Work Plan For
Voluntary Investigation

25 Melville Park Road
Melville, New York

February 1997

Prepared for:

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Letter of Transmittal

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Section 1
Purpose and Scope

1.1 Introduction

Camp Dresser & McKee (CDM) has prepared this Remedial Investigation Work Plan for Voluntary Investigation for WHCS for the commercial property located at 25 Melville Park Road, Melville, New York. This work plan provides a scope of services to complete the remedial investigation in accordance with New York State Department of Environmental Conservation's (NYSDEC) Voluntary Cleanup Program. It is noted that WHCS is a secured lender to Delco Development Company, the current site owner, and the subject property is in receivership. WHCS has had no past history with this property or the former operations conducted there. WHCS is voluntarily pursuing the expeditious remediation of on-site source areas to meet criteria that will be acceptable to WHCS and the NYSDEC and to restore the property to a viable commercial use. The purpose of this remedial investigative work plan is to outline the method by which additional data will be obtained in order to more fully characterize the site and determine reasonable remedial actions. Specifically, information from soil borings, groundwater samples and soil samples will be used to further evaluate the nature and extent of impacted soils and groundwater on site. This plan has been developed to address NYSDEC comments on prior remedial investigations. CDM has reviewed pertinent information from previous investigations and incorporated relevant information into this plan. Data collected during prior investigations include results from monitoring well sampling, geoprobe and soil sampling, soil gas survey, ground penetrating radar results, and boring logs. The information is contained in the following reports:

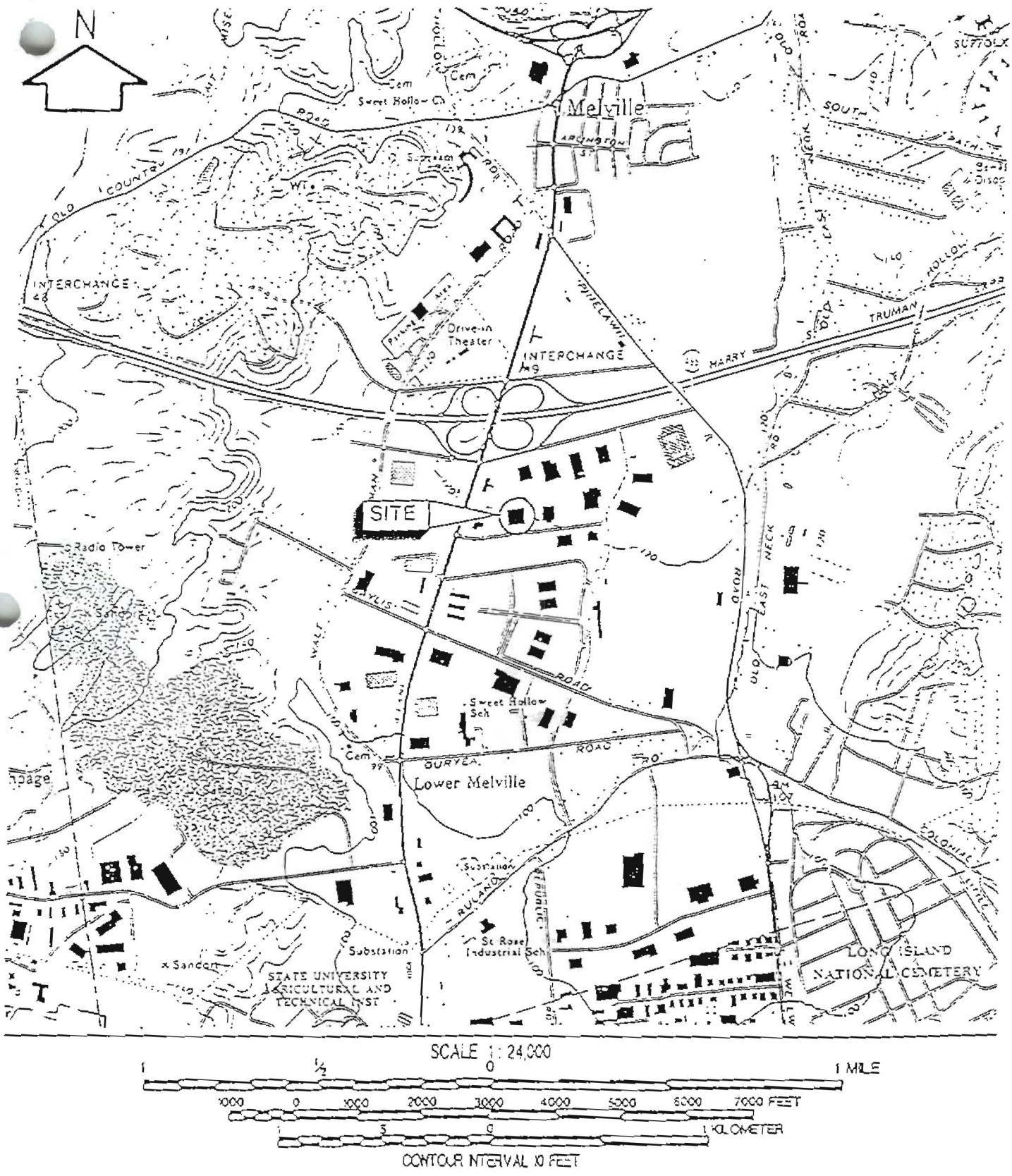
- Phase I Environmental Site Assessment (AquaTerra, March 1993)
- Phase I Environmental Site Assessment with Subsurface Investigation (Fugro East, 1995)
- Additional Subsurface Investigation and Ground Penetrating Radar letter report (Fugro East 1995)
- Petrex Soil Gas Survey Report (NERI, Rizzo Assoc. 1995)
- Preliminary Remedial Action Plan (ERI, 1996)
- Work Plan for Voluntary Cleanup Action (ERI, 1996)

Where appropriate, background information has been directly incorporated from the Workplan for Voluntary Cleanup Action, prepared by ERI in August 1996.

1.2 Site Description

The subject property is located in the Village of Melville, Nassau County, Long Island, New York (figure 1). Route 495 (the Long Island Expressway) is located an estimated 1,000 feet north of the property. Surrounding properties are classified as industrial and commercial.

Presently, the property is occupied by a two-story office building and parking facilities. As of January 1996, building occupants included Northville Industries Corporation, Great Eastern Management, Inc. and Gilmore and Security Company, Inc. The building is served by municipal water and is heated by natural gas. The property is served by two on-site septic systems located to the south of the building. The nearest water supply well was identified approximately one-half mile



SOURCE. Fugro.

Figure 1
Site Location
25 Melville Park Road, Melville, New York

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north of the site. Two additional wells are located an estimated one mile south-southwest of the site. The property is located within the South Huntington Water District.

Historically, the property was occupied by the New York Twist Drill Company (NYTD). NYTD was present on-site from 1966 (when the building was originally constructed) through 1985. NYTD apparently manufactured high-speed carbon and carbide drills. After NYTD vacated the building, the building was converted into a two-story office building. This renovation involved expanding the building footprint to the southeast (Figure 2).

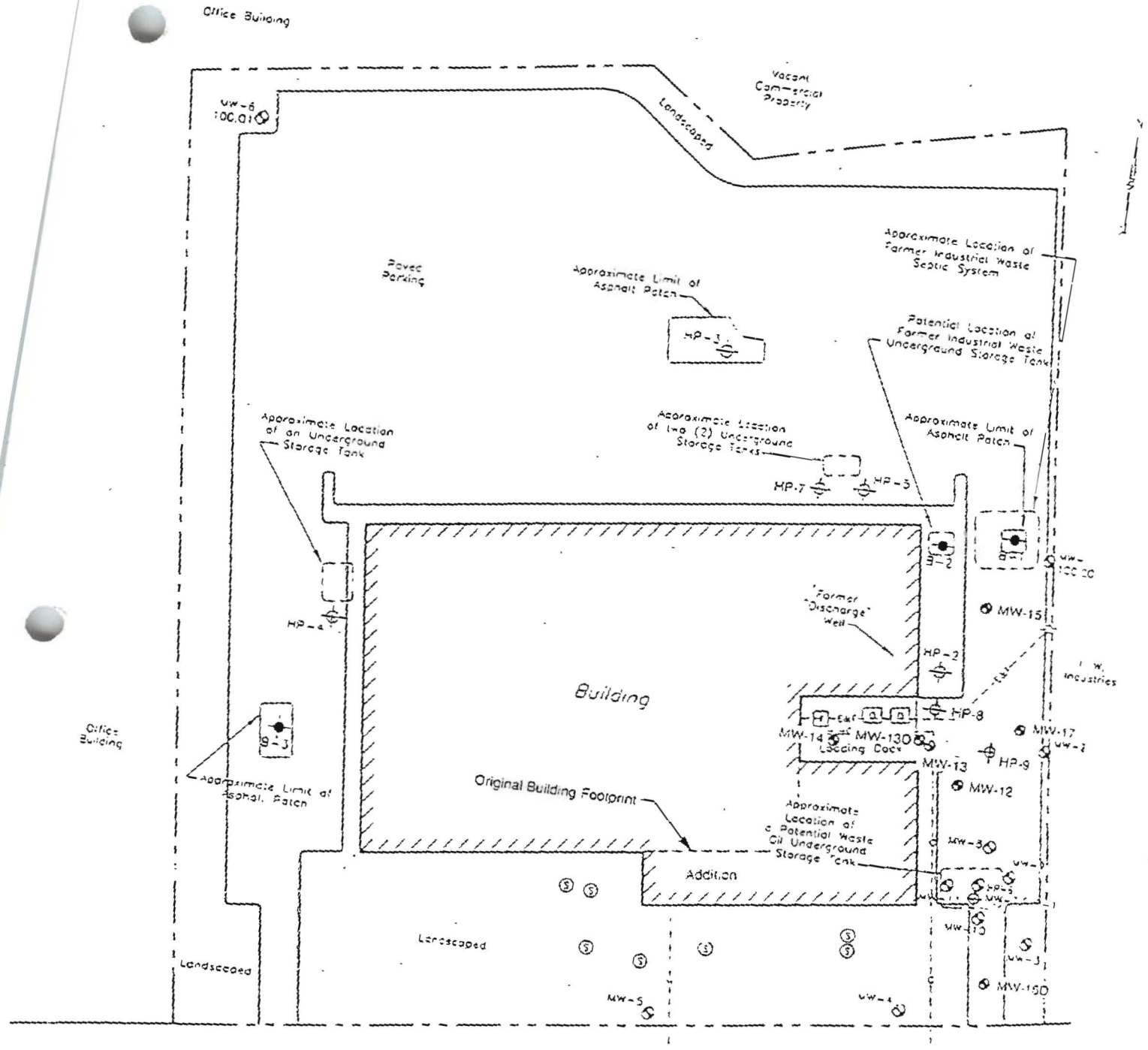
According to the Article 12 Tank Registry (No. 4-02614) maintained by the Suffolk County Department of Health Services (SCDHS), NYTD operated four underground storage tanks (USTs) on the property. Two 2,500 gallon industrial waste USTs were abandoned near the northeast corner of the building in 1991. Representatives of the SCDHS were onsite during the tank abandonment and approved of the procedures. Reportedly, a smaller (200 gallon) industrial waste UST was also removed east of the building near the northern corner. This UST may have been associated with a former industrial septic system. Records confirming the removal of this tank were not found during a previous review. Soil borings conducted in the area however, encountered no tank. A fourth tank, a 10,000 gallon #2 fuel oil storage tank was reportedly removed in 1991 also. However, a geophysical/magnetometer survey conducted by a former consultant, Fugro, in January 1995 identified two anomalies. One anomaly was interpreted to be the 10,000 gallon fuel oil UST; the second, the two abandoned 2,500 gallon industrial waste UST's. The presence of an anomaly at the location corresponding to the former 10,000 gallon fuel oil UST, suggests perhaps that this tank was actually abandoned rather than removed. Evaluation of a NYTD floorplan included a hand drawn sketch which identified a floor drain leading to another waste oil UST. This UST was removed circa 1993 with its location indicated by an asphalt patch near the southeastern corner of the building. Previous reports have also identified a former "discharge or diffusion well" located near the north side of the entrance to the east loading dock. Reportedly, the use of the "diffusion well" was discontinued around 1981. The diffusion well was reportedly used for disposal of non-contact cooling water.

1.3 Site Geology and Hydrogeology

The site is underlain by thick, unconsolidated deposits of clay, silt, sand, and gravel that rest on a southward dipping crystalline bedrock. The deeper units were deposited during the Cretaceous Period (63-138 million years ago), and form (in ascending order) the Raritan and Magothy Formations. During the Tertiary Period (2 to 63 million years ago), any additional deposits overlying the Magothy Formation were eventually eroded away by glacial activity. During the Pleistocene Epoch (1.8 million years ago to 10,000 years ago), glacial melt water deposited outwash material forming what is presently known as the Upper Glacial aquifer.

Bedrock beneath the site is found at an approximate elevation of 800 feet below mean sea level (msl). The Lloyd aquifer overlies bedrock, and has a surface elevation of approximately 600 below msl. The Lloyd aquifer is a source of water for some south shore communities and consists of moderate to high permeability sands.

The Raritan clay is a major clay unit separating the Magothy aquifer from the Lloyd aquifer. Beneath the site, it is found between 400 and 600 feet below msl.



SOURCE: Fugro.

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Figure 2
Site Plan
25 Melville Park Road, Melville, New York

Above the Raritan Clay, the Magothy aquifer (50 feet above to 400 feet below msl) forms the major water bearing unit, consisting of sand and gravel deposits with minor lenses of silt and clay throughout. The contact between the Upper Glacial aquifer and the Magothy aquifer occurs at approximately 50-100 feet above mean sea level at the site. The Upper Glacial aquifer corresponds to the saturated upper part of the highly permeable Pleistocene deposit of sand and gravel, and is a major source of water supply in Suffolk County.

A review of local well logs (provided by the Suffolk County Department of Health Services) indicates that the overburden geology in the site area consists mostly of brown to gray fine to coarse sand with thin interbeds of clay. Solid gray clay was encountered at 293 feet below grade (fbg) in a well drilled south of Melville Park Road.

Section 2
Previous Site Investigations

2.1 Investigations Prior to 1996

Several previous environmental investigations have been performed on the subject site. These include:

- A Phase I Environmental Site Assessment performed by Aqua Terra dated March 1993;
- A Phase I Environmental Site Assessment with Subsurface Investigation performed by Fugro East, Inc. dated January 1995;
- An Additional Subsurface Investigation and Ground Penetrating Radar Letter Report by Fugro East dated January 1995;
- Findings of the Petrex Soil Gas Survey Report by Northeast Research Institute and Rizzo Associates dated November 1995.

Investigations by Fugro East

Fugro East ("Fugro") performed a preliminary geophysical (ground penetrating radar/magnetometer) survey in January 1995 and identified two magnetic anomalies. One of the anomalies was interpreted as a 10,000 gallon fuel oil UST located on the northwestern side of the building. The second anomaly was interpreted as the two abandoned 2,500 gallon industrial waste USTs. A second Ground Penetrating Radar Survey confirmed these subsurface anomalies.

A hydropunch and well boring survey was conducted in December 1994 by Fugro. Six hydropunch well points and three borings were advanced on the property. In addition, six existing wells were identified on the property. Several soil samples were analyzed for total petroleum hydrocarbons (TPH) via gas chromatograph/flame ionization detector (GC/FID), 13 priority pollutant metals, cyanide and pH. Ten groundwater samples were analyzed for volatile organic compounds (VOCs) via Method 8260 and TPH via GC/FID. Seven of the samples were also analyzed for dissolved priority pollutant metals, cyanide, and pH.

One soil sample extracted from boring B-2 had a concentration of mercury [1.8 milligrams per kilograms (mg/kg)] which exceeds NYSDEC recommended cleanup levels for soil. Boring B-2 was located in the former industrial UST area west of the former industrial septic system located near the northeastern corner of the building (see Figure 2). The soil sampling depth was unclear from the existing information.

The groundwater analytical results indicated that the area near the former waste oil UST (southeastern corner of the building) was contaminated with trichloroethene (TCE) and tetrachloroethylene (PCE). One groundwater sample (HP-2) had PCE and TCE levels of 15,000 and 1,100 ug/L, respectively. Groundwater beneath the property was encountered between 49 and 50 feet below grade. Fugro estimated the groundwater flow direction to be towards the south/southeast.

Follow-up soil and groundwater sampling was conducted by Fugro in January 1995. One additional hydropunch sample and one monitoring well were advanced. In addition, three borings were drilled. All of this additional sampling was conducted in the area of the former waste oil UST (where the elevated PCE and TCE levels were detected). Eleven soil samples were submitted for laboratory analysis and analyzed for TPH and VOCs via GC/FID and Method 8260, respectively. The soil sample depths ranged from 5 to 50 feet below grade. No VOCs or TPH levels were detected in the soil samples.

Fugro submitted three additional groundwater samples for analyses. One hydropunch point (HP-6) was advanced to 73 feet below grade. The analytical results indicated that higher levels of VOCs were detected near the water table (12,600 ug/L PCE) as compared to the deeper portion of the aquifer (7,300 ug/L PCE).

Four additional groundwater monitoring wells (MW-8 through MW-11) were installed by Fugro near the former waste oil UST in May 1995. Groundwater samples collected from these wells were analyzed for VOCs via Method 8260. The highest VOC values (TCE equaling 12,900 ug/L and PCE equaling 31,700 ug/L) were detected approximately 30 feet north of the former waste oil UST in well MW-8.

Investigation by Northeast Research Institute and Rizzo Associates

A soil gas survey was conducted on the property by Northeast Research Institute and Rizzo Associates in November 1995. Thirty seven shallow soil gas sampling points were installed on the east side of the building. The results of this survey showed that the highest reading for PCE was near the loading dock. The highest reading for TCE was detected just north of well MW-8.

The sum of the previous investigations indicated that the source of the PCE and TCE groundwater contamination is located north of the former waste oil UST and south of the former septic system. The results of the soil gas survey suggested that the loading dock area may be the source of the PCE groundwater contamination.

2.2 Site Investigation of 1996

Subsurface Investigation Conducted by ERI February-March 1996

All onsite investigative work during 1996 was performed by a previous consultant, Environmental Remediation, Inc. (ERI) of East Hartford, CT. ERI advanced four soil borings in the area of the former industrial septic system and the associated former 200 gallon UST (see Figure 2). Selected soil samples were collected at various depth intervals and analyzed for VOCs via Method 8260, TPH via GC/FID (extractables) and for Resource Conservation and Recovery Act (RCRA) Metals. The goal of this portion of the study was to delineate the mercury contamination detected in boring B-2 and to evaluate if any VOC contamination exists near the former industrial waste septic system.

Four additional groundwater wells were installed by ERI north of MW-8 to evaluate the loading dock, the former discharge well area and the area north of MW-8 as a possible source of the VOC contamination. In addition, a second goal of this groundwater study was to define the horizontal extent of the VOC contamination. Groundwater samples were collected from the monitoring wells and analyzed for VOCs via Method 8260.

In addition to the groundwater samples, selected soil samples from the four newly installed monitoring wells were also submitted for laboratory analysis. Although no VOCs were detected in soil samples collected during previous sampling events in the area of high groundwater VOC contamination, these additional soil samples were collected to confirm the absence of soil VOC contamination. Seven soil samples from the monitoring well borings were submitted for the VOC analysis via Method 8260 and TPH via GC/FID (extractables). Due to insufficient sample volume (recovery), the sample collected from MW-13 (45-47 fbg) was only analyzed for VOCs. Results of the analysis are discussed below.

Subsurface Investigation Conducted by ERI July 1996

Two deep groundwater monitoring wells were installed by Environmental Remediation, Inc. to establish the vertical extent of the contamination. One well (MW-16D) was placed near the southern property border to monitor the deep groundwater and to evaluate whether contamination was moving off-site. A second well (MW-13D) was installed adjacent to MW-13 to evaluate the vertical extent of the groundwater contamination in the vicinity of the contamination source. The wells were extended to approximately 90 fbg.

One additional water table well (MW-17) was also installed near a potential source area identified in the eastern parking lot. A metal detector was used to identify the potential source. The monitoring well was installed directly downgradient of the detected anomaly.

Several additional hydropunch groundwater samples were collected. Two hydropunch points were advanced to approximately five feet below the water table in the vicinity of MW-13. The purpose of these wells was to evaluate the source area of the contamination surrounding MW-13. One hydropunch groundwater sample (HP-7) was collected north of the building and west of existing hydropunch point, HP-5, to evaluate the area downgradient of the second abandoned waste oil UST.

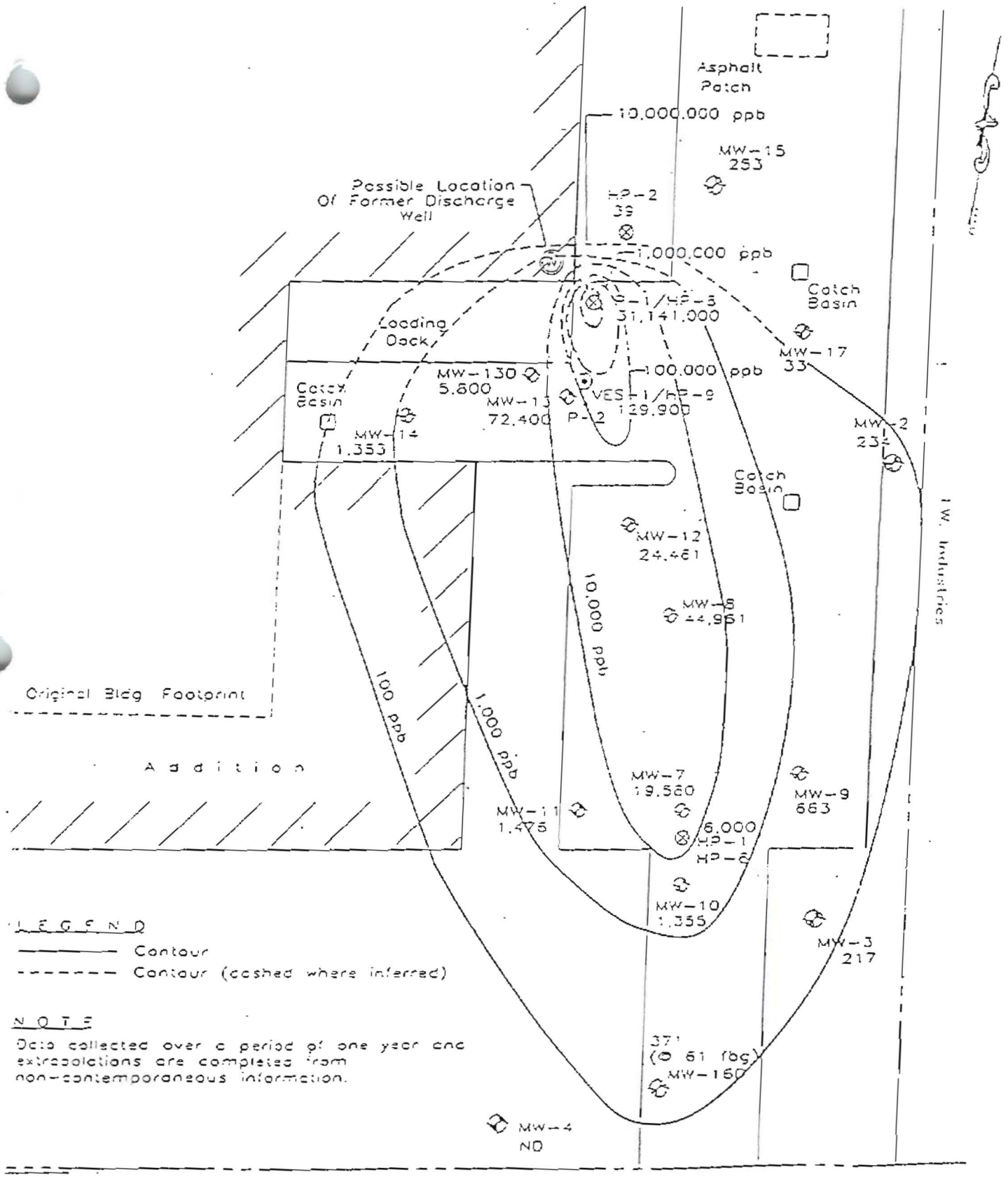
All of the samples collected were analyzed for halogenated VOCs via Method 8010. In addition, the groundwater sample collected from well MW-17 was analyzed for total RCRA metals.

Summary of Soil Boring and Monitoring Wells

ERI drilling activities were conducted February to March and July of 1996. Fifteen soil borings were advanced, seven of which were completed as groundwater monitoring wells (MWS 12, 13, 14, 15, 13D, 16D and 17). Three hydropunches were used to collect groundwater samples. Borings and monitoring wells were located as follows (See Figures 2 and 3):

- MW-12: Monitoring well MW-12 was installed to evaluate soil and groundwater conditions upgradient of an area of documented groundwater contamination MW-8, and in the area of elevated soil gas concentrations of PCE. MW-12 was screened above a clay layer, which was encountered at a depth of approximately 56.5 fbg. This clay layer was not encountered in any of the subsequent soil borings.

- MW-13: Monitoring well MW-13 was located just east of the east loading dock. The purpose of the well was to evaluate soil and groundwater conditions downgradient of a potential source of contamination, the former "discharge well," and in the area of elevated soil gas concentrations of PCE.



KEY:

- ⊙ - Monitoring Well
- ⊗ - Hydropunch

MAP SOURCE. ERI Preliminary Remedial Action Plan.

Figure 3
TVOC Plume
25 Melville Park Road, Melville, New York

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- MW-14: Monitoring well MW-14 was installed immediately east of the loading dock. The purpose of the well was to evaluate soil and groundwater conditions in the vicinity of a potential release area, the loading dock.

- MW-15: Monitoring well MW-15 was installed east of the loading dock and the suspected location of the "discharge well". The purpose of this well was to evaluate soil and groundwater conditions associated with and potentially upgradient of the former discharge well.

- MW-13D: Monitoring well MW-13D was installed directly west of well MW-13 to evaluate the vertical extent of the soil and groundwater contamination in the vicinity of the contamination source.

- MW-16D: Monitoring well MW-16D was installed near the southern property border. The purpose of this well was to evaluate whether any contamination was moving off-site.

- MW-17: Monitoring well MW-17 was installed east of the loading dock and the suspected location of the "discharge well". The purpose of this well was to evaluate soil and groundwater conditions associated with a metallic anomaly identified in the east parking area.

- SB-7: Soil boring SB-7 was installed in the vicinity of the former industrial waste septic system leaching area. The purpose of the boring was to further delineate the extent of soil contaminated by mercury, and to evaluate the soil for the presence of VOCs. Refusal (possibly an old septic system pipe) was encountered at a depth of approximately 5.5 fbg, and the boring was abandoned.

- SB-7A: Soil boring SB-7A was installed adjacent to the abandoned boring SB-7 to collect samples below the depth of refusal which was encountered in boring SB-7. As with SB-7, the purpose of the boring was again to further delineate the extent of soil contamination by mercury, and to evaluate the soil for the presence of VOCs in the vicinity of the former industrial waste septic system leaching area.

- SB-8: Soil boring SB-8 was installed in the northern vicinity of the presumed former industrial waste septic system holding tank. The purpose of the boring was to further delineate the mercury contaminated soil, and to evaluate the soil for the presence of VOCs.

- SB-9: Soil boring SB-9 was installed in the vicinity of the presumed southern portion of the former industrial waste septic system holding tank. The purpose of the boring was to further delineate the mercury contaminated soil, and to evaluate the soil for the presence of VOCs.

- SB-10: Soil boring SB-10 was installed in the vicinity of the former industrial waste septic system. The purpose of the boring was to further delineate the extent of soil contamination and to evaluate the soil for the presence of VOCs.

- HP-7: Hydropunch Point HP-7 was advanced south of the western abandoned 2,500 gallon waste oil tank located north of the building and a groundwater sample was collected to evaluate the condition of the groundwater downgradient of this second tank.

- HP-8: Hydropunch Point HP-8 was advanced northeast of well MW-13. The purpose of collecting a groundwater sample from this location was to evaluate the source of the contamination.

- HP-9: Hydropunch Point HP-9 was advanced east of well MW-13. The purpose of collecting a groundwater sample from this location was to evaluate the source of the contamination.

The soil and groundwater investigation was performed using a truck mounted drill rig and the hollow stem auger (4.25 inch inside diameter) drilling technique. Split spoon samples were collected from the surface and at various depth intervals. In the deeper wells (MW-13D and MW-16D), clean water was added to keep the boring open below the water table. The samples were field screened both immediately after retrieval and by the head space method using an HNu-photoinization detector (PID) for VOCs.

Monitoring wells were constructed using two-inch diameter, flush-jointed polyvinyl chloride (PVC) well casing with a ten foot screen length of 10 slot PVC screen. The annular space surrounding each well screen was filled with Morie equivalent No. 2 inert silica filter gravel to an elevation two feet above the top of the screen. Above the sand, a two foot bentonite seal was placed to seal the well from the formation above. A concrete collar was poured around a flush-mounted, protective steel case to secure the wells.

Groundwater Elevation Surveys and Flow Direction Measurements

The monitoring wells were surveyed relative to an arbitrary datum, and water level measurements were collected at the time of the groundwater sampling on March 4, and on July 29, 1996 using an electronic air/water interface. The surveyed well elevations and water level data were then used to calculate the direction of groundwater flow. The direction of flow was calculated to be toward the south/southwest in the vicinity of the east loading dock on March 4 and towards the south/southeast on July 29, 1996. The groundwater gradient was calculated to be 0.001 during both measurement events. Based on the groundwater flow measurements and the distribution of contaminants over the site, it appears that the overall groundwater flow is towards the south/ southeast.

Results of Soil Sampling and Analysis

February-March 1996

The four soil borings which were completed as monitoring wells in the vicinity of the loading dock and former discharge well were advanced to approximately 55-57 fbg. Each of the four borings performed in the vicinity of the former industrial waste septic system and tank were advanced to a depth of 20 fbg. The material encountered at the site generally consisted of light brown to light tan, fine to coarse sand and gravel deposits. A light, tan, coarse sand and gravel deposit was encountered in three of the four borings which were completed as monitoring wells, ranging from 48.5 fbg (MW-14) to approximately 55 fbg (MW-12, MW-13). A discontinuous medium gray clay unit was also observed at 56.5 fbg in MW-12.

Relatively elevated levels of VOCs were detected in the soil samples analyzed. Laboratory analysis of the monitoring well soil samples revealed the presence of PCE above the NYSDEC soil cleanup

objective of 1,400 micrograms per kilogram (ug/kg) in the sample collected from MW-13 at 54-54.7 fbg (30,000 (ug/kg)). TPH extractables representing diesel fuel, No.2 fuel oil and lubricating oil were also detected in the samples collected from MW-12 at 45-47 fbg and MW-13 at 54-54.7 fbg.

Samples collected from the soil borings in the vicinity of the former industrial waste septic system exhibited relatively low levels of contaminants. Constituents detected included TPH extractables resembling lubricating oil (21 mg/kg, SB-9 at 20-22 fbg), Nos. 4 and 6 heating oils (250 mg/kg, SB-10 at 05-07 fbg), and total metals including arsenic (0.5-2.5 mg/kg), barium (20-489 mg/kg), chromium (8 mg/kg), lead (0.5-2.1 mg/kg) and silver (2 mg/kg). Only barium exceeded the NYSDEC recommended cleanup objective of 300 mg/kg.

July 1996

Four soil samples were analyzed from the MW-13D soil boring. Boring MW-13D was extended to 90 fbg (40 feet below the water table). Soil samples collected from 45 fbg, 62 fbg, 67 fbg, and 75 to 77 fbg were submitted to laboratory analysis. PCE was detected in the 45 fbg sample (collected above water table) at 1,000 ug/kg. By comparison, PCE was detected in the 62 fbg sample at 200 ug/kg. No PCE was detected in either of the deeper samples.

Results of Groundwater Sampling and Analysis

February-March 1996

The four groundwater samples collected from monitoring wells MW-12, MW-13, MW-14, and MW-15 were analyzed for VOCs according to EPA method 8260. VOCs were detected in all four groundwater samples, ranging from 254 ug/L total VOCs (MW-15) to 72,400 ug/L total VOCs (MW-13). PCE was detected in all four samples above the NYSDEC water quality standard of 5 ug/L, at 17,000 ug/L in MW-12; 59,000 ug/L in MW-13; 360 ug/L in MW-14 and 150 ug/L in MW-15. Additional constituents detected in all four samples above the water quality standards included TCE (63 to 7,600 ug/L), 1,1,1-trichloroethane (TCA) (13 to 1,300 ug/L), and cis-1,2-dichloroethene (13 to 4,500 ug/L). The sample collected from MW-12 contained additional constituents above NYSDEC standards including 1,1-dichloroethene (30 ug/L), trans-1,2-dichloroethene (15 ug/L), ethyl benzene (22 ug/L), toluene (16 ug/L), 1,2,4-trimethylbenzene (76 ug/L), 1,3,5-trimethylbenzene (35 ug/L), O-xylene (110 ug/L) and P, M-xylene (120 ug/L). In addition, 1,1-dichloroethene (14 ug/L) and trans-1,2-dichloroethene (5 ug/L) were detected equal to or above the standard in the sample collected from MW-15 and MW-14, respectively.

July 1996

Hydropunch groundwater samples were collected from selected monitoring wells at various depth intervals (61, 76 and 86 fbg) from well MW-16D. Well MW-16D is located near the southern property boundary. The 61 fbg groundwater sample (collected near the water table) had a concentration of 300 ug/L PCE. The 76 fbg groundwater sample had a concentration of 9,800 ug/L PCE detected. The deepest groundwater sample (collected at 86 fbg) had a level of 2,600 ug/L PCE detected.

In addition to the hydropunch samples collected near the property border, two hydropunch groundwater samples (HP-8 and HP-9) were collected near the suspected source of the contamination (see Figure 3). PCE was detected in HP-8 in concentrations of 30,500,000 ug/L. In HP-9, PCE was detected at 122,100 ug/L. Trichloroethane (TCA) and TCE were also detected in

these two hydropunch groundwater samples. TCA was detected as high as 142,700 ug/L (HP-8) and TCE as high as 498,300 ug/L (HP-8).

One hydropunch groundwater sample (HP-7) was collected north of the building and downgradient of the second abandoned waste oil UST. PCE was detected in concentrations of 16 ug/L.

To supplement the hydropunch groundwater samples, three groundwater samples were collected from the two deep monitoring wells (MW-13D and MW-16D) and one water table well MW-17 located in the eastern parking lot. PCE was detected in the MW-13D groundwater sample at a level of 5,800 ug/L. In MW-16D, (near the southern property border), PCE was detected at 1,200 ug/L. The PCE concentration in MW-17 was 21 ug/L. In addition, relatively low levels of arsenic, barium, chromium and lead were detected in an unfiltered groundwater sample collected from MW-17.

2.3 Previous Off-Site Investigations

A previous assessment performed on the subject site in 1993 by Aciduria Environmental Services (AES) Corporation, indicated that the I.W. Industries property, located directly to the east of the subject site, is classified as a Class 2 inactive hazardous waste disposal site by the NYSDEC. The site assessment indicated that, based on its classification, the I.W. Industries site presents a significant threat to public health or the environment, and that remedial action is required.

This previous assessment indicated that the State Pollution Discharge Elimination System (SPDES) permit was prepared for and groundwater sampling was conducted on the I.W. Industries site. Contaminants detected in a former SPDES outfall above the maximum allowed levels included metals (copper, iron, aluminum, lead and zinc), 1,2,4 trimethylbenzene, 1,3,5 trimethylbenzene, 1,2,4,5 tetramethylbenzene and xylenes. Contaminants detected in groundwater included cis-1,2-dichloroethene, lead, and benzene. According to the AES report, the discharge ceased in September 1984, coincident with the removal of two industrial waste pools (pumped and backfilled with clean fill), and the capping of the filtration system in the area. According to the report, a remedial investigation/feasibility study (RI/FS) had not been completed for the property.

Section 3
Present Knowledge of Nature, Degree and Extent of Contamination

The information collected during previous investigations was used to evaluate the nature, degree and extent of the contamination. This information, combined with data obtained from the proposed remedial investigation, will be used in the future to develop a remedial action plan.

3.1 Soils

Based upon the available data, soils under the subject site appear to have been impacted by VOCs in the vicinity of the east loading dock. PCE was detected in the soil above the NYSDEC cleanup level in the soil boring for MW-13 at 54-54.7 fbg (33,000 ug/kg). PCE was detected in the samples collected from MW-12 (45-47 fbg), MW-13 (45-47 fbg) at 180 ug/kg and MW-13D (45 fbg) at 1,000 ug/kg. Wells MW-13 and MW-13D are located east of the loading dock area. The surrounding monitoring wells (MW-14, MW-15 and MW-8) did not have any VOCs detected in the soil samples. It appears that the source of the soil VOC contamination is near well MW-13. In addition, based on the levels detected in the groundwater samples, the extent of the soil contamination appears to include HP-8 and HP-9. Further investigation is required to determine the vertical extent of the plume in the vicinity of HP-8. However, additional investigation in the area of the loading docks will need to be performed to determine the horizontal extent of soil contamination.

3.2 Groundwater

In general, PCE, TCE and TCA were detected in the highest concentrations near well MW-13, HP-8 and HP-9. Of these sampling points, HP-8 exhibited the highest levels of contamination. PCE levels were three orders of magnitude higher than those detected in MW-13 and HP-9 and two orders of magnitude higher in levels of TCA and TCE. PCE was detected above the solubility limits (in HP-8) and likely occurs as a free phase in the vicinity of HP-8. The HP-2 hydropunch groundwater sample was collected directly northeast of and upgradient of HP-8. PCE was detected at 28 ug/L. Total VOC concentration appears to decrease from the suspected source area downgradient to the property boundary.

The horizontal extent of the PCE contamination and other VOC compounds extends south of the HP-8, HP-9 and MW-13 area to the property boundary. The total VOC concentration appears to decrease from the suspected source area downgradient to the property boundary. The concentrations detected at the water table decrease to 300 ug/L in the MW-16D (61 fbg) groundwater sample. MW-16D is located near the southern property boundary. The eastern extent of the contamination appears to be coincident with the property border. Samples collected from wells MW-2 and MW-3 (near the eastern property border) had relatively low levels of PCE detected (120 and 110 ug/L, respectively).

The vertical extent of the groundwater contamination was evaluated near the source area. The deep groundwater sample collected from MW-13D had PCE concentrations of 5,800 ug/L compared to a concentration of 59,000 ug/L in MW-13.

The hydropunch groundwater sample collected from 76 fbg (MW-16D) had levels of 9,800 ug/L PCE detected. By comparison, the hydropunch samples collected near the water table surface (61 fbg) and at a deeper depth (86 fbg) had relatively lower levels detected equaling 300 and 2,600 ug/L, respectively. The sample collected from the permanent monitoring well MW-16D (screened from 80 to 90 fbg) had levels of 1,200 ug/L detected. Overall, it appears that the highest levels of PCE contamination were detected near the presumed source area at a depth of 85 fbg and downgradient of the presumed source area, decreasing towards the southern property boundary.

3.3 Offsite

Based upon information from previous investigations, soil and groundwater contamination exists at the southern property boundary of the site. This suggests a potential for offsite plume migration. Under the stipulations and provisions of NYSDEC's voluntary cleanup program, only on-site contamination will be addressed. As stated in a September 25, 1996 correspondence from NYSDEC, the goal of the voluntary cleanup will be to remediate the on-site soil and groundwater contamination. Groundwater contamination extends offsite. However, study and remediation of this offsite contamination will not be required under the voluntary cleanup program. The Department will attempt to have previous owners/operators fund the offsite investigation and remediation.

NYSDEC reserves the right to evaluate offsite/downgradient properties for the presence/absence of site related contamination. The work plan tasks proposed herein serve only to quantify the nature, extent and degree of on-site contamination. To date, NYSDEC has not performed a formal evaluation of offsite/downgradient properties.

3.4 Source Area

The elevated levels of PCE, TCE and TCA detected in hydropunch groundwater sample HP-8 indicate that the source of the contamination is near the loading dock. An upgradient hydropunch groundwater sampling point (HP-2) shows a marked decrease in the levels of contaminants detected. Similarly, the detected level of contaminants decrease to the east (MW-17) and to the west (MW-13 and MW-14) of point HP-8. Based on the groundwater flow direction (south/southeast), it appears that the source of the PCE and other related solvent contamination is in the direct vicinity of HP-8.

Section 4
Investigative Work Plan

Additional Work Tasks

In order to complete the site investigation and fill in the data gaps identified on a September 25, 1996 correspondence from NYSDEC, CDM proposes to conduct additional investigations.
A portion of the additional investigations will include a field study and/or sample collection and analyses, the results of which will be used to evaluate groundwater remedial technologies which can be pilot tested for full scale implementation. It is anticipated that any additional sampling and analysis will take place coincident with the field program identified in task 1.3.

Prior to the field study, CDM will undertake a review of the site history. This task will include several subtasks including:

- Data Review
- Review of SCDHS and NYSDEC files
- Interviews with former NYTD employees
- Contact NYSDEC for status of offsite investigations
- Evaluation of 1995 Ground Penetrating Radar (GPR) signatures
- Meeting with NYSDEC

Each subtask is briefly described below.

- Data Review. Although most of the historical sampling data has already been reviewed, CDM will reassess the analytical data to ensure that no data gaps will exist following completion of the proposed additional field activities. Should data gaps be identified, CDM will modify the field effort accordingly.

- Review project files retained by the Suffolk County Department of Health Services (SCDHS) and the New York State Department of Environmental Conservation (NYSDEC). Data collected from SCDHS has proven to be useful in focusing the field effort. SCDHS records were used to identify the possible source area(s)as they indicated the presence of an UST, a drum storage area and an underground waste oil transfer line presumably used during the former NYTD operations, circa 1960's.

- Interviews with former NYTD employees. Performed in conjunction with the file reviews, the identification of former NYTD employees involved in property/facility maintenance will be reviewed. It has been CDM's experience that former employees often provide the crucial bit of information regarding disposal practices. Names of these individuals are often recorded on Health Department audit forms. Review of the available data suggests that SCDHS did conduct frequent audits of the former NYTD facility.

- Status of offsite investigations. CDM will contact NYSDEC to determine what actions have been taken to evaluate the extent of offsite downgradient contamination. The objective of this exercise is to determine the extent of PCE contamination offsite to the 5 ppb level, pursuant to the NYSDEC's voiced concern of October 11, 1996, to the extent such information is available.

- In accordance with NYSDEC's request, CDM will make attempts to contact the contractor who performed the original ground penetration radar study on the east side of the premises. Anomalies in the GPR record will be re-evaluated by the Contractor with the intent to determine whether the anomalies are actual buried targets worthy of additional investigation.

- Meeting with NYSDEC. Upon completion of the aforementioned tasks and the field program presented below, CDM will meet with NYSDEC to discuss the results of the investigation, provide details of a potential pilot groundwater and soil remediation technology, present plans for full scale implementation, and determine a basis for site closure, including issuance of a "no further action" letter.

Additional Field Study

Task 1: Additional Field Study

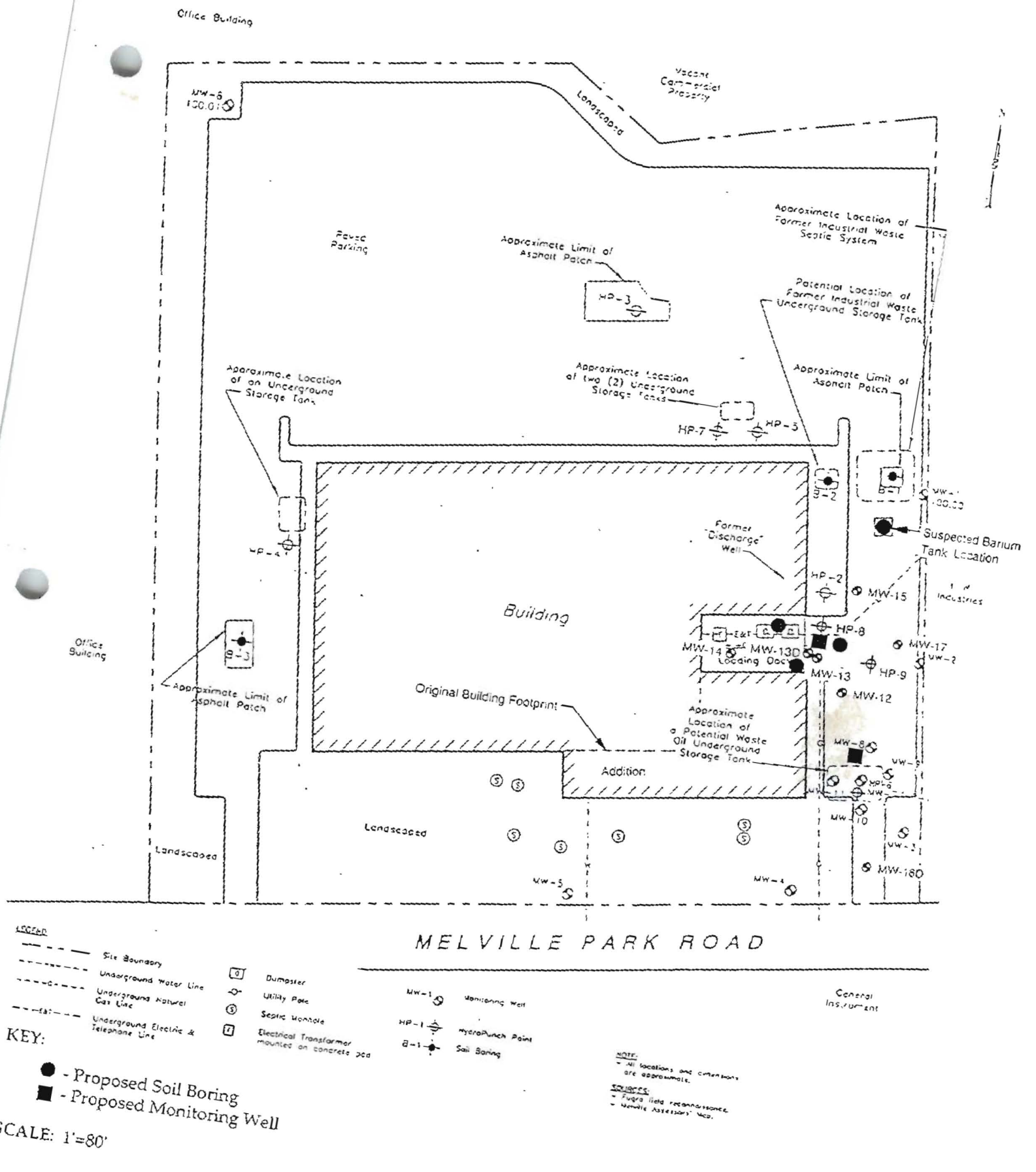
NYSDEC identified a number of data gaps in the results of previous site investigations. To date, the investigation has not fully delineated the extent of contamination. Limited investigation is necessary to develop and pilot test the selected remediation alternatives. The proposed additional investigations are outlined below. Locations of proposed soil borings and monitoring wells are depicted in figure 4. It is noted that all field investigative procedures and environmental sampling protocols will be conducted in accordance with the NYSDEC guidelines maintained under the State's Environmental Standby Contract. NYSDEC will be notified of any deviations to these guidelines as a result of site specific field conditions.

In addition all field work will be governed by the CDM Site Specific Health and Safety Plan (attached) to ensure that on-site workers are adequately protected. Potential exposures to building tenants and to on-site workers will be through temporary access restrictions. Potential exposures to the surrounding community will follow the protocol outlined in the New York State Department of Health (NYSDOH) Community Air Monitoring Plan.

1.1 Source Areas

The approximate location of the suspected source for the TCE/PCE plume has been identified through the high concentrations found in monitoring well MW-13 (72,400 ppb TVOC), and the presence of Dense Non-Aqueous Phase Liquids (DNAPL) near the hydropunch sample HP-8. These results, coupled with the lower concentrations in hydropunch sample HP-2, and lower concentrations found in monitoring wells MW-13, 14 and 17, suggest that the source of DNAPLs originated near the loading dock. The ground penetrating radar study performed in January, 1995 (Fugro East 1995) covered the entire eastern side of the building, and found no evidence of underground storage tanks. Unfortunately, the prior investigation was limited in extent and did not characterize a remaining potential source area: the area beneath the loading dock/dumpster area.

Copies of site plans of the former NYTD facility provided by WHCS contain handwritten sketches of a former drum storage area and/or underground tank location. This former storage area corresponds with the location of the present loading dock and dumpster area. Ground penetrating radar and magnetometer techniques will be used to characterize this area. In areas where the present building overlies an area formerly designated as a drum storage or UST area, a GPR investigation will be attempted. This phase of the geophysical investigation will be performed in the southeast portion of the building interior. Should the GPR and/or magnetic survey detect a potential



KEY:

● - Proposed Soil Boring
■ - Proposed Monitoring Well

SCALE: 1"=80'

SOURCE: Fugro

CDM Camp Dresser & McKee

Figure 4
Proposed Soil Boring And Monitoring Well Locations
25 Melville Park Road, Melville, New York

contaminant source (i.e., buried tank), the proposed remedial alternative will be designed to address not only the loading dock/dumpster area but also the area beneath the present building footprint.

Three soil borings will be made in the loading dock/dumpster area to further delineate the extent of the suspected DNAPL source. If a previously unknown tank is discovered in the loading dock/dumpster area, at least one of the borings will be advanced adjacent to the tank. The borings will be extended to the depth of the water table, with samples taken every ten feet (a total of 5 samples each). All samples will be screened with an Hnu photoionization detector immediately after retrieval at each borehole. Heated head space analysis using the Hnu will also be performed, along with the use of hydrophobic dye to help identify DNAPL contaminated soils. The samples with the two highest readings per boring will be sent to the laboratory for VOC analysis.

One of the three soil boring locations will be converted to a deep groundwater monitoring well (see Section 2.3 for vertical plume delineation). If a tank is discovered during the GPR study, the boring next to the tank will be converted to the monitoring well. A groundwater sample will be taken at the water table and analyzed for VOCs. It is noted that any groundwater sample collected at the water table from a temporary well will be collected from an interval minimum of 4 feet into the water table.

Historical data indicate that one groundwater sample from MW-17 contained barium at a concentration in excess of NYSDEC recommended cleanup levels (1.7 mg/L versus 1.0 mg/L). The former groundwater sample was turbid which could result in false positive results or elevated results, not representative of actual groundwater conditions. The potential source of barium was a waste underground storage tank reportedly located in the area of MW-17. That location corresponds with an asphalt patch in the eastern parking area. The former GPR survey conducted in that area did not identify an anomaly, which suggests that the tank was removed. CDM proposes that no additional subsurface investigation be conducted for the former barium waste tank. Task 1.3, however, presents CDM's proposal to conduct a comprehensive groundwater sampling event at existing onsite monitoring wells. Groundwater will be analyzed for barium (among other constituents). Should barium be detected in these samples at levels which exceed NYSDEC guidance values, then CDM will conduct additional investigations (soil boring(s) and sampling) in the presumed barium source area.

A review of the historical environmental data by NYSDEC has shown that one of the key samples had been improperly handled. As such, data from this sample has been deemed as unusable. CDM will make efforts to duplicate the sample by collecting a single split spoon sample adjacent to MW-11 at the 10-12 foot interval. Analysis of this soil sample will be for total volatiles NYSDEC ASP Method 91-1.

During the course of the additional field study, waste material will be generated. Any residuals from the soil borings (soil, water) will be drummed and stored onsite until completion of the investigation, at which time the materials will be characterized and disposed by a licensed contractor.

During the drilling of the soil borings, particular attention will be paid to the site geology. Lithology information collected to date indicates the presence of clay stringers, but no continuous clay layers

1.2 Vertical Plume Definition

The distribution of contaminants as evaluated from previous investigations indicates that contamination has reached depths of over 90 feet below grade in the vicinity of the presumed source area (HP-8). CDM believes that this cannot be attributed solely to vertical downward groundwater gradients, and is a strong indication of DNAPL contamination at depth near the source area. In order to investigate the vertical extent of the plume, two new monitoring wells will be installed. One well will be installed just down gradient of HP-8; the second will be placed near the center of the plume adjacent to MW-8. At each location, a borehole will be drilled to 90 feet, where a groundwater sample will be taken. The borehole will be advanced to a depth of 135 feet, with split spoon samples collected every 5 feet. The split spoon samples will be important in identifying any confining units near the source area that may impact the vertical movement of the DNAPL. Groundwater samples will be taken in advance of the drill bit at 15 foot intervals between 90 and 135 feet. Samples will be sent to a laboratory for 24-hour turnaround for VOCs. Based on the groundwater sampling results, final well screen settings will be placed to correspond with the bottom of the plume. It is assumed that the bottom of the plume will be less than 135 feet and that each well will be approximately 125 feet deep, with a 4-inch diameter, PVC casing and screen. Note that if VOC contamination above 100 ppb is detected at a depth of 135 feet, drilling will continue another 30 feet, with samples sent out for 24 hour turnaround. Based on the results, drilling will continue in 30 foot intervals until a VOC concentration of less than 100 ppb is encountered or the practical limits of drill depth are achieved.

In order to close an apparent data gap identified by NYSDEC, four (4) additional water samples will be collected from these two boreholes with the use of temporary wells. Samples will be collected from the intervals of 64 and 72 feet below grade. Samples will be analyzed for chlorinated solvents (VOCs) only.

For all intrusive activities described in task 1.1 and 1.2, R&L Drilling of Islip, New York will provide drilling services. Geophysical surveys will be performed by NAEVA Geophysics of Tappan, New York.

1.3 Comprehensive Sampling of Existing Wells

Although considerable data exists from the prior investigations, a number of inconsistencies in sampling protocol and selected analytical procedures have been identified by the NYSDEC. In order to gain a complete picture of the site contamination and avoid returning for additional sampling after initial results are received, a single, synoptic round of groundwater samples is recommended from the following monitoring wells: MW-2, MW-3, MW-4, MW-7, MW-8, MW-9, MW-10, MW-11, MW-12, MW-13, MW-13D, MW-14, MW-15, MW-16D, and MW-17. Samples will also be taken from the two new proposed wells, as well as from the existing onsite supply well (if available). Since no information is present on the construction method or depth of the former onsite supply well, CDM will attempt to sound the well and collect water level information and groundwater samples. The two new wells will be developed and will be allowed to stabilize for 14 days. After 14 days, all wells will be purged and groundwater samples will be collected when the turbidity is less than 50 N.T.U.

If during normal well purging efforts (pre-groundwater sample collection), the turbidity of the groundwater remains greater than 50 NTUs, CDM will perform one of the following:

- collect both an unfiltered and a filtered groundwater sample in order to determine the effect of turbidity in the metals analysis. CDM will conduct this testing on groundwater samples collected from MW-10, MW-13, MW-14, MW-15 and MW-17.

- decant clear water from a volume of groundwater which has been allowed to settle for a period of time estimated to be 2 hours. This decanting procedure will only be used for metals and semi-volatile analyses. Decanting will not be performed on samples earmarked for volatile organic analyses.

All groundwater samples will be tested for volatiles and semi-volatiles. In addition, sampling for trace metals (antimony, manganese, arsenic, beryllium, barium, cadmium, chromium, copper, iron, lead, mercury, nickel, selenium, silver, thallium, and zinc) as well as cyanide will be included. Should other analytes be required to obtain information on water chemistry and its impact or influence on potential remedial technologies, appropriate sampling will be conducted during the comprehensive sampling round.

Development/purge water from the sampling will be drummed and stored onsite for eventual disposal by a licensed contractor at an appropriate disposal facility.

1.4 Laboratory

All environmental samples will be collected and delivered to a NYSDEC approved laboratory with CLP certification. Analyses will include Target Compound List volatile organics and semi-volatile organics, as well as metals.

Field blank samples and trip blank samples will be taken at the appropriate frequencies (one each per day of sampling) to ensure proper quality assurance and quality control. In addition, duplicate samples will be collected at a frequency of one duplicate per ten samples (10%).

Although no data validation has been performed on any of the environmental data collected to date, it will be performed during this comprehensive sampling round. A NYSDEC standby contractor, ChemWorld Environmental of Rockville, MD, will provide CDM with data validation services. CDM's Quality Assurance Officer will determine the usability of all data following the data validation process.

Table 1 provides a matrix sheet of the proposed samples to be collected, media to be sampled, analytical methods, sample preservatives, sample containers and holding times.

Task 2: Report/Recommendations

Data obtained from prior investigations will be integrated with the data collected by CDM in a written report, which will provide the basis for an evaluation of the proposed remedial action, as well as aid in the eventual design of the necessary pilot studies. The data will be analyzed and appropriate conclusions drawn about the nature and extent of contamination at the site. CDM will submit a Draft Voluntary Investigation Report by incorporating the additional data and analysis from the field investigations. The report will be prepared for submission to the NYSDEC, and will conform to NYSDEC regulations and protocols. CDM will incorporate comments from two reviews of the Draft Voluntary Investigation Report, one by WHCS, and one by NYSDEC and appropriate agencies to which NYSDEC may circulate the draft document. It is anticipated that NYSDEC will

Sample Matrix	*Parameter*	*Number Of Samples*	*Analytical Reference Method*	*Sample Preservation*	*Holding Time [a]*	*Container*
Hydrogeologic Characterization Environmental Samples						
• Groundwater Monitoring Well Samples	VOAs	31	CLP *[b]*	Cool to 4 C	7 days	2 x 40-ml vial
	BNAs	19	CLP *[c]*	Cool to 4 C	5 days extractions 40 days analysis	2 x 80-oz amber or 4 x Hiter amber
	Metals	19	CLP *[d]*	HNO3 to pH<2 Cool to 4 C	6 months/ Hg-26 days	1 liter poly
	Cyanide	19	CLP *[d]*	NaOH to pH<12 Cool to 4 C	12 days	1 liter poly
• Sediment Samples	VOAs	7	CLP *[b]*	Cool to 4 C	7 days	2 x 40-ml vials
	BNAs	6	CLP *[c]*	Cool to 4 C	5 days extractions 40 days analysis	1 x 8-oz glass jar
	Metals/ Cyanide	6	CLP *[d]*	Cool to 4 C	6 months/ Hg-26 days	1 x 8-oz glass jar

KEY:

[a] - Unless otherwise noted, all holding times are from Verified Time of Sample Receipt (VTSR) at the laboratory

[b] - Analysis will be performed in accordance with NYSDEC Analytical Services Protocol (ASP) 1991, Exhibit D, Part II (NYSDEC Method 91-1).

[c] - Analysis will be performed in accordance with NYSDEC ASP 1991, Volume 2, Exhibit D, Part III and IV (NYSDEC methods 91-2 and 91-3)

[d] - Analysis will be performed in accordance with NYSDEC ASP 1991, Volume 2, Exhibit D, Part V.

NOTES:

1. Sample parameter table does not include parameters which may be collected for pilot study purposes.
2. All analytical results to undergo data validation.
3. Duplicates to be collected at a frequency of one duplicate per ten samples or 10%.
4. Field and trip blank samples to be collected at a frequency of once per day.
5. CLP requirements call for one MS/MSD duplicate per 20 samples. MS/MSD samples will be collected for groundwater and soil.
6. Quality control samples
   MS Samples: 4 GW; 3 Soil, MSD Samples: 4 GW; 3 Soil, TB Samples: 2, FB Samples: 4, EB Samples: 3.

Table 1
Sample Parameters
25 Melville Park Road, Melville, New York

coordinate and resolve any inconsistency among any Agency comments, and that CDM will be provided with one consolidated set of comments for incorporation into the final document. If necessary, based upon the number and extent of comments, an additional draft report will be circulated for review. Twelve (12) copies of the Draft Voluntary Investigation report, and 12 copies of the final document will be produced.

During the review process for the Draft Voluntary Investigation Report, CDM will outline recommended tasks to be performed as part of a Remedial Work Plan. It is expected that this document will outline specific tasks conducted to meet the recommended site cleanup objectives. These tasks include development of a pilot study protocol evaluation of pilot study results, followed by full scale implementation of the selected remedial alternatives.

Task 3: Contingencies (Optional)

Due to the very focused nature of the final phase of this field investigation and the significant schedule constraints, several unanticipated results may arise. Should this occur, CDM will, with WHCS approval, implement the following contingency plans.

In the unlikely event that the two proposed deep monitoring wells fail to delineate the vertical extent of the plume/DNAPL zone, drilling and groundwater sampling would continue. Potential future sampling actions will be contingent on new data and findings.

If, during the groundwater sampling event, either individual contaminant species or suites of contaminants are identified in areas where they have not been known to occur previously, CDM will utilize this data in the context of its groundwater modeling capability to project the limits of this contamination. The subsequent remedial design will encompass all impacted on-site areas.

In the event that barium is detected in groundwater at concentrations exceeding 0.7 parts per million, a soil boring will be installed adjacent to or beneath (by angle drilling) the former barium waste storage tank.

In the event that previously unknown, potential contaminant sources are identified as a result of the ground penetrating radar/magnetometer survey, CDM has the flexibility to expand the soil boring and soil sampling program into these areas in order to adequately characterize the suspected sources.

Under any conditions where an expansion or modification of the field program is warranted, NYSDEC will be contacted. Should an expansion or modification of the field program be recommended by NYSDEC, any necessary revisions will be made.

HEALTH AND SAFETY PLAN FORM

CDM Health and Safety Program

This document is for the exclusive use of CDM and its subcontractors

CAMP DRESSER & McKEE INC.

PROJECT DOCUMENT #: _____

PROJECT NAME: 25 Melville Road

JOBSITE ADDRESS: 25 Melville Road
Melville, New York

PROJECT # _____ *REGION:* II

CLIENT: Achon Group L.P./W.H.C.S.

CLIENT CONTACT: Shawn O'Hara

CLIENT CONTACT PHONE # (972) 868-2444

DATE EXISTING H&SP WAS APPROVED? _____

( ) *AMENDMENT TO EXISTING APPROVED H&SP?* .

( ) *H&SP AMENDMENT NUMBER?* .

To be used in conjunction with NYSDOH Community Air Monitoring Plan.

OBJECTIVES OF FIELD WORK:

To fill in the environmental data gaps from previous investigations (by others), for pilot study, and remedial technologies if applicable.

- Install soil borings, collect split spoons for analysis.
- Install groundwater monitoring wells and sample groundwater to determine vertical extent of on-site contamination.

TYPE: Check as many as applicable

Active	(x)	Landfill	( )	Unknown	( )
Inactive	( )	Uncontrolled	( )	Military	( )
Secure	(x)	Industrial	( )	Other	(*specify*)
Unsecure	( )	Recovery	( )	Residential	( )
Enclosed space	( )	Well Field	( )	Commercial Office Property	(x)

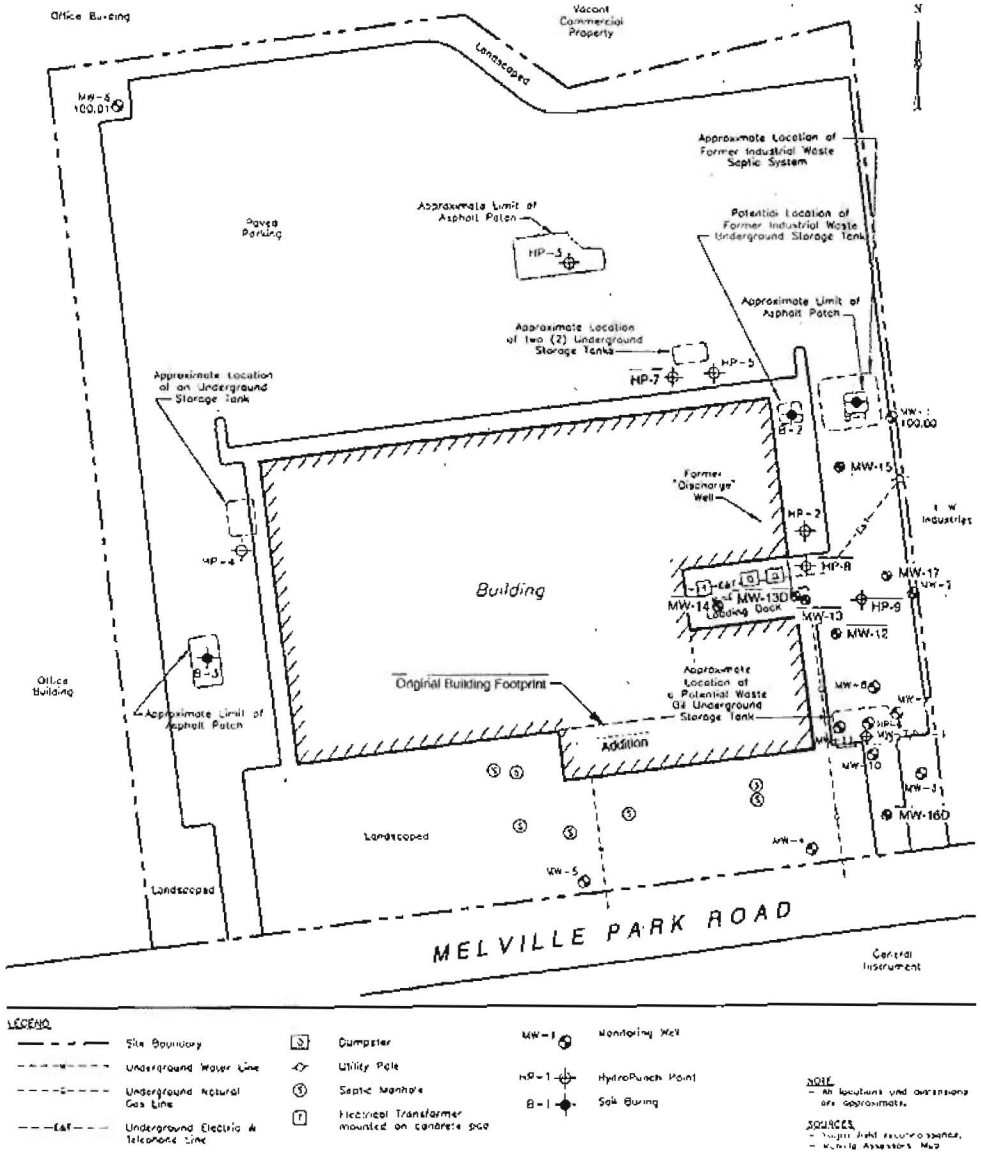
All requirements described in the CDM Health and Safety Assurance Manual for Hazardous Waste Operations are incorporated in this health and safety plan by reference.

DESCRIPTION AND FEATURES: Include principal operations and unusual features (containers, buildings, dikes, power lines, hills, slopes, rivers, etc.)

The site was formerly occupied by a manufacturer of high speed drill equipment (New York Twist Drill). Operations of NYTD existed from 1966 through 1985, at which time the operation/facility was temporarily abandoned. The site owner modified the former manufacturing facility, expanded the building footprint and constructed a professional office building. The property presently consists of a two-story office complex with a parking facility. A building maintenance and truck loading area exists on the eastern side of the building. The eastern parking area is the location of former and abandoned in place underground storage tanks. Also, located cast of the property is a NYSDEC listed site called I.W. Industries.

SURROUNDING POPULATION: ( ) Residential ( ) Industrial (x) Commercial ( ) Rural ( ) Urban OTHER:

THIS PAGE RESERVED FOR MAP (Show Exclusion, Contamination Reduction, and Support Zones. Indicate evacuation and reassembly points.)



HISTORY: Summarize below. Include complaints from public, previous agency actions, known exposures or injuries, etc.

New York Twist Drill (NYTD) company originally constructed the facility in 1966 as the site for the manufacturing of high speed carbon and carbide drills and equipment. NYTD operated the facility until 1985 when they vacated the premises. The former manufacturing area was gutted and renovated. The present structure was enlarged and converted into a two-story office complex. Regulatory agency files document the presence of several UST's and a discharge well. Most if not all have been abandoned or removed.

WASTE TYPES: (x) Liquid ( ) Solid ( ) Sludge ( ) Gas ( ) Unknown ( ) Other *specify:*

WASTE CHARACTERISTICS: Check as many as applicable.

( ) Corrosive	( ) Flammable	( ) Radioactive
(x) Toxic	(x) Volatile	( ) Reactive
( ) Inert Gas	( ) Unknown	(x) Other *specify:*

Chlorinated and non-chlorinated solvents mixed with petroleum based contaminants.

WORK ZONES: Describe the Exclusion, Contamination Reduction, and Support Zones in terms on-site personnel will recognize

Exclusion zone will exist around each borehole and the drill rig. During well sampling, the exclusion zone will be around the well head only. Contaminant reduction and support zones will be established in an upwind direction. In accordance with NYSDOH requirements, VOC and dust monitoring will be conducted in down wind direction during intrusive work.

HAZARDS OF CONCERN:

(x) Heat Stress *attach guidelines*	(x) Noise
(x) Cold Stress *attach guidelines*	(x) Inorganic Chemicals
( ) Explosive/Flammable	(x) Organic Chemicals
( ) Oxygen Deficient	(x) Motorized Traffic
( ) Radiological	(x) Heavy Machinery
( ) Biological	(x) Slips, Trips, & Falls
( ) Other - *specify*	

FACILITY'S DISPOSAL METHODS AND PRACTICES: Summarize below.

It is not be believed that the present facility generates hazardous materials. The former NYTD operation disposed of spent material in underground holding tanks. Evidence suggests that discharge lagoons and a discharge well were also used for disposal. Former site plans also indicate an outdoor drum storage area.

HAZARDOUS MATERIAL SUMMARY: Circle waste type and estimate amounts by category

CHEMICALS: Amount/Units:	SOLIDS: Amount/Units:	SLUDGES: Amount/Units:	SOLVENTS: Amount/Units:	OILS: Amount/Units:	OTHER: Amount/Units:
Acids	Flyash	Paints	Halogenated (chloro, bromo) Solvents	Oily Wastes	Laboratory
Pickling Liquors	Mine or Mill Tailings	Pigments		Gasoline	Pharmaceutical
Caustics	Asbestos	Metals Sludges	Hydrocarbons	Diesel Oil	Hospital
Pesticides	Ferrous Smelter	POTW Sludge	Alcohols	Lubricants	Radiological
Dyes / Inks	Non-Ferrous Smelter	Aluminum	Ketones	PCBs	Municipal
Cyanides	Metals	Distillation Bottoms	Esters	Polynuclear Aromatics	Construction
Phenols	Other *specify:*	Other *specify:*	Ethers	Other *specify:*	Munitions
Halogens	Barium in groundwater measured at 1.65 ppm		Other *specify:*		Other *specify:*
Other *specify:*					

OVERALL HAZARD EVALUATION: ( ) High ( ) Medium (x) Low ( ) Unknown *(Where tasks have different hazards, evaluate each)*

JUSTIFICATION: No contaminants currently visible or known to exist in media that CDM will contact.

FIRE/EXPLOSION POTENTIAL: ( ) High ( ) Medium (x) Low ( ) Unknown

BACKGROUND REVIEW: ( ) COMPLETE (x) INCOMPLETE

KNOWN CONTAMINANTS	HIGHEST OBSERVED CONCENTRATION (specify units and media)	PEL/TLV ppm or mg/m³ (specify)	IDLH ppm or mg/m³ (specify)	WARNING CONCENTRATION ppm	SYMPTOMS/EFFECTS OF ACUTE EXPOSURE	PHOTOIONIZATION POTENTIAL IP (eV)
Tetrachloro-ethylene	≤ 72,000 ppb (GW) ≤ 33,000 ppb (S)	25 ppm	150 ppm	47 ppm	Irritated eyes, nose, throat, flushed face & neck, dizziness	9.32
Trichloro-ethylene	≤ 72,000 ppb (GW)	50 ppm	1,000 ppm	82 ppm	Vertigo, visual disturbance, headache, drowsiness	9.45
1,1,1-Trichloro-ethane	1,300 ppb (GW)	350 ppm	700 ppm	400 ppm	Headache, CNS depression, loss of balance, eye irritation	11.0
Benzene	≤ 200 ppb (GW)	1 ppm	500 ppm	61 ppm	Eye & nose irritation, headache, giddiness, nausea, fatigue	9.25
Toluene (skin)	≤ 200 ppb (GW)	50 ppm	500 ppm	1.7 ppm	Fatigue, confusion, euphoria, dizziness, headache, tears	8.82
Ethyl benzene	≤ 200 ppb (GW)	100 ppm	800 ppm	200 ppm	Eye & nose irritation, headache, narcosis	8.76
Xylene	≤ 200 ppb (GW)	100 ppm	900 ppm	5 ppm	Eye, nose & throat irritation, drowsiness, nausea, incoordination	8.44

L = Lagoon
SW = Surface Water
T = Tailings

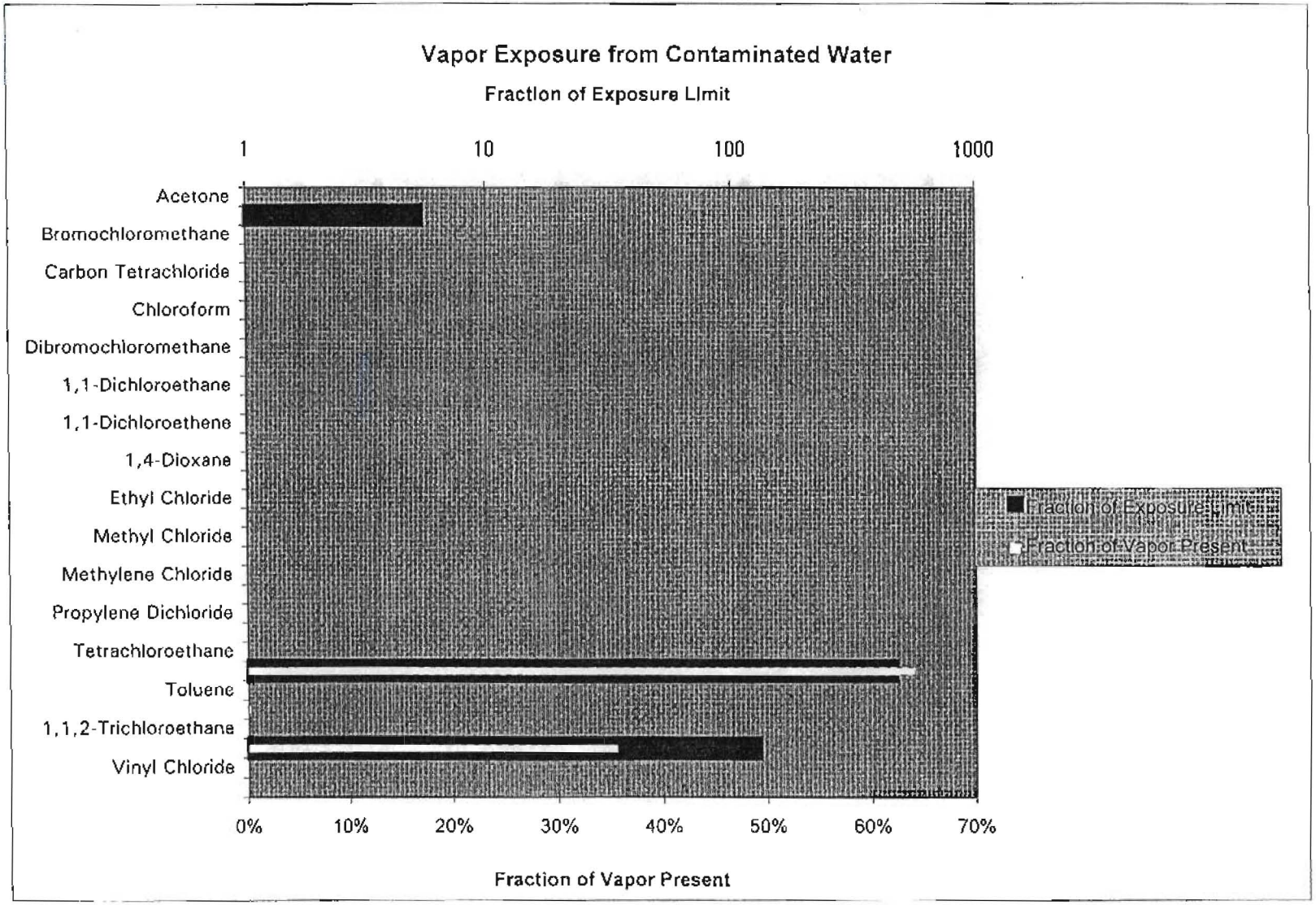
OFF = Off-site
U = Unknown
W = Waste

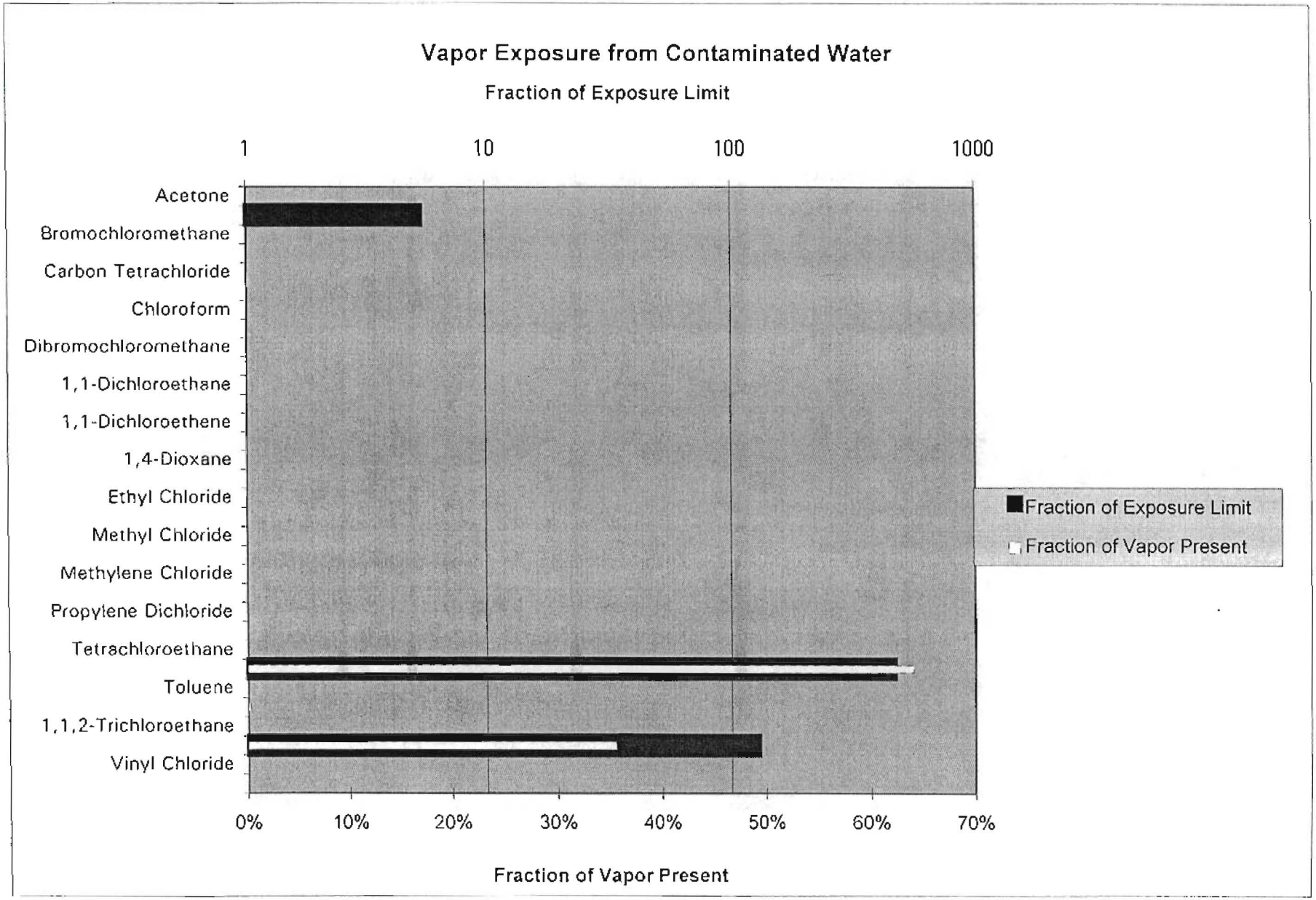
NA = Not available
GW = Groundwater
S = Soil

SL = Sludge
A = Air
SL = Sludge

TK = Tanks
SD = Sediment
D= Drums

VaporGraph


Vapor Exposure from Contaminated Water
Fraction of Exposure Limit
1
10
100
1000
Acetone
Bromochloromethane
Carbon Tetrachloride
Chloroform
Dibromochloromethane
1,1-Dichloroethane
1,1-Dichloroethene
1,4-Dioxane
Ethyl Chloride
Methyl Chloride
Methylene Chloride
Propylene Dichloride
Tetrachloroethane
Toluene
1,1,2-Trichloroethane
Vinyl Chloride
Fraction of Exposure Limit
Fraction of Vapor Present
0%
10%
20%
30%
40%
50%
60%
70%
Fraction of Vapor Present


Vapor Exposure from Contaminated Water
Fraction of Exposure Limit
1
10
100
1000
Acetone
Bromochloromethane
Carbon Tetrachloride
Chloroform
Dibromochloromethane
1,1-Dichloroethane
1,1-Dichloroethene
1,4-Dioxane
Ethyl Chloride
Methyl Chloride
Methylene Chloride
Propylene Dichloride
Tetrachloroethane
Toluene
1,1,2-Trichloroethane
Vinyl Chloride
Fraction of Exposure Limit
Fraction of Vapor Present
0%
10%
20%
30%
40%
50%
60%
70%
Fraction of Vapor Present

HEALTH AND SAFETY PLAN FORM

CDM Health and Safety Program

This document is for the exclusive use of CDM and its subcontractors

CAMP DRESSER & McKEE INC.

PROJECT DOCUMENT #: _____

TASK DESCRIPTION/SPECIFIC TECHNIQUE/SITE LOCATION *(attach additional sheets as necessary)*	TYPE	Primary	Contingency	HAZARD & SCHEDULE
1. Installation of soil borings and collection of split spoon samples for analysis.	(Intrusive) Non-intrusive	A B C (D)	A B C D	Hi Med (Low)
		(Modified)	(Exit Area)	Spring '97
2. Installation of groundwater monitoring wells with hollow-stem auger.	(Intrusive) Non-intrusive	A B C (D)	A B C D	Hi Med (Low)
		(Modified)	(Exit Area)	Spring '97
3. Collection of groundwater samples from 18 wells by pump and manual bailer.	(Intrusive) Non-intrusive	A B C (D)	A B C D	Hi Med (Low)
		(Modified)	(Exit Area)	Spring '97
4. .	Intrusive Non-intrusive	A B C D	A B C D	Hi Med Low
		Modified	Exit Area	
5. .	Intrusive Non-intrusive	A B C D	A B C D	Hi Med Low
		Modified	Exit Area	
6.	Intrusive Non-intrusive	A B C D	A B C D	Hi Med Low
		Modified	Exit Area	

PERSONNEL AND RESPONSIBLITIES

NAME	FIRM/DIVISION	CDM HEALTH CLEARANCE	RESPONSIBILITIES	On site?
David Keil	EMAV/WBY	B-T/D-S	Project Manager	(1) - (2) - (3) - 4 - 5
Brian Murtagh	EMAV/WBY	D-T	Monitoring Well/Soil Boring Installation	(1) - (2) - (3) - 4 - 5
Frank Robinson	EMAV/WBY	B-T/D-S	Environmental Sampling	(1) - (2) - (3) - 4 - 5
Brian Kearney	EMAV/WBY	C-T	Environmental Sampling	(1) - (2) - (3) - 4 - 5
				1 - 2 - 3 - 4 - 5
				1 - 2 - 3 - 4 - 5

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PROTECTIVE EQUIPMENT: Specify by task. Indicate type and/or material, as necessary. Group tasks if possible. Use copies of this sheet if needed.

BLOCK A

TASKS: (1) - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 - 10
LEVEL: A - B - C - (D) - Modified
(x) Primary ( ) Contingency

Respiratory: (x) Not needed
( ) SCBA, Airline: _____
( ) APR: _____
( ) Cartridge: _____
( ) Escape Mask: _____
( ) Other: _____

Head and Eye: ( ) Not needed
(x) Safety Glasses: _____
( ) Face Shield: _____
( ) Goggles: _____
(x) Hard Hat: _____
( ) Other: _____

Boots: ( ) Not Needed
(x) Steel-Toe (x) Steel Shank
( ) Rubber (x) Leather
(x) Overboots: If Muddy

Prot. Clothing ( ) Not needed
( ) Encapsulated Suit: _____
( ) Splash Suit: _____
( ) Apron: _____
( ) Tyvek Coverall
( ) Saranex Coverall
(x) Cloth Coverall: _____
( ) Other: _____

Gloves: ( ) Not Needed
(x) Undergloves: For Contact
(x) Gloves: For Contact
( ) Overgloves: _____
Other: *Specify below*
( ) Tick Spray
( ) Flotation Device
( ) Hearing Protection
(x) Sun Screen
( ) Traffic Vests

BLOCK B EXIT AREA

TASKS: (1) - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 - 10
LEVEL: A - B - C - D - Modified
( ) Primary (x) Contingency

Respiratory: ( ) Not needed
( ) SCBA, Airline: _____
( ) APR: _____
( ) Cartridge: _____
( ) Escape Mask: _____
( ) Other: _____

Head and Eye: ( ) Not needed
( ) Safety Glasses: _____
( ) Face Shield: _____
( ) Goggles: _____
( ) Hard Hat: _____
( ) Other: _____

Boots: ( ) Not Needed
( ) Steel-Toe ( ) Steel Shank
( ) Rubber ( ) Leather
( ) Overboots: _____

Prot. Clothing ( ) Not needed
( ) Encapsulated Suit: _____
( ) Splash Suit: _____
( ) Apron: _____
( ) Tyvek Coverall
( ) Saranex Coverall
( ) Cloth Coverall: _____
( ) Other: _____

Gloves: ( ) Not Needed
( ) Undergloves: _____
( ) Gloves: _____
( ) Overgloves: _____
Other: *Specify below*
( ) Tick Spray
( ) Flotation Device
( ) Hearing Protection
( ) Sun Screen
( ) Traffic Vests

BLOCK C

TASKS: 1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 - 10
LEVEL: A - B - C - D - Modified
( ) Primary ( ) Contingency

Respiratory: ( ) Not needed
( ) SCBA, Airline: _____
( ) APR: _____
( ) Cartridge: _____
( ) Escape Mask: _____
( ) Other: _____

Head and Eye: ( ) Not needed
( ) Safety Glasses: _____
( ) Face Shield: _____
( ) Goggles: _____
( ) Hard Hat: _____
( ) Other: _____

Boots: ( ) Not Needed
( ) Steel-Toe ( ) Steel Shank
( ) Rubber ( ) Leather
( ) Overboots: _____

Prot. Clothing ( ) Not needed
( ) Encapsulated Suit: _____
( ) Splash Suit: _____
( ) Apron: _____
( ) Tyvek Coverall
( ) Saranex Coverall
( ) Cloth Coverall: _____
( ) Other: _____

Gloves: ( ) Not Needed
( ) Undergloves: _____
( ) Gloves: _____
( ) Overgloves: _____
Other: *Specify below*
( ) Tick Spray
( ) Flotation Device
( ) Hearing Protection
( ) Sun Screen
( ) Traffic Vests

BLOCK D

TASKS: 1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 - 10
LEVEL: A - B - C - D - Modified
( ) Primary ( ) Contingency

Respiratory: ( ) Not needed
( ) SCBA, Airline: _____
( ) APR: _____
( ) Cartridge: _____
( ) Escape Mask: _____
( ) Other: _____

Head and Eye: ( ) Not needed
( ) Safety Glasses: _____
( ) Face Shield: _____
( ) Goggles: _____
( ) Hard Hat: _____
( ) Other: _____

Boots: ( ) Not Needed
( ) Steel-Toe ( ) Steel Shank
( ) Rubber ( ) Leather
( ) Overboots: _____

Prot. Clothing ( ) Not needed
( ) Encapsulated Suit: _____
( ) Splash Suit: _____
( ) Apron: _____
( ) Tyvek Coverall
( ) Saranex Coverall
( ) Cloth Coverall: _____
( ) Other: _____

Gloves: ( ) Not Needed
( ) Undergloves: _____
( ) Gloves: _____
( ) Overgloves: _____
Other: *Specify below*
( ) Tick Spray
( ) Flotation Device
( ) Hearing Protection
( ) Sun Screen
( ) Traffic Vests

MONITORING EQUIPMENT: Specify by task. Indicate type as necessary. Attach additional sheets if needed.

INSTRUMENT	*TASK*	*ACTION GUIDELINES*	*COMMENTS (When and how will you use the monitor?)*
Combustible Gas Indicator	(1 - 2 -) 3 - 4 - 5 - 6 - 7 - 8	0-10%LEL: No explosion hazard. 10-25%LEL: Potential explosion hazard; notify SHSC. >25%LEL: Explosion hazard; interupt task/evacuate. 21.0%O_2: Oxygen normal. <21.0%O_2: Oxygen Deficient; notify SHSC. <19.5%O_2: Interrupt task/evacuate.	(x) Not Needed
Radiation Survey Meter	(1 - 2 -) 3 - 4 - 5 - 6 - 7 - 8	3 x Background: Notify HSM >2mR/hr: Establish REZ.	( ) Not Needed Measure organic vapor continually. Compare action levels to time-averaged breathing zone measurements.
Photoionization Detector OVM eV Lamp Type: _____	(1 - 2 - 3) 4 - 5 - 6 - 7 - 8	0-20 ppm: Level D >20 ppm: Leave area. Call HSM	( ) Not Needed May be used as a alternate to the PID instrument.
Flame Ionization Detector Type: OVA	(1 - 2 - 3) 4 - 5 - 6 - 7 - 8	*Specify:*	(x) Not Needed
Detector Tubes Type: _____ Type: _____	1 - 2 - 3 - 4 - 5 - 6 - 7 - 8	*Specify:*	( ) Not Needed
Respirable Dust Monitor Type: _____ Type: _____	(1 - 2 -) 3 - 4 - 5 - 6 - 7 - 8	If team sees visible concentrations of dust in air, or dry, windy conditions that produce dust, they will leave the area.	( ) Not Needed
Other *Specify:*	(1 - 2 -) 3 - 4 - 5 - 6 - 7 - 8	If team notices unusual odors, or irritation of the eye or throat, they will leave the area.	

DECONTAMINATION PROCEDURES

ATTACH SITE MAP INDICATING EXCLUSION, DECONTAMINATION, AND SUPPORT ZONES AS PAGE TWO

Personnel Decontamination
Summarize below or attach diagram;

Team members will remove their protective clothing in the following order:

- Equipment drop
- Boot cover (if worn) removal
- Outer glove removal
- Hard hat removal
- Coverall removal
- Respirator (if worn) removal
- Surgical glove removal
- Hand and face wash

( ) Not needed

Sampling Equipment Decontamination
Summarize below or attach diagram;

- Bag all disposable sampling and PPE equipment
- Wash/rinse the outside of sample containers in soapy/clean water
- Wash all non-disposable sampling equipment in low sudsing detergent (Alconox or equivalent)
- Use Laboratory brush or equivalent; disassemble equipment when necessary
- Follow with tap water rinse, and distilled water rinse

( ) Not needed

Heavy Equipment Decontamination
Summarize below or attach diagram;

A decontamination pad will be constructed for deconning all heavy equipment used at the site. The drill rig shall be deconned by high pressure steam rinses between each monitoring well and borehole. All rods, augers, etc., shall be deconned between each hole.

( ) Not needed

Containment and Disposal Method

Waste generated during this investigation will be containerized and stored on-site in 55 gallon drums and a frac tank. The contractor will be responsible for disposal of all waste-generated materials.

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DECONTAMINATION PROCEDURES (If any are not needed, mark with ■ using control C)

Personalized Decontamination ( ) Not Needed

Summarize below and/or attach diagram; discuss use of work zones.

Personal decontamination station will move from location to location based on work site.

Wash hands and face if necessary with soap and water upon doffing personal protective equipment.

Wash well before hand-to-mouth contact is made. Workers will remove protective clothing in this order:

(1) equipment drop
(2) hard hat
(3) boot covers
(4) outer gloves
(5) Tyvek
(6) respirator (not used)
(7) inner gloves
(8) face and hand wash

WASH HANDS AND FACE PRIOR TO ANY INGESTION OF FOOD OR LIQUIDS.

Containment and Disposal Method

Wash solutions and removed soils may be allowed to return to the ground from which they came. Unless containerized wastes are hazardous, dispose with office builing waste stream. Dispose of hazardous wastes through a site-specific waste disposal contract.

Sampling Equipment Decontamination ( ) Not Needed

Summarize below and/or attach diagram; discuss use of work zones.

All sampling equipment will be throughly decontaminated between samples with soap, water, and then rinsing.

These tools are decontaminated between use at each sampling location by a four-step cleaning process. These steps are:

1. Immersion and vigorous scrubbing in a mild solution of laboratory grade detergent until all visual accumulations of soil are removed.

2. Thorough rinsing with potable water.

3. Spray rinsing with deionized grade water.

4. Air dry.

Containment and Disposal Method

Wash solutions and removed soils may be allowed to return to the ground from which they came. Unless containerized wastes are hazardous, dispose with office builing waste stream. Dispose of hazardous wastes through a site-specific waste disposal contract.

Heavy Equipment Decontamination ( ) Not Needed

Summarize below and/or attach diagram; discuss use of work zones.

All down-hole equipment and tool parts that contact excavated soil are constructed of heavy gauge steel and have no natural or synthetic components that could absorb and retain most soil-borne organic contaminants.

The drill rig, augers, and any other large equipment in the exclusion zone shall be steam cleaned prior to movement from the site.

Soil gas probes shall be decontaminated in the same fashion as drill rig equipment.

Containment and Disposal Method

Wash solutions and removed soils may be allowed to return to the ground from which they came. Unless containerized wastes are hazardous, dispose with office builing waste stream. Dispose of hazardous wastes through a site-specific waste disposal contract.

HAZARDOUS MATERIALS INVENTORY (Investigation-Associated Substances: Attach MSDS). Copy " ■ " to mark answers

Preservatives

( ) Hydrochloric Acid (HCl)
( ) Nitric Acid (HNO_3)
( ) Sulfuric Acid (H_2SO_4)
( ) Sodium Hydroxide (NaOH)
( ) Zinc Acetate (ZnOAc)
( ) Ascorbic Acid
( ) Other:
( ) Other

Decontamination

( )Alconox™
( ) Liquinox™
( ) Acetone
( ) Methanol
( ) Mineral Spirits
( ) Hexane
( ) Isopropanol
( ) Nitric Acid
( ) Other:

Calibration Gases and Fluids

( ) Isobutylene
( ) Methane
( ) Standard
( ) Pentane
( ) Hydrogen
( ) Propane
( ) pH Standard
( ) Conductivity
( ) Other

HEALTH AND SAFETY PLAN FORM

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PROJECT DOCUMENT #: _____

EMERGENCY CONTACTS

Water Supply:		
Site Telephone:		
EPA Release Report #:		1(800) 424-8802
CDM 24-Hour Emergency #:		1(800) SKY-PAGE 31821#
Facility Management:	Luis Crespo	(516) 249-4203
Other *(specify)*		
CHEMTREC Emergency #:		1(800) 424-9300

CONTINGENCY PLANS: Summarize below

All intrusive work to take place in modified Level D. Exceedances of action limits will not require the upgrade of personnel protective equipment. Exceedances will require work stoppage until acceptable conditions return.

HEALTH AND SAFETY PLAN APPROVALS

Prepared by: D. Keil Date 2/27/97

DHSC Signature _____ Date _____

HSM Signature Chris Marlowe Date 2/25/97

EMERGENCY CONTACTS	*NAME*	*PHONE*
Health and Safety Manager	Lisa Granados	(908) 225-7000
Project Manager	David Keil	(516) 496-8400
Site Safety Coordinator	Brian Murtagh	(516) 496-8400
Client Contact	Shawn O'Hara	(972) 868-2444
Other *(specify)*		
Environmental Agency	NYSDEC	
State Spill Number		1 (800) 457-7362
Fire Department		(516) 547-4121 Or 911
Police Department		911
State Police		(518) 458-6305
Health Department		(516) 853-3056
Poison Control Center		(516) 542-2323
Occupational Physician	David Barnes	1 (800) 229-3674

MEDICAL EMERGENCY *PHONE*

Hospital Name: Central General Hospital

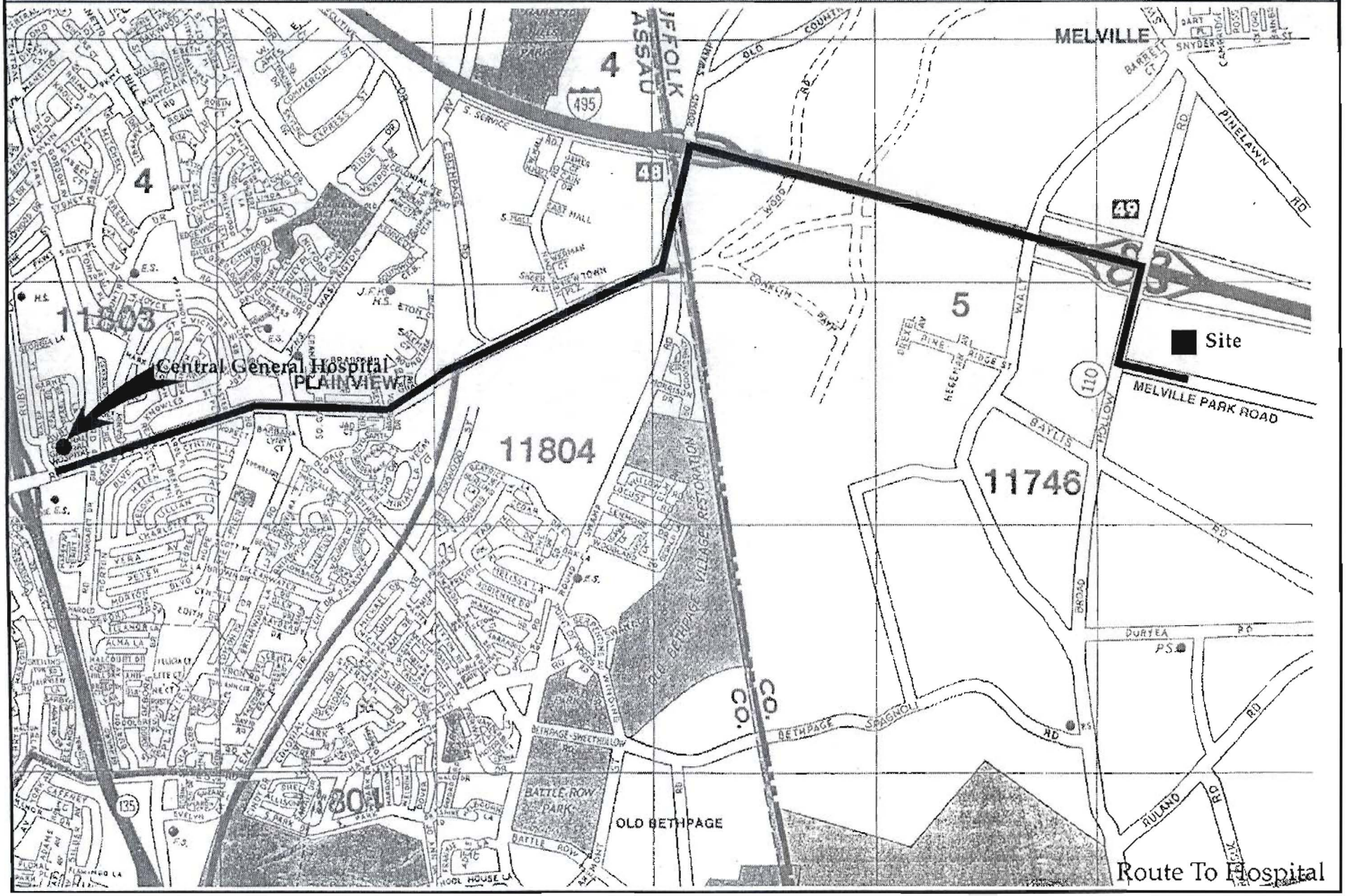
Hospital Address: 888 Old Country Road, Plainview, New York

Name of 24-Hour Ambulance: 911

Route to Hospital: Attached.

Distance to hospital: ~3 miles

Attach map with route to hospital: Broad Hollow Road north to LIE Exit 49 west. Follow LIE to Exit 48. South on Round Swamp Road to Old Country Road. Follow Old Country Road west to Central General Hospital (on the right).


Central General Hospital
PLAINVIEW
Site
MELVILLE
MELVILLE PARK ROAD
OLD BETHPAGE
11803
11804
11746
11801
Route To Hospital

DREW B. BENNETT
Senior Environmental Scientist
Camp Dresser & McKee

Summary

Mr. Bennett has 13 years of experience in hydrology, water resources management, contamination remediation, environmental management, and air toxics. He has conducted numerous studies relating to groundwater supply development, urban hydrology, remedial action designs for both groundwater and soil cleanups, natural systems for wastewater treatment, non-point source impacts on estuaries, and groundwater/surface water interactions. He has also provided environmental management support for large industrial facilities, and is experienced in industrial air pollution source sampling and analysis.

Experience

Mr. Bennett has 13 years of experience in environmental engineering and science. He has solved environmental and regulatory related problems by integrating engineering, technology, planning, research, and community participation as required. He has participated in numerous public and private sector projects involving water supply, water resource management, water quality improvement, land development, environmental management of industrial facilities, industrial site redevelopment, hazardous and industrial waste remediation, and resource restoration.

Mr. Bennett manages site contamination or other regulated materials that may be encountered during upgrade of the Spring Creek Auxiliary WPCP. The facility is a NYCDEP CSO storage facility and pump station located in Brooklyn, New York. Mr. Bennett's responsibilities include identifying regulated materials in areas of future excavation, influent barrels, and areas of the existing facility, and preparing design and contract documents for remediation. Regulated materials include landfill, lead-coated surfaces and electrical cables, asbestos, mercury, PCBs, USTs, and 6,000 cubic yards of debris and settlement in influent barrels.

As project manager and senior scientist for the Brookfield Avenue landfill remediation project on Staten Island, New York, Mr. Bennett is directing a team of engineers and scientists in the RI/FS, risk assessment and remedial design for this 200-acre inactive hazardous waste site owned by NYCDEP. The remedial investigation phase of the project involves intensive, state-of-the art investigations of air impacts, gas production, solid waste hot spots and groundwater/surface water impacts. He is working closely with NYSDEC, the community, and a Scientific Advisory Committee to address significant public concerns and maximize state EQBA funding for the project. The project is following a presumptive approach of remediating "hot spots" and containment via capping, landfill gas and leachate control. In addition, Mr. Bennett completed a 3D groundwater model of this complicated site. The model is guiding the RI and is being used to respond to the Community/Scientific Advisory Committee's questions on the potential exposure pathways in the complex hydrogeology. Specific issues include private wells, a mass balance of leachate as it travels through the groundwater/surface water

system, evaluation of the significance of buried river channels, and the potential for leachate leakage to deeper aquifers caused by extensive regional water supply pumping.

Mr. Bennett was assistant project manager for a critical path soil remediation plan and remedial action for a private client developing an industrial site on Long Island, New York. The site contained 18 underground storage tanks (USTs) and 45,000 cubic yards of soil mixed with refuse incinerator ash. He directed the preparation of a feasibility study, remediation plan, risk assessment, bid documents, and remediation contractor oversight during the reclamation of the site for future industrial use.

Mr. Bennett was the project hydrologist for the design of a groundwater remediation system for the Waldwick Aerospace site in Monmouth County, New Jersey. He assisted in the development of a three-dimensional groundwater model to aid field hydrogeologic investigations, defined required extraction rates to capture the solvent plume prior to discharge to a nearby stream, evaluated the impact of pumping on nearby riparian wetlands, and developed mitigation measures. He worked closely with CDM's wetland scientists and EPA's Biological Technical Assistance Group in resolving wetland impact issues.

Mr. Bennett is the quality assurance officer for the NYSDEC Standby Contract for Hazardous Waste Remediation Services. In this capacity, he is responsible for reinforcement of CDM's Quality Management Process. He reviews all project deliverables for technical accuracy and overall quality of work, performs project audits, assists in developing project specific quality assurance plans, resolves data problems, and directs the preparation of data usability reports.

Mr. Bennett is the senior scientist for the design and operation of remedial systems for contaminated soil and groundwater at the SMS Instruments Superfund site in Deer Park, New York. For the soil remediation system, Mr. Bennett prepared a treatability study that evaluated various forms of soil vapor extraction (SVE) technology to effectively remove volatile and semi-volatile soil contaminants. Based on this study, Mr. Bennett prepared performance-based specifications for bidding the construction and operation of an SVE system. The SVE system successfully achieved NYSDEC/EPA derived soil cleanup criteria. For the design of the groundwater pump and treat system, Mr. Bennett was responsible for the groundwater pump tests and the groundwater extraction and recharge well system. He currently monitors and evaluates the performance of the 100-gpm system and recommends operational changes as necessary.

For an industrial client's site on Long Island, Mr. Bennett directed an air sparging/soil venting pilot study involving groundwater highly contaminated with gasoline and a residual saturation zone below the water table. The objective of the pilot study was to cost-effectively remediate hot spots as a source control. In addition to optimizing extraction and injection rates, Mr. Bennett evaluated the

soil stripping and biodegradation treatment mechanisms associated with sparging. The process was selected for full-scale design and implementation over a 30-acre site.

For the John F. Kennedy Space Center in Florida, Mr. Bennett participated in the preparation of a RCRA facility investigation and the closure of two 150,000-gallon holding lagoons in compliance with RCRA regulations. He was responsible for the delineation of contaminants and for preparation of detailed closure plans and groundwater monitoring plans. He also assisted in preparing the RCRA Part B application.

Mr. Bennett provided consulting, construction, and operation services for a 75-gpm groundwater pump and treat project to remediate an off-site plume and control a DNAPL source. In addition to the groundwater extraction-recharge design, he provided construction management and system startup services.

As part of a remedial investigation of gasoline-contaminated groundwater at a large petrochemical distributor on Long Island, Mr. Bennett was the task manager for a soils vapor contamination monitoring program designed to monitor and evaluate the potential of trace gasoline vapors in residential home basements. Working closely with regulatory agencies and the local health department, Mr. Bennett developed a standardized monitoring program. He was also responsible for air emission stack testing of a number of sources associated with remedial activities.

For EPA, Mr. Bennett provided technical review of a RCRA Part B permit application for a petrochemical complex undergoing decommissioning in Puerto Rico. The application included four SWMU groups totaling 32 individual units. Active units included two aeration basins receiving wastewater produced by corrective actions and an industrial landfill which continues to receive hazardous wastes from the decommissioning process.

Mr. Bennett developed and calibrated three-dimensional groundwater flow and contaminant transport models for the Brookhaven National Laboratory's remediation program for Operable Units 1, 4, 5 and 6. Multiple source areas were addressed, including two landfills, waste pits, hazardous waste storage facilities, STP effluent recharge areas, and experimental agricultural fields. Model applications were used to identify source areas, guide field investigations, remedial alternative evaluations, and remedial designs. Mr. Bennett completed the engineering evaluation/cost analysis phase, and was responsible for pump testing, integrating operable units, and design of the groundwater extraction and recharge basin systems.

Education

M.S. - Environmental Engineering Sciences, University of Florida, 1989
B.S. - Hydrology, University of New Hampshire, 1982

Registrations

Professional Groundwater Hydrologist

Honors

NASA Graduate Assistantship

1991 Kenneth Allen Memorial Award from NYWPCA for the paper "Retrofitting for Watershed Drainage."

Memberships

Water Environment Federation
Long Island Water Conference
American Institute of Hydrology