
Cis-1,3-Dichloropropene	BDL	BDL	BDL
Ethylbenzene	90	10	BDL
Methylene Chloride	LCB	LCB	LCB
Chloromethane(2)	BDL	BDL	BDL
Bromomethane (2)	BDL	BDL	BDL
Bromoform	BDL	BDL	BDL
Bromodichloromethane	BDL	BDL	BDL
Dibromochloromethane	BDL	BDL	BDL
Tetrachloroethene	BDL	BDL	BDL
Toluene	66	1J	BDL
Trichloroethene	BDL	BDL	BDL
Vinyl Chloride (2)	15J	13	BDL
Acetone (2)	140C	LCB	LCB
2-Butanone (2)	16JC	LCB	LCB
Carbon Disulfide	BDL	BDL	BDL
2-Hexanone (2)	BDL	BDL	BDL
4-Methyl-2-Pentanone (2)	12J	BDL	BDL
Styrene	BDL	BDL	BDL
Vinyl Acetate (2)	BDL	BDL	BDL
Total Xylenes	180	4J	22
Detection Limit (ug/l (ppb)=	10	5	5
(2) Detection Limit ug/l (ppb) =	20	10	10

J = An estimated value. The mass spectrum indicates the presence of the compound, but the calculated result is less than the reliable detection limit for this compound. C = The result has been corrected for the presence in the blank. LCB = Compound was found but at low concentration, comparable to that in the blank. Quantitation is not possible.

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REPORT OF ANALYSIS

EPA Method 8270- SEMI-VOLATILE ORGANICS

Client: GHR Engineering Associates, Inc. Job No.: 37-613
Project: Whitney Barrel JN 3661-002

Date Collected: October 17, 1988 Date Extracted: October 25, 1988
Collected by: RDC/BEM Analyzed by: Aquatec, Inc.

Sample Location:	MW-4 water	MW-5 water	MW-6 Field Blank water
GHR Lab ID:	87492	87493	87494
Parameter	Concentration in ug/l (ppb)		
Acenaphthene	BDL (1)	BDL	BDL
1,2,4-Trichlorobenzene	17J	BDL	BDL
Hexachlorobenzene	BDL	BDL	BDL
Hexachloroethane	BDL	BDL	BDL
Bis (2-Chloroethyl) Ether	BDL	BDL	BDL
2-Chloronaphthalene	BDL	BDL	BDL
1,2-Dichlorobenzene	21	BDL	BDL
1,3-Dichlorobenzene	9J	29	BDL
1,4-Dichlorobenzene	24	140	BDL
3,3-Dichlorobenzidine (2)	BDL	BDL	BDL
2,4-Dinitrotoluene	BDL	BDL	BDL
2,6-Dinitrotoluene	BDL	BDL	BDL
Fluoranthene	BDL	BDL	BDL
4-Chlorophenyl Phenyl Ether	BDL	BDL	BDL
4-Bromophenyl Phenyl Ether	BDL	BDL	BDL
Bis (2-Chloroisopropyl) Ether	BDL	BDL	BDL
Bis (2-Chloroethoxy) Methane	BDL	BDL	BDL
Hexachlorobutadiene	BDL	BDL	BDL
Hexachlorocyclopentadiene	BDL	BDL	BDL
Isophorone	BDL	BDL	BDL
Naphthalene	6J	BDL	BDL
Nitrobenzene	BDL	BDL	BDL
N-Nitrosodiphenylamine	BDL	BDL	BDL
N-Nitrosodi-N-Propylamine	BDL	BDL	BDL
Bis-(2-Ethylhexyl) Phthalate	5JC	BDL	BDL

(1) BDL = Below Detection Limit.
Detection Limit = 20 ug/l.
(2) Detection Limit for 3,3-Dichlorobenzidine = 40 ug/l.
J = An estimated value. The mass spectrum indicates the presence of the compound, but the calculated result is less than the reliable detection limit for this compound. C = The result has been corrected for the presence of the compound in the blank.

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REPORT OF ANALYSIS

EPA Method 8270-SEMI-VOLATILE ORGANICS

Client: GHR Engineering Associates, Inc. Job No.: 37-613
Project: Whitney Barrel JN 3661-002

Date Collected: October 17, 1988 Date Extracted: October 25, 1988
Collected by: RDC/BEM Analyzed by: Aquatec, Inc.

Sample Location:	MW-4 water	MW-5 water	MW-6 Field Blank water
GHR Lab ID:	87492	87493	87494

Parameter	Concentration in ug/l (ppb)		
Benzyl Butyl Phthalate	BDL (1)	BDL	BDL
Di-N-Butyl Phthalate	BDL	BDL	BDL
Di-N-Octyl Phthalate	BDL	BDL	BDL
Diethyl Phthalate	8JC	BDL	BDL
Dimethyl Phthalate	BDL	BDL	BDL
Benzo(A)Anthracene	BDL	BDL	BDL
Benzo(A)Pyrene	BDL	BDL	BDL
Benzo(B)Fluoranthene	BDL	BDL	BDL
Benzo(K)Fluoranthene	BDL	BDL	BDL
Chrysene	BDL	BDL	BDL
Acenaphthylene	BDL	BDL	BDL
Anthracene	BDL	BDL	BDL
Benzo(GHI)Perylene	BDL	BDL	BDL
Fluorene	BDL	BDL	BDL
Phenanthrene	BDL	BDL	BDL
Dibenzo(AH)Anthracene	BDL	BDL	BDL
Indeno(1,2,3-CD)Pyrene	BDL	BDL	BDL
Pyrene	BDL	BDL	BDL
Benzyl Alcohol	BDL	BDL	BDL
4-Chloroaniline	BDL	BDL	BDL
Dibenzofuran	BDL	BDL	BDL
2-Methylnaphthalene	BDL	BDL	BDL
2-Nitroaniline (2)	BDL	BDL	BDL
3-Nitroaniline (2)	BDL	BDL	BDL
4-Nitroaniline (2)	BDL	BDL	BDL

(1) BDL = Below Detection Limit.
Detection Limit = 20 ug/l.
(2) Detection Limit for these compounds = 100 ug/l.

J = An estimated value. The mass spectrum indicates the presence of the compound, but the calculated result is less than the reliable detection limit for this compound. C = The result has been corrected for the presence of the compound in the blank.

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REPORT OF ANALYSIS

ACID EXTRACTABLES

Client: GHR Engineering Associates, Inc. Job No.: 37-613
Project: Whitney Barrel JN 3661-002

Date Collected: October 17, 1988 Date Extracted: October 25, 1988
Collected by: RDC/BEM Analyzed by: Aquatec, Inc.

Sample Location:	MW-4 water	MW-5 water	MW-6 Field Blank water
GHR Lab ID:	87492	87493	87494
Parameter	**Concentration in ug/l (ppb)**		
2,4,6-Trichlorophenol	BDL (1)	BDL	BDL
P-Chloro-m-Cresol	BDL	BDL	BDL
2-Chlorophenol	BDL	BDL	BDL
2,4-Dichlorophenol	BDL	BDL	BDL
2,4-Dimethylphenol	25	BDL	BDL
2-Nitrophenol	BDL	BDL	BDL
4-Nitrophenol (2)	BDL	BDL	BDL
2,4-Dinitrophenol (2)	BDL	BDL	BDL
4,6-Dinitro-2-Methylphenol (2)	BDL	BDL	BDL
Pentachlorophenol (2)	BDL	BDL	BDL
Phenol	15J	BDL	BDL
Benzoic Acid (2)	BDL	BDL	BDL
2-Methylphenol	39	BDL	BDL
4-Methylphenol	30	BDL	BDL
2,4,5-Trichlorophenol (2)	BDL	BDL	BDL

(1) BDL = Below Detection Limit.
Detection Limit = 20 ug/l.
(2) Detection Limit for these compounds = 100 ug/l.

J = An estimated value. The mass spectrum indicates the presence of the compound, but the calculated result is less than the reliable detection limit for this compound.

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METHODS OF ANALYSIS

PARAMETER	METHOD REFERENCE	METHOD DESCRIPTION
Aluminum	Method 202.1 (1)	Atomic Absorption, Flame
Antimony	Method 204.1 (1)	Atomic Absorption, Flame
Arsenic	Method 206.2 (1)	Atomic Absorption, Furnace
Barium	Method 208.1 (1)	Atomic Absorption, Flame
Cadmium	Method 213.1 (1)	Atomic Absorption, Flame
Calcium	Method 215.1 (1)	Atomic Absorption, Flame
Chromium-Total	Method 218.1 (1)	Atomic Absorption, Flame
Cobalt	Method 219.1 (1)	Atomic Absorption, Flame
Copper	Method 220.1 (1)	Atomic Absorption, Flame
Iron	Method 236.1 (1)	Atomic Absorption, Flame
Lead	Method 239.1 (1)	Atomic Absorption, Flame
Magnesium	Method 242.1 (1)	Atomic Absorption, Flame
Manganese	Method 243.1 (1)	Atomic Absorption, Flame
Mercury	Method 245.1 (1)	Manual Cold Vapor
Nickel	Method 249.1 (1)	Atomic Absorption, Flame
Potassium	Method 258.1 (1)	Atomic Flame
Selenium	Method 270.2 (1)	Atomic Absorption, Furnace
Silver	Method 272.1 (1)	Atomic Absorption, Flame
Sodium	Method 273.1 (1)	Atomic Absorption, Flame
Thallium	Method 279.1 (1)	Atomic Absorption, Flame
Vanadium	Method 286.1 (1)	Atomic Absorption, Flame
Zinc	Method 289.1 (1)	Atomic Absorption, Flame

ORGANIC ANALYSIS

Volatile Organics - water	Method 8240 (3)	Purge and trap, gas chromatography/mass spectrometry
Semi-Volatile Organics- water Acid/Base/Neutrals	Method 8270 (3)	Soxhlet extraction, gas chromatography/, mass spectrometry
Pesticides & PCB's - water	Method 608 (2)	Solvent extraction, as chromatography/electron capture detection

(1) U.S. EPA, 1979. "Methods for Chemical Analysis of Water and Wastes". EPA 600/4-79-020, EPA/EMSL, Cincinnati, Ohio.

(2) U.S. EPA, 1982. "Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater". EPA 600/4-82-057. EPA/EMSL, Cincinnati, Ohio.

(3) U.S. EPA, 1986. "Test Methods for Evaluating Solid Waste" SW-846. Volumes 1 & 2:

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Certification of Results

The enclosed results of analyses are representative of the sample(s) as received by the laboratory. GHR Analytical makes no representations or certifications as to the method of sample collection, sample identification or transportation/handling procedures used prior to the receipt of samples by GHR Analytical.

To the best of my knowledge, the information contained in this report is accurate and complete.

Approved by: ______________________ Date: 11/30/88

James E. Mich
Laboratory Manager

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REPORT OF ANALYSIS

EPA Method 8270

Client: GHR Engineering Associates, Inc. Job No.: 37-066
Project: Whitney Barrel JN 3661002

Date Extracted: September 1, 1988
Collected by: RDC/BEM Analyzed by: Aquatec, Inc.

Sample ID:	TP-7 Soil	TP-9 Soil	TP-11 Soil
Date Collected:	8/26/88	8/25/88	8/25/88
GHR Lab ID:	84978	84979	84980

Parameter	Concentration in ug/kg (ppb)		
Acenaphthene	BDL (1)	BDL	130J
1,2,4-Trichlorobenzene	170J	BDL	2,000
Hexachlorobenzene	BDL	BDL	BDL
Hexachloroethane	BDL	BDL	BDL
Bis (2-Chloroethyl) Ether	BDL	BDL	BDL
2-Chloronaphthalene	BDL	BDL	BDL
1,2-Dichlorobenzene	BDL	BDL	73J
1,3-Dichlorobenzene	BDL	BDL	300J
1,4-Dichlorobenzene	81J	BDL	900
3,3-Dichlorobenzidine (2)	BDL	BDL	BDL
2,4-Dinitrotoluene	BDL	BDL	BDL
2,6-Dinitrotoluene	BDL	BDL	BDL
Fluoranthene	130J	BDL	100J
4-Chlorophenyl Phenyl Ether	BDL	BDL	BDL
4-Bromophenyl Phenyl Ether	BDL	BDL	BDL
Bis (2-Chloroisopropyl) Ether	BDL	BDL	BDL
Bis (2-Chloroethoxy) Methane	BDL	BDL	BDL
Hexachlorobutadiene	BDL	BDL	BDL
Hexachlorocyclopentadiene	BDL	BDL	BDL
Isophorone	BDL	BDL	BDL
Naphthalene	BDL	BDL	210J
Nitrobenzene	BDL	BDL	BDL
N-Nitrosodiphenylamine	BDL	BDL	BDL
N-Nitrosodi-N-Propylamine	BDL	BDL	BDL
Bis-(2-Ethylhexyl) Phthalate	390	390	1,300

(1) BDL = Below Detection Limit.
Detection Limit = 330 ug/kg (ppb).
(2) Detection Limit for 3,3-Dichlorobenzidine = 660 ug/kg (ppb).
J = An estimated value. The mass spectrum indicates the presence of the compound, but the calculated result is less than the reliable detection limit for this compound.

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REPORT OF ANALYSIS

EPA Method 8270

Client: GHR Engineering Associates, Inc. Job No.: 37-066
Project: Whitney Barrell JN 3661002

Date Extracted: September 1, 1988
Collected by: RDC/BEM Analyzed by: Aquatec, Inc.

Sample ID:	TP-7 Soil	TP-9 Soil	TP-11 Soil
Date Collected:	8/26/88	8/25/88	8/25/88
GHR Lab ID:	84978	84979	84980

Parameter	Concentration in ug/kg (ppb)		
Benzyl Butyl Phthalate	BDL (1)	BDL	BDL
Di-N-Butyl Phthalate	BDL	BDL	BDL
Di-N-Octyl Phthalate	BDL	BDL	BDL
Diethyl Phthalate	BDL	BDL	BDL
Dimethyl Phthalate	BDL	BDL	BDL
Benzo(A)Anthracene	110J	BDL	BDL
Benzo(A)Pyrene	170J	BDL	BDL
Benzo(B)Fluoranthene	130J	BDL	75J
Benzo(K)Fluoranthene	120J	BDL	BDL
Chrysene	140J	BDL	BDL
Acenaphthylene	BDL	BDL	BDL
Anthracene	BDL	BDL	BDL
Benzo(GHI)Perylene	150J	BDL	BDL
Fluorene	BDL	74J	73J
Phenanthrene	75J	120J	110J
Dibenzo(AH)Anthracene	65J	BDL	BDL
Indeno(1,2,3-CD)Pyrene	110J	BDL	BDL
Pyrene	260J	70J	120J
Benzyl Alcohol	BDL	BDL	BDL
4-Chloroaniline	BDL	BDL	BDL
Dibenzofuran	BDL	BDL	66J
2-Methylnaphthalene	BDL	210J	72J
2-Nitroaniline (2)	BDL	BDL	BDL
3-Nitroaniline (2)	BDL	BDL	BDL
4-Nitroaniline (2)	BDL	BDL	BDL

(1) BDL = Below Detection Limit.
Detection Limit = 330 ug/kg (ppb).
(2) Detection Limit for these compounds = 1,600 ug/kg (ppb).
J = An estimated value. The mass spectrum indicates the presence of the compound, but the calculated result is less than the reliable detection limit for this compound.

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REPORT OF ANALYSIS

EPA METHOD 8270 - SEMI-VOLATILE ORGANICS

Client: GHR Engineering Associates, Inc. Job No.: 37-130
Project: Whitney Barrel JN 3661002

Date Received: September 2, 1988 Date Extracted: September 13 & 21, 1988
Collected by: M. Hawiger Analyzed by: Aquatec, Inc.

Sample ID:	SD-1 Soil
Date Collected:	9/1/88
GHR Lab ID:	85280

Parameter	Concentration in ug/kg (ppb)
Acenaphthene	BDL (1)
1,2,4-Trichlorobenzene	BDL
Hexachlorobenzene	BDL
Hexachloroethane	BDL
Bis (2-Chloroethyl) Ether	BDL
2-Chloronaphthalene	BDL
1,2-Dichlorobenzene	BDL
1,3-Dichlorobenzene	BDL
1,4-Dichlorobenzene	BDL
3,3-Dichlorobenzidine (2)	BDL
2,4-Dinitrotoluene	BDL
2,6-Dinitrotoluene	BDL
Fluoranthene	BDL
4-Chlorophenyl Phenyl Ether	BDL
4-Bromophenyl Phenyl Ether	BDL
Bis (2-Chloroisopropyl) Ether	BDL
Bis (2-Chloroethoxy) Methane	BDL
Hexachlorobutadiene	BDL
Hexachlorocyclopentadiene	BDL
Isophorone	BDL
Naphthalene	6,600J
Nitrobenzene	BDL
N-Nitrosodiphenylamine	BDL
N-Nitrosodi-N-Propylamine	BDL
Bis-(2-Ethylhexyl) Phthalate	40,000,000

(1) BDL = Below Detection Limit.
Detection Limit = 10,000 ug/kg (ppb).
(2) Detection Limit for 3,3-Dichlorobenzidine = 20,000 ug/kg (ppb).

J = An estimated value. The mass spectrum indicates the presence of the compound, but the calculated result is less than the reliable detection limit for this compound.

GHR ANALYTICAL
A DIVISION OF GHR ENGINEERING ASSOCIATES, INC.
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REPORT OF ANALYSIS

EPA METHOD 8270 - SEMI-VOLATILE ORGANICS

Client: GHR Engineering Associates, Inc. Job No.: 37-130
Project: Whitney Barrel JN 3661002

Date Received: September 2, 1988 Date Extracted: September 13 & 21, 1988
Collected by: M. Haviger Analyzed by: Aquatec, Inc.

Sample ID:	SD-1 Soil
Date Collected:	9/1/88
GHR Lab ID:	85280

Parameter	Concentration in ug/kg (ppb)	
Benzyl Butyl Phthalate	23,000,000	
Di-N-Butyl Phthalate	52,000	
Di-N-Octyl Phthalate	75,000	
Diethyl Phthalate	18,000	
Phthalate		BDL (1)
Benzo(A)Anthracene		BDL
Benzo(A)Pyrene		BDL
Benzo(B)Fluoranthene		BDL
Benzo(K)Fluoranthene		BDL
Chrysene		BDL
Acenaphthylene		BDL
Anthracene		BDL
Benzo(GHI)Perylene		BDL
Fluorene		BDL
Phenanthrene	5,000J	
Dibenzo(AH)Anthracene		BDL
Indeno(1,2,3-CD)Pyrene		BDL
Pyrene		BDL
Benzyl Alcohol	76,000	
4-Chloroaniline		BDL
Dibenzofuran		BDL
2-Methylnaphthalene	6,500J	
2-Nitroaniline (2)		BDL
3-Nitroaniline (2)		BDL
4-Nitroaniline (2)		BDL

(1) BDL = Below Detection Limit.
Detection Limit = 10,000 ug/kg (ppb).
(2) Detection Limit for these compounds = 50,000 ug/kg (ppb).

J = An estimated value. The mass spectrum indicates the presence of the compound, but the calculated result is less than the reliable detection limit for this compound.

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REPORT OF ANALYSIS

EPA METHOD 8270 - SEMI-VOLATILE ORGANICS

Client: GHR Engineering Associates, Inc. Job No.: 37-130
Project: Whitney Barrel JN 3661002

Date Received: September 2, 1988 Date Extracted: October 13, 1988
Collected by: M. Haviger Analyzed by: Aquatec, Inc.

Sample ID:	B-7 Soil composite 0-2', 4-6', 9-11'	B-8 Soil composite
Date Collected:	9/1/88	9/1/88
GHR Lab ID:	85278	85279

Parameter	Concentration in ug/kg (ppb)	
Benzyl Butyl Phthalate	5,700	BDL (1)
Di-N-Butyl Phthalate	110J	94J
Di-N-Octyl Phthalate	BDL	BDL
Diethyl Phthalate	BDL	BDL
Dimethyl Phthalate	BDL	BDL
Benzo(A)Anthracene	BDL	69J
Benzo(A)Pyrene	BDL	BDL
Benzo(B)Fluoranthene	BDL	BDL
Benzo(K)Fluoranthene	BDL	BDL
Chrysene	BDL	BDL
Acenaphthylene	BDL	BDL
Anthracene	BDL	BDL
Benzo(GHI)Perylene	BDL	BDL
Fluorene	BDL	BDL
Phenanthrene	BDL	64J
Dibenzo(AH)Anthracene	BDL	BDL
Indeno(1,2,3-CD)Pyrene	BDL	BDL
Pyrene	BDL	100J
Benzyl Alcohol	BDL	BDL
4-Chloroaniline	BDL	BDL
Dibenzofuran	BDL	BDL
2-Methylnaphthalene	BDL	BDL
2-Nitroaniline (2)	BDL	BDL
3-Nitroaniline (2)	BDL	BDL
4-Nitroaniline (2)	BDL	BDL

(1) BDL = Below Detection Limit.
Detection Limit = 330 ug/kg (ppb).
(2) Detection Limit for these compounds = 1,600 ug/kg (ppb).

J = An estimated value. The mass spectrum indicates the presence of the compound, but the calculated result is less than the reliable detection limit for this compound.

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REPORT OF ANALYSIS

ACID EXTRACTABLES

Client: GHR Engineering Associates, Inc. Job No.: 37-130
Project: Whitney Barrel JN 3661002

Date Received: September 2, 1988 Date Extracted: October 13, 1988
Collected by: M. Hawiger Analyzed by: Aquatec, Inc.

Sample ID:	B-7 Soil composite 0-2', 4-6', 9-11'	B-8 Soil composite
Date Collected:	9/1/88	9/1/88
GHR Lab ID:	85278	85279

Parameter	Concentration in ug/kg (ppb)	
2,4,6-Trichlorophenol	BDL (1)	BDL
P-Chloro-m-Cresol	BDL	BDL
2-Chlorophenol	BDL	BDL
2,4-Dichlorophenol	BDL	BDL
2,4-Dimethylphenol	BDL	BDL
2-Nitrophenol	BDL	BDL
4-Nitrophenol (2)	BDL	BDL
2,4-Dinitrophenol (2)	BDL	BDL
4,6-Dinitro-2-Methylphenol (2)	BDL	BDL
Pentachlorophenol (2)	BDL	BDL
Phenol	BDL	BDL
Benzoic Acid (2)	BDL	BDL
2-Methylphenol	BDL	BDL
4-Methylphenol	BDL	BDL
2,4,5-Trichlorophenol (2)	BDL	BDL

(1) BDL = Below Detection Limit.
Detection Limit = 330 ug/kg (ppb).
(2) Detection Limit for these compounds = 1,600 ug/kg (ppb).

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REPORT OF ANALYSIS
EPA METHOD 8240 - VOLATILE ORGANICS

Client: GHR Engineering Associates, Inc. Job No.: 37-130
Project: Whitney Barrel JN 3661002

Date Received: September 2, 1988 Date Analyzed: September 30, 1988
Collected by: M. Hawiger Analyzed by: Aquatec, Inc.

Sample ID:	SD-1 Soil
Date Collected:	9/1/88
GHR Lab ID:	85280

Parameter	Concentration in ug/kg (ppb)
Benzene	BDL (1)
Carbon Tetrachloride	BDL
Chlorobenzene	7,500
1,2-Dichloroethane	BDL
1,1,1-Trichloroethane	1,400J
1,1-Dichloroethane	1,900J
1,1,2-Trichloroethane	BDL
1,1,2,2-Tetrachloroethane	BDL
Chloroethane (2)	BDL
2-Chloroethyl Vinyl Ether (2)	BDL
Chloroform	BDL
1,1-Dichloroethene	BDL
1,2-Dichloroethene	BDL
1,2-Dichloropropane	BDL
Trans-1,3-Dichloropropene	BDL
Cis-1,3-Dichloropropene	BDL
Ethylbenzene	9,900
Methylene Chloride	LCB
Chloromethane (2)	BDL
Bromomethane (2)	BDL
Bromoform	BDL
Bromodichloromethane	BDL
Dibromochloromethane	BDL
Tetrachloroethene	2,100J
Toluene	90,000C
Trichloroethene	BDL
Vinyl Chloride (2)	BDL
Acetone (2)	LCB
2-Butanone (2)	LCB
Carbon Disulfide	BDL
2-Hexanone (2)	BDL
4-Methyl-2-Pentanone (2)	BDL
Styrene	BDL
Vinyl Acetate (2)	BDL
Total Xylenes	46,000

(1) BDL = Below Detection Limit. (2) Detection Limit for these compounds = 7,000 ug/kg(ppb). Detection Limit= 3,500 ug/kg (ppb). LCB = Compound was found but at low concentration, comparable to that in the blank. Quantitation is not possible. J = An estimated value. The mass spectrum indicates the presence of the compound, but the calculated result is less than the reliable detection limit for this compound. C = The result has been corrected for the presence of the compound in the blank.

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REPORT OF ANALYSIS

TRACE METALS

Client: GHR Engineering Associates, Inc. Job No: 37-066
Project: Whitney Barrel JN 3661002

Date Collected: August 26, 1988
Collected by: RDC/BEM

Sample ID:	TP-17 Soil	TP-18 Soil	TP-19 Soil	Detection Limit
GHR Lab ID:	84984	84985	84986	
Parameter	**Test Results in mg/kg (ppm) dry wt.**			
Aluminum	3,710	3,590	4,360	
Antimony	BDL (1)	BDL	BDL	20
Arsenic	3.80	2.80	375	
Barium	56	BDL	10	10
Beryllium	BDL	BDL	BDL	2.0
Cadmium	BDL	BDL	BDL	1.00
Calcium	1,500	422	424	
Chromium	420	12.0	10.0	
Cobalt	BDL	BDL	BDL	5.0
Copper	13.0	4.0	3.0	
Iron	4,980	3,450	3,490	
Lead	252	10.0	BDL	10.0
Magnesium	1,070	846	980	
Manganese	62.0	34.0	42.0	
Mercury	0.66	0.48	0.60	

(1) BDL = Below Detection Limit.

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REPORT OF ANALYSIS

TRACE METALS

Client: GHR Engineering Associates, Inc. Job No: 37-066
Project: Whitney Barrel JN 3661002

Date Collected: August 26, 1988
Collected by: RDC/BEM

Sample ID:	TP-17 Soil	TP-18 Soil	TP-19 Soil	Detection Limit
GHR Lab ID:	84984	84985	84986	
Parameter	Test Results in mg/kg (ppm) dry wt.			
Nickel	8.0	8.0	6.0	
Potassium	393	293	379	
Selenium	BDL (1)	BDL	BDL	0.50
Silver	BDL	BDL	BDL	1.0
Sodium	78.0	33.0	100	
Thallium	BDL	BDL	BDL	10
Vanadium	BDL	BDL	BDL	20
Zinc	66.0	15.0	10.0	

(1) BDL = Below Detection Limit.

FINAL REPORT

GHR Engineering Associates, Inc.
1050 Waltham Street
Lexington, MA 02173

PROJECT: Whitney Barrel JN 3661-002

GHR ANALYTICAL JOB NUMBER: 37-613

PREPARED BY: GHR Analytical

DATE PREPARED: November 30, 1988

GHR ANALYTICAL
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LAKEVILLE, MA
02347
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617 763 8404

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A DIVISION OF GHR ENGINEERING ASSOCIATES, INC.
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REPORT OF ANALYSIS

TRACE METALS

Client: GHR Engineering Associates, Inc. Job No: 37-613
Project: Whitney Barrel JN 3661-002

Date Collected: October 17, 1988
Collected by: RDC/BEM

Sample Location:	MW-1 water	MW-2 water	MW-3 water	Detection Limit
GHR Lab ID:	87489	87490	87491	
Parameter	Test Results in mg/l			
Aluminum	5.6	1.4	BDL (1)	0.5
Antimony	BDL	BDL	BDL	0.2
Arsenic	0.011	0.003	0.062	
Barium	BDL	BDL	BDL	0.1
Beryllium	BDL	BDL	BDL	0.02
Cadmium	BDL	BDL	BDL	0.010
Calcium	62.4	23.8	60.8	
Chromium	BDL	BDL	BDL	0.02
Cobalt	BDL	BDL	BDL	0.05
Copper	BDL	BDL	BDL	0.02
Iron	13.5	4.20	35.0	
Lead	BDL	BDL	BDL	0.10
Magnesium	6.10	2.04	10.9	
Manganese	1.78	0.68	1.52	
Mercury	BDL	BDL	BDL	0.0002

(1) BDl = Below Detection Limit.

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REPORT OF ANALYSIS

TRACE METALS

Client: GHR Engineering Associates, Inc. Job No: 87-613
Project: Whitney Barrel JN 3661-002

Date Collected: October 17, 1988
Collected by: RDC/BEM

Sample Location:	MW-1 water	MW-2 water	MW-3 water	Detection Limit
GHR Lab ID:	87489	87490	87491	
Parameter	Test Results in mg/l			
Nickel	BDL (1)	BDL	BDL	0.04
Potassium	6.7	11.1	12.8	
Selenium	BDL	BDL	BDL	0.002
Silver	BDL	BDL	BDL	0.01
Sodium	34.6	50.8	185	
Thallium	BDL	BDL	BDL	0.1
Vanadium	BDL	BDL	BDL	0.2
Zinc	0.06	BDL	0.06	0.02

(1) BDL = Below Detection Limit.

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REPORT OF ANALYSIS

EPA METHOD 608 - PESTICIDES & PCB'S

Client: GHR Engineering Associates, Inc. Job No.: 37-613
Project: Whitney Barrel JN 3661-002

Date Collected: October 17, 1988 Date Extracted: October 19, 1988
Collected by: RDC/BEM Analyzed by: DMJ

Sample Location:	MW-1 water	MW-2 water	MW-3 water	Detection Limit
GHR Lab ID:	87489	87490	87491	
Parameter	Concentration in ug/l (ppb)			
Aldrin	BDL (1)	BDL	BDL	0.1
Alpha-BHC	BDL	BDL	BDL	0.1
Beta-BHC	BDL	BDL	BDL	0.1
Gamma-BHC (Lindane)	BDL	BDL	BDL	0.1
Delta-BHC	BDL	BDL	BDL	0.1
Chlordane	BDL	BDL	BDL	1.0
4,4'-DDT	BDL	BDL	BDL	0.1
4,4'-DDE	BDL	BDL	BDL	0.1
4,4'-DDD	BDL	BDL	BDL	0.1
Dieldrin	BDL	BDL	BDL	0.1
Alpha-Endosulfan	BDL	BDL	BDL	0.1
Beta-Endosulfan	BDL	BDL	BDL	0.1
Endosulfan Sulfate	BDL	BDL	BDL	0.1
Endrin	BDL	BDL	BDL	0.1
Endrin Aldehyde	BDL	BDL	BDL	0.1
Heptachlor	BDL	BDL	BDL	0.1
Heptachlor Epoxide	BDL	BDL	BDL	0.1
Methoxychlor	BDL	BDL	BDL	1.0
Toxaphene	BDL	BDL	BDL	1.0
PCB-1242	BDL	BDL	BDL	1.0
PCB-1254	BDL	BDL	BDL	1.0
PCB-1221	BDL	BDL	BDL	1.0
PCB-1232	BDL	BDL	BDL	1.0
PCB-1248	BDL	BDL	BDL	1.0
PCB-1260	BDL	2.8	2.2	1.0
PCB-1016	BDL	BDL	BDL	1.0

(1) BDL = Below Detection Limit.

See attached sheet for GC Operating Conditions.

GHR ANALYTICAL
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REPORT OF ANALYSIS
EPA Method 8240-VOLATILE ORGANICS

Client: GHR Engineering Associates, Inc. Job No.: 37-613
Project: Whitney Barrel JN 3661-002

Date Collected: October 17, 1988 Date Analyzed: October 20, 1988
Collected by: RDC/BEM Analyzed by: Aquatec, Inc.

Sample ID:	MW-1 water	MW-2 water	MW-3 water
GHR Lab ID:	87489	87490	87491
VOLATILE ORGANICS	Concentration in ug/l (ppb)		
Benzene	5	BDL(1)	12
Carbon Tetrachloride	BDL	BDL	BDL
Chlorobenzene	3J	39	2J
1,2-Dichloroethane	BDL	BDL	BDL
1,1,1-Trichloroethane	BDL	BDL	BDL
1,1-Dichloroethane	BDL	BDL	43
1,1,2-Trichloroethane	BDL	BDL	BDL
1,1,2,2-Tetrachloroethane	BDL	BDL	BDL
Chloroethane (2)	BDL	BDL	BDL
2-Chloroethyl Vinyl Ether (2)	BDL	BDL	BDL
Chloroform	BDL	BDL	BDL
1,1-Dichloroethene	BDL	BDL	BDL
1,2-Dichloroethene	39	49	77
1,2-Dichloropropane	BDL	BDL	BDL
Trans-1,3-Dichloropropene	BDL	BDL	BDL
Cis-1,3-Dichloropropene	BDL	BDL	BDL
Ethylbenzene	2J	7	31
Methylene Chloride	LCB	LCB	LCB
Chloromethane(2)	BDL	BDL	BDL
Bromomethane (2)	BDL	BDL	BDL
Bromoform	BDL	BDL	BDL
Bromodichloromethane	BDL	BDL	BDL
Dibromochloromethane	BDL	BDL	BDL
Tetrachloroethene	BDL	BDL	BDL
Toluene	BDL	1J	26
Trichloroethene	BDL	BDL	BDL
Vinyl Chloride (2)	11	18	32
Acetone (2)	LCB	BDL	LCB
2-Butanone (2)	LCB	BDL	LCB
Carbon Disulfide	BDL	BDL	BDL
2-Hexanone (2)	BDL	BDL	BDL
4-Methyl-2-Pentanone (2)	BDL	BDL	5J
Styrene	BDL	BDL	BDL
Vinyl Acetate (2)	BDL	BDL	BDL
Total Xylenes	5	5	96

(1) BDL = Below Detection Limit. Detection Limit= 5 ug/l (ppb). (2) Detection Limit for these compounds = 10 ug/l (ppb).

J = An estimated value. The mass spectrum indicates the presence of the compound, but the calculated result is less than the reliable detection limit for this compound. LCB = Compound was found but at low concentration, comparable to that in the blank. Quantitation is not possible.

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REPORT OF ANALYSIS
EPA Method 8240

Client: GHR Engineering Associates, Inc. Job No.: 37-066
Project: Whitney Barrel JN 3661002

Date Collected: August 26, 1988 Date Analyzed: September 25, 1988
Collected by: RDC/BEM Analyzed by: Aquatec, Inc.

Sample ID:	TP-17 Soil	TP-18 Soil	TP-19 Soil
GHR Lab ID:	84984	84985	84986
VOLATILE ORGANICS	Concentration in ug/kg (ppb)		
Benzene	BDL (1)	BDL	BDL
Carbon Tetrachloride	BDL	BDL	BDL
Chlorobenzene	BDL	BDL	280
1,2-Dichloroethane	BDL	BDL	BDL
1,1,1-Trichloroethane	BDL	BDL	2,000
1,1-Dichloroethane	BDL	BDL	BDL
1,1,2-Trichloroethane	BDL	BDL	BDL
1,1,2,2-Tetrachloroethane	BDL	BDL	BDL
Chloroethane (2)	BDL	BDL	BDL
2-Chloroethyl Vinyl Ether (2)	BDL	BDL	BDL
Chloroform	BDL	BDL	BDL
1,1-Dichloroethene	BDL	BDL	BDL
1,2-Dichloroethene	BDL	BDL	32
1,2-Dichloropropane	BDL	BDL	BDL
Trans-1,3-Dichloropropene	BDL	BDL	BDL
Cis-1,3-Dichloropropene	BDL	BDL	BDL
Ethylbenzene	BDL	BDL	3,900
Methylene Chloride	LCB	LCB	LCB
Chloromethane (2)	BDL	BDL	BDL
Bromomethane (2)	BDL	BDL	BDL
Bromoform	BDL	BDL	BDL
Bromodichloromethane	BDL	BDL	BDL
Dibromochloromethane	BDL	BDL	BDL
Tetrachloroethene	BDL	BDL	130,000
Toluene	BDL	BDL	26,000
Trichloroethene	BDL	BDL	120,000
Vinyl Chloride (2)	BDL	BDL	BDL
Acetone (2)	LCB	LCB	LCB
2-Butanone (2)	BDL	BDL	LCB
Carbon Disulfide	BDL	BDL	BDL
2-Hexanone (2)	BDL	BDL	BDL
4-Methyl-2-Pentanone (2)	BDL	BDL	BDL
Styrene	BDL	BDL	BDL
Vinyl Acetate (2)	BDL	BDL	BDL
Total Xylenes	BDL	BDL	28,000

(1) BDL = Below Detection Limit. Detection Limit = 5 ug/kg (ppb).
(2) Detection Limit for these compounds = 10 ug/kg (ppb).
LCB = Compound was found but at low concentration, comparable to that in the blank. Quantitation is not possible.

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REPORT OF ANALYSIS

EPA Method 8270

Client: GHR Engineering Associates, Inc. Job No.: 37-066
Project: Whitney Barrel JN 3661002

Date Collected: August 26, 1988 Date Extracted: September 1, 1988
Collected by: RDC/BEM Analyzed by: Aquatec, Inc.

Sample ID:	TP-17 Soil	TP-18 Soil
GHR Lab ID:	84984	84985
Parameter	**Concentration in ug/kg (ppb)**	
Acenaphthene	2,300	BDL (1)
1,2,4-Trichlorobenzene	170J	71J
Hexachlorobenzene	BDL	BDL
Hexachloroethane	BDL	BDL
Bis (2-Chloroethyl) Ether	BDL	BDL
2-Chloronaphthalene	BDL	BDL
1,2-Dichlorobenzene	BDL	BDL
1,3-Dichlorobenzene	360	BDL
1,4-Dichlorobenzene	920	BDL
3,3-Dichlorobenzidine (2)	BDL	BDL
2,4-Dinitrotoluene	BDL	BDL
2,6-Dinitrotoluene	BDL	BDL
Fluoranthene	2,600	80J
4-Chlorophenyl Phenyl Ether	BDL	BDL
4-Bromophenyl Phenyl Ether	BDL	BDL
Bis (2-Chloroisopropyl) Ether	BDL	BDL
Bis (2-Chloroethoxy) Methane	BDL	BDL
Hexachlorobutadiene	BDL	BDL
Hexachlorocyclopentadiene	BDL	BDL
Isophorone	BDL	BDL
Naphthalene	3,900	BDL
Nitrobenzene	BDL	BDL
N-Nitrosodiphenylamine	BDL	BDL
N-Nitrosodi-N-Propylamine	BDL	BDL
Bis-(2-Ethylhexyl) Phthalate	580	310J

(1) BDL = Below Detection Limit.
Detection Limit = 330 ug/kg (ppb).
(2) Detection Limit for 3,3-Dichlorobenzidine = 660 ug/kg (ppb).
J = An estimated value. The mass spectrum indicates the presence of the compound, but the calculated result is less than the reliable detection limit for this compound.

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REPORT OF ANALYSIS

EPA Method 8270

Client: GHR Engineering Associates, Inc. Job No.: 37-066
Project: Whitney Barrel JN 3661002

Date Collected: August 26, 1988 Date Extracted: September 1, 1988
Collected by: RDC/BEM Analyzed by: Aquatec, Inc.

Sample ID:	TP-17 Soil	TP-18 Soil
GHR Lab ID:	84984	84985

Parameter	Concentration in ug/kg (ppb)	
Benzyl Butyl Phthalate	BDL (1)	BDL
Di-N-Butyl Phthalate	BDL	BDL
Di-N-Octyl Phthalate	BDL	BDL
Diethyl Phthalate	BDL	BDL
Dimethyl Phthalate	BDL	BDL
Benzo(A)Anthracene	640	BDL
Benzo(A)Pyrene	440	BDL
Benzo(B)Fluoranthene	560	BDL
Benzo(K)Fluoranthene	290J	BDL
Chrysene	800	BDL
Acenaphthylene	200J	BDL
Anthracene	1,400	BDL
Benzo(GHI)Perylene	320J	BDL
Fluorene	1,600	BDL
Phenanthrene	2,400	97J
Dibenzo(AH)Anthracene	180J	BDL
Indeno(1,2,3-CD)	290J	BDL
Pyrene	2,500	83J
Benzyl Alcohol	BDL	BDL
4-Chloroaniline	BDL	BDL
Dibenzofuran	820	BDL
2-Methylnaphthalene	820	75J
2-Nitroaniline (2)	BDL	BDL
3-Nitroaniline (2)	BDL	BDL
4-Nitroaniline (2)	BDL	BDL

(1) BDL = Below Detection Limit.
Detection Limit = 330 ug/kg (ppb).
(2) Detection Limit for these compounds = 1,600 ug/kg (ppb).
J = An estimated value. The mass spectrum indicates the presence of the compound, but the calculated result is less than the reliable detection limit for this compound.

GHR ANALYTICAL
A DIVISION OF GHR ENGINEERING ASSOCIATES, INC.
26 MAIN STREET
LAKEVILLE, MA 02347
(508) 947-5077

REPORT OF ANALYSIS

EPA Method 8270

Client: GHR Engineering Associates, Inc. Job No.: 37-066
Project: Whitney Barrel JN 3661002

Date Collected: August 26, 1988 Date Extracted: September 1, 1988
Collected by: RDC/BEM Analyzed by: Aquatec, Inc.

Sample ID:	TP-17 Soil	TP-18 Soil
GHR Lab No.:	84984	84985
Parameter	**Concentration in ug/kg (ppb)**	
2,4,6-Trichlorophenol	BDL (1)	BDL
P-Chloro-m-Cresol	BDL	BDL
2-Chlorophenol	BDL	BDL
2,4-Dichlorophenol	BDL	BDL
2,4-Dimethylphenol	BDL	BDL
2-Nitrophenol	BDL	BDL
4-Nitrophenol (2)	BDL	BDL
2,4-Dinitrophenol (2)	BDL	BDL
4,6-Dinitro-2-Methylphenol (2)	BDL	BDL
Pentachlorophenol (2)	BDL	BDL
Phenol	BDL	BDL
Benzoic Acid (2)	BDL	BDL
2-Methylphenol	BDL	BDL
4-Methylphenol	BDL	BDL
2,4,5-Trichlorophenol (2)	BDL	BDL

(1) BDL = Below Detection Limit.
Detection Limit = 330 ug/kg (ppb).

(2) Detection Limit for these compounds = 1,600 ug/kg (ppb).

J = An estimated value. The mass spectrum indicates the presence of the compound, but the calculated result is less than the reliable detection limit for this compound.

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REPORT OF ANALYSIS

EPA METHOD 8080 - PESTICIDES & PCB'S

Client: GHR Engineering Associates, Inc. Job No.: 37-066
Project: Whitney Barrel
JN 3661002

Date Collected: August 26, 1988 Date Extracted: September 1, 1988
Collected by: RDC/BEM Extracted by: DMJ

Sample ID:	TP-17 Soil	Detection Limit	TP-18 Soil	Detection Limit	TP-19 Soil	Detection Limit
GHR Lab ID:	84984		84985		84986	
Parameter	Concentration in mg/kg (ppm) dry wt.					
Aldrin	BDL(1)	0.1	BDL	0.01	BDL	1.0
Alpha-BHC	BDL	0.1	BDL	0.01	BDL	1.0
Beta-BHC	BDL	0.1	BDL	0.01	BDL	1.0
Gamma-BHC (Lindane)	BDL	0.1	BDL	0.01	BDL	1.0
Delta-BHC	BDL	0.1	BDL	0.01	BDL	1.0
Chlordane	5.97	1.0	0.31	0.1	19.5	10
4,4'-DDT	BDL	0.1	BDL	0.01	BDL	1.0
4,4'-DDE	BDL	0.1	BDL	0.01	BDL	1.0
4,4'-DDD	BDL	0.1	BDL	0.01	BDL	1.0
Dieldrin	BDL	0.1	BDL	0.01	BDL	1.0
Alpha-Endosulfan	BDL	0.1	BDL	0.01	BDL	1.0
Beta-Endosulfan	BDL	0.1	BDL	0.01	BDL	1.0
Endosulfan Sulfate	BDL	0.1	BDL	0.01	BDL	1.0
Endrin	BDL	0.1	BDL	0.01	BDL	1.0
Endrin Aldehyde	BDL	0.1	BDL	0.01	BDL	1.0
Heptachlor	BDL	0.1	BDL	0.01	BDL	1.0
Heptachlor Epoxide	BDL	0.1	BDL	0.01	BDL	1.0
Methoxychlor	BDL	1.0	BDL	0.1	BDL	10
Toxaphene	BDL	1.0	BDL	0.1	BDL	10
PCB-1242	BDL	1.0	BDL	0.1	BDL	10
PCB-1254	BDL	1.0	BDL	0.1	BDL	10
PCB-1221	BDL	1.0	BDL	0.1	BDL	10
PCB-1232	BDL	1.0	BDL	0.1	BDL	10
PCB-1248	BDL	1.0	BDL	0.1	BDL	10
PCB-1260	8.46	1.0	0.54	0.1	94.8	10
PCB-1016	BDL	1.0	BDL	0.1	BDL	10

(1) BDL = Below Detection Limit.
See attached sheet for GC Operating Conditions.

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REPORT OF ANALYSIS

EPA Method 8270

Client: GHR Engineering Associates, Inc.   Job No.: 37-066
Project: Whitney Barrel JN 3661002

Date Collected: August 26, 1988   Date Extracted: September 2, 1988
Collected by: RDC/BEM   Analyzed by: Aquatec, Inc.

Sample ID: TP-19
Soil
GHR Lab ID: 84986

Parameter	Concentration in mg/kg (ppm)
Acenaphthene	5J
1,2,4-Trichlorobenzene	79
Hexachlorobenzene	BDL(1)
Hexachloroethane	BDL
Bis (2-Chloroethyl) Ether	BDL
2-Chloronaphthalene	BDL
1,2-Dichlorobenzene	7J
1,3-Dichlorobenzene	BDL
1,4-Dichlorobenzene	3J
3,3-Dichlorobenzidine (2)	BDL
2,4-Dinitrotoluene	BDL
2,6-Dinitrotoluene	BDL
Fluoranthene	BDL
4-Chlorophenyl Phenyl Ether	BDL
4-Bromophenyl Phenyl Ether	BDL
Bis (2-Chloroisopropyl) Ether	BDL
Bis (2-Chloroethoxy) Methane	BDL
Hexachlorobutadiene	BDL
Hexachlorocyclopentadiene	BDL
Isophorone	BDL
Naphthalene	14
Nitrobenzene	BDL
N-Nitrosodiphenylamine	BDL
N-Nitrosodi-N-Propylamine	BDL
Bis-(2-Ethylhexyl) Phthalate	38

(1) BDL = Below Detection Limit.
Detection Limit = 10 mg/kg (ppm).
(2) Detection Limit for 3,3-Dichlorobenzidine = 20 mg/kg (ppm).

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REPORT OF ANALYSIS

EPA Method 8270

Client: GHR Engineering Associates, Inc. Job No.: 37-066
Project: Whitney Barrel JN 3661002

Date Collected: August 26, 1988 Date Extracted: September 2, 1988
Collected by: RDC/BEM Analyzed by: Aquatec, Inc.

Sample ID:	TP-19 Soil
GHR Lab ID:	84986

Parameter	Concentration in mg/kg (ppm)
Benzyl Butyl Phthalate	BDL (1)
Di-N-Butyl Phthalate	13
Di-N-Octyl Phthalate	BDL
Diethyl Phthalate	10
Dimethyl Phthalate	BDL
Benzo(A)Anthracene	BDL
Benzo(A)Pyrene	BDL
Benzo(B)Fluoranthene	BDL
Benzo(K)Fluoranthene	BDL
Chrysene	BDL
Acenaphthylene	BDL
Anthracene	BDL
Benzo(GHI)Perylene	BDL
Fluorene	4J
Phenanthrene	5J
Dibenzo(AH)Anthracene	BDL
Indeno(1,2,3-CD)Pyrene	BDL
Pyrene	BDL
Benzyl Alcohol	BDL
4-Chloroaniline	BDL
Dibenzofuran	3J
2-Methylnaphthalene	36
2-Nitroaniline (2)	BDL
3-Nitroaniline (2)	BDL
4-Nitroaniline (2)	BDL

(1) BDL = Below Detection Limit.
Detection Limit = 10 mg/kg (ppm).
(2) Detection Limit for these compounds = 50 mg/kg (ppm).

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REPORT OF ANALYSIS

EPA Method 8270

Client: GHR Engineering Associates, Inc.   Job No.: 37-066
Project: Whitney Barrel JN 3661002

Date Collected: August 26, 1988   Date Extracted: September 2, 1988
Collected by: RDC/BEM   Analyzed by: Aquatec, Inc.

Sample ID:	TP-19 Soil
GHR Lab No.:	84986

Parameter	Concentration in mg/kg (ppm)
2,4,6-Trichlorophenol	BDL (1)
P-Chloro-m-Cresol	BDL
2-Chlorophenol	BDL
2,4-Dichlorophenol	BDL
2,4-Dimethylphenol	BDL
2-Nitrophenol	BDL
4-Nitrophenol (2)	BDL
2,4-Dinitrophenol (2)	BDL
4,6-Dinitro-2-Methylphenol (2)	BDL
Pentachlorophenol (2)	BDL
Phenol	BDL
Benzoic Acid (2)	BDL
2-Methylphenol	BDL
4-Methylphenol	BDL
2,4,5-Trichlorophenol (2)	17J

(1) BDL = Below Detection Limit.
Detection Limit = 10 mg/kg (ppm).
(2) Detection Limit for these compounds = 50 mg/kg (ppm).

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METHODS OF ANALYSIS

PARAMETER	METHOD REFERENCE	METHOD DESCRIPTION
Aluminum	Method 202.1 (1)	Atomic Absorption, Flame
Antimony	Method 204.1 (1)	Atomic Absorption, Flame
Arsenic	Method 206.2 (1)	Atomic Absorption, Furnace
Barium	Method 208.1 (1)	Atomic Absorption, Flame
Beryllium	Method 210.1 (1)	Atomic Absorption, Flame
Cadmium	Method 213.1 (1)	Atomic Absorption, Flame
Calcium	Method 215.1 (1)	Atomic Absorption, Flame
Chromium-Total	Method 218.1 (1)	Atomic Absorption, Flame
Cobalt	Method 219.1 (1)	Atomic Absorption, Flame
Copper	Method 220.1 (1)	Atomic Absorption, Flame
Iron	Method 236.1 (1)	Atomic Absorption, Flame
Lead	Method 239.1 (1)	Atomic Absorption, Flame
Magnesium	Method 242.1 (1)	Atomic Absorption, Flame
Manganese	Method 243.1 (1)	Atomic Absorption, Flame
Mercury	Method 245.1 (1)	Manual Cold Vapor
Nickel	Method 249.1 (1)	Atomic Absorption, Flame
Potassium	Method 258.1 (1)	Atomic Flame
Selenium	Method 270.2 (1)	Atomic Absorption, Furnace
Silver	Method 272.1 (1)	Atomic Absorption, Flame
Sodium	Method 273.1 (1)	Atomic Absorption, Flame
Thallium	Method 279.1 (1)	Atomic Absorption, Flame
Vanadium	Method 286.1 (1)	Atomic Absorption, Flame
Zinc	Method 289.1 (1)	Atomic Absorption, Flame
Organic Analysis		
Volatile Organics	Method 8240 (2)	Purge and trap, gas chromatography/mass spectrometry
Semi-Volatile Organics	Method 8270 (2)	Soxhlet extraction, gas chromatography/mass spectrometry
Pesticides & PCB's	Method 8080 (2)	Soxhlet extraction, gas chromatography/electron capture detection

(1) U.S. EPA, 1979. "Methods for Chemical Analysis of Water and Wastes". EPA 600/4-79-020, EPA/EMSL, Cincinnati, Ohio.

(2) U.S. EPA, 1986. "Test Methods for Evaluating Solid Waste" SW-846. Volumes 1 & 2: Laboratory Manual Physical/Chemical Methods, Third Edition; Office of Solid Waste and Emergency Response, Washington, D.C.

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Certification of Results

The enclosed results of analyses are representative of the sample(s) as received by the laboratory. GHR Analytical makes no representations or certifications as to the method of sample collection, sample identification or transportation/handling procedures used prior to the receipt of samples by GHR Analytical.

To the best of my knowledge, the information contained in this report is accurate and complete.

Approved by: Stephen O'Neil
Stephen O'Neil
Assistant Laboratory Director

Date: October 7, 1988

SOILS ANALYTICAL REPORTS
(SOIL BORINGS &
FLOOR DRAIN SEDIMENTS)

OCTOBER, 1988

SAMPLES COLLECTED
AUGUST 30 -
SEPTEMBER 2, 1988

Appendix G

Whitney Barrel Company

Customer List

Compiled by:

John Gushue

Lantz and Associates
New Bedford, Massachusetts

CUSTOMER LISTING FOR WHITNEY BARREL CO., INC.

Compiled by John Gushue
Lantz and Associates, New Bedford, Massachusetts

The following customer listing was compiled from available purchase order and bank deposit records of Whitney Barrel. The identified customers were placed into the five indicated categories by John E. Whitney, III as an initial approach toward identifying customers that may have sent oil or hazardous materials to Whitney Barrel. An asterisk next to a name indicates uncertain spelling.

A. One-time customers considered not likely to have sent oil or hazardous materials to the facility.

B. One-time customers who may have sent oil or hazardous materials to the facility.

C. Regular, repeat customers considered not likely to have sent oil or hazardous materials to the facility.

D. Regular, repeat customers who may have sent oil or hazardous materials to the facility.

E. Other customers about which little is known.

Group A - One-time customers considered not likely to have sent oil or hazardous materials to the facility.

Acc Ins. Olds. (car)*
Acton Equip.*
Adams, J.J.
All Seasons Burner Serv.
All Tech Material
American Chain & Cable
American Elect Testing
American Paper Products
American Precast
American Shoe Machine
American Tara
Amicare, J. Co., Inc.
Amstar
Analogic Corp.
Andrew Card
Apple Wipes & Supply Co.
Arlington, Town of
Ash St. Realty Trust
Atlantic Food Mart
Atlantic Lab. Inc.
Atlantic Realty Trust

Auciello Iron Works
B & N Dist. Co.
B.T.S. Leasing
Balzarini*
Bartlett Co.
Barwood Mfg.*
Baylies C.
Bay State York
Bernelli, David
Bio Energy Co.
Bishop Trucking
Blimbey, A.
Blonders, Inc.
Blumberg Co.
Blue Cross
A. Bonfatti & Co., Inc.
Bork of Canada
Boston Freight
Brad Auto
Brid, K.F. Co., Inc.
Brilliant Seafood
Brodie
Brody Int.
Brooks, Winfield Co.
Brown, William H.
Bushnick Co.
C.D.M.
C. J. Shuttle Service
Cabco Eng. Co.*
Caesars Roofing, Inc.
Campbell, Wm. & Sheila
Carr Dee Test Borings
Cannestraro, J.C.
Caskell, Inc.
Cefalo, Frank
Chak, Hal Homes*
Charles River Park
Chemslart*
Clark, H.J. & Sons
Clooney, Pat
Colbath, Richard P.
Comet Trod. Inc.
Comins Prd. Co.*
Conbustion Catalyst
Con Color
Continental Ins. Co. (car)
Continental Valve
Conway, G. Inc.
Cooper, Paul J.
Couier-Citizen Co.
Crescent Laundry
Crandell Dry Dock
Crgariac
Crockett, Dace
Cumberland

Cummings Ind. Ctr.
Cursco Processing & Refining
Cutter Brick Co.
D.M.L.S.
Davis Building
Diamond Int.
Dipetro, P.
Dougherty, T.
Duffy, Jim
Duran & Sons
Easton Materials Equip.
Economy Building Inc.
Economy Lub Co.
Electrical Power System
Elemco
Elia, D. & Sons
Elliott, Steven
Emerson Textile
Enos, Clarence
Essey Chem. Co.
Everett Auto
Exeter North Corp.
F.C.C. Packaging Co.
Fabrici, Joan
Fairbanks, Dana
Family Prod. Co.
Farmers Home
Farnsworth, Inc.
Federal Dismantling
Federal Properties
Fedoral Machine*
Feedwater Chem.
Ferd Corp.*
FiFast Corp.*
Finerthy, Albert
Fisher, Arnold Co.
Fisher, Robert
Fletcher, H.E., Co.
Flett, James
Forber, L. Co.
Forbes, J.D.
Forner, J.
Fraser
G.H.R. Analytical, Inc.
Gaukstern, F.*
General Plasma
General Spice
General Telephone & Electronics
Gennon American
Geosystems
Giftware Group
Glennron, T.M. Co.
Gloucester Eng.
Gold, Stephan
Green G.G. Tank

Greene, Robert, Jr.
Greenwood & Sons
H & K Family Trust
Handy Man Home Ctr.
Hanson Porcelian
Hart Eng. Co.
Hatch, Robert
Haverhill Natl. Bank
Healatey Corp.*
Hersey Prod. Inc.
Hewett, L.E., Jr.
Hewlett Packard Corp.
Hitchiner Mfg.*
Hollers Garden Ctr.*
Hollett Bldg. Corp.
Holley
Hub Foundation Co.
Hunter, Bruce W.
Hytrist, The Corp.*
Iafolla Co.
Inst. Lab.*
Int. Underwater
Inter Rental
Interstate Eng.
Ipswich Shellfish
Ircon
Itek Corp.
J.B.I.S. Scientific
Jensen, Peter
Jones, Robert
Kalaora, Eli*
Karchenes*
Kennebec Fish Corp.
Kenney, D.B.
Kingdom, The*
L.P. Brazing Ent.
Lake Regis Dish Co.
Lakon, Inc.
Lamont Labs, Inc.
Launder Rite
Lawlor, David
Lawrence, A.C. Co.
Leach, Ralph
Lee Prod. Co.
Lewis Nat. Supply Co.
Liberty Mutual Ins.
Lipman Bros.
Lipton Foods
Liquid Carbonic Corp.
Lubix Products
Magnetic Corp. of America
Maher, D.L.
Markham Lumber Co.
Marshall Beef. (meat)
Martin, Stan & Son

Mass. Oxygen
Matkeson Gas*
Mazur, Maureen
Mazza Co.
McEacheson, Peter
McKim, Walter & Sons
McNutt, Harvey
Merrimac Valley Appraiser
Middlesex Leasing
Middleson Research Mfg. Co.
Milliano
Mills, M.
Minton Bld.
Mirtcy, Karen M.*
Modern Dispense
Mohawk Assoc.
Moods Hale A.I.
Moretto
Morey, Booker
Morten, David Lumber Sales*
Morton, R.A. & Sons
Morton, Stanley
Moses, Donald
Motor, Elec. & Controls*
Mourod Enterprize, Inc.
Muzzadi, Daniel
McGurie, David
National Alumn.
National Gypsum Co.
N.E. Aerosol
N.E. Trans. Service
N.E. Water
New England Business Forms
New England Engineering Co.
New England Industrial Rental
Ninety-three Realty
Norris Incl.
North Central Warehouse
North Eastern Ammonia
North Reading Sawmill
Nottingham, N.H., Town of
O'Neil, Marshall*
Otter Creek Lumber
Palmer, Harold Ins.
Perino Ind.
Perkins, Dana
Pethov. Al
Physical Science
Pollack, Joseph & Co.
Power Tool
Powers M.D.
Pride Mf.
Quinn, K.J.
Quinn, Shanon
R.C.L. Ind.

R.H. Prod. Co.
R.I. Hospital Trust
R.X. Eng. Co.
Racek, E.R. Assoc.
Randolf Floral*
Rapax, Inc.
Reading Rotary Club
Recor Inc.
Richardson Prod. Devel
Ricker, Scott
Riverside Home
Robbins, Kenan
Rounds, Annie M.
Rutelenbig*
Saddle Rawee, Inc.*
Safety Projects
Sands & Taylor & Wood
Sawyer, Clark*
Scandinavian Design
Secomer, Inc.
Seift & Co.
Seigle, Harold J.
Seiler Corp.
Skinner, David
Ski Haus
Silverman Bros., Inc.
Skelton, George
Smith & Miller (fork lift sale)
Smith & Miller Moving
Smith, Arthur R., Jr.
Smithsonian
Sobel, ABC
Soffson Bros., Inc.*
Somerville Electric
Soni-Shield
Sperry
Stanley, Richard
Staples
State Garden Celery*
Sunny Meadow
Sweeney, James
T&R Dist.
Tev's Engine Co.
Tigron Latey *
Tremont Dev. Corp.
Tufts University
U.S. Gov't.
Unaletto, L.*
University Bank
University of Mass.
University of N.H.
Univertical Corp.*
Vanoh, Peter*
Vecchio, Michael
Vietnamis Centr.*

Walters, J.F. Co.
Waltham Hospital
Wapoli Wrecking
Watts Regulator
Webster Printing Co.
Wellesley Freight Lines
Wemcco
Westgate, Wolin, Hamilton Realty
Whil o Will
White, Paul
Whittmore Percite Co.
Winning Home, Inc.*
Wood, W.A.

Group B - <u>One-time customers who may have sent oil or hazardous materials to the facility</u>

Alberto Bros.
Allied Fuel
Almac
American Finish & Chem.
Amicon
Andover Truck
Ans Constr.*
Asa Constr. Co.
Avco Research-Everett
Baker Schools
Baldes Constr.
Bay Colony Real Estate
Belmont, Town of
Belmont Country Club
Benson Gass Fuel*
Beverly, City of
Bilo Const. Co.
Blair Terminal
Bobcat of Boston
Boston & Maine Corp.
Boston College
Boston University
Bradford Corp.
Bridgewater, Town of
Brigham & Womens Hospital
Bruce Realty Trust
Burlington, Town of
Burlington Foundry
Bursaw Oil Co.
Cambridge Electric Light
Cambridge Plating
Cappola Constr.
Center Constr. Co.
Charrette
Chomerics
Clark, Sterling Corp.
Clover Realty
Colella & Sons

Colonial Gardens
Columbia Const.
Connolly Bros.
Crestwood Realty
Croteaus Oil
Cummings Park
Dalton, G.F.& Sons, Inc.
Data Print, Inc.
Deflice Bros. Const.
DeRosa, Inc.
Dixon, F.W. Co.
Dover, Town of
Dyoramih Cont. Co.**
Eastern Microwave
Electro-Spec. Inc.
Elliott Sargent Fuel
Este Corp.
Garage Equip. Distributors
Gibbs Oil Co.
Gibbons Oil
Gordon College
Govoni & Sons
Grimes Oil
Halacorp. Inc.
Hamamatssu Syst.
Harris Construction Co.
Harvard University
Harvey Ind.
Hathaway, C.L. Co.
Haverhill Country Club
Hillside Garden
Hycor
Hytrons
IBM Scientific Corp.
I.T.R. Plastic
Ind Gen. Contracting
Indian Ridge Dev. Co.
Ipswich, Town of
Issacson, Charles & Sons, Inc.
Jones Chemical
Jones, Fabrics
KarKraft System
Kelco Petro
Kencla Const. Co.*
Kenics Corp.*
Kleenco Co.
Kol-Tar Inc.
Kontron
Lexington, Town of
M & V Electroplating
M.S. Metals Co.
Marchese & Sons
Marrin Const.
Market Forge
Masolino Constr. Co.

Mass Bus Co.
McGregor-Smith Mtr. Co. Inc.
Meade, G.L. Foundry
Melrose, City of
Meninno & Sons
Merit Equipment
Merrimac College
Merrimack Valley Constr.
Mesino Leather
Microwave Assoc.
Middleton Car Wash
Milbury Metals
Morse Diesel
Mullin Constr.
Murray Printing
N.A.P.A. N. Eng.
N.E. Casket Co.
N.E. Main & Chemical Co.
Nashua
National Metal Finish Co.
New England Sealcoating Co.
New England Telephone
Noble & Greenough School
North America Chem. Co.
Northern Oil
Parker Hill Assoc.
Parlex Const.
Patten Plumbing
Patterson Plumbing
Petco Oil
Phillips Express
Pickering Petro
Plastic Lace
Precise Alloys
Renica Constr.
Rich Const.
Royal Petroleum
Rust Proofing & Metal Finish Co.
Sacca, N. & Sons
St. Johnsbury Trucking
Salem Suede
Samitan Eng.
Sanborns Express
Saugus, Town of
Schaffer Corp.
Seaside Maint.
Senter Trans
Seppala Aho Constr. Co.
Shawsheen Rubber
Silverio Constr. Co.
Smith Oil Co.
Solar Constr. Co.
Specialty Alloys
Spectrowax Corp
Speen, J.C. Contracting Co.

Star Chemical
Stoneham Tool Co.
Stoneham, Town of
Strong Equip.
Sudbury Lab. Inc.
Sullivan, J.W. Corp.
Suncook Leather
T. Equip. Corp.
Tanco Chemical
Thomas Fuel
Timberlane Trans
Transitron
Tremount
Tri-Plating
Trust Const.
Tyler Const. Co.
USM Corp.
United Chemical
Unitrode
Utec Constr. Inc.
Vac-Hyd Processing*
Vapor Lite Lab.
Village Row Development
Wakefield, Town of
Walsh Chemical Co.
Waltham Chem
Wang Labs
Water Chemical Co.
Web Const. Co.
Wellesley, Town of
Western Electric
Weston, Town of
Winchester, Town of
Wolverine Corp
York Const. Co.

Group C - Regular, repeat customers considered not likely to have sent oil or hazardous materials to the facility.

American Door Co.
American Hoechst*
Anderson Oil
Arrow Automotive, Inc.
Arrow Ind.
Baker, Arnold R.
Baker, M.E.
Beede Waste Oil
Bellofram Const.
Boutwell, Cliff
Card, Andrew J.
Cash Oil Sales
Chapin Reily & Howe
Consolidated Color
Continental Chemicals (ec-div)
County Bank, The (loan)

Covelier, Leo Inc.
Diamond Crystal
Eastern Tool Stamping
Elliott, C&C Bros., Inc.
Farm Bureau Assoc.
Fawcett Fuel Service
Firemans Fund, Inc.
Fish Chemical
Foster Grant Co.
Franki Foundation Co.
Galante Bros.
Gilet Wool Scouring Corp.
Gillette Corp
Globe Mach. & Supply
Granet. Corp.
Hodson, S.M. Inc.
Independent Tallow Co.
Industrial Feed
Inmont Corp
Instant Road Rep.
Int. Harvester
J.G. Machine
Joe App. Co.*
Johnson Bros. Greenhouse
Joseph Catering
Keley, A.C. Drum*
Keystone Battery
Lincoln Foods
Lloyd Lab.
London, D.
Lynn, City of
Maclellan Co.
Mahoneys Rocky Ledge
Malden Mills
Massachusetts, Commonwealth of
Murphy Oil Co.
N.E. Maintenance
N.E. Prolerized
Nemcco
New England Nuclear Corp.
North Woburn Motors
Pappas, C. Co.
Park Electron
Pelrine, W.A., Inc.
Perry Equipt.
Podren, M. Co.
Rabenwitz, Bill
Rainin
Rapid Forms
Ravinius & Sons, Inc.
Reading, Town of (tax)
Roketnetz, Stanley
Ross Barrel Co.
Roy Bros.
Schiavone

Sheen, Lani
Siliboni Prod.
Solomon, J.
Sonnichsen, H.M. (rent)
Spincraft
Sprag Eng. Co.*
Spray Eng.
Strogoff, I*
Sutherland Foundry
Tech Weld Corp.
Tewksbury Auto Parts
Thunderbird Const.
Tomborello, John C.
United Edible Oil Co.
WaterLac Ind.
Westgate, C.B., Inc.
Whiney, E.C. (whiten)
Whipple, The Co.
Woburn Barrel Co.
Woburn Steel Drum
Woburn Truck Parts
Woods Hole
Yesley Co.

Group D - Regular, repeat customers who may have sent oil or hazardous materials to the facility.

B.W. Const. Co.
Baird and McGuire
Boston Edison
Brockton Edison Co.
Brooks Adhesive
Cabot, Samual Constr.
Chesterton
Compugraphic
Craftsmen Constr. Co.
Eastern Industrial Oil
Empire Adhesive Co. Inc.
Fry Roofing
Gaulston, Geo. A. Co.
General Gelatin
General Tire Co.
Grace W.R.
Great Lake Container
Hallberg, John D. Inc.
Hampshire Chemical Co.
Henkel Inc. (eastern oil)
High Standard Eng.
High Voltage Eng.
Honeywell
Houghton Chemical Co.
Hulbert Datsun*
Ideal Tape Co.
Kel-Scot Corp.
Kessler Constr. Co.

Kingsland Drum Co.
Kingston Steel Drum
Lamco Chemical
Mann, Geo. Co.
Medford Constr Co.
Mirror Glaze Co. Inc.
Mobil Oil
Mongiello Constr.
Monsanto
Mystic Bituminous
National Polychemicals
Nicetta, N.F.
Nyanza, Inc.
Olin
Omni-Wave
Pollution Control
Polymerics, Inc.
Polyvinyl
Printers Oil Supply Co.
Raytheon Corp.
Reed, Roger
Roche Bros. Barrel Co.
Rust Lick, Inc.
Ryan Barrel
SCI Industries
Semicon, Inc.
Service Station Maint.
Servisco
Sorco Corp.
Sorenson, Wm. R. Co.
Sousa, J.R. & Sons
Southwell Combing
Specialty Polymer
Stahl Finish
Stephan Chemical Co.
Suburban Const. Co.
Superior Chem. Co.
Sylvania
Taverna Bros. Inc.
Thermo Electron
Tillotson Rubber Co.*
Triram Corp.
Turner Constr. Co.
Varian
Westinghouse Electric
White & Hodges Inc.
Zecco, Inc.

Group E - <u>Other customers about which little is known.</u>

Alpha Chemical Serv
Arden Eng.
M & M
Weber & Smith, Inc.
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