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FORMER NEPERA FACILITY
HARRIMAN, NEW YORK

SITE-WIDE CHARACTERIZATION SUMMARY REPORT

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March 2011

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EXECUTIVE SUMMARY

This Site-Wide Characterization Summary Report (Summary Report) presents a comprehensive summary of previous environmental investigations and remedial activities conducted at the former Nepera facility in Harriman, New York (Site) under regulatory oversight of the New York State Department of Environmental Conservation (NYSDEC). This Summary Report is designed to assist the NYSDEC in its evaluation of the completeness of the site characterization and recommendations with respect to any future activities at the Site. The Site has been addressed under the RCRA Corrective Action Program and the Inactive Hazardous Waste Site program.

Under the RCRA program, the Site has been the subject of a RCRA Facility Investigation (RFI) and Corrective Measures Study (CMS) commencing in 2005 and continuing through today. Under the RCRA program various Solid Waste Management Units (SWMUs), Areas of Concern (AOCs), and Treatment, Storage or Disposal Facilities (TSDFs) have been characterized. Under the Inactive Hazardous Waste Site program, investigations started at the Site in 1986, culminating in completion of a full Remedial Investigation (RI) and Feasibility Study (FS) in 1995/1996, which led to NYSDEC's issuance of a Record of Decision (ROD) in 1997.

Following the issuance of the ROD, several remedial measures were conducted. Those remedial measures include: source area excavations; operation of a groundwater Interim Remedial Measure (IRM) from 1990 through 2004; installation of erosion controls along the stream bank of the West Branch of the Ramapo River; operation of a biosparging system from 2001 to 2008; and monitored natural attenuation (MNA) of groundwater.

The nature and extent of contamination at the Site have been fully characterized for the purpose of evaluating and setting forth potential additional remedial options. This characterization may be summarized as follows:

Surface and Subsurface Soil – More than 150 shallow soil samples and 200 subsurface soil samples were collected from borings and test pits as part of the NYSDEC-approved RFI and RI. Sample locations targeted all of the identified SWMUs, AOCs and other areas of potential impact based on review of historical records, aerial photographs and spill reports, as well as field observations and interviews with plant employees. Soils containing mercury concentrations in excess of the applicable soil cleanup objectives (SCOs) are distributed broadly across the Site in shallow and deeper soils. The mercury exists in a highly immobile form, which limits its ability to migrate in groundwater and surface water, leaving direct contact with or ingestion of soils as the primary potential exposure pathway. Surface soils at the Site have been fully characterized both analytically and spatially. The samples collected beneath the previously inaccessible SWMUs (including buildings, tanks and pipelines) did not indicate any significant differences in the type or concentration of constituents detected when compared to samples collected outside of these areas. The data did not identify any new significant sources impacting groundwater beneath the previously inaccessible SWMUs. Rather, the data continue to support the conceptual site model developed under the Inactive Hazardous Waste Site program that indicates the existing groundwater impacts observed underlying the main plant area are associated with residual contaminant concentrations within the lower permeability soils. Based on the extensive coverage provided by the available data and the lack of indication of a significant source within any of the studied areas, additional subsurface soil sampling beneath buildings, tanks or pipelines is not necessary to evaluate remedial options.

Parking Lot (Area B, Calcium Sulfate) – An April 2010 investigation of the parking lot included 55 borings and collection of a total of 12 samples for mercury and VOC testing. Based on the delineation that was performed of the lateral and vertical extent of the calcium sulfate material, the volume of material is calculated to be approximately 22,000 cubic yards. Mercury was detected at concentrations ranging from 1.1 to 1,900 mg/kg; VOCs were not detected. Based on the data collected during this investigation and from groundwater monitoring, mercury is present in a highly immobile form and is not a source of dissolved mercury to surrounding soils, groundwater, or surface water. Therefore, calcium sulfate in the parking lot has been fully delineated and characterized and additional study is not necessary to evaluate potential remedial options.

Lagoon – Samples of lagoon solids collected during the RFI indicate that the solids contain low levels of PAHs and metals. Surface water samples have been collected from the lagoon to comply with the State Pollutant Discharge Elimination System (SPDES) permit and have consistently demonstrated compliance with the permit limits. Based on the available data, there is no indication that the lagoon or subsurface soils beneath the lagoon are impacting groundwater. Therefore, additional soil sampling within or beneath the lagoon is not necessary to support the evaluation of remedial options. If the recommended final remedial action for the Site includes on-site consolidation, then the appropriateness of using the lagoon (based on volume to be consolidated) would be evaluated. If the lagoon appears to be an appropriate consolidation location, then sampling may be conducted as part of a future design activity as necessary to further characterize the lagoon contents and/or clay liner.

Riverbank – Investigation and stabilization activities along the stream bank have included a focused test pit investigation to confirm the limits of calcium sulfate material and construction of an IRM to install an erosion control cover along the bank. The current interim erosion control cover consists of a geotextile secured with soil staples and a gravel cover. The pending proposal for a final erosion control cover consists of a vegetative cover with Turf Reinforcement Mat (TRM) in lieu of gravel. The interim cover has been subjected to several extreme rainfall events, including the flooding event in April of 2007. Only minor repairs were necessary following the 2007 event, confirming that the erosion control cover is functioning as intended and that the calcium sulfate is contained. Therefore, further study of the stream bank is not necessary for selection of the final remedy.

Groundwater – Groundwater contamination has been found at the Site and the contaminants of concern (COCs) identified include, among others, benzene, which, because it is present at the sampling locations which define the area of groundwater impacts, has routinely been used as a groundwater COC surrogate at the Site. In 2008, a conceptual site model was developed which enhanced the understanding of groundwater flow at the Site. A Supplemental Remedial Action Work Plan (RAWP) was implemented to further characterize groundwater flow and contaminant transport. The Supplemental RAWP results confirmed that groundwater flow is controlled by thicker zones of coarse-grained deposits in the central portion of the Site. As a consequence of previous remedial actions consisting of soil and drum excavation and removal, groundwater extraction and treatment, and biosparging for mass removal of contaminants, the extent of the plume of impacted groundwater and overall COC concentrations have decreased to where groundwater quality standards for the COCs are routinely met at the down-gradient sentinel wells on site, including within the preferential flow paths of the coarser-grained materials. Concentrations above groundwater quality standards remain in the on-site area of the former main plant operations due to remnant contamination present in the low-permeability soils. Both the groundwater extraction and treatment IRM and the biosparging system have been shut down with concurrence from the NYSDEC; yet, routine groundwater testing since 2008 has consistently demonstrated that down-gradient groundwater quality meets standards through natural degradation of residual contamination. As a result of the completed investigation and remediation efforts, further study of groundwater is not necessary.

Surface Water (West Branch of the Ramapo River) – Surface water was characterized as a part of the RI. In addition, a supplemental investigation performed on surface water by the NYSDEC specifically focused on mercury. The RI results indicated there were no differences in upstream and downstream water quality and concluded that the Site has no measurable impact on water quality within the West Branch of the Ramapo River. The mercury investigation by the NYSDEC generally indicated similar findings; however, the highest concentration of mercury was reported at the outfall to the Site's groundwater treatment system discharge. It should be noted that this mercury concentration was below the applicable SCG and the discharge is no longer used or present. The NYSDEC also conducted a fish study within the West Branch of the Ramapo River, which concluded that concentrations of mercury detected in the fish samples were all well below the fish consumption advisory level. In addition, all of the concentrations detected in surface water are well below the current groundwater quality standard for mercury of 700 ppt, and well below the MCL of 2 ppb (2,000 ppt). Collectively, the data indicate there has been no overall Site impact on surface water quality and there is no need for further investigation.

Sediment – Sediment sample characterization conducted in the West Branch of the Ramapo River during the RI and NYSDEC's supplemental mercury investigation indicate comparable, or higher, concentrations of SVOCs, metals, and TPH in upstream sampling locations as compared to the downstream sampling locations. Mercury was detected in sediment from the upstream and downstream locations at similar levels. Detections were slightly less in the upstream locations. The highest detected concentration was adjacent to the Site, suggesting some localized influence on mercury concentrations. All of the values were below the NYSDEC's ROD-specific SCG. Because the groundwater data indicate that mercury is generally not migrating in the dissolved phase, such mercury contributions to sediment from the Site as may have occurred were most likely from historical sediment transport, which is now controlled. The NYSDEC's fish study did not indicate mercury levels above fish advisory levels, thus indicating that mercury is not propagating up through the food chain from sediments. The work performed has characterized the sediments and controlled prior transport mechanisms. Therefore, further study of sediments is not needed.

Soil Vapor – The vapor intrusion pathway is not of concern under current conditions since the buildings are unoccupied. Groundwater quality within the overburden sand and gravel aquifer is well characterized as part of the groundwater monitoring program. It is anticipated that institutional controls will be a remedial component and will require that future development either incorporate vapor mitigation measures or include a vapor intrusion evaluation specific to future structure locations. No further investigation of soil vapor is necessary to support the evaluation of remedial options for the Site.

Source Areas -- Based upon the previously completed remedial actions (removal of drums, soils, and sediments) and data from the extensive number of soil borings, geoprobe borings and soil gas points completed throughout the main plant area, there is no evidence of any remaining discrete areas of contamination that meet the definition of a source area as defined in DER-10 and Part 375. Therefore, given the extensive amount of investigation that has been completed, no further investigation of source areas is necessary for site soils and groundwater. The vertical and horizontal extent of the calcium sulfate material in the parking lot adjacent to the West Branch of the Ramapo River has been studied and defined. While the calcium sulfate material could meet the definition of a source material with respect to exposure and subsequent transport in surface water, it is currently controlled. Therefore, no further study is needed to evaluate remedial options.

Off-Site Soil -- The results of off-site soil samples collected on the adjacent Avon parcel and Village of Harriman property show very low mercury concentrations, demonstrating no significant impact from the Site. Despite diligent efforts, ELT Harriman was unable to secure access to other perimeter locations, including properties across the Ramapo River and the property located on the other side of the railroad. ELT Harriman will complete the scope of the Supplemental RFI Work Plan provided that access can be obtained with the assistance of the NYSDEC.

Ecological -- Ecological assessments at the Site were performed as part of the RI and they concluded that there are no impacts with the exception of sediment quality in the off-site area known as Area K on the Avon parcel. As part of the remedial actions implemented under the ROD, this sediment was removed from Area K on the Avon parcel. In addition, the NYSDEC's study of the West Branch of the Ramapo River indicated that mercury is below fish consumption advisory levels. The Site is downstream of the outfall of the Orange County Sewer District (OCSD) #1 wastewater treatment plant which could also be contributing mercury or other contaminants at the levels seen in upstream samples.

A qualitative exposure assessment for the Site indicates the following:

- Although the potential exists for a complete pathway for direct contact with site soils if engineering and/or institutional controls are not in place, engineering controls are already in place in the form of restricted site access and ELT Harriman has indicated that it will agree to institutional controls for future use of the Site.
- Although the calcium sulfate material could represent a direct contact pathway or surface water pathway through erosion, it is currently controlled through maintenance of the parking lot pavement and stream bank erosion control cover.
- There is currently no complete pathway for groundwater, and with use restrictions/institutional controls, a complete pathway will not exist in the future.
- A complete exposure pathway is not indicated for surface water based on analytical data and the NYSDEC's fish study.
- A complete exposure pathway is not indicated for sediment based on analytical data and the NYSDEC's fish study. Although future exposure pathways are possible through erosion, this pathway can be controlled through continued maintenance of the IRM cover system, use restrictions, institutional controls and implementation of the final erosion control cover.
- A complete exposure pathway for soil vapor does not exist because none of the buildings on the Site are occupied. If the Site is redeveloped, a soil vapor intrusion evaluation would be needed and measures to control soil vapor at new locations will be implemented, as appropriate.
- Exposures through ambient air are unlikely because operations have ceased at the Site. During remedy implementation a community air monitoring program would be in place to address potential short-term emissions. Institutional controls will address this issue for future uses of the Site.

On the basis of data collected over 25 years of site investigation and remediation, further study is not indicated for on-site soils, off-site soils, sediments, surface water, groundwater, source areas, the parking lot (calcium sulfate material), the lagoon, and soil vapor. As a part of final Site remedy selection and design, focused pre-design investigations may be warranted (e.g., lagoon as a containment area). However, such investigation is not necessary to proceed to final remedy selection. If the Site is developed, potential vapor intrusion will be evaluated with the inclusion of institutional controls, as necessary.

1 INTRODUCTION

This Site-Wide Characterization Summary Report (Summary Report) is a comprehensive summary of the information that has been obtained from previous environmental investigations conducted at the former Nepera facility in Harriman, New York (Nepera-Harriman Site or Site). The report has been prepared on behalf of ELT Harriman, LLC (ELT Harriman) and the Maybrook and Harriman Environmental Trust (Trust) (collectively ELT/Trust). In an email dated December 21, 2010 the New York State Department of Environmental Conservation (NYSDEC) provided to ELT/Trust a draft Scope of Work outlining additional investigatory activities to address data gaps that the NYSDEC believes exist and should be addressed before further evaluation of remedial options can be completed. ELT/Trust prepared a January 19, 2011 response to the NYSDEC addressing the NYSDEC's comments and concerns and suggesting that a comprehensive summary report addressing all environmental media be prepared. The NYSDEC issued a letter dated February 4, 2011 authorizing ELT/Trust to prepare a comprehensive summary report. This report presents a summary of the combined results of the investigatory efforts that have been conducted pursuant to both the NYSDEC's RCRA Corrective Action and Inactive Hazardous Waste Site (State Superfund) programs.

1.1 Site Background

The history of the Site is detailed in the report titled Remedial Investigation – Harriman Site (Conestoga-Rovers & Associates, July 1995) (hereinafter the "RI Report") and the Record of Decision (ROD) issued by the NYSDEC in March 1997 (NYSDEC, March 1997). A brief description of the site setting, the historic site use and regulatory background is provided herein.

1.1.1 Site Location and Description

The Nepera-Harriman Site, which manufactured fine and bulk pharmaceutical products from 1942 to 2005, is located in the Village of Harriman, Orange County, New York (see attached RFI Figure 2-1, Site Location, designated F1). The southwest corner of the Site is in the Town of Monroe. The Site is bounded to the northwest by NYS Route 17, to the northeast by the West Branch of the Ramapo River, and to the south by undeveloped land currently owned by ELT Harriman (commonly referred to as the "Avon parcel"). The Site occupies approximately 28 acres and can generally be divided into two areas: (1) approximately 10 acres located to the northeast of Arden House Road on which the former administrative offices, a parking lot, and the former wastewater (now SPDES) lagoon are located, and (2) approximately 18 acres to the southwest of Arden House Road on which the former manufacturing facilities are located. The facility is currently inactive and the tank farms, distilling operations, and other manufacturing areas have been decommissioned.

1.1.2 Regulatory Background

The following sections provide an overview of the site history and the activities undertaken pursuant to the NYSDEC's Superfund and RCRA Corrective Action programs.

1.1.2.1 Site Chronology

A brief description of historical operational and waste management practices follows. Additional site history, including developments under both the State Superfund and RCRA regulatory programs, is summarized in Table 1-1, Site Chronology (newly prepared for this report and designated T1). The Site is currently owned by ELT Harriman. The Site was used for the manufacture of pharmaceutical and specialty chemicals from 1942 to 2005.

Chemical by-products (organic compounds) were incinerated on Site from September 1945 through May 1957. This activity was conducted on a regular basis in two areas. During the mid 1940s, a "burn pit" apparently was located near the former blind lagoon and the current SPDES lagoon. From the late 1940s until 1957, a second "burn pit" was located near where the cyano reactor now stands. In 1978, an incinerator was installed in Building 61 and later became subject to the RCRA Permit. The incinerator was shut down in August 2005.

From the late 1940s to approximately 1953, calcium sulfate material, which was used as a catalyst in the manufacturing of niacinamide, was disposed of on site, primarily in a low lying area where the administration building and parking lot are now located. The calcium sulfate material contains inorganic mercury in a form that is highly immobile.

Drum burial occurred in an area near Buildings 67 and 75 and in an area near the southern boundary of the Site. Drum removal from these areas was conducted during the mid 1980s. Additional soils removal including drum fragments was completed in Area F and Building 53 in 2001.

The wastewater lagoon, constructed in the mid 1960s, is located southeast of the parking lot. It is reportedly approximately 12 feet deep, lined with compacted clay, and stores approximately 5.5 million gallons of water that prior to plant shutdown was derived from boiler blowdown and non-contact cooling water, storm water runoff and treated groundwater. Currently, water in the lagoon is derived solely from stormwater. Water from the lagoon is discharged to the west branch of the Ramapo River under a State Pollutant Discharge Elimination System (SPDES) permit. As a result, it is commonly referred to as the SPDES Lagoon. Prior to its current use, the lagoon served as a settling pond for aluminum hydroxide and magnesium silicate precipitates from manufacturing. The former blind lagoon (previously located where the SPDES lagoon currently is situated) was used to drain fire-system sprinkler (deluge) water, which was conveyed via gravity flow through underground pipes. Until recently, deluge water was collected in a 20,000-gallon underground storage tank, and periodically pumped to an above-ground 300,000-gallon storage tank. The deluge water system currently is inactive.

ELT Harriman purchased the Site in November 2007 and submitted an application for transfer of the SPDES Permit in December 2007. The NYSDEC elected not to transfer the permit and it expired on April 30, 2010. ELT submitted an application for a new SPDES Permit in August 2010. The NYSDEC has not acted on the application as of the date of this report. There have been no discharges from the lagoon since the permit expired.

1.1.2.2 New York State Inactive Hazardous Waste Disposal Site Program

The Nepera-Harriman Site has been the subject of extensive investigation and remediation under the New York State Inactive Hazardous Waste Disposal Site (State Superfund) program (Site No. 336006). Various Work Plans, a Remedial Investigation (RI), a Feasibility Study (FS), Interim Remedial Measures (IRMs), and final remedial measures have all been undertaken at the Site, starting with preliminary investigations in 1986 and continuing to this day. The RI/FS was completed in accordance with Stipulation Agreement Index No. W3-0004-8101 (SA), and formed the basis for the NYSDEC to select a site remedy and issue the March 1997 ROD. Subsequent to the ROD, the Trust, as well as others, entered into a Consent Decree that was filed in the United States District Court for the Southern District of New York (U.S. District Court, April 21, 1998) to implement the remedy selected in the ROD.

An IRM consisting of groundwater extraction and treatment was initiated in 1990. The IRM, specifically recovery wells RW-1S and RW-3, operated from 1990 through 2004. As a result of decreased well efficiencies and pumping rates from these wells resulting from siltation and other factors, pumping from both wells was discontinued in September 2004 as a part of biosparge system implementation and monitoring.

As a part of the ROD selected remedy implementation, a number of activities were undertaken as follows:

- Drum and contaminated soil source materials were removed from several areas of the Site (Areas F and Building 53). Surface soil was also removed in Area K. Work performed was documented in the Excavation Summary Report (Arcadis, March 2001).
- A biosparge system was installed for contaminant mass removal in lieu of soil vapor extraction (SVE), which was pilot-tested and found to be impractical. The work was documented in the Interim Pilot Test Report (Arcadis, March 2001).
- Surface water, sediments, and stream bank investigation and assessment were performed by the Trust and the NYSDEC. The work was documented in the RI Report and a fact sheet was issued (NYSDEC, June/July 2001).
- Interim erosion controls were implemented along the stream bank. A final design was proposed to the NYSDEC in "Concept Plan for River Bank Stabilization, West Branch of the Ramapo River (Southern Bank)" (Arcadis, November 2005) and is still under review.
- A Conceptual Site Model and Supplemental Remedial Action Work Plan report (HydroQual, May 2008) was developed and the work plan was implemented, which further defined groundwater flow and quality.
- In response to the implementation of the Supplemental Remedial Action Work Plan, the biosparge system was discontinued in 2008 and the Site entered a routine monitoring phase to confirm that groundwater impacts remain within the boundaries of the Site. Monitored natural attenuation to address residual ground water contaminants is on-going.

Additional details of the investigation and remediation work performed under the NYS Inactive Hazardous Waste Disposal Site program are provided in the sections which follow and in the referenced documents.

1.1.2.3 RCRA Corrective Action

In July 1999, the NYSDEC issued a 6 NYCRR Part 373 Hazardous Waste Management Permit (RCRA Permit) to Nepera Inc. (EPA ID#: NYD002014595) (NYSDEC, July 1999). The RCRA Permit was subsequently transferred to Rutherford Chemicals after it purchased the Site in October 2003. When ELT Harriman purchased the Site in November 2007, it contractually assumed the responsibility for Rutherford Chemicals' obligations under the RCRA Permit. Module III of the RCRA Permit includes Corrective Action Requirements for specific Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs).

Manufacturing operations ceased in May 2005. The hazardous waste incinerator was shutdown in August 2005 and the last product was shipped off site in September 2005. Equipment shutdown, cleanout and decontamination were completed between July 2005 and October 2006. The above-ground portions of all treatment, storage and disposal (TSD) units were closed pursuant to the RCRA Permit and the approved RCRA Closure Plan (Shaw Environmental, Inc., November 2005).

Following the cessation of manufacturing operations, areas previously deemed inaccessible because of ongoing operations became accessible and subject to the Module III Corrective Action Requirements of the RCRA Permit. Table III-1 of the Permit lists the SWMUs and AOCs known to exist when the permit was issued. The list includes the TSD Units, "Accessible Remediation SWMUs" and "Inaccessible SWMUs". The Accessible Remediation SWMUs correspond to study areas identified in the ROD as Areas A through J and include the thermal water sewers conveying blowdown from boiler and cooling tower systems, the deluge water collection system and building trench drains (RFI Report Figure 2-2 presented herein for reference and designated F2). The inaccessible SWMUs include potentially contaminated soil under 72 buildings and process areas within Study Areas A, B, E, G, I, and J as shown on the aforementioned RFI Report Figure 2-2.

In a letter dated May 3, 2006, the NYSDEC required that Rutherford Chemicals prepare a RCRA Facility Investigation (RFI) Work Plan. A draft RFI Work Plan was submitted to the NYSDEC on August 31, 2006. Conditional approval of the RFI Work Plan was given by the NYSDEC in correspondence dated October 13, 2006. The comments and questions provided by the NYSDEC in the conditional approval were addressed and the final RFI Work Plan was submitted on November 9, 2006 (Brown and Caldwell Associates, November 2006). The RFI was implemented from October 2006 until January 2007 and documented in the report entitled RCRA Facility Investigation Report, Former Nepera Plant Site, Harriman, New York dated April 2007 (Brown and Caldwell Associates, April 2007) (hereinafter the "RFI Report"). The NYSDEC issued comments on the RFI Report in a letter dated July 10, 2007. An Addendum to the RFI Report, dated October 8, 2007, was submitted to the NYSDEC as a response to the RFI Report Comment Letter (Brown and Caldwell Associates, October 2007).

In its July 10, 2007, letter the NYSDEC required that a Phase II RFI be conducted to investigate off-site areas adjacent to the former plant facility and across the Ramapo River. A Phase II RFI Work Plan was prepared and submitted to NYSDEC in November 2007 (Brown and Caldwell Associates, November 2007). ELT Harriman only was able to obtain access to approximately half of the targeted off-site locations and completed the sampling and analyses for those locations in June 2008. Analytical results were transmitted to the NYSDEC in a technical memorandum dated August 6, 2008 (Brown and Caldwell Associates, August 2008).

The NYSDEC also required, in its July 10, 2007 letter, that ELT Harriman move forward with a Corrective Measures Study (CMS). A CMS Plan and Task I Report was prepared and submitted to the NYSDEC in November 2007 (Brown and Caldwell Associates, November 2007). The CMS Plan and Task I Report presented the corrective action objectives, identified and screened remedial technologies, and described the approach to completing the remaining tasks of the CMS. The NYSDEC issued a letter dated September 11, 2008, that provided comments on the CMS Plan and Task I Report and guidance pertaining to the hazardous constituents and target cleanup levels to be evaluated in the CMS. The NYSDEC also requested an interim report providing "rough cost estimates for the various alternatives and the likely final use of the site". Brown and Caldwell Associates submitted the Interim Report – Corrective Measure Alternatives and Preliminary Cost Estimates dated March 16, 2009 (Brown and Caldwell Associates, March 2009).

The Interim Report presented a range of alternatives for remediation of the Site (with the exception of Area B – Parking Lot, which was not addressed in the CMS) and preliminary cost estimates. The NYSDEC issued comments on the Interim Report in a letter dated May 21, 2009. The NYSDEC indicated that no further evaluation of excavation/removal actions for achieving site wide "unrestricted use" and "residential use" for mercury, PCBs or benzene was necessary; the NYSDEC also requested that further study include alternatives for consolidation and excavation and address the potential use of the lagoon as a consolidation unit. The NYSDEC also provided comments regarding the development of Soil Cleanup Objectives (SCOs) for mercury and specifically the use of mercury speciation. A work plan for Supplemental Mercury Speciation Evaluation was prepared and submitted to the NYSDEC in September 2009 (Brown and Caldwell Associates, September 2009). The NYSDEC issued comments on the Work Plan in a letter dated November 24, 2009 and indicated that further discussion of the study goals and proposed methods was needed. After further discussion, the NYSDEC indicated that further study is not necessary and that alternate SCOs may be used in the evaluation of remedial options.

1.2 Scope of the Project

As noted previously, the objective of this Site-Wide Characterization Summary Report is to present a comprehensive summary of the information that has been obtained from previous environmental investigations and remedial activities conducted at the Nepera-Harriman Site. The scope of the report includes the following:

- A technical overview (executive summary) of the RI and RFI findings;
- A brief overview of the field activities conducted under the RI and RFI programs;
- A description of the regional setting of the Site, including geology, hydrogeology and groundwater use;
- A description of the site setting, including a review of historical records, site hydrogeology, a conceptual site model, and surface water hydrology;
- A discussion of chemical distribution by environmental media, including surface and subsurface soils, lagoon sediments, parking lot soils, riverbank soils, groundwater, surface water, sediment, soil vapor, off-site soils, source areas, on-site surface water system, and mercury speciation in soil;
- A qualitative exposure assessment; and
- Conclusions and recommendations.

2 TECHNICAL OVERVIEW AND FINDINGS

ELT/Trust believes the Nepera-Harriman Site is fully characterized for the purpose of evaluating and selecting remedial options. The NYSDEC previously reached the same conclusion in its approval of the RFI report and required preparation of a CMS with the only identified data gap being investigation of off-site soil quality on the adjacent properties. A summary of the nature and extent of contamination is presented below and further details are presented in Section 6 – Chemical Distribution.

2.1 Summary of Nature and Extent of Contamination

Surface and Subsurface Soil

More than 150 shallow soil samples were collected from within the 0 to 2 foot interval during the RI and RFI, in accordance with the NYSDEC-approved RI/FS Work Plan and RFI Work Plan, respectively. The results from the RI and RFI sampling are discussed in detail in Section 6.1 and compared with the NYSDEC's SCOs for protection of human health in commercial and industrial use scenarios. The data indicate that exceedances of the applicable SCOs for mercury are distributed in shallow soils over most of the Site. Exceedances for other compounds and metals, including polynuclear aromatic hydrocarbon (PAH) compounds, polychlorinated biphenyl compounds (PCBs), arsenic and copper have been identified in more localized areas of the Site. Surface soils at the Site have been fully characterized, both analytically and spatially.

In the course of the RFI, a total of 202 subsurface soil samples (> 2 feet bgs) were collected from 219 borings. RI subsurface samples (>2 feet bgs) were collected from a total of 30 test pits excavated at locations across the Site. The results of this sampling are discussed in detail in Section 6.2. Benzene was the only VOC detected in subsurface samples at concentrations above its Commercial or Industrial SCO. These exceedances were clustered in the vicinity of the wastewater tank farm, distillation pad and crude-base distillation facilities located south of the amide manufacturing control room. A number of SVOCs (all PAH compounds) exceeded their respective Commercial or Industrial SCOs at five locations, including the warehouse/water filtration facility in the northwest corner of the Site, the aforementioned wastewater tank farm, the engineering offices and the truck scale. The concentrations of the site-specific SVOCs alpha-picoline, beta-picoline and pyridine in the subsurface samples were generally non-detect to less than 1 mg/kg, and exceeded 10 ppm at no more than three locations. The PCB Aroclor 1254 was detected in subsurface soil samples; its concentration exceeded the Commercial SCO at five locations. As with the shallow soil samples the only metal with widespread exceedances of the SCOs was mercury. Arsenic, barium, cadmium, copper and lead were the only other metals detected in subsurface soil at concentrations above their respective SCOs, with exceedances occurring in relatively few, localized areas.

In accordance with the NYSDEC-approved RFI Work Plan (Brown and Caldwell Associates, November 2006), a minimum of one sample was collected from underneath each building or tank slab and was biased toward areas with the highest probability of impact (i.e., cracks in slabs, visible staining, adjacent to floor drains, etc.). If there was no visual or historical rationale, the sample was collected beneath the most heavily utilized area with a bias toward the center of the building. Along underground sewer alignments, samples were collected from the interval demonstrating the greatest impact through field screening or visual inspection or if there was no evidence of impact, the sample was collected from the next change in lithology or from immediately above the water table. The samples collected beneath the previously inaccessible SWMUs did not indicate any significant differences in the type or concentration of constituents detected when compared to samples collected outside of these areas. The data did not identify any new significant sources impacting groundwater beneath the previously inaccessible SWMUs. Rather, the data continue to support the Conceptual Site Model (CSM) that indicates the existing groundwater impacts observed underlying the main plant area are associated with residual contaminant concentrations within the lower permeability soils as described in the Conceptual Site Model and Supplemental Action Work Plan (HydroQual, May 2008). Based on the extent of the available data and the lack of any indication of a significant source attributable to the previously inaccessible SWMUs, additional subsurface soil sampling beneath buildings, tanks or pipelines is not necessary for the evaluation of remedial options.

Parking Lot – Area B (Calcium Sulfate)

As discussed in greater detail within Section 6.4, approximately 22,000 cubic yards of calcium sulfate are present under the parking lot. The area is bounded by Arden House Road and NY Route 17 to the south and west, the SPDES lagoon to the east and the West Branch of the Ramapo River to the north (see figure in Section 6.4).

Mercury is present within the calcium sulfate material as a byproduct from the manufacture of niacinamide. Total mercury concentrations within individual samples ranged from 1.1 to 1900 mg/kg, while total mercury concentrations in composite samples ranged from 356 to 598 mg/kg. The collective data indicates that the mercury is present in a highly immobile form and is not a source of dissolved mercury in groundwater. Similarly, testing for volatile organic compounds indicates the calcium sulfate is not a source of VOCs.

The calcium sulfate material within the parking lot area is currently covered with asphalt and an IRM consisting of geotextile and stone along the river bank has been implemented to prevent erosion of the material. The condition of the asphalt and IRM are inspected quarterly and repairs are made as necessary. Based on current conditions at the Site, the calcium sulfate is not a significant source of mercury to groundwater, surface water, or sediment. Furthermore, based on the information gathered to date, sufficient data exists to evaluate and recommend a remedial action for the parking lot.

Lagoon

Samples of lagoon solids collected during the RFI indicate that the solids contain low levels of PAHs and metals. Surface water samples have been collected from the lagoon to comply with the SPDES Permit and have consistently demonstrated compliance with the permit limits. Based on the available data, there is no indication that the lagoon or subsurface soils beneath the lagoon are impacting groundwater.

As discussed in the March 2009 CMS Interim Report, the lagoon may be employed as an area to consolidate excavated impacted materials from other areas of the Site. The potential use of the lagoon (or a portion thereof) as a consolidation area would depend on how other areas of the Site are addressed. If the lagoon is used as a consolidation area, it would be decommissioned prior to or coincident with remedial construction as part of the lagoon closure under the SPDES Permit or per a work plan approved by the NYSDEC. Following decommissioning of the lagoon, the surface water and solids contained within the lagoon will be managed in accordance with the approved plan. Note that the lagoon may be maintained to manage stormwater during building demolition and, depending on the selected remedy (i.e., if on-site consolidation at the lagoon is not selected), during remedial construction.

Because the available data is sufficient to support the evaluation of remedial options, additional soil sampling within or beneath the lagoon is not necessary. If on-site consolidation is recommended, then the appropriateness of using the lagoon (based on volume to be consolidated) would be evaluated. If the lagoon appears to be an appropriate consolidation location, then sampling may be conducted as part of a future design activity.

<u>Riverbank</u>

The river bank represents the northern limit of calcium sulfate material beneath the parking lot described above but has been the subject of focused investigations and interim remedial measures performed at the request of NYSDEC. Following completion of a test pit investigation in August 2005, the Trust voluntarily constructed an interim cover on the stream bank that included the placement of geotextile, secured with soil staples, and then covered with gravel. The interim action covered the area containing calcium sulfate near the stream bank surface as delineated by the test pits.

Prior to the interim action described above, a Riverbank Capping Work Plan (Arcadis, May 2005) was submitted to the NYSDEC which called for final bank stabilization using geotextile, covered with a geogrid and a one foot thick layer of 6" stone rip-rap. At the request of the NYSDEC, the proposed cap was then revised to consist of a vegetative cover in lieu of rip-rap. A revised Concept Plan for Riverbank Stabilization (Arcadis, November 2005) was submitted to the NYSDEC, along with calculations to support the proposed changes. The proposed final remedial action has not been implemented pending comments/approval by the NYSDEC. In the interim, the previously installed erosion control cover has been inspected and maintained as needed. The cover has not been eroded and maintenance has been limited to minor repairs following an extreme flooding event in April 2007 and replacement of the silt fence. On-going inspection and maintenance activities have been reported to the NYSDEC in quarterly progress reports, which are continuing to this day.

<u>Groundwater</u>

Groundwater contamination, consisting principally of benzene and pyridine, was first identified in the mid 1980s. Based on the results of the 1995 RI/FS, the ROD identified nine site COCs consisting of benzene, toluene, ethylbenzene, xylene (collectively identified as BTEX compounds), chlorobenzene, pyridine, alpha-picoline, 2-amino pyridine and mercury. Benzene is present at all sampling locations which define the area of groundwater impacts, and at the highest concentrations. Benzene has, therefore, been routinely used as a site surrogate to represent groundwater quality underlying the Site.

As a consequence of remedial actions consisting of soil and drum excavation and removal, groundwater extraction and treatment, and biosparging, the area of impacted groundwater and overall concentrations have declined considerably since the late 1980s (see Section 6.6 for detailed discussion). The excavation and removal projects were completed in 2001, groundwater extraction and treatment ceased operation in September 2004, and the biosparge system was taken off-line in September 2008. Semi-annual groundwater sampling since that time continues to demonstrate that the concentration of site COCs at down-gradient sentinel wells remains below standards, criteria and guidance (SCGs) and there are no impacts to off-site properties or the West Branch of the Ramapo River. Concentrations above SCGs (principally benzene) are present under the main plant site but are generally below SCGs down-gradient of the main plant area at Arden House Road due to natural degradation. Groundwater impacts are restricted to the overburden. Bedrock water quality is not impacted.

Based on these investigations and remedial actions, further study of groundwater apart from routine monitoring is unnecessary.

Surface Water (West Branch of the Ramapo River)

Surface water samples were obtained as part of the 1995 RI/FS and during a November 1995 investigation by NYSDEC (NYSDEC collected additional surface water and sediment samples focused on mercury only). As described in more detail in Section 6.7, there were no site COCs detected above SCGs in the RI/FS samples and the concentration of detected VOCs, SVOCs and metals in the upstream sample were similar or higher than those reported in the downstream sample. The Site is located immediately downstream of the OCSD #1 Harriman Treatment Plant and the detection of bromoform in all three of the stream samples is attributed to the documented use of bromine for final treatment of the Sewer District's wastewater effluent. Based upon the data, it was concluded that the Site had no measurable impact on water quality within the West Branch of the Ramapo River.

The November 1995 investigation by the NYSDEC included the collection of surface water samples for mercury with a detection limit of 1 ppt as opposed to the detection limit during the RI/FS of 200 ppt. The SCG at that time was 200 ppt and mercury in the RI/FS samples was not detectable at this concentration. Mercury was detected in the NYSDEC samples at concentrations ranging from approximately 4 to 12 ppt in all samples but one found at 140 ppt, with the highest concentration reported at the outfall to the Site's groundwater treatment system discharge (no longer present). All concentrations were below the SCG of 200 ppt at that time. Since then the Part 703 standard for mercury has been reduced to 0.7 ppt. Both background and downstream samples collected in 1995 are above this much lower standard.

The NYSDEC also conducted a fish study within the West Branch of the Ramapo River and determined that concentrations of mercury detected in the fish samples were all well below the fish consumption advisory level. In addition, all of the concentrations found are well below the current groundwater quality standard for mercury of 700 ppt, and well below the MCL of 2 ppb (2,000 ppt). Collectively, the data do not indicate an overall impact on surface water quality or the need for any further investigation.

Sediment

Sediment sample results (discussed in Section 6.7) from the July 1995 RI indicate comparable if not generally higher concentrations of SVOCs, metals, and TPH upstream in the West Branch of the Ramapo River in comparison to the downstream sampling locations. Mercury was detected in the sediment in the upstream and downstream locations at similar levels, although slightly less in the upstream locations. None of the sediment samples from the West Branch of the Ramapo River collected during the RI exceeded the SCG for mercury.

As a part of the NYSDEC's supplementary investigation of the river, conducted in November 1995, additional sediment samples were collected for mercury analysis. These results ranged from 11.2 to 824 ppb and although the results suggest that some localized influence on mercury concentrations may be associated with the Site, all of the values are below the NYSDEC's ROD-selected SCG. As the groundwater data have indicated that mercury is generally not migrating in the dissolved phase, any historic mercury contributions to sediment from the Site are most likely in the form of sediment transport due to historic erosion of calcium sulfate material along the stream bank. However, any erosion has since been halted through erosion control measures.

Collectively, the sediment analytical data do not indicate that the Site is having an impact on overall sediment quality. Any historical localized potential impact from mercury is most likely as a result of past sediment transport of calcium sulfate. As noted above, this has been halted through erosion control measures.

Accordingly, the work that has been performed has sufficiently characterized the sediments and controlled prior transport mechanisms. Further study is not indicated.

Soil Vapor

A soil gas survey was conducted in May 1991 as part of the RI. Soil gas samples were collected from 122 locations. Analytes included total hydrocarbons (THC), aromatic hydrocarbons, chlorinated hydrocarbons and total petroleum hydrocarbons (TPH). Detected compounds included benzene, toluene, ethylbenzene and xylenes (BTEX), chlorobenzene and pyridine. There are no data to assess whether indoor air vapor intrusion has occurred as sub-slab soil vapor testing has not been performed at the on-site buildings. The NYSDEC conducted an Environmental Indicator (EI) Study at the Site in 2005 (NYSDEC, September 2005) and concluded that the vapor intrusion pathway was not of concern under current conditions since the buildings are unoccupied. Groundwater quality within the overburden sand and gravel aquifer is well characterized as part of the groundwater monitoring program. It is anticipated that institutional controls will be a remedial component and will require that future development either incorporate vapor mitigation measures or include a vapor intrusion evaluation for Site-related COCs specific to future structure locations. Given the foregoing, additional study is unnecessary as sufficient information exists to evaluate and recommend remedial options.

2.2 Summary of Ecological Assessments

An ecological assessment (EA) was completed as part of the Site's Remedial Investigation (RI Report, Conestoga-Rovers, July 1995). As summarized in the RI Report, the EA determined that no natural cover types or mapped wildlife resources occur within the plant site. The EA determined that although no visual ecological impacts were identified, a potential existed for minor effects associated with the sediments sampled within the Avon parcel. As a result, an excavation program was completed on the Avon parcel, as documented in the Excavation Summary Report (Arcadis, 2001). Approximately 200 cubic yards of sediments were removed and the parcel was restored. Therefore, ecological impacts associated with the Site and the adjacent parcel have been addressed.

Prompted by the results of surface water and sediment investigations adjacent to and in the West Branch of the Ramapo River (see Section 6.7), in June/July 2001, the NYSDEC conducted an additional ecological assessment in the form of a fish study. The results were presented in a Fact Sheet (Ramapo River Fish Sampling, June/July 2001, NYSDEC). The purpose of the fish study was to determine mercury levels in fish in the Ramapo River and evaluate the results in relation to potential sources of mercury in the river. As presented in the Fact Sheet, these potential sources include the OCSD #1 outfalls 001 and 002, and the former Nepera facility. Based on the results from 90 samples, the average concentration of mercury in the fish was 183 ng/g. The concentration that the New York State Department of Health uses to issue fish consumption advisories is 1000 ng/g. The Fact Sheet reported that there was a significant difference between the upstream and downstream samples. The samples upstream of the dam averaged 109 ng/g, while the samples from the seven downstream locations averaged

196 ng/g. The most notable difference was the higher levels found in the samples from the Sloatsburg sampling location which averaged 412 ng/g. The Sloatsburg location is approximately 11.1 miles downstream of the Nepera outfall and approximately 9.5 miles downstream of OCSD #1 outfall 002. As further stated in the draft Fact Sheet, there is not enough information to determine whether the higher concentrations at the Sloatsburg location are related to the OCSD or the former Nepera facility or some other environmental factor. Variations in the types of fish caught at each location can also effect the interpretation of the results. While the NYSDEC did not provide any specific conclusions in its 2001 Fact Sheet, the overriding conclusion was that concentrations of mercury detected in the fish samples were all well below the fish consumption advisory level.

The ecological evaluations performed as a part of the RI and the NYSDEC's fish study addressed each of the potential ecological risk pathways at the Site (terrestrial, sediments, surface water), and where the potential for an impact was evidenced (i.e., the Avon Parcel), remediation was completed. As a result, there are no outstanding issues or data gaps related to ecological assessment of the Site.

2.3 Significant Events

In accordance with DER-10 significant events are those "...events, observations, or seasonal variations which can influence sampling procedures or analytical results". The investigations performed at the former Nepera facility have spanned the time period from 1986 through the present, with a consistent pattern of understanding regarding the Site. The only significant event(s) which have been identified, which could influence the interpretations at the Site are extreme rainfall events causing high/flood flows in the West Branch of the Ramapo River. Such events, if they were capable of causing erosion, would have the potential to erode the stream bank (currently under an erosion control cover), which could in turn result in the need for further ecological evaluation. However, while several extreme rainfall events have occurred since the erosion control cover was installed and sediment and stream bank investigations were completed, there is no evidence of erosion and, therefore, there is no need for additional evaluation or sampling and analysis.

For example, the NYSDEC, in its December 21, 2010 correspondence noted the flooding event that occurred in the spring of 2007 as its basis for requesting additional sediment sampling adjacent to the Site. However, inspection of the cover after the April 2007 flooding event referenced by the NYSDEC indicated only minor damage to the interim cover. Approximately 15 linear feet of the gravel layer had been disturbed and an approximate 1 foot square portion of the geotextile was ripped. The NYSDEC was notified of the observed damage via email on May 2, 2007 and repairs to the cover, including the installation of a larger stone protective layer, were completed later that month. Photographic documentation was provided to the NYSDEC. Records indicate that there was de minimis exposure of calcium sulfate during the flooding event. It is important to note that the prior river studies discussed in this report assumed no cover over the stream bank and addressed a potential worst case scenario of equal or greater severity than the actual 2007 flood event and still concluded that such conditions resulted in no unacceptable risks to fish and wildlife.

Subsequent to the 2007 event and the installation of a larger stone protective layer, there have been additional heavy rainfall events, particularly spring rains, which have resulted in high water flow in the West Branch of the Ramapo River, and erosion of the protective stone layer has not been observed. The only repairs that have been necessary at the stream bank have been to the silt fence, which with the vegetative growth is no longer needed, but is kept in place as an additional safeguard. Accordingly, the erosion control system, together with periodic inspection and maintenance, is effectively and appropriately serving any necessary remedial objectives.

2.4 Data Usability

The analytical data for the RFI were validated by an independent, certified data validator (Environmental Data Services, Inc.). The results of the data validation are presented in Data Usability Reports, which are provided in Appendix B of the RFI Report. The results of the data validation demonstrate that the data are generally valid and usable. Of the approximately 38,000 data records, approximately 36,500 data records (96%) required no qualification. Approximately 1,500 data records were qualified either as estimated ("J") or as having estimated detection limits ("UJ"). Those data were deemed to be valid and usable for the purpose of comparison to SCGs. Additional details are provided in Section 3.3.1 of the RFI Report.

The data collected for the RI also were subject to data validation (Appendix M of the RI Report), and were considered representative of the site conditions and suitable for risk assessment and completion of the FS. Since the completion of the RI/FS, collection of additional analytical data has been a part of the implementation of remedial measures. Because the Site is in routine monitoring, data consistency is demonstrated through multiple events, and formal data validation is not necessary. Rather, the case narrative for each data set is reviewed for such items as surrogate recoveries, blanks, etc. Overall, the RI data are considered usable and representative of site conditions.

3 FIELD ACTIVITIES

The following subsections describe the scope of the investigatory activities conducted at the Site under the New York State Inactive Hazardous Waste Disposal Site (State Superfund) and RCRA Corrective Action programs. The descriptions include overviews of investigatory methods and materials. General descriptions of areas targeted for investigation are provided; specific sample locations are shown on figures associated with Section 6.0 - Chemical Distribution.

3.1 Previous Investigations – New York State Superfund

Extensive site characterization activities/investigation activities have been carried out under various regulatory programs over the past 25 years. These activities, which are described below, include the remedial investigation, remedial design, remedial actions, operations and maintenance and supplemental investigation activities.

3.1.1 Pre-Remedial Investigation

A hydrogeologic investigation was conducted at the Site as documented in the Plantwide Hydrogeologic Investigation (C. A. Rich, March 1986) and provided to the NYSDEC. The report described the program of groundwater monitoring well installation and sampling, characterized underlying site geology, and identified the presence of benzene and other facility-related organic compounds in groundwater underlying the Site.

3.1.2 Remedial Investigation/Feasibility Study

The following is a list with annotations of RI/FS activities conducted at the Site, in chronologic order.

1989: Phase I Hydrogeologic Investigation Interim Remedial Measures (Dames and Moore, July 1989) – Report described additional findings with respect to groundwater and described a program to pump contaminated groundwater from three existing wells and treat the water prior to discharge to the on-site storm water/cooling water lagoon prior to discharge to the West Branch Ramapo River under a SPDES Permit.

1995: Remedial Investigation Report (Conestoga-Rovers & Associates, July 1995) – Report summarized additional groundwater investigation findings and presented the chemical fate and transport evaluation, and also presented the results of a soil gas survey, magnetometer survey, surface and subsurface soil sampling, surface water and sediment sampling, a baseline risk assessment, and ecological/environmental assessment. The RI activities were conducted pursuant to work plans approved by the NYSDEC (Dames and Moore, 1989 and Conestoga-Rovers & Associates, April 1991).

1995: Feasibility Study Report (Conestoga-Rovers & Associates, September 1995) and Addendum (Conestoga-Rovers & Associates, January 1996) – Report developed and evaluated remedial alternatives and provided the basis for remedy selection.

1997: Record of Decision (NYSDEC, March 1997) – Summarized remediation goals and the selected remedy.

1998: Consent Decree (U.S. District Court, April 21, 1998) – Trust and other parties committed to performing the prescribed Remedial Action and O&M as set forth in the ROD.

3.1.3 Remedial Design/Remedial Action

1990 – 2004: Following design and approval, the IRM system was installed in 2001 and operated until September 2004. The IRM included pumping from wells RW-1S, RW-3 and MW-1S. Pumping ceased due to fouling problems at the wells. Well RW-1R was installed to replace well RW-1S but was not put into service based on groundwater monitoring (i.e., results indicated groundwater quality goals achieved at sentinel wells) and the use of the alternative biosparge system.

1999: Additional sentry monitoring wells were installed in accordance with the ROD to complete the array of down-gradient monitoring wells. Two monitoring wells were added in the vicinity of Building 53 to assess groundwater conditions in this area.

1999 – 2001: Drum and contaminated soil elements of the ROD performed and completed in Area F, the Avon parcel (Area K), and an additional area – Building 53. Oxygen Release Compound (ORC) injected to treat remaining concentrations in soil beneath the water table at Area F and Building 53. Work performed was summarized in the Excavation Summary Report (Arcadis, March 2001) submitted to the NYSDEC in March 2001.

2001: SVE/VER Test Report (Arcadis, March 2001) – Report summarized results of pilot testing which demonstrated that SVE and VER technologies (selected per the ROD) are impractical for removing the COCs from the soil and perched groundwater at the Site due to high perched water table and low permeability of the underlying clay. Biosparge was selected as an alternative for implementation (see other investigation activity below).

2001 – 2008: Following design and approval, the biosparge system was installed in October 2002. Operations of the biosparge system continued until September 2008, when the system was terminated in accordance with the NYSDEC-approved Supplemental Remedial Action Work Plan (HydroQual, May 2008). During this period groundwater sampling and analysis was routinely performed at on site monitoring wells. The data are reported to the NYSDEC as part of quarterly progress reports which continue to this day.

2002 – 2005: Several activities were performed in the MW-1S area. A three-point biosparge system was installed and operated for two years adjacent to MW-1S. The MW-1 Groundwater Evaluation Work Plan was developed and performed. Six monitoring wells were added between Arden House Road and MW-1S – well couplets MW-35, MW-36 and MW 37. Soil borings were completed surrounding MW-1S. Arcadis prepared an MW-1 Groundwater Evaluation Report that was submitted to the NYSDEC in February 2004.

2005: Erosion control IRM implemented along the stream bank consisting of stapled geotextile with overlying gravel cover, to control the potential for erosion of calcium sulfate material into the West Branch of the Ramapo River.

2007: Following a flooding event in April 2007, minor erosion of the stream bank IRM was repaired and the gravel stone layer was replaced with a heavier rip-rap material. This enhanced IRM was also designed to ensure the erosional stability of the West Branch of the Ramapo River, and has been maintained to date in good working order.

3.1.4 Groundwater Operation and Maintenance

1990 – 2004: As noted above, the IRM system was maintained and operated from September of 1990 until September 2004.

2001 – 2008: Also as noted above, the biosparge system was operated and maintained from October 2002 until September 2008, when the system was terminated in accordance with the NYSDEC-approved Supplemental Remedial Action Work Plan. The system remains in a state of good repair for future use if needed, based on monitoring data. During this period groundwater sampling and analysis was routinely performed at on site monitoring wells.

2008 – Present: Routine semi-annual groundwater sampling and analysis performed at on site monitoring wells, in accordance with the NYSDEC-approved Supplemental Remedial Action Work Plan. These results are analyzed to confirm that the groundwater impacts are contained and that water quality in sentinel wells meets the groundwater quality criteria, which has been the case to date. Based on the monitoring program, if groundwater quality were to indicate the need, the biosparge system can be returned to operation.

3.1.5 Other Investigation Activities

In addition to the above-described site investigation and remediation specific to the ROD selected remedy, other activities conducted at the Site include:

2001: Biosparge pilot testing demonstrated that biosparge was an alternative to the original SVE system selected in the ROD. SVE was not successfully demonstrated during pilot testing and, therefore, an alternative system was evaluated.

2001: Biosparge system consisting of four lines and 20 air injection wells commenced operation to address the main plume in the southeast portion of the Site.

2001 - 2002: Building 13 seep investigation completed. Monitoring wells MW-33 and MW-34 were added at this time. Building 13 Seep Investigation Report (Arcadis, October 2002) was submitted to NYSDEC.

2008: The site conceptual model was developed and presented to the NYSDEC (March 2008 meeting) along with a Supplemental Remedial Action Work Plan (HydroQual, May 2008) for installation and sampling of additional wells. The Work Plan was approved and implemented during the latter half of 2008. The results confirmed and refined the site conceptual model (the major conclusion being that groundwater flow is controlled by sand and gravel deposits in the central portion of the Site). The sampling indicated that contaminants are not reaching sentinel wells above groundwater quality standards, and that the biosparge system could remain turned off. The assessment of bedrock groundwater quality (specifically MW-20D and MW-20DR) indicated that bedrock groundwater is not impacted.

2010: Area B Parking lot – The NYSDEC requested additional sampling and delineation of the calcium sulfate material in the parking lot (located in Area B). The investigation included 54 soil borings for vertical and horizontal delineation of the calcium sulfate and analysis of six discrete samples and six composite samples for characterization. The results were submitted in a summary report to the NYSDEC (Cornerstone Environmental Group, April 16, 2010).

3.2 Previous Investigations – RCRA Corrective Action

3.2.1 RCRA Closure

Following the cessation of manufacturing operations in May 2005, equipment decontamination and dismantling was performed for all TSDF units in accordance with the NYSDEC-approved RCRA Closure Plan (Shaw Environmental, Inc., November 2005). Closure activities were initiated in July 2005 and completed in October 2006.

3.2.2 RCRA Facility Assessment/Investigation

1994: The NYSDEC conducted a RCRA Facility Assessment (RFA) (NYSDEC, June 8, 1994) and identified SWMUs and AOCs that were incorporated into the RCRA Permit under Module III – Corrective Action Requirements.

2006-2007: The RFI was conducted in accordance with the NYSDEC-approved RFI Work Plan and included the collection of approximately 354 soil samples at 219 soil borings beneath the Inaccessible SWMUs, TSDF Units, and adjacent to the underground sewers. Locations adjacent to the Inaccessible SWMUs or elsewhere on the Site where historic knowledge indicated the potential for environmental impacts were also investigated. The locations of the RFI soil borings are shown in RFI Report Figure 3-1 (included herein and designated F3). The rationale for the placement of each soil boring, targeted sample depths and analytes was provided in Table 4-1 of the RFI Work Plan (included herein and designated T2).

Prior to the actual sampling, each soil sample location was marked out and biased toward areas with the highest probability of impact (i.e., cracks in slabs, visible staining, adjacent to floor drains, etc.). If there was no rationale based on visible indicators, the sample was collected beneath the most heavily utilized area with a bias toward the center of the building.

Sample depths varied according to location. At each of the Inaccessible SWMU and TSDF Unit sample locations, two soil samples were collected from 0-1 foot and 1-2 feet below ground surface (bgs). At other soil boring locations, a sample was collected from the 0-1 foot interval beneath the slab/pad or pavement sub base material, and a deeper sample was collected from the 1 foot increment with the highest PID reading. If the PID did not indicate the presence of VOCs, a deeper sample was collected from the interval demonstrating the greatest impact by visual inspection (e.g., stained soils). Samples were also collected adjacent to buried sewers at depths corresponding to the pipe invert. Because sewer depths were not always well documented, samples along sewer lines were collected from the interval demonstrating the greatest impact through field screening or visual inspection. If there was no evidence of impact, the sample was collected from the next change in lithology or from immediately above the water table.

Soil samples were analyzed for the following analyte groups, using the methods listed below:

- VOCs - 8260B

- Semi-Volatile Organic Compounds (SVOCs) - 8270C (including pyridine and alpha- and beta-picoline)
- TAL Metals – 7000/7471A/6020 (including lead and mercury)
- Polychlorinated Biphenyls (PCBs) – 8082
- Ammonia - MCAW 350.2M
- Methyl-mercury – 1630M (select samples)

Results are discussed in Sections 6.1 and 6.2.

2008: As part of a Phase II (Supplemental) RFI, 16 borings were completed at off-site locations on the Avon parcel and Village of Harriman property in June 2008. The locations of the borings are shown on the figure titled Total Mercury in Supplemental RFI Samples that accompanied the August 6, 2008 technical memorandum (presented herein for reference and designated F4). Despite diligent efforts, ELT Harriman was unable to secure access to other perimeter locations on the railroad property and the property across the river. In accordance with the approved Phase II RFI Work Plan (Brown and Caldwell Associates, November 2007), samples were collected and analyzed for mercury and PCB Aroclors at each location from the 0 to 2-inch and the 2 to 24-inch depth intervals. A third sample from the 6-inch interval above the water table was collected and held for possible laboratory analysis pending "evidence of impact" from results of the shallower samples. Results are presented in Section 6.9.

3.2.2 Corrective Measures Study

A CMS Plan and Task I Report was prepared and submitted at the request of the NYSDEC (Brown and Caldwell Associates, November 2007). The CMS Plan and Task I Report presented the corrective action objectives, identified and screened remedial technologies, and described the approach to completing the remaining tasks of the CMS. The NYSDEC issued a letter dated September 11, 2008 that provided comments on the CMS Plan and Task I Report and guidance pertaining to the hazardous constituents and target cleanup levels to be evaluated in the CMS. The NYSDEC also requested an interim report providing "rough cost estimates for the various alternatives and the likely final use of the site". Brown and Caldwell Associates submitted the Interim Report – Corrective Measure Alternatives and Preliminary Cost Estimates dated March 16, 2009 (Brown and Caldwell Associates, March 2009).

The Interim Report presented a range of alternatives for remediation of the Site (with the exception of Area B – Parking Lot, which was not addressed in the CMS) and preliminary cost estimates. The NYSDEC issued comments on the Interim Report in a letter dated May 21, 2009. The NYSDEC stated that no further evaluation of excavation/removal actions for achieving site wide "unrestricted use" and "residential use" for mercury, PCBs or benzene is necessary; the NYSDEC requested that further study include alternatives for consolidation and excavation, and address the potential use of the lagoon as a consolidation unit.

3.3 Previous Investigations – SPDES Lagoon

1995: During the RI, one composite surface water sample was taken from four locations along the edges of the lagoon (sample SW-WW-05) and analyzed for VOCs, SVOCs, pesticides/PCBs and metals.

2001-2005: Investigations were performed in accordance with the SPDES Permit to identify plant sources of mercury and evaluate measures to mitigate those sources. These investigations addressed the various sources of water to the lagoon, including discharges from the former IRM systems, plant effluent thermal waters, water treatment chemicals, and stormwater runoff. A Pollutant Minimization Plan (PMP) was prepared in 2002 and updated/revised versions of the PMP were issued in 2003, 2004 and 2006.

2006-2007: As part of the RFI, samples of the solids settled at the bottom of the SPDES Lagoon were collected at a total of five locations shown on RFI Report Figure 3-1 (included herein and designated F3). Samples were collected from a boat using a sediment corer with polycarbonate tubes. Upon retrieval, a PID was used to field screen the material, so that the sample could be biased towards the 1-foot increment with the highest VOC reading. After collecting the VOC sample, the core was divided in 1 foot increments, and each 1 foot increment was transferred into decontaminated containers. After collecting samples from each of the five locations, the material in each container representing a 1 foot increment was homogenized by thoroughly stirring the sample using a single use plastic spoon. The samples were placed into the appropriate jars, using a single-use plastic spoon.

Each lagoon solids sample was analyzed for the following analyte groups, using the methods listed below:

- VOCs - 8260B
- SVOCs - 8270C (including pyridine)
- TAL Metals – 200.8/7000/6020
- PCBs – 8082
- Ammonia - MCAW 350.2M
- RCRA Characteristics SW 846 Methods (including ignitability, corrosivity, reactivity, and full TCLP)

Results are presented in Section 6.3.

3.4 Previous Investigation – Mercury Speciation

2006-2007: As noted in the ROD, it has been determined that the mercury present at the Site exists in a highly immobile form. This determination was based on the data generated during the RI, sampling events at other locations within the Village of Harriman, and a review of the process chemistry in which mercury was used.

The fate and transport and potential bioavailability characteristics of mercury in soil were further evaluated in the RFI through a series of separation and analytical procedures known as sequential extraction. A total of seven RFI soil samples and one lagoon sediment sample were analyzed by the sequential extraction procedure. This technique, which has low detection limits, uses a sequence of five increasingly aggressive extraction reagents (solvents) to separate the mercury compounds into biogeochemically distinct categories.

The results are concentrations of mercury in five behavioral classes, in the following order: a water soluble class, a 'human stomach acid' soluble class, an organo-chelated class, an elemental mercury class, and a mercuric sulfide class. The bioavailable component is represented by the sum of the first two fractions. The sequential extraction method is not intended to identify individual mercury compounds. Rather, it provides information about the biogeochemical behavior of various classes of mercury compounds under a range of in situ environmental conditions.

The results of mercury speciation testing are presented in Section 6.12.

4 REGIONAL SETTING

4.1 Regional Physiography

The Site is located within the Hudson Highlands portion of the New England physiographic province. The terrain can generally be described as mountainous as a result of several stages of tectonic forces that resulted in formation of the Appalachian Region. The area has subsequently been overridden by glaciers which eroded and smoothed the landscape, creating the unconsolidated deposits which overlie the bedrock. Numerous small lakes and northeast-trending mountain ranges and valleys dominate the landscape. Ground surface elevations throughout the region range from near sea level to approximately 1,400 feet above sea level.

4.2 Regional Geology

The regional geology consists of glacially derived overburden overlying bedrock of varying lithology and age. Overburden thickness ranges from not present along mountain ridges and peaks to over one hundred feet in the bedrock valleys, with a majority of the area covered by glacial till (a heterogeneous mixture of unconsolidated materials ranging from clay through boulders deposited directly by the glacier). Present day surface water courses often follow similar paths as did the glacial meltwaters which carried and deposited sediment as well as eroded the previously deposited glacial till. The glacial meltwater deposits range from sand and gravels (high energy deposits) to glaciolacustrine silts and clays (low energy deposits). Thicker accumulations of the water lain deposits are generally found along valleys and water courses.

The underlying bedrock has been deformed through a variety of tectonic episodes that has resulted in complex structural features throughout the region. The closest major structural feature is the Ramapo Seismic Zone which trends northeasterly and passes southeast of the Site. The feature consists of an overthrust sheet of Proterozoic metamorphic rocks which have been forced northwesterly over the top of Lower Paleozoic (younger) sedimentary strata. The Site is located within the block of younger strata, with the Ramapo River located along this structural lineament.

Mapping of the bedrock geology within the vicinity of the Site indicates the area is underlain by Paleozoic Era dolostone (with minor amounts of shale) of the Wappinger Group of Cambrian-Ordovician age. Younger sedimentary bedrock formations of Devonian age occur approximately one mile north of the Site and Precambrian metamorphic rock (primarily gneiss) is found approximately one half mile south of the Site.

4.3 Regional Hydrogeology

4.3.1 Overburden

Overburden groundwater is found within numerous, localized sand and gravel aquifers within the region's valleys and along water courses. These aquifers may be high yielding and are often utilized as a source of groundwater for towns and cities. They may be in direct hydraulic communication with surface water (lakes and rivers), and recharge from the surface water to the aquifer may be induced by production wells and infiltration galleries. Wells within the glacial till are typically only capable of providing sufficient quantities of water for limited domestic use.

The overburden groundwater is typically of good quality, although often hard. Long term use of the overburden groundwater has been known to demonstrate increased concentrations of dissolved iron and manganese, which may require treatment for continued use.

4.3.2 Bedrock

Regionally, bedrock aquifers typically only yield sufficient quantities of water for domestic use. However, highly transmissive fracture zones can be found within structurally disturbed zones that yield large enough quantities for municipal well systems and some municipalities do rely on the bedrock aquifer for the water supply. The availability of water, controlled by the degree of fracturing, can be extremely variable over very short distances.

Water quality in the bedrock is typically hard (particularly in the carbonate aquifers) and iron and hydrogen sulfide (particularly in the deep shale aquifers) may be present at undesirable concentrations.

4.4 Groundwater Use

Potable groundwater use in the vicinity of the Site is principally obtained from the bedrock, as opposed to overburden sand and gravel deposits. Of the nineteen water supply wells identified during the RI (four of which were inactive in 1995), only two of the wells were completed in the overburden sand and gravel. Figure 3-3 from the RI Report (designated F5) illustrates water supply wells in the vicinity of the Site. Water supply wells are located predominantly up and/or cross gradient relative to the Site.

The closest wells to the Site are located upgradient and across NY Route 17 relative to the Site. Of these, Mary Harriman Well No. 2 (MH-2) has never been used and has been abandoned. Likewise, both of the Layne Wells were abandoned in the 1970s due to low yields. Mary Harriman Well No. 1 (MH-1) is impacted by chlorinated solvents believed to be associated with a site west of the wells along the railroad tracks. The only down-gradient water supply well is bedrock well OR-7. Sentinel monitoring wells, located between OR-7 and the Nepera-Harriman Site on the Interchange Commerce Center property located north of the West Branch of the Ramapo River, have consistently indicated that there is no migration of site contaminants toward OR-7. This conclusion is further supported by the current semi-annual groundwater monitoring program which demonstrates that groundwater impacts are not migrating off site.

5 SITE SETTING

5.1 Historical Record Review

Historical records were reviewed during preparation of the RFI Work Plan to identify areas for investigation in addition to the SWMUs listed in the RCRA Permit and those previously investigated in the RI. This review included historic aerial photographs dating back to the 1940s, spill reports, documents pertaining to plant operations, previous environmental reports, and discussions with plant personnel. Samples were included in the RFI to target suspect locations as described in Table 4-1 and shown on Figure 4-3 of the RFI Work Plan (included herein and designated T2 and F6). Additional sample locations were selected to target former manufacturing operations, former above ground and underground tank locations, former material handling and loading/unloading areas, known spill locations, areas of staining or stressed vegetation, and locations of former drainage features.

5.2 Site Geology

As presented in the May 16, 2008 document titled Conceptual Site Model and Supplemental Remedial Action Work Plan (HydroQual, May 2008), the Site is underlain by a layer of fill material overlying a complex sequence of glacially derived clay, silt, sand and gravel. Near surface, immediately underlying any fill material, is a fine grained Clay and Silt with interbedded, discontinuous layers of Silt and fine Sand. This fine grained unit represents a glacial lacustrine or lake deposit that is present throughout the entire Site with the exception of the area near PZ-1 near the west-central portion of the Site. Underlying the Clay and Silt deposits is a glacial outwash or stream deposit that varies across the Site from fine to coarse Sand. Generally speaking, the sand is finer near the southeast end of the Site and coarser and thicker near the central portion. Also within the central portion of the Site, the coarse Sand deposits immediately overlie bedrock. Within the northeast side of the Site, the glacial lacustrine and glacial outwash deposits are underlain by a kame or esker deposit which is characterized by a mix of clay, silt, sand and gravel that is weakly cemented. Glacial till, consisting of a dense silt and clay matrix with lesser amounts of sand and gravel, is present intermittently at various locations immediately overlying bedrock. The entire Site is underlain by fractured dolomite bedrock. Figure 2-1 from the 2008 Conceptual Site Model Report (designated F7) provides a map of the Site along with the orientation of three cross sections that are presented Figures 2-2 through 2-4 from the 2008 report (designated F8 through F-10). The cross sections illustrate the relationship between the various glacially derived deposits described above and visually depict the layer of glacial lacustrine silt and clay overlying the coarser-grained sand and gravel as well as the kame and glacial till deposits. Figure 2-5 from 2008 Conceptual Site Model Report presents an isopach map of the thickness of the glacial outwash deposits (included herein and designated F11). This map illustrates a thicker sequence of sand and gravel underlying the central portions of the facility as depicted by the shaded area.

Conceptually, the depositional history can be envisioned as glacial ice moving southward across the region while depositing the glacial till. As the glaciers melted, fast moving water carrying sand and gravel eroded channels into the glacial till, with the deepest channels cutting completely through the glacial till to the underlying bedrock. As the melt waters subsided, the coarse sand carried by these melt water streams fell out of suspension and was deposited within these channels. Over the course of multiple thaw and melt cycles, the melt water would overflow the banks of these channels and fine sands and silts suspended in the water were deposited along the banks. The thicker glacial outwash deposits underlying the central portion of the Site represents the channel cut into the underlying glacial till by the glacial melt water. Likewise, the observed finer grained sands represent materials deposited to the sides of the channel. The edges of the channel are where the coarse sand deposits abruptly intersect the glacial till deposits between wells R-3D and MW-27D.

The kame deposits, comprised of an unsorted mix of silt, sand and gravel, represent localized deposition of materials immediately adjacent to the edge of a glacier. Finally, as the glaciers retreated farther to the north, the area was repeatedly flooded by glacial lakes which deposited the fine grained clay and silt deposits that are present over the majority of the Site.

5.3 Site Conceptual Model

The variations in grain size and the thickness of the glacial deposits described above and illustrated in previously noted Figures 2-2 through 2-5 from the Conceptual Site Model Report (designated F8 through F11) represent the controlling factors relative to groundwater flow beneath the facility. Water levels collected on October 15, 2007 are plotted on the cross sections presented in Figures 2-2 through 2-4 and are used as control points for construction of the equipotential lines illustrated in blue. These data consistently indicate principally vertical (downward) flow paths within the near surface, fine grained glacial lacustrine deposits and more horizontal flow paths in the coarser-grained outwash deposits.

Monitoring wells completed within the overburden aquifer (i.e., outwash deposits) have been used to construct a potentiometric surface map as illustrated in Figure 2-6 from the 2008 Conceptual Site Model report (included herein and designated F12). Collectively, the data suggest that groundwater flow is controlled by the thick channel of coarser-grained outwash underlying the central portion of the Site. As a result, groundwater flow is not perpendicular to the equipotential lines but at an angle, with a conceptualized flow path sweeping generally from the MW-25S area towards MW-16S, RW-1R and MW-18S. Similar flow paths would be present at other locations across the Site with the predominant flow paths converging towards the coarser-grained, thicker outwash deposits underlying the central portion of the facility. An updated potentiometric surface map from April 2010, originally presented in the 2nd Quarter 2010 Progress Report, is presented herein for reference and designated F13.

As presented in the 2008 HydroQual Report, the conceptual site model (CSM) for the Site is summarized as follows:

- Groundwater flow in the near surface glacial lacustrine deposits (aquitard) is principally vertical with discharge into the underlying glacial outwash. Horizontal flow in the aquitard is limited to localized and discontinuous lenses of sand.
- A channel of coarser-grained sand and some gravel outwash, underlying the central portions of the Site, is the primary conduit for groundwater flow and contaminant transport. While the outwash aquifer is present underlying most, if not all of the Site, these deposits thin and become finer grained to the north and south, thus limiting their ability to transmit groundwater.
- The variable thickness and grain size of the outwash aquifer deposits result in a non-homogeneous, anisotropic aquifer. As a consequence, groundwater flow is not perpendicular to the equipotential lines. Rather, groundwater flow will travel at an angle to the equipotential lines toward the coarser-grained, thicker deposits underlying the central portion of the Site.

- Groundwater flow through the glacial outwash aquifer is generally to the northeast with discharge to surface water (West Branch of the Ramapo River) and adjacent wetlands.
- Groundwater travel times vary depending on the grain size and associated permeability of the aquifer material. Travel times through the coarser-grained, thicker deposits underlying the central portion of the Site are likely on the order of 600 to 800 feet/year.
- COC concentrations are declining as a result of past remedial activities (excavations, pumping, biosparging) and natural degradation. As a result, COC concentrations are below SCGs at plume fringe and sentinel wells.
- The lower permeability fine Sands and Silts of the Aquifer, and Silt and Fine Sand of the Aquitard, retain residual levels of COCs.
- Residual levels of contamination are present underlying the main plant area and with the possible exception of the area identified in the RFI investigation as containing elevated levels of benzene, the presence of significant localized "hot spots" is unlikely.

5.4 Surface Water Hydrology

5.4.1 Regional Surface Water Hydrology

The Site location is within the Hudson Highlands portion of the New England physiographic province within a northwest trending glacial valley. The Site is situated within the northeastern limit of a 6,600-acre drainage basin which drains into the West Branch of the Ramapo River. A portion of the Site is within the 100-year floodplain. Surrounding the Site are two ridges, one to the southwest and one to the northeast. A third ridge to the southeast forms the southern hydrologic boundary of the valley. These ridges control surface water and groundwater flow in the valley. The entire drainage basins of both the West and Main Branches of the Ramapo River extend from the northwest and north-northeast directions and converge east of the Site. Groundwater and surface water flow to the southeast and exit the valley to the south where the West Branch of the Ramapo River joins the Main Branch of the Ramapo River. The Ramapo River then flows southwesterly into northern New Jersey.

5.4.2 Site Surface Hydrology

The topographic relief of the Site is very low, ranging from 515 to 535 feet above mean sea level (msl). Surface drainage of the Site has been altered from its natural flow pattern by plant expansion throughout its operation. The importation of permeable fill materials, the presence of impervious surfaces such as roadways and buildings, and the modification to the natural terrain contribute to the present drainage pattern. Stormwater runoff from precipitation generally flows over the road surfaces in a northerly direction toward Arden House Road or east toward the open field and the West Branch of the Ramapo River. Storm drains intercept a portion of the surface runoff on Site and channel it through the SPDES lagoon and ultimately into the river. Drainage is also directed into storm drains near Building 1 (in the southwestern corner of the property) and across Arden House Road west of the lagoon.

The "Avon" parcel located southeast of the Site is poorly drained and swampy. Evidence of drainage from the southwestern portion of the Site into the Avon parcel was observed at the southern most corner of the Site. The stormwater ultimately empties into drainage ditches in the Avon parcel.

An analysis of water level measurements on both sides of the river found that the West Branch of the Ramapo River, adjacent to the Site, is characterized as both a gaining and losing stream. Groundwater is discharging to the stream along the western portion of the Site, while along the eastern portion of the Site, the stream is losing water to the aquifer. This is a result of the discharge of treated water from the OCSD #1 wastewater treatment plant.

6 CHEMICAL DISTRIBUTION

6.1 Surface Soil Data

RCRA Facility Investigation

As part of the RFI, a total of 150 shallow soil samples was collected from 219 borings (see RFI Report Figure 3-1 designated F3). The shallow samples were collected from the first 2 feet below grade or, in paved areas or building interiors, the samples were collected from the first 2 feet below the pavement or concrete floor slab. Some floor slabs were 1 or more feet in thickness. In general, the shallow soils encountered were a mix of fill and sandy silt.

Each soil sample was analyzed for VOCs, SVOCs (including pyridine and alpha- and beta-picoline), PCBs, TAL metals, and ammonia. Shallow soil analytical results from the RFI were compared to Subpart 375.6 Soil Cleanup Objectives (SCOs) for Commercial and Industrial uses (see RFI Report Tables 4-1A, 4-2A, 4-3A and 4-4A designated T3 through T6). No VOC analytes were detected in shallow samples at concentrations that exceeded the respective Commercial or Industrial SCOs. The SVOCs benzo(a)pyrene and dibenz(a,h)anthracene exceeded their respective Commercial SCOs at four and one locations respectively. Both of these polynuclear aromatic hydrocarbon (PAH) compounds have low SCOs (1.1 mg/kg or less). The site-specific SVOCs alpha-picoline, beta-picoline and pyridine do not have established SCOs. Concentrations of these compounds in the shallow samples were generally non-detect to less than 1 mg/kg, and exceeded 10 ppm at no more than three locations (see RFI Report Figures 4-3, 4-4 and 4-5 designated F14 through F16). Aroclor 1254 was the only PCB mixture detected in shallow soil samples; its concentration exceeded the Commercial SCO at 18 locations and the Industrial SCO at one location (see RFI Report Figure 4-6 designated F17). The only metal with widespread exceedances of the SCOs was mercury, with a total of 87 (58%) samples exceeding the Commercial SCO and 69 (46%) exceeding the Industrial SCO (see RFI Report Figure 4-8 designated F18). As discussed further in Section 6.12, the SCOs for mercury are based on elemental mercury and the NYSDEC has developed alternate SCOs for mercury salts. Arsenic, barium and copper were the only other metals detected in shallow soil at concentrations above their respective SCOs, with exceedances occurring at one to three sample locations each. The results demonstrate that mercury concentrations in surficial soil are highly variable with no clear pattern or discernible source. The NYSDEC previously reached this conclusion in the Environmental Indicator Determination (NYSDEC, September 22, 2005) which stated: "No inorganic trends were evident in the data; exceedances were dispersed randomly throughout the site".

Remedial Investigation

As part of the RI, a total of 10 surficial and background soil samples was collected from depths of 0 to 4 inches (see RI Report Figure 2.6 designated F19). These included four samples collected as background soils and six surficial soil samples, including three from on-site locations. RI surficial samples were collected from areas that exhibited signs of distressed vegetation or stained soil and submitted for VOC, SVOC, pesticide/PCB, metals, cyanide, total petroleum hydrocarbon (TPH), and site-specific parameter analysis. The soil samples from RI test pits were collected from depths greater than 2 feet and are therefore discussed in Section 6.2 (below).

A summary of detected parameters for RI surficial samples is presented in RI Report Table 6.3 (included herein and designated T7). As expected, VOCs were not detected in the surficial soils. TPH concentrations for SS-WW-03, SS-WW-04, and SS-WW-06 were 88.0 mg/kg, 180 mg/kg, and 10.5/6.0 mg/kg, respectively. These results indicate that some residual petroleum based materials (i.e., oil stains, etc.) were present in the surficial soils at these locations. The primary SVOC constituents detected in the surficial soils were PAHs. RI Report Figure 6.1 (included herein and designated F20) presents the distribution of VOCs and SVOCs in surficial soils. The only detected pesticide/PCB was Aroclor-1254 at SS-WW-04 (210 μg/kg) and at SS-WW-OS/SS-WW-06 (ND (16O)/ 160 μg/kg). All detected inorganics were generally in the range of background concentrations as identified in RI Table 6.1 (included herein and designated T8) with the exception of mercury. Mercury had a concentration of 20.1 mg/kg at SS-WW-03.

Given the extent of available data discussed herein, additional surface soil sampling is not necessary to evaluate remedial options.

6.2 Subsurface Soil Data

RCRA Facility Investigation

A total of 202 subsurface soil samples (> 2 feet bgs) were collected from 219 RFI borings (see RFI Report Figure 3-1 designated F3). In general, the subsurface soils encountered were a mix of fill and sandy silt. Clay was occasionally encountered near the terminus of some of the deeper borings. Wet soils were encountered at various depths across the Site, usually determined by the elevation of the boring location. Wet soils were encountered at depths as shallow as less than 2 feet near the center of the Site in the area of Buildings 2, 28, and 29, and as deep as 16 feet along the railroad tracks at the southern boundary of the Site. No non-aqueous phase liquids (NAPL) or drums were encountered. Occasional petroleum-like odors were noticed, particularly in samples from the area of Tank Farms 18 and 31. Occasional elevated PID readings were observed in the soils from those areas, as well.

Each subsurface soil sample was analyzed for VOCs, SVOCs (including pyridine and alpha- and beta-picoline), PCBs, TAL metals, and ammonia. Subsurface soil analytical results from the RFI were compared to Subpart 375.6 SCOs for Commercial and Industrial uses (see RFI Report Tables 4-1A, 4-2A, 4-3A and 4-4A designated T3 through T6). Benzene was the only VOC analyte detected in subsurface samples at concentrations that exceeded its Commercial or Industrial SCO. These exceedances were clustered in the vicinity of the wastewater tank farm, distillation pad and crude-base distillation facilities located south of the amide manufacturing control room (see RFI Report Figure 4-2A designated F21). A number of SVOCs (all PAH compounds) exceeded their respective Commercial or Industrial SCOs at five locations, including the warehouse/water filtration facility in the northwest corner of the Site, the aforementioned wastewater tank farm, the engineering offices and the truck scale. The concentrations of the site-specific SVOCs alpha-picoline, beta-picoline and pyridine in the subsurface samples were generally non-detect to less than 1 mg/kg, and exceeded 10 ppm at no more than three locations (see RFI Report Figures 4-3A, 4-4A and 4-5A designated F22 through F24). Aroclor 1254 was the only PCB mixture detected in subsurface soil samples; its concentration exceeded the Commercial SCO at five locations (see RFI Report Figure 4-6A designated F25). As with the shallow soil samples, the only metal with widespread exceedances of the SCOs was mercury, with a total of 84 (42%) samples exceeding the Commercial SCO and 72 samples (36%) exceeding the Industrial SCO (RFI Report Figure 4-8A designated F26). As previously noted, the SCOs for mercury are based on elemental mercury and the NYSDEC has developed alternate SCOs for mercury salts (refer to Section 6.12). Arsenic, copper and lead were the only other metals detected in subsurface soil at concentrations above their respective SCOs, with exceedances occurring at one to six sample locations each. As previously noted in Section 6.1 for surficial soil, the results demonstrate that mercury concentrations in subsurface soil also are highly variable with no clear pattern or discernible source.

Remedial Investigation

During the RI, subsurface samples (>2 feet BGS) were collected from a total of 30 test pits excavated at locations across the Site (see RI Report Figure 2.7 designated F27). Samples were submitted for VOC, SVOC, pesticide/PCB, metals, cyanide, total petroleum hydrocarbon (TPH), and Site-specific parameter analysis.

A summary of detected parameters for RI subsurface samples is presented in RI Table 6.2 (included herein and designated T9). VOC and SVOC results are shown on RI Figure 6.3 (included herein and designated F28). The only VOC detected above the Commercial or Industrial SCO was benzene, at a single location in the vicinity of the crude-base distillation facility. No SVOCs were detected in the subsurface soil samples above their respective SCOs. The only PCB mixture detected above the Commercial or Industrial SCO was Aroclor 1254, at a single location (TP-21B) at the southeast boundary of the Site. As with the RFI soil samples, the only metal with widespread exceedances of the SCOs was mercury, with samples from a total of 14 test pits exceeding the Commercial or Industrial SCO. As previously noted, the SCOs for mercury are based on elemental mercury and the NYSDEC has developed alternate SCOs for mercury salts (refer to Section 6.12). Arsenic, barium, cadmium and copper were the only other metals detected in test pit soils at concentrations above their respective SCOs, with exceedances occurring at one to two sample locations each.

Accordingly, based on the extent of available data, additional subsurface soil sampling beneath buildings, tanks or pipelines, or at other locations, is not necessary to evaluate remedial options.

6.3 Lagoon Characterization

RCRA Facility Investigation

Five samples of lagoon solids were collected from the SPDES Lagoon during the RFI. The lagoon solids encountered ranged in thickness from approximately one to three feet. The lagoon solids samples were very fme, black, and nearly colloidal with a high water content (approximately 90%). The resulting samples were analyzed for VOCs, SVOCs (including pyridine), TAL Metals, PCBs, ammonia and RCRA characteristics (ignitability, corrosivity, reactivity, and toxicity including the full list of toxicity characteristic leaching procedure constituents). The analytical results are provided in RFI Appendix C, Table C2-A through C2-F. None of the lagoon solids samples exhibited any of the characteristics of a hazardous waste.

No VOCs were detected in the lagoon samples. Several SVOCs were detected at low levels in the lagoon samples; the results are presented in RFI Appendix C, Table C2-B. Several metals were detected at low levels in the lagoon samples; the results are in RFI Appendix C, Table C2-C. No PCBs were detected in the samples from the lagoon.

Remedial Investigation

During the RI (1995), one composite surface water sample was taken from four locations along the edges of the lagoon (sample SW-WW-05). The VOCs acetone and toluene were detected at low concentrations; no SVOCs, pesticides or PCBs were detected. Various inorganic constituents were detected at concentrations generally below USEPA and NYSDEC Ambient Water Quality Criteria.

Based on the available data, there is no indication that the lagoon or subsurface soils beneath the lagoon are impacting groundwater. Additional soil sampling within or beneath the lagoon is not needed to evaluate remedial options.

6.4 Parking Lot

In November 2009 the NYSDEC requested that additional sampling and delineation be conducted for the sludge in the Area B parking lot. Area B is defined as the area encompassed by The West Branch of the Ramapo River to the north, Arden House Road to the south, Route 17 to the west and the western berm of the lagoon to the east. A field investigation was implemented during the period January 25 through January 29, 2010 with the objective of delineating the vertical and horizontal extent of the calcium sulfate material and to further characterize this material.

Details of the investigation and subsequent findings were presented in a letter report to the NYSDEC dated April 16, 2010 followed by a subsequent email dated May 14, 2010, in which estimates of the volume of calcium sulfate material were provided. A summary of the work is provided below.

6.4.1 Background

The parking lot is underlain by a white calcium sulfate material that is visually distinct from the surrounding soils. The material contains mercury residues believed to originate from the use of mercury as a catalyst during the production of niacinamide. The production waste was deposited in a low lying area bounded on the south by Arden House Road, to the north by the West Branch of the Ramapo River and to the west and east by New York Route 17 and the SPDES lagoon, respectively.

The mercury analytical data available prior to the 2010 investigation are summarized by medium in Table 1 from the April 2010 report, reproduced herein for reference and designated T10. The data indicate mercury concentrations obtained from two RI samples of the calcium sulfate material ranged from 323 to 756 mg/kg. However, mercury has only been detected in groundwater once at concentrations above the Class GA groundwater quality criterion of 0.7 µg/l, in MW-24S. Of note is that the sulfate concentrations in MW-24S consistently indicate that groundwater originates from the zone of the calcium sulfate material. With the exception of one reported concentration of 1.1 µg/l at MW-24S in June 2006, mercury is consistently below the Class GA water quality standard. In addition, a fish study conducted by NYSDEC concluded that fish in the West Branch of the Ramapo River do not contain elevated levels of mercury and that a fish advisory was not necessary (see discussion in Section 6.7). Collectively, these data indicate that mercury is not leaching from the calcium sulfate layer and is in a form that is highly immobile.

6.4.2 January 2010 Investigation and Observations

The investigation consisted of the advancement of 55 GeoProbe borings on an approximate 50 by 50 foot grid as illustrated in Figure 1 from the April 2010 report, reproduced herein for reference and designated

F29. Soil samples were collected continuously from immediately below the pavement to a depth of 10–15 feet or until the calcium sulfate material was no longer observed in the boring core (i.e., to natural soils). Occasional borings were advanced up to 15 feet in natural soils at the request of the NYSDEC representative who was present throughout the field investigation. The samples were collected in acetate sleeves, screened with a PID and mercury vapor analyzer upon retrieval, and visually described.

For the purpose of analytical sampling, the borings were divided into six groups. One sample for the analysis of TCL VOCs and total mercury was collected from the boring within each group registering the highest PID and mercury vapor readings (a total of six samples for TCL VOCs and six samples for total mercury). In addition, a representative portion of the calcium sulfate material observed in each boring within a group was composited in the field for a total of six composite samples for total mercury analysis.

6.4.3 Results

The analytical results (detected compounds) for the samples registering the highest PID readings are summarized in Table 2 from the April 2010 report, reproduced herein for reference and designated T11. All of the samples were analyzed for TCL VOCs via Method 8260B and compounds not identified in Table 2 were below detection limits.

All of the samples registering the highest PID readings consisted of organic silt and clay, sand and gravel or, in the case of SB6-A1, sand and gravel fill. Detectable PID readings were only observed in the calcium sulfate material on one occasion at SB9-A2 (24 ppm at a depth of 5 feet). Further, only one constituent, benzene at SB9-A2, 8 – 8.5 feet bgs, exhibited site related concentrations greater than the Part 375 groundwater protection standard. These data indicate that the calcium sulfate layer is not a source of VOCs and that the presence of VOCs in the natural soils underlying the parking lot is not wide spread or associated with the material. Rather, it appears that the reported concentrations are attributable to an isolated and unrelated historical release.

The results for samples analyzed for total mercury during the January 2010 investigation, are summarized in Table 3 from the April 2010 report, reproduced herein for reference and designated T12. As noted previously, discrete samples were collected from intervals registering the highest mercury vapor readings within each group. In addition, representative portions of the calcium sulfate material observed in each of the borings within a group were composited for total mercury analysis.

Mercury vapor readings ranged from 0.000 to 0.999 mg/m^3 and in all cases, except location SB6-A2, mercury vapors were detected in the soils or fill material immediately adjacent to the calcium sulfate layer or within a few feet of the material. SB6-A2 was the only location where mercury vapor readings were detected within the calcium sulfate material itself The total mercury results within the discrete samples ranged from 1.1 to 1900 mg/kg and do not correlate particularly well with the mercury vapor readings. Total mercury concentrations in the composite samples were generally consistent and ranged from 356 to 598 mg/kg.

As reported above, mercury is present within the calcium sulfate material as a byproduct from the manufacture of niacinamide. Based on the manufacturing process information, the mercury is present as mercuric sulfide, a highly immobile form of mercury. In the presence of organic rich deposits in the underlying soils and a reducing environment some, more volatile forms of mercury can form (e.g., reduction of Hg^{+2} to Hg^0), accounting for readings on the mercury vapor meter. Reducing conditions, however, would also help maintain mercury in the mercuric sulfide form, which, again, is the least soluble and a non-volatile form of mercury. The presence of mercury in the underlying soils, given the waste being mercuric sulfide, is much more likely the result of fines intermixing with the underlying soils along a "filter" front. This explains the detectable levels of mercury in the calcium sulfate material and underlying soils, the observed mercury vapor readings in the underlying soils and the absence, or only trace, levels of dissolved mercury reported in groundwater downgradient of the calcium sulfate material. As noted above, groundwater samples from MW-24 clearly demonstrate a sulfate concentration indicative of groundwater originating from the calcium sulfate disposal area. However, with the exception of one reported concentration of 1.1 μg/l at MW-24, mercury is consistently below the Class GA water quality standard. Further, fish within the West Branch of the Ramapo River do not exhibit elevated levels of mercury. Collectively, these data continue to demonstrate that the mercury is not migrating downgradient of the disposal area.

The lateral extent and thickness of the calcium sulfate layer is presented in Figure 2 from the April 2010 report, and is reproduced here for reference and designated F30. The boundaries to the south and west are defined by Arden House Road and NY Route 17 based upon the presence of these roads in the 1935 USGS Quadrangle (Schunemuck Quadrangle UNH Dimond Library, Historic USGS Maps of New England and New York) and the start of site operations in 1942. The borings completed along the side of these roads (Group 6 borings) were advanced at the apparent edge of the public roadway and demonstrated the presence of only six inches or less of calcium sulfate material along Route 17 and from 0 to 3 feet of the material along Arden House Road. The presence of the material at these boring locations is likely associated with road work during more recent times (e.g., widening, shoulder work) which could have overlapped with the material. However, with the exception of some boundary variability, likely limited to the shoulders of the roads, the material must be bounded by the roadways given the road presence prior to the start of plant operations. The approximate northern and eastern limits of the calcium sulfate layer are based upon test pits conducted along the banks of the West Branch of the Ramapo River and the absence of material in well logs for the MW-37 and MW-36 well clusters adjacent to the SPDES lagoon. The greatest thickness of the calcium sulfate layer was observed to be 8 feet near the central portions of the parking lot as illustrated in Figure 2 (F30). The volume of calcium sulfate material present is estimated at approximately 22,000 cubic yards. Finally, the presence of the material under the Administration Building is inferred based upon the presence of the material surrounding the building. The newer building is constructed on a slab, reportedly supported by redwood piles. There is also no evidence, based upon site history and soil sampling conducted during monitoring well installation, of the presence of calcium sulfate sludge on the northern side of the stream.

In conclusion, the results of these investigations have delineated the vertical and lateral extent of calcium sulfate material underlying the parking lot and adjacent to the West Branch of the Ramapo River, characterized the mercury concentrations in the calcium sulfate, and confirmed both the immobility of the mercury and lack of migration of the material or its constituents. Based on the results of this investigation, no further investigation is warranted, as sufficient data are available to fully characterize the parking lot (located in Area B).

6.5 Riverbank

The stream bank represents the northern limit of calcium sulfate material beneath the parking lot described above but has been the subject of focused investigations and IRMs conducted at the request of the NYSDEC. The Trust voluntarily constructed an interim cover on the stream bank that included the placement of geotextile, secured with soil staples, and then covered with gravel. The interim action covered the area containing calcium sulfate near the stream bank surface as delineated by the test pits. The condition of the streambank stabilization is documented in routine site inspections conducted on a quarterly basis. These inspections have been ongoing since May of 2006 and are documented in the quarterly progress reports provided to the NYSDEC. The purpose of the site inspections is to monitor the site condition on a routine basis and make repairs, as needed.

The interim action has been effective in protecting the stream bank and underlying calcium sulfate from erosion both under normal conditions and during extreme flooding events such as that observed on April 15 and 16, 2007. The inspection reports from this time indicate only minor damage to the IRM. Approximately 15 linear feet of stone was washed away and an approximate 1 foot square portion of the geotextile was ripped. The NYSDEC was notified of the observed damage via email on May 2, 2007 and repairs to the IRM were completed later that month, including the installation of larger stone over the geotextile.

Prior to the interim action described above, in April 2005 a NYSDEC representative observed exposed calcium sulfate at several localized spots along the top of the bank adjacent to the parking lot. In response, Arcadis (the Trust's consultant at that time) obtained one sample and placed a temporary cover consisting of geotextile over the exposed areas and also prepared a work plan and section detail for installation of an erosion control cover to mitigate further erosion.

Subsequent to this initial covering activity and in a letter dated June 7, 2005, the NYSDEC required that test pits be conducted along the stream bank in order to delineate the extent of calcium sulfate along the bank. Arcadis completed the test pit program in August 2005 during which a representative of the NYSDEC was present, and the results were integrated into Figure 2 described above. A Capping Work Plan (Arcadis, May 2005) was submitted to the NYSDEC which called for final bank stabilization using geotextile, covered with a geogrid and a one foot thick layer of 6" stone rip-rap. At the request of the NYSDEC, the proposed cap was then revised to consist of a vegetative cover as opposed to rip-rap and a revised Concept Plan for Riverbank Stabilization (Arcadis, November 2005) was submitted in November 2005, along with calculations to support the proposed changes. The proposed final remedial action has not been implemented pending comments/approval by the NYSDEC. However, the available data are sufficient for selection of the final remedy.

In the interim, the previously installed erosion control cover has been inspected and maintained as needed. Repairs have been limited to replacement of the silt fence as the cover has not required repair or maintenance. Ongoing inspection and maintenance activities have been reported to the NYSDEC in quarterly progress reports, which are continuing to this day.

6.6 Groundwater Quality

The following sets forth the extensive investigation and remediation that has occurred to date relative to groundwater at the Site. Based on these efforts, apart from routine monitoring, further study of groundwater is not necessary.

6.6.1 Overburden Comparison to SCGs

Nine COCs for groundwater were identified based on the groundwater data collected during the RI and the data from the earlier Plant-wide Hydrogeologic Investigation (C.A. Rich Consultants, Inc., 1986) as follows:

- benzene,
- toluene,

- xylenes,
- ethylbenzene,
- chlorobenzene,
- pyridine,
- alpha-picoline,
- 2-amino pyridine, and
- mercury.

The work performed during the RI included a comprehensive suite of analyses comprised of volatile organics, semi-volatile organics, pesticides/PCBs, and inorganics. These data are presented in Tables 6-1 (overburden) and 6-2 (bedrock) (newly created from Table 6.5 of the RI Report and designated T13 and T14) with a comparison to the current Part 703 Groundwater Quality Standards (SCGs). A review of Tables 6-1 and 6-2 indicates that the COCs selected in the ROD are appropriate. This is based on the following findings represented by the data in Tables 6-1 and 6-2:

- The predominant VOCs detected at the Site are benzene, toluene, xylenes, ethylbenzene, and chlorobenzene. Chlorinated volatile organic compounds are detected at trace levels (sometimes above the Part 703 standard), however, they are also detected in the background wells and are attributed to an off-site source. The BTEX and chlorobenzene compounds are linked to the former operations at the Site. Sporadic other detections are found at the Site (e.g., acetone, 2-butanone), however, these are common sampling and laboratory contaminants, do not have relevant Part 703 standards, and are also co-located with the COCs. In addition, these constituents have much higher guidance cleanup levels. For example, the USEPA RSLs for acetone and 2-butanone are 22,000 and 7,100 ug/L, respectively.
- The predominant SVOCs include pyridine and pyridine derivatives associated with past site operations. Similar to the volatile compounds, other detections are found, such as bis(2-ethylhexyl)phthalate, however, this compound is fairly ubiquitous in the environment, is also co-located with the COCs, and is also a common laboratory contaminant.
- As reported in the RI, pesticides and PCBs were generally not present on the Site (e.g., occasional detections only) and are not summarized on the tables, nor were they shown in the RI.
- The inorganic constituents generally do not show any consistent patterns of contamination, although various metals are present above the Part 703 standards. The most prevalent metals are iron, manganese, and magnesium. These metals are also commonly found in water supply wells in the area. In addition, the organic enrichment caused by the organic contamination at the Site would tend to promote reducing conditions and low ORP, and therefore, some level of these constituents is likely associated with the area of contamination associated with organics. However, to the extent the groundwater contamination from organics is managed, these metals will be managed as well. Other metals are detected sporadically, most likely related to sample turbidity rather than site operations. In addition, intra-well data is also not consistent. For example, a constituent (e.g., arsenic in MW-9) may be detected in one event (1985, 107 ug/L) and not detected in another event (1991, ND). As such the inorganic constituents other than mercury are not considered COCs. The ROD did select mercury as a COC in groundwater predominantly because of its use in the former manufacturing operations, even though the data do not suggest, that as discussed subsequently, it is present in a mobile form.

One additional parameter associated with site operations is ammonia, and this was not shown in the RI data summary nor was it selected as a COC in the ROD. Ammonia has a Part 703 groundwater standard of 2 mg/L, and concentrations found in wells on site are above this level. However, the primary issue for ammonia is its discharge to surface water (i.e., groundwater is not used at the Site). The OCSD #1 discharge upstream of the Site is likely the major source of ammonia to the stream, and in some cases causes the stream to be "losing". By comparison, the net flux from the Site is likely minimal. Nonetheless, testing for ammonia has continued at the Site and its distribution in groundwater is well understood.

Based on the above conclusions regarding COCs, the focus of groundwater monitoring events during remedy implementation has been on the COCs, and these constituents are considered good indicators of groundwater impacts at the Site. The data do not indicate a need for modifying or expanding on the sampling and analysis protocols for the Site.

As presented in Figure 2-1 of the Groundwater Quality Assessment Supplemental Report (Arcadis, October 2007), included herein and designated F31, Arcadis prepared a map depicting historical groundwater sampling results for benzene circa-1988. This figure illustrates the extent of benzene in the overburden aquifer prior to the start of site remediation activities. Plotting of the benzene concentrations provides a good representation of COC concentrations in the aquifer, as benzene is consistently detected at concentrations above that of other COCs and fluctuations in concentration of other constituents through time are consistent with those observed for benzene.

Also presented in the October 2007 Supplemental Report is a figure which depicts the benzene plume as of January 2007. That figure, Historical Groundwater Sampling Results and January 2007 Benzene Plume Map – Overburden Aquifer (Figure 2-2 included herein and designated F32), shows that benzene concentrations at and beyond the property line are less than 1.0 μg/L (the SCG for benzene). These results indicate shrinkage of the area of groundwater contamination back toward the former source areas and a decrease in concentrations along the centerlines of contamination. Based on the data available from the existing overburden monitoring wells, the area of the Site underlain by the groundwater contamination in 2007 was approximately six acres, or 25 percent of the 1988 area (estimated at 25 acres), a 75 percent reduction in area. These retractions of the groundwater contamination are consistent with the remediation work that has been performed at the Site: (1) excavation of the source areas, (2) 14 years of groundwater pumping and treatment, (3) use of ORC compound in excavated areas, and (4) eight years of biosparge operations.

Graphical bar charts of concentrations for eight key monitoring wells were presented in Figure 4-1 of the October 2007 Supplemental Report, designated F33. Wells MW-1S, MW-8S, and RW-1R are considered plume fringe monitoring wells, and MW-5S is a sentinel monitoring well. From these trend graphs it was previously concluded that:

- MW-1S groundwater has been ND for COCs since June 2006 and continues to meet SCGs.
- MW-8S groundwater has been ND for COCs since January 2006 and continues to meet SCGs.
- RW-1/RW-1R groundwater has been ND or 0.5J for benzene in 8 of the 11 sampling events since February 2002, and continues to meet SCGs.
- MW-5S groundwater has been ND for COCs in 19 of last 20 sampling events since September 1991 and continues to meet SCGs.

At the request of the NYSDEC, and as proposed in the HydroQual 2008 Supplemental Remedial Action Work Plan, six additional monitoring wells were installed to collect additional water quality data along projected groundwater flow paths and at additional locations adjacent to the West Branch of the Ramapo River. These wells were constructed in July and August 2008 and sampled in September 2008. As presented in the Quarterly Progress Report for the 3rd Quarter 2008 (HydroQual, October 15, 2008), the analytical data from the new wells are consistent with the historical data from nearby wells. The new well installations also provided analytical data in the area of the Site where the coarser grained deposits predominate and groundwater flows preferentially, as described in the 2008 HydroQual Report. The analytical results from the September 2008 groundwater sampling of the new wells are presented in Tables 1 through 3 of the 3rd Quarter 2008 Progress Report, designated T15 through T17. The data from the new wells, including within this preferential flow zone, continue to show that concentrations of COCs are below SCGs at plume fringe and sentinel wells. Since 2009, semi-annual groundwater monitoring includes analysis of the COCs benzene, toluene, xylenes, ethylbenzene, pyridine, alpha-picoline, and 2-amino pyridine. Mercury was added to the analytical list for MW-24S in April 2010. Results of the April 2010 sampling program are presented in Tables 2 through 4 of the April 2010 Groundwater Monitoring Report (R&C Formation, Ltd, April 2010), as attached to the 2nd Quarter 2010 Progress Report (designated T18 through T20). Selected inorganic parameters iron, manganese, sulfate, nitrate, and ammonia are also included in the semi-annual monitoring program, principally for indication of natural attenuation. Iron, manganese, sulfate and ammonia are detected above SCGs in a number of monitoring wells. Mercury has been detected in MW-24S in both the April 2010 and October 2010 sampling event, but below the SCG.

The biosparging system was shut down on September 10, 2008 in accordance with the approved Work Plan, and remains off line to this day, per recommendations in prior quarterly reports to the NYSDEC. As reported in the 4th Quarter 2010 Progress Report, benzene concentrations within the main plant area, as illustrated in the time series graphs (designated F34) continue to fluctuate within a range of concentration similar to that observed prior to biosparging system shutdown, indicating that conditions are at equilibrium (i.e., increasing trends are not evidenced). The increases in concentration observed in October 2010 at locations OW-6, OW-7 and MW-20S are consistent with the fluctuation in concentrations observed during operation of the biosparge system and are attributable to changes in precipitation and groundwater levels over time. As reported in the quarterly reports since 4th Quarter 2008, after shutdown of the biosparging system, the data continue to demonstrate non-detectable concentrations of site VOCs/SVOCs at the down-gradient property boundary. The data also continue to demonstrate that since shut down of the biosparging system, there has been no expansion of the plume or an exceedance of groundwater quality criteria for the COCs at the down-gradient perimeter.

6.6.2 Bedrock Comparison to SCGs

As previously discussed in Section 6.6.1, the RI data used to develop the Site COC list are presented in Tables 6-1 (overburden) and 6-2 (bedrock) (designated T13 and T14) with a comparison to the current Part 703 Groundwater Quality Standards (SCGs). A review of Table 6-2 indicates the same conclusions regarding COCs in bedrock groundwater as that presented in Section 6.6.1. However, the bedrock data from the RI also had indicated that impacts to groundwater quality were much more limited, generally two orders of magnitude lower than in the overburden.

Bedrock wells MW-6D, MW-20D, MW-23D, MW-26D, MW-27D, and MW-20DR are included in the semi-annual monitoring program, and were sampled six times between October 2008 and October 2010. With the exception of MW-20D, due to the reasons described in the next paragraph, no COCs were detected above SCGs in these bedrock wells during this period. These results were presented in quarterly progress reports 4th Quarter 2008 to 4th Quarter 2010. Additionally, as reported in the Groundwater Assessment Report (Arcadis, January 2007), MW-6D and MW-26D were sampled in June 2006, and no COCs were detected.

As reported in the January 2007 Arcadis Report, concentrations of benzene, toluene, ethylbenzene, xylene, pyridine, alpha-picoline and 2-amino-pyridine were detected in MW-20D which is positioned below the overburden aquifer plume. These results from the June 2006 sampling are consistent with earlier sampling rounds. As presented in the October 2007 Arcadis Supplemental Report, samples obtained from MW-20D may not be representative of actual bedrock groundwater quality conditions beneath the Site due to leakage around the well seal. A replacement well MW-20DR was constructed in August 2008 as a part of the Supplemental Remedial Action Work Plan implementation. Well MW-20DR was first sampled in September 2008, and in the seven sampling events from September 2008 to October 2010, no COCs have been detected. This confirms that the original MW-20D groundwater is influenced by the overburden groundwater. It also confirms that there is no influence on bedrock water quality from the shallower groundwater at this location. Bedrock groundwater sampling results for April 2010 are presented in Tables 2 through 4 from the Groundwater Monitoring Report (R&C Formation, Ltd, April 2010), as attached to the 2nd Quarter 2010 Progress Report (designated T18 through T20).

6.6.3 Summary of Groundwater Quality

The groundwater monitoring program, detailed in the 2008 HydroQual Supplemental Remedial Action Work Plan, continues to be consistently implemented and consistently demonstrates that impacts of the groundwater COCs, including benzene, pyridine, and picoline, are restricted to within the Site boundaries, and that there are no impacts at sentinel wells, offsite areas, or the Ramapo River. The monitoring results, presented in quarterly progress reports from 3rd Quarter 2008 to 4th Quarter 2010, also consistently confirm that the impacts are restricted to the overburden deposits and COCs are not impacting the underlying bedrock. Groundwater quality at the Site is well understood and none of the data suggests gaps in understanding or the need to modify the current monitoring program.

6.6.4 Town of Harriman Wells

As presented in the Groundwater Quality Assessment (Arcadis, January 2007), a series of groundwater supply reports, correspondence and data prepared for the Village of Harriman by its groundwater consultants were reviewed in detail. The Village of Harriman, in April 1989, owned eleven water supply wells. Five were operational, four were inactive, and two were test wells. At the time of the report, five wells were tested quarterly for VOCs, and none had tested positive for VOCs. Based on data obtained as part of the Nepera-Harriman Site groundwater monitoring program through 2006, none of the 11 Village wells or the private wells identified in the 1989 report is hydraulically downgradient from the Site.

The Village currently owns 13 wells, one of which is OR-7, located approximately 3,500 feet east of the Nepera-Harriman Site. OR-7 is a 417 foot deep well in dolomite bedrock. In 1998, a 72-hour pumping test was performed to determine whether the allowable pumping rate at OR-7 could be safely increased from 50 gallons per minute (gpm) to as much as 150 gpm. This test was performed to assess whether the hydraulic stress imposed by the additional pumping would induce contaminant migration from the Site. The 1998 report concluded that "the pumping of OR-7 at rates up to 148 gpm would not likely induce migration or redirect the groundwater contamination located at the Nepera site." Well OR-7 is reportedly pumped at a rate of 125 gpm.

Special Condition #11 of the Village of Harriman's Water Well Permit for OR-7 requires that a network of groundwater monitoring wells between OR-7 and the Nepera-Harriman Site be annually sampled and analyzed for VOCs and pyridine. Several of these wells are the sentry wells required in the ROD. A February 23, 2000 letter from the Village's groundwater consultant (Leggette, Brashears & Graham, Inc.)

to NYSDEC includes the acknowledgement that, "Historical data from the existing monitoring plan indicates no migration of groundwater contamination on the Nepera site, offsite."

The 21 sets of OR-7 groundwater quality data from 2000 through March 2006 demonstrate that none of the Nepera COCs – benzene, toluene, xylene, pyridine and others – have been detected in the Village of Harriman supply well OR-7.

6.7 Surface Water and Sediment Quality

6.7.1 Surface Water Quality Comparison to SCGs & Other Surface Water Evaluations

As presented in the RI Report, surface water and sediment sampling were conducted at the Site on August 28 and 29, 1991. The purpose of the surface water and sediment investigation was to assess the nature and extent of contamination, if any, within the surface water and sediments at and in the vicinity of the Site. An additional surface water and sediment sample was collected on May 15, 1995 to assess contamination at a location reported to have received seasonal runoff from the active operating facility. A total of 12 surface water and seven sediment samples were collected at the Site and submitted for analyses.

A summary of the surface water and sediment sampling results is presented in Tables 6-1 and 6-2 (newly created from Tables 6-6 and 6-7 of the RI Report and designated T21 and T22). Sample locations are presented on Figure 2.6 of RI Report (designated F19). Key sample locations are WW-04, which represents upstream surface water quality in the West Branch of the Ramapo River entering the Site, WW-02/WW-03, located just downstream of the Site, and WW-01, located farther downstream of the Site.

Also shown in Table 6-1 (designated T21) is the current surface water standard for the listed contaminants. Except for mercury, surface water sampling results were compared to the surface water standard for the protection of health (water source), abbreviated in Part 703 as H(WS). As presented in the Site's ROD (Table 4), the SCG determined by NYSDEC as applicable for mercury is the surface water criterion for the protection of human health with respect to the consumption of fish, abbreviated in Part 703 as H(FC). If no criteria for H(WS) or H(FC) are listed, for comparison purposes other applicable criteria may be shown and their type indicated.

As shown in Table 6-1 (designated T21), a number of volatile organic and semi-volatile organic compounds were detected in the surface water samples. The only VOC or SVOC detected above criteria was a tentatively identified compound (TIC), 1,1,2-trichloro-1,2,2-trifluoroethane. This was detected at estimated values of 8 and 10 μg/L. The SCG for this compound is 5 μg/L. Chlorofluorocarbon compounds have not been associated with the former manufacturing operations at the Site.

Bromoform was detected in all three surface water samples taken from the West Branch of the Ramapo River. However, bromoform was not used in plant processing operations. The OCSD indicated that bromine or chlorine is used as a final treatment at the Village of Harriman sewage treatment plant which discharges its treated effluent into the West Branch of the Ramapo just upstream of the Site. As reported in the current NYSDEC Part 703, Surface Water and Groundwater Quality Standards and Groundwater Effluent Limitations, there is no surface water SCG for bromoform.

As shown in Table 6-1 (designated T21), mercury was detected in one on-site location, and was ND in the three surface water samples, with a detection limit of 0.2 μg/L. At the time of the ROD, the H(FC) criterion was 0.2 µg/L (200 ppt). Currently, the NYSDEC Part 703 criterion for mercury, H(FC) is 7×10^{-4} µg/L (0.7 ppt). Thus, for these samples, a comparison cannot be made with the current SCG, which is much lower than the detection limit at the time. Cobalt was detected in downstream location at a concentration of 5.4 µg/L, slightly higher than the acute aquatic criterion A(C). Iron was detected in the two downstream samples at concentrations above the aesthetic water source criteria E(WS).

As summarized in the July 1995 RI, based on the August 1991 data, the surface water quality data indicated that the Site has no measurable impact on the water quality of the West Branch of the Ramapo River. As shown in Table 6-1 (designated T21), upstream concentrations for VOCs, SVOCs and metals are very similar to the downstream concentrations.

In November 1995, the NYSDEC collected surface water and sediment samples from the West Branch of the Ramapo River. The samples were analyzed for mercury only and the results of this study were presented in the Site's ROD. Surface water samples were collected from 10 locations in the West Branch of the Ramapo River. While the SCG for mercury at the time of the ROD was 0.2 µg/L, or 200 ppt, as stated earlier, the detection limit for these surface water samples was much lower, on the order of 1 ppt. As a result, the concentrations reported for mercury, while all below the then current SCG, ranged from 4.66 ppt to 140 ppt (Table 4, 1997 ROD). With one exception, the surface water concentrations were within a rather narrow range of 4.66 to 12.5 ppt. Given the current SCG of 0.7 ppt for mercury, both the background and down-gradient concentrations found in the 1995 sampling exceed the current SCG, although the down-gradient samples were marginally higher.

As reported in the ROD, the highest concentration of mercury in the surface water was found at the sample location adjacent to the Site's permitted outfall. A concentration of 140 ppt was detected at this location. As stated in Appendix A – Responsiveness Summary of the Site's ROD:

> "Of particular note is the mercury concentration (140 ppt) detected at location #8 during the NYSDEC's November 1995 sampling event. This sample was collected at the outfall from the groundwater treatment system. The groundwater standard is 2000 ppt. Although no clean-up standards or guidance values have been exceeded, it is the opinion of the NYSDEC that further investigation is warranted to evaluate the future potential for mercury to enter the river. This is important as the river is used for recreation (fishing) and as a source of drinking water downstream."

One would assume that the results of this sampling prompted the NYSDEC to conduct the fish study in the Ramapo River near Harriman, New York in June/July 2001, as discussed in Section 2.2. As described in Section 2.2, the fish study concluded that none of the concentrations found in tissue resulted in the need for a fish advisory. Also, all of the concentrations found were well below the current groundwater quality standard for mercury of 700 ppt, and well below the MCL of 2 ppb (2,000 ppt).

6.7.2 Sediment Quality Comparison to SCGs

The SCG sediment criteria for metals are from the NYSDEC's Technical Guidance for Screening Contaminated Sediments (NYSDEC, January 1999). Table 2 of the guidance lists two levels of sediment criteria for metals, the Lowest Effect Level and the Severe Effect Level. As stated by the NYSDEC in Appendix A - Responsiveness Summary of the Site's ROD, the sediment cleanup goal for the Site is the higher of the two levels, the Severe Effect Level. Table 6-2 (designated T22) presents the guidance value for the Severe Effect Level for the listed metals. The guidance criteria for organic compounds in the

NYSDEC's Technical Guidance for Screening Contaminated Sediments are based on an assumed organic carbon fraction, and are not shown on Table 6-2.

Table 6-2 (designated T22) provides the RI sediment data with comparison to SCGs for three sample locations: SDWW01 downstream of Arden House Road, SDWW02/03 at the downstream boundary of the Site, and SDWW04, upstream of the Site. Sample location SDDJM003/004 is not included in the summary as this sample was taken at the Avon parcel where remediation had been performed. As shown in Table 6-2, the sediment sample results from the July 1995 RI indicate that background concentrations of volatile organics, semi-volatile organics, tentatively identified compounds, pesticides/PCBs and inorganics are generally comparable to and mostly higher than the downstream sample results. Mercury was detected in the sediment in the upstream location at similar concentrations, although slightly less than the concentrations at downstream locations. None of the sediment samples from the West Branch of the Ramapo River exceed the SCG for mercury as presented in the ROD.

As a part of the NYSDEC's supplementary investigation of the river as presented in the ROD, additional sediment samples were collected for mercury analysis. These results are presented in Table 5 of the ROD, and may be summarized as follows:

- 61.9 to 180 ppb upstream of the Site
- 155 to 824 ppb adjacent to the Site
- 11.2 to 87.9 ppb downstream of the Site

These data suggest that some localized influence on mercury concentrations may be associated with the Site, although all of the values are below the NYSDEC's ROD selected SCG. As the data have indicated that mercury is not migrating to groundwater, any mercury contributions to sediment would most likely have been from of sediment transport due to erosion along the stream bank. The limited potential for dissolved phase migration of mercury to sediments and surface water is further supported by the fact that along the eastern portions of the Site, the West Branch of the Ramapo River is actually a losing stream as a result of the substantial base flow from the OCSD #1 wastewater treatment plant outfall (see Conceptual Site Model discussion in Section 5.3).

As noted previously, an effective erosion control IRM has been constructed on the stream bank thereby controlling the potential for erosion of any calcium sulfate material which may exist along the stream bank in the area of the parking lot. In addition, the Trust has proposed a permanent erosion control measure for the stream bank, which is pending NYSDEC review. The NYSDEC's fish study concluded that a fish advisory associated with mercury is not necessary thereby also indicating that to the extent mercury is present in sediments, it is not propagating through the food chain at levels of concern.

6.7.3 Summary of Results

The preceding discussion of surface water and sediment quality indicates the following, by way of summary:

- The surface water analytical data do not indicate that the Site is having an impact on overall surface water quality, although a localized potential impact from mercury was evidenced at the former wastewater outfall (now the SPDES Lagoon stormwater outfall).
- The sediment analytical data also do not indicate that the Site is having an impact on overall sediment quality, although a localized potential impact from mercury is possible adjacent to the

Site, most likely as a result of past sediment transport, which has since been halted through erosion control measures.

- The NYSDEC's fish study, which was a follow up to the potential localized surface water/sediments impacts noted above, did not indicate the need for establishing a fish advisory, thereby indicating that overall the Site is not having a significant impact on ecological resources.

Collectively, the above conclusions indicate that the Site's interaction with surface water and sediment is well understood, that mercury is the only COC for which the data suggest localized potential impact, that such impact is most likely a result of past sediment transport (i.e., the dissolved phase migration of mercury is not indicated by the data), and that implementation of permanent erosion controls would eliminate the only potential mercury transport mechanism indicated by the data. Given the foregoing, no further investigation is warranted.

6.8 Soil Vapor

A soil gas survey was conducted by Hydro Geo Chem of Tucson, AZ at the Site during April and May of 1991. The soil gas survey consisted of the sampling and analysis of soil gas that resides in the pore space of the unsaturated zone above the water table. The purpose of the soil gas survey was to evaluate those areas of the Site where VOCs in the vadose zone or groundwater environment may be migrating near the surface. The data generated through this reconnaissance survey was used to help define areas of contamination and confirm areas for test pits and/or soil borings. Soil gas samples were collected from 122 locations.

Analytes included in the soil gas survey included total hydrocarbons (THC), aromatic hydrocarbons, chlorinated hydrocarbons and total petroleum hydrocarbons (TPH). Detected compounds included benzene, toluene, ethylbenzene and xylenes (BTEX), chlorobenzene and pyridine. Soil gas concentrations ranged from the low µg/L level to 6,000 µg/L (THC). The most prevalent compounds identified on the Site were benzene and toluene/pyridine (toluene and pyridine co-eluted). The highest concentration of benzene in the soil gas was about 2,100 µg/L. Other BTEX compounds were detected spatially across the Site at various concentrations. The RI Report Figure 6.2 (designated F35) presents an isoconcentration plot of THC soil gas concentrations, which was utilized as the basis (in conjunction with a magnetometer survey) to finalize the test pit locations for subsequent subsurface investigations.

There are no data to assess whether indoor air vapor intrusion has occurred as sub-slab soil vapor testing has not been performed at the on-site buildings. The NYSDEC conducted an Environmental Indicator (EI) Determination for the Site in 2005 (NYSDEC, September 22, 2005) and concluded that the vapor intrusion pathway was not of concern under current conditions since the buildings are unoccupied. Groundwater quality within the overburden sand and gravel aquifer is well characterized as part of the groundwater monitoring program. It is anticipated that institutional controls will be a remedial component and will require that future development either incorporate vapor mitigation measures or include a vapor intrusion evaluation for Site-related COCs specific to future structure locations. No further investigation of soil vapor is necessary to support the evaluation or remedial options for the Site.

6.9 Off-Site Soil

Supplemental RFI

As part of a Supplemental RFI, 16 borings were completed at off-site locations on the Avon parcel (i.e., to the southeast) and Village of Harriman property (i.e., northwest across NY Route 17) in June 2008. The locations of the borings are shown on the figure included in the August 6, 2008 technical memorandum (designated F4). The table included in the technical memorandum (designated T23) provides a summary of the data; mercury data are also plotted on the figure. In accordance with the NYSDEC-approved Phase II (Supplemental) RFI Work Plan, samples were collected and analyzed for mercury and Aroclor PCBs at each location from the 0 to 2-inch and the 2 to 24-inch depth intervals. A third sample from the 6-inch interval above the water table was collected and held for possible laboratory analysis pending "evidence of impact" from results of the shallower samples.

No calcium sulfate sludge was encountered in any of the borings. No PCBs were detected in any of the samples. All mercury results were well below the Commercial and Industrial SCOs. On the Village of Harriman property, two of the borings contained mercury in the shallower samples above the unrestricted standard of 0.18 mg/kg (SB-15: 0.57 and 1.01 mg/kg; SB-16: 0.989, 0.310 mg/kg). While these results do not necessarily constitute "evidence of impact" per the Work Plan, because they are on Village property, the deeper sample at both those locations was analyzed. The deeper samples were both below the unrestricted standard (SB-15: 0.172; SB-16: 0.021).

Despite diligent efforts, ELT Harriman was unable to secure access to other perimeter locations, including properties across the Ramapo River (i.e., to the northeast and east) and the property located on the other side of the railroad (i.e., to the south and southwest). ELT Harriman will complete the scope of the Supplemental RFI Work Plan provided that access can be obtained with the NYSDEC's assistance.

Investigation of Mary Harriman Park

The NYSDEC conducted an investigation in February-March, 2000 to determine the presence or absence of buried drums beneath the baseball field area at Mary Harriman Park, located west of the Site across NY Route 17. The investigation consisted of an examination of historical aerial photographs, a surface geophysical survey and a test pit program. The results of the investigation are presented in the report by IT Corporation for the NYSDEC (IT Corporation, March 2000) and confirmed that no buried drums were present beneath the baseball field.

6.10 Source Areas

In an email dated December 21, 2010, the NYSDEC requested that a working definition of site specific 'source material' be developed as part of the Summary Report. The NYSDEC further stated that the working definition was to consider guidance provided by Part 375 and DER-10 and those areas of the Site that meet the definition should be identified and considered for additional sampling. Based on the stated guidance, Section 6.10.1 presents the requested definition of source material. Section 6.10.2 then summarizes the remedial actions already taken to address the identified source areas and Section 6.10.3 summarizes the overall status of source areas at the Site.

6.10.1 Source Area Definition

Part 375 defines a source area or source to mean "a portion of a site or area of concern at a site where the investigation has identified a discrete area of soil, sediment, surface water or groundwater containing contaminants in sufficient concentrations to migrate in that medium, or to release significant levels of contaminants to another environmental medium, which could result in a threat to public health or the environment." The definition then goes on to identify typical source materials as concentrated solid or semi-solid hazardous substance, non-aqueous phase liquids, and grossly contaminated media. Grossly contaminated media is further defined (Part 375) as that which contains sources or substantial quantities of mobile contamination in the form of NAPL, that is identifiable either visually, through strong odor, by elevated contaminant vapor levels or is otherwise readily detectable without laboratory analysis.

Overall, the key, operative terms in this definition are that a source area be discrete and contain readily identifiable, concentrated sources of contamination.

6.10.2 Previous Source Area Remediation

The remedy selected in the ROD had identified Area F as containing drums (a source area) which were to be removed. The ROD estimated the number of drums at 320. In implementing the ROD-selected remedy, the Trust undertook the excavation in Area F as planned, but also identified an additional area of drums (Area 53). The remediation efforts in these previously identified source areas included drum, soil, and liquids removal, post-excavation sampling, installation of two additional monitoring wells, and site restoration. The details of these remediation efforts are summarized in Table 6-5 (newly created from the RI Report and designated T24). Of note, remediation work in Area K (the Avon parcel) included removal of contaminated sediments. This work was not, however, source removal. Rather it was designed to address the potential ecological impacts from contaminated sediments found on the Avon parcel. The effectiveness of these remedial actions is evident from the decline in the concentrations of COCs observed in groundwater monitoring wells.

As described more fully in the 2008 Conceptual Site Model and Supplemental Remedial Action Work Plan, and as illustrated in Figures 2-10 and 2-11 from that report (F36 and F37), an extensive number of soil borings, geoprobe borings and soil gas points completed throughout the main plant area has not identified the presence of any remaining discrete areas of contamination that meet the definition of a source area as defined in DER-10 and Part 375. Soil gas readings, soil sample results, and groundwater concentrations, showed no correlation. That is, while one might expect a high groundwater concentration adjacent to a high soil gas or soil sample result, this was not the case. Rather, the data indicate that the existing groundwater impacts observed underlying the main plant area are associated with residual contaminant concentrations within the lower permeability soils. These diffuse areas are releasing site COCs at a rate that is at equilibrium with the Site geochemistry and groundwater flow rates such that the site COCs are either not present or are below applicable groundwater quality criteria at the Site boundaries. The absence of site COCs at the Site's perimeter monitoring wells is consistently documented by the semi-annual groundwater monitoring program that has been on-going.

Calcium sulfate material, which has been found to contain mercury, has been encountered primarily within the Parking Lot area, and has also been identified in soil borings in other areas on the Site. While the calcium sulfate material represents a discrete area, multiple lines of evidence indicate the calcium sulfate material is not releasing "significant levels of contaminants to another environmental medium, which could result in a threat to public health or the environment." Such lines of evidence include knowledge of the manufacturing process that generated the waste, mercury speciation work completed during the RFI, and semi-annual water quality data documenting the absence of mercury above applicable water quality standards. Therefore, the calcium sulfate material does not represent a source with respect to adjacent soils or groundwater. However, the calcium sulfate material would meet the definition of a source material if it were exposed (i.e., uncovered) and eroded and transported within surface water. As a result, IRMs have been implemented to prevent exposure and subsequent transport of the sludge in surface water. The IRMs are inspected quarterly, with repairs made as needed.

6.10.3 Status of Source Areas

Based upon the previously implemented remedial actions, and the extensive number of soil borings, geoprobe borings and soil gas points completed throughout the main plant area, there is no evidence of any remaining discrete areas of contamination that meet the definition of a source area as defined in DER-10 and Part 375. Given the extensive amount of investigation that has been completed, no further investigation of source areas is necessary or recommended relative to site soils and groundwater.

As noted above, the calcium sulfate material could meet the definition of a source material with respect to exposure, erosion and subsequent transport in surface water if it were not controlled. The vertical and horizontal extent of the calcium sulfate material in the parking lot adjacent to the West Branch of the Ramapo River has been studied and defined as presented in Sections 6.4 and 6.5. Therefore, no further study is needed or recommended as sufficient information exists to evaluate and recommend a final remedial action.

6.11 On-Site Surface Water System

Current Status

Stormwater runoff from precipitation generally flows over the road surfaces in a northerly direction toward Arden House Road or east toward the open field and the West Branch of the Ramapo River. A portion of the surface runoff on site is collected and conveyed to the lagoon by a series of catch basins along Arden House Road. Drainage is also directed into storm drains near Building 1 (in the southwestern corner of the property) and across Arden House Road west of the lagoon. Evidence of drainage from the southwestern portion of the Site into the Avon parcel was observed at the southern most corner of the Site. The stormwater ultimately empties into drainage ditches in the Avon parcel.

The catch basins along Arden House Road flow into a sump containing three pumps that discharge collected runoff through a 10-inch steel pipe into the lagoon. Stormwater enters the SPDES lagoon via a sump located at the westerly corner of the lagoon. A concrete splash pad has been installed at the outlet of the influent pipe to minimize erosion and re-suspension of settled solids within the lagoon. Direct surface runoff entering the lagoon is minimal due to the raised berm construction.

Water from the lagoon historically was discharged to the West Branch of the Ramapo River via Outfall 002 (Permit NY 0006670). Discharges from Outfall 002 were controlled by two pumps located in the northeast corner of the lagoon that produce a combined flow rate of 70-80 gallons per minute. Discharges from the lagoon were directed to a manhole with a Parshal flume prior to reaching the outfall location in the bank of the river. A 10-inch steel pipe is located in the vicinity of the discharge pipes for overflow protection. The overflow pipe is routed through the Parshal flume prior to discharge. A wooden pier structure located near the center of the south westerly embankment, along Arden House Road, reportedly allowed lagoon water to be used by fire fighting personnel as an emergency source of water for the Site. However, the piping to this structure reportedly has been disconnected and no longer is in use.

ELT Harriman submitted an application for transfer of the SPDES Permit in December 2007. The NYSDEC elected not to transfer the permit and it expired on April 30, 2010. ELT Harriman submitted an application for a new SPDES Permit in August 2010. The NYSDEC has not acted on the application as of the date of this report. There have been no discharges from the lagoon since the permit expired.

The depth of the solids in the lagoon ranges from less than 1 to 3 feet, with the greatest thickness occurring near the inlet at the westerly corner of the lagoon and decreasing toward the outlet near the easterly corner. Based on a maximum depth of 3 feet over approximately 5 acres of lagoon surface area, the maximum total volume of lagoon solids is approximately 24,000 cubic yards. A Lagoon Closure Plan was submitted to the NYSDEC in June 2010 (Spectra Environmental Group, June 2010).

Previous Status and Pollutant Minimization Activities

Prior to its current use, the lagoon served as a settling pond for aluminum hydroxide and magnesium silicate precipitates from manufacturing. The former blind lagoon (previously located where the SPDES lagoon currently is situated), was used to drain fire-system sprinkler (deluge) water, which was conveyed via gravity flow through underground pipes. The water is now collected in a 20,000-gallon underground storage tank and periodically pumped to an above-ground 300,000-gallon storage tank.

Beginning in 2001, investigations were performed in accordance with the SPDES Permit to identify any plant sources of mercury and evaluate measures to mitigate those sources. These investigations addressed the various potential sources of mercury including discharges from the former IRM systems, plant effluent thermal waters, water treatment chemicals, and stormwater runoff. Mitigation measures were developed and implemented as described in the following reports:

- Pollutant Minimization Plan, Nepera, Inc., Harriman, New York, Arcadis, February 2002
- Updated Pollutant Minimization Plan 2003, Nepera, Inc., Harriman, New York, Arcadis, August 2003
- Pollutant Minimization Plan 2004, Brown and Caldwell Associates, April 2004
- Pollutant Minization Plan for Nepera Chemical Plant, Shaw Environmental and Infrastructure, May 2006

Former Seeps

Activities were conducted in 2002 to investigate and eliminate a seep emanating from beneath the floor slab of the former Amide Building (Building 13). Water exfiltration in the area around Building 13 was first noticed in late 2000. Investigations were conducted to identify and characterize the source and an IRM was installed to contain and collect water from the seep. It was concluded that the seep was attributable to mounding of perched water on the north and south sides of the building. The source of the seep could not be conclusively determined, but a leak in the domestic city water line near Building 13 was suspected. The IRM was effective in eliminating the seep. Details are presented in the Building 13 Seep Investigation Report (Arcadis, October 2002).

Seeps were observed in the past at one or more other locations within the main plant area. However, seeps have not been observed since the cessation of plant operations in 2005. Consistent with the Site Conceptual Model, the primary flow paths are vertical in the low permeability, shallow overburden soils.

However, coarser-grained higher permeability deposits are interspersed with the low-permeability deposits, and during wetter times of the year can become saturated and result in a component of lateral flow that may be manifested as a seep. These localized seeps, if present, would represent a small portion of overall groundwater flow; as discussed in the Site Conceptual Model groundwater flow is controlled by the thicker sequence of coarse-grained deposits in the central portion of the site and thus, no further investigation is necessary. Nonetheless, this understanding of the presence of shallow aquitards and perched groundwater needs to be taken into account in the evaluation, design and implementation of remedial measures as well as future development.

6.12 Mercury Speciation in Soils

As more fully described in Section 3.4, the fate, transport and potential bioavailability characteristics of mercury in soil were further evaluated in the RFI through a series of separation and analytical procedures known as sequential extraction. The analytical results of the sequential extraction and methyl mercury analyses are presented in RFI Tables 4.6 and 4.6A (designated T25 and T26).

The pattern of fractionation demonstrated variability (see RFI Report Figure 4-9, designated F38) of mercury fractionation biased to the later-extracting fractions, indicating low environmental mobility. The bioavailable fractions correlate with F1 and F2, which represented a very low proportion of total mercury present. Only G B 005 had more than 5% of mercury in these early-eluting fractions, and this sample had very low total mercury (0.7 mg/kg) so the absolute bioavailable amount is very low. Similarly, the most mercury-contaminated sample (02-B-002, total mercury of 1795 mg/kg) had the highest proportion of mercury in late-extracting (resistant) fractions and a total bioavailable component of only 0.006%, or a concentration of 0.1 mg/kg mercury.

A very low portion of total mercury was present as methyl mercury, with a maximum of 0.035% in sample A-B-012 (see RFI Report Figure 4-10 included herein and designated F39). In general, no particular relationship between the proportion of methyl mercury and the fractionation pattern is evident.

One sample from the lagoon was analyzed for methyl mercury and mercury by sequential extraction. The results are shown in RFI Report Tables 4-6 and 4-6A and Figures 4-9 and 4-10 (designated T25, T26, F38 and F39). The lagoon solids sample had a different pattern than the soils, with more mercury in the F3 fraction. This result is consistent with the information presented in the method development article (Bloom et al, March 2003), which identified F3 and F5 as the most common mercury reservoirs for mercury in aqueous solids.

The following table identifies the promulgated SCOs for mercury in soil and potential alternate SCOs applicable for mercury salts:

	Default Mercury SCO (mg/kg)	Alternate Mercury SCO (mg/kg)
Unrestricted Use	0.18	0.18
Residential Use	0.81	1.2
Restricted Residential	0.81	5.8
Commercial Use	2.8	47
Industrial Use	5.7	220

The promulgated SCOs are based on the lower of the Final Human Health-based SCOs for mercury (elemental) or mercury (inorganic salts) in Table 5.6-1 of the NYSDEC's document titled "New York

State Brownfield Cleanup Program Development of Soil Cleanup Objectives Technical Support Document" (TSD) dated September 2006 (NYSDEC, September 2006). The TSD explains the technical basis of the methods used to develop the SCOs that were promulgated under 6 NYCRR Part 375.6. The SCOs established in Part 375 are the lower of the two values, which are based on elemental mercury.

Alternate SCOs listed above for mercury are the Final Human Health-Based SCOs for mercury (inorganic salts) in Table 5.6-1 of the TSD. Table 5.6-1 includes separate Final Human Health-based SCOs for mercury (elemental) and mercury (inorganic salts). These criteria for inorganic mercury salts have been published by the NYSDEC and serve as appropriate mercury SCOs where the mercury present at a Site can be demonstrated to be in the inorganic form.

In the RFI and partial Supplemental RFI, a total of 388 soil samples from 235 borings were collected and analyzed. These programs are in addition to the 122 soil samples collected as part of the RI (1995). During these investigations, no evidence of a sheen or mercury beads was reported. As part of the RFI, seven soil samples were sent for mercury speciation by selective sequential extraction (SSE) (Bloom, et. al., 2003) and methyl mercury (MeHg) analysis. The overall objective at the time was to evaluate properties related to the potential for environmental mobility, and not specifically to quantitate elemental mercury. However, the data do provide sufficient information about the form of the mercury that is present. The samples were surface and near-surface soils scattered throughout the Site and encompassed a range of total mercury concentrations, up to 1,800 mg/kg. The data show the following:

- Soluble mercury (F1 fraction) is less than the aqueous solubility fraction, indicating low likelihood of elemental mercury presence.
- Methyl mercury represents a vanishingly small proportion of total mercury, 0.001% to 0.035%, of the mercury present.

These results suggest an absence of elemental and organic mercury forms, indicating that the application of inorganic mercury SCOs would be appropriate.

A work plan for Supplemental Mercury Speciation Evaluation was prepared and submitted to the NYSDEC in September 2009 (Brown and Caldwell Associates, September 2009). The NYSDEC issued comments on the work plan in a letter dated November 24, 2009 and indicated that further discussion of the study goals and proposed methods was needed. After further discussion, the NYSDEC indicated that further study is not necessary and that alternate SCOs may be used in the evaluation of remedial options.

7 QUALITATIVE EXPOSURE ASSESSMENT

The following presents a qualitative assessment of the potential exposure pathways associated with the various areas and/or media at the Site under both current and potential future use, per the exposure assessment criteria in DER-10 (NYSDEC, May 3, 2010). This qualitative assessment is summarized in Table 7-1 (newly created and designated T27).

7.1 Soil

Since the majority of the Site is covered with buildings and/or pavement, operations of the industrial facility have ceased, and access to the Site is restricted, there is currently very little potential for ingestion and/or dermal contact with soil. Under current conditions, potential exposures could occur for trespassers or workers performing maintenance or repair activities that involve ground-intrusive work. A future pathway also is possible if ground-intrusive work is conducted as part of site remediation or redevelopment. In these cases, the possibility exists for exposure via both incidental ingestion and dermal contact.

The potential for trespassers to access the Site is minimized by the perimeter fencing that encircles the former main plant area and the fencing that recently has been installed around the parking lot. Potential worker exposure can be mitigated by implementing a site management plan that would identify potential risks posed by subsurface contamination and specify protective measures (e.g. training, personal protective equipment, environmental monitoring) to be taken by workers. If the Site is redeveloped for future use, potential exposure can be controlled by implementing a site management plan and installing/maintaining a protective cover (i.e., pavement, building slabs, layer of clean soil or other suitable material) in areas where COC concentrations in surficial soil are above applicable SCOs. Residential use of the Site can be prevented by instituting an environmental easement; this will prevent the possibility of incidental ingestion of soil through vegetable gardens and dermal contact/incidental ingestion of soil by children.

7.2 Calcium Sulfate

The calcium sulfate material represents a concern relative to dermal exposure or through its transport in surface water and sediment if exposed to precipitation. The calcium sulfate material is currently covered so there is no current pathway. A future exposure pathway is possible if cover and erosion controls are not maintained and the calcium sulfate material is exposed. This potential pathway can be controlled by keeping the calcium sulfate material covered and maintaining erosion controls, and instituting an environmental easement along with a site management plan.

7.3 Groundwater

There is currently no use of groundwater at the Site and, therefore, no currently complete exposure pathway. Potential future exposure to the Site COCs in groundwater could result via ingestion, dermal contact, and inhalation of volatiles, if the groundwater were used for domestic and to a lesser extent, industrial, water supply purposes. This pathway can be controlled through use restrictions. Groundwater impacts are contained within the property boundaries and will continue to decrease with MNA as the current concentrations of COCs in sentinel wells are below the groundwater quality criteria (SCGs). Monitoring wells completed between the Site and water supply wells to the north do not indicate a pathway relative to the off-site use of groundwater.

7.4 Surface Water

There is no current or future exposure pathway relative to surface water. The surface water analytical data indicate that the Site is not having an impact on overall surface water quality. Although a localized potential impact from mercury was evidenced at the former wastewater outfall (now the SPDES Lagoon stormwater outfall) the concentration is below the 0.7 µg/l Part 703 standard for protection of health (water source). In addition, a fish study conducted by the NYSDEC concluded that there was no need for a fish advisory.

7.5 Sediment

There is no current exposure pathway relative to sediment. The sediment data suggest the potential for a localized mercury impact on sediment likely attributable to past erosion of calcium sulfate containing mercury. The concentrations, however, are below the ROD-selected SCG and erosion controls are now in place. In addition, and as noted above, the NYSDEC's fish study concluded that a fish advisory associated with mercury is not necessary, thereby also indicating that, to the extent mercury is present in sediments, it is not propagating through the food chain at levels of concern. A future exposure pathway is possible if erosion controls are not maintained and calcium sulfate erodes into the stream. This pathway can be controlled through continued maintenance of the IRM cover system, an environmental easement for the Site, and implementation of a final remedial measure as called for in the ROD.

7.6 Soil Vapor

Since there are no operations currently taking place at the Site, inhalation of soil vapor is unlikely in the current scenario. It is anticipated that all of the existing buildings will be demolished in conjunction with remedial measures implementation. If the Site is redeveloped, a soil vapor intrusion evaluation will be needed and measures may need to be taken to prevent soil vapor from entering new buildings or other structures at the Site.

7.7 Ambient Air

Since there are no operations currently taking place at the Site, exposure to constituents in ambient air within the Site boundaries is unlikely. A Baseline Risk Assessment prepared for the Site in 1991 showed that on-site worker and off-site resident exposure scenarios result in estimated cancer risks below and within the target cancer risk range established by the USEPA. This conservative evaluation used estimated average soil concentrations from areas of the Site that were not covered with buildings or pavement as the basis for the air emissions. Air emissions from Site soils are not likely to change in the future, as the Site will remain in industrial or commercial use. Temporary air emissions from soils may occur if major ground-intrusive work is conducted at the Site during implementation of the selected remedial action. A community air monitoring plan will be prepared and measures implemented to control volatile organic and fugitive dust emissions prior to implementation of site remedial activities.

8 CONCLUSIONS AND RECOMMENDATIONS

On the basis of the data collected over the past twenty five years, the following conclusions and recommendations are provided relative to the need for additional investigation of various media and/or areas of the Site.

8.1 Surface and Subsurface Soil

Soils containing mercury concentrations in excess of the applicable SCOs are distributed broadly across the Site in shallow and deeper soils. The mercury exists primarily as highly immobile mercuric sulfide, which limits its ability to migrate in groundwater and surface water, and leaves direct contact with or ingestion of soils as the primary potential exposure pathway. Surface soils at the Site have been fully characterized, both analytically and spatially. The samples collected beneath the previously inaccessible SWMUs did not indicate any significant differences in the type or concentration of constituents detected when compared to samples collected outside of these areas. The data did not identify any new significant sources impacting groundwater beneath the previously inaccessible SWMUs. Rather, the data continue to support the Conceptual Site Model that indicates the existing groundwater impacts observed underlying the main plant area are associated with residual contaminant concentrations within the lower permeability soils. Based on the extent of the available data and lack of any indication of a significant source attributable to the previously inaccessible SWMUs, AOCs and other areas of potential impact, additional subsurface soil sampling beneath buildings, tanks or pipelines is not necessary to evaluate remedial options.

8.2 Parking Lot – Area B

Approximately 22,000 cubic yards of calcium sulfate are present under the parking lot. The calcium sulfate material is bounded by Arden House Road and NY Route 17 to the south and west, the SPDES lagoon to the east and the West Branch of the Ramapo River to the north.

Mercury is present within the calcium sulfate material as a byproduct from the manufacture of niacinamide. Total mercury concentrations within individual samples ranged from 1.1 to 1900 mg/kg, while total mercury concentrations in composite samples ranged from 356 to 598 mg/kg.

The lateral and vertical extent of the calcium sulfate is well defined and it has been characterized relative to both mercury and VOCs. The collective data indicate that the mercury is present in a highly immobile form and is not a source of dissolved mercury to surrounding soils, groundwater, or surface water. Similarly, testing for volatile organic compounds indicates the calcium sulfate is not a source of VOCs.

The work completed to date has fully delineated and characterized the calcium sulfate and, therefore, provides sufficient data to evaluate remedial options. Therefore, no further investigation is recommended or needed.

8.3 Groundwater

Groundwater impacts associated with the Site have declined significantly with respect to both overall concentration and spatial extent since implementation of various remedial actions (soil and drum excavation, groundwater extraction and treatment, biosparging and natural degradation). Following completion and discussion of an updated site conceptual model with the NYSDEC, seven additional monitoring wells were installed in October 2008 and these wells are now included in the semi-annual monitoring program for the Site. The addition of these wells confirmed the understanding of the site conceptual model. The semi-annual groundwater monitoring data consistently demonstrate that impacts from the groundwater COCs, including benzene, pyridine, and alpha-picoline, are restricted to within the Site boundaries, and that there are no impacts at sentinel wells, offsite areas, or the West Branch of the Ramapo River. The data also consistently confirm that the impacts are restricted to the overburden deposits and COCs are not impacting the underlying bedrock. Groundwater quality at the Site is, therefore, well understood and none of the data suggests gaps in understanding or the need to modify the current monitoring program.

8.4 Surface Water

As summarized in the July 1995 RI (data collected in 1991), the surface water quality data indicated that the Site has no measurable impact on the water quality of the West Branch of the Ramapo River. Upstream concentrations for VOCs, SVOCs and metals are very similar to the downstream concentrations. Data specific to mercury collected during the RI reported non-detectable concentrations at all sampling locations within the River. Additional work conducted by the NYSDEC in 1995, which used an analytical method for mercury capable of achieving lower detection limits (approximately 1 ppt as compared to 200 ppt during the RI) reported mercury concentrations ranging from 4.66 ppt to 140 ppt. With one exception, the surface water concentrations were within a rather narrow range of 4.66 to 12.5 ppt, and all concentrations were below the ROD-specified SCG of 200 ppt. Given the current SCG of 0.7 ppt for mercury, both the background and down-gradient concentrations found in the 1995 sampling exceed the current SCG, although the down-gradient samples were only marginally higher.

The NYSDEC also conducted a fish study in the Ramapo River near Harriman, New York in June/July 2001. The fish study concluded that none of the concentrations found in tissue necessitated a fish advisory. Also, all of the concentrations found are well below the current groundwater quality standard for mercury of 700 ppt, and well below the MCL of 2 ppb (2,000 ppt).

Most notably, all of these data were collected prior to completion of the IRM activities to prevent erosion of calcium sulfate containing mercury into the river, while the pumping from the groundwater extraction and treatment system was discharging to surface water, and while the plant was still operating. In comparison to current conditions, the sampling results represent a worst case scenario, yet none of the reported concentrations exceeded the ROD-specified SCG of 200 ppt.

Finally, the data indicate that the only potential source of mercury transport from the Site to the river is related to the erosion of calcium sulfate. Interim measures to control erosion are in place and are inspected and repaired quarterly as required. A final remedial measure has also been proposed and is pending comment and approval from NYSDEC.

The foregoing illustrates a full understanding of the Site's inter-relationship with surface water, and the absence of any significant impacts, particularly as measured by the ultimate receptors tested during the fish study. Therefore, no further investigation or study of surface water is recommended or needed.

8.5 Sediment

The sediment sample results from the July 1995 RI indicate that background concentrations of volatile organics, semi-volatile organics, tentatively identified compounds, pesticides/PCBs and inorganics are generally comparable to and mostly higher than the downstream sample results. Mercury was detected in the sediment in the upstream location at similar, although slightly less than the downstream locations. None of the sediment samples from the West Branch of the Ramapo River exceed the SCG for mercury as presented in the ROD.

As a part of the NYSDEC's supplementary investigation of the river, additional sediment samples were collected for mercury analysis. These results ranged from 11.2 to 824 ppb and suggest that some localized influence on mercury concentrations may be associated with the Site, although all of the values are below the NYSDEC's ROD selected SCG. As described previously, the mercury contributions to sediment from the Site would most likely have been in the form of sediment transport due to erosion of calcium sulfate along the stream bank. At the time this study was conducted, erosion control measures had not been implemented.

Since that time, an effective erosion control IRM has been constructed on the stream bank thereby controlling the potential for erosion of mercury containing calcium sulfate material which exists along the stream bank in the area of the parking lot. In addition, a permanent erosion control measure has been proposed for the stream bank, which is pending NYSDEC review. The NYSDEC's fish study concluded that a fish advisory associated with mercury is not necessary, thereby also indicating that, to the extent mercury is present in sediments, it is not propagating through the food chain at levels of concern.

In conclusion, the transport mechanism for mercury to sediment is related to the erosion of calcium sulfate (see prior discussion concerning the general absence of dissolved phase mercury transport). Further study is not required to determine that the appropriate remedial action is to implement permanent erosion control measures.

8.6 Soil Vapor

The vapor intrusion pathway is not of concern under current conditions since the buildings are unoccupied. Groundwater quality within the overburden sand and gravel aquifer is well characterized as part of the groundwater monitoring program. It is anticipated that institutional controls will be a remedial component and will require that future development either incorporate vapor mitigation measures or include a vapor intrusion evaluation for Site-related COCs specific to future structure locations. No further investigation of soil vapor is necessary to support the evaluation of remedial options for the Site.

8.7 Off-Site Soil

The results of off-site soil samples collected on the Avon parcel and Village of Harriman property indicate non-detect for PCB Aroclors and mercury concentrations well below the Commercial and Industrial SCOs. On the Village of Harriman property, two of the borings contained mercury in the shallower samples above the unrestricted standard of 0.18 mg/kg. These results do not necessarily indicate impact by former Site operations, and deeper samples from these locations were below the unrestricted mercury standard. The results demonstrate no significant impact attributable to air deposition or stormwater runoff from the Site.

Despite diligent efforts, ELT Harriman was unable to secure access to other perimeter locations, including properties across the Ramapo River and the property located on the other side of the railroad. ELT Harriman will complete the scope of the Supplemental RFI Work Plan provided that access can be obtained with the assistance of the NYSDEC.

8.8 Source Areas

Based upon the previously implemented remedial actions, and the extensive number of soil borings, geoprobe borings and soil gas points completed throughout the main plant area, there is no evidence of any remaining discrete areas of contamination that meet the definition of a source area as defined in DER-10 and Part 375. Given the extensive amount of investigation that has been completed, no further investigation of source areas is necessary or recommended relative to site soils and groundwater.

The calcium sulfate material would meet the definition of a source material with respect to exposure and subsequent transport in surface water if it were not controlled. Therefore, no further study is needed or recommended as sufficient information exists to evaluate remedial options.

8.9 On-Site Surface Water System

Samples of lagoon solids collected during the RFI indicate that the solids contain low levels of PAHs and metals. Surface water samples have been collected from the lagoon to comply with the SPDES Permit and have consistently demonstrated compliance with the permit limits. Based on the available data, there is no indication that the lagoon or subsurface soils beneath the lagoon are impacting groundwater. Additional soil sampling within or beneath the lagoon is not necessary to support the evaluation of remedial options. If on-site consolidation is recommended, then the appropriateness of using the lagoon (based on volume to be consolidated) would be evaluated. If the lagoon appears to be an appropriate consolidation location, then sampling may be conducted as part of a future design activity.

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Tables

TABLE 1-1
SITE CHRONOLOGY
NEPERA-HARRIMAN SITE

Year	Month	CERCLA Activities	RCRA Activities	SPDES Activities	Description
1942					Nepera plant begins operations. Operated by Pyridium Corporation. Manufactures bulk and fine pharmaceutical chemicals, hydrogels, and pyridine-based chemical intermediates.
1942					Begin spreading of solidified process wastes (neutralized with lime) in location of present-day parking lot.
1945	September				Incineration of waste products in burn pits commences.
1947-1948					Land spreading of solidified process wastes ceases.
1953					On-site disposal of calcium sulfate sludge ceases.
1956					Pyridium Corporation and its affiliate, Nepera Chemical Company, purchased by Warner-Lambert Company. Nepera, Inc. formed as a wholly owned subsidiary in 1957 of Warner-Lambert Company.
1957	May				Incineration of waste products in burn pits ceases.
Mid 1960s					Wastewater lagoon constructed.
1976					In 1976, Nepera, Inc. becomes a wholly owned subsidiary of Schering, A.G. of Berlin, Germany.
Mid 1980s					Buried drums removed from areas near Buildings 67 and 75 and southern boundary of Site.
1986					Schering, A.G. sells Nepera to Cambrex.
1986	March	X			Plant Wide Hydrogeologic Investigation report issued.
1988	March	X			Nepera, Inc. and Warner Lambert enter into Stipulation Agreement with NYSDEC.
1989	July	X			Phase I Hydrogeologic Investigation/Interim Remedial Measures report issued.
1990	July	X			NYSDEC conditionally approves RI/FS Work Plan.
1990		X			IRM groundwater extraction system installed and begins operating.
1991	March	X			Revised RI/FS Work Plan Addendum and QAPP submitted to NYSDEC.
1991	April	X			Commence RI field investigations.
1992	June	X			RI field investigations completed.
1992	July	X			RI Report submitted to NYSDEC.
1994	April	X			NYSDEC provides comments on RI Report.
1994	November	X			Feasibility Study (FS) Report submitted to NYSDEC. (NYSDEC did not review the report and requested submission of a Phase I FS report.)
1994	December	X			NYSDEC provides additional comments on RI Report.
1995	1st half	X			Additional RI activities performed.

TABLE 1-1
SITE CHRONOLOGY
NEPERA-HARRIMAN SITE

Year	Month	CERCLA Activities	RCRA Activities	SPDES Activities	Description
1995	June	X			Phase I FS Report submitted to NYSDEC. (NYSDEC provided comments that were incorporated into a revised FS report.)
1995	July	X			Revised RI Report submitted to NYSDEC.
1995	September	X			NYSDEC provides comments on revised RI Report. Response to comments submitted to NYSDEC.
1995	September	X			Revised FS Report submitted to NYSDEC.
1995	November	X			Final RI Report submitted to NYSDEC.
1995	November	X			NYSDEC provides comments on revised FS Report.
1995	November	X			NYSDEC conducts surface water sampling in West Branch of Ramapo River.
1996	January	X			FS Report Addendum submitted to NYSDEC.
1997	March	X			NYSDEC issues Record of Decision (ROD).
1998	May	X			Trust enters into Consent Decree to implement the remedy selected in the ROD.
1999	July		X		Part 373 Hazardous Waste Management Permit issued to Nepera Inc. Permit subsequently transferred to Rutherford Chemicals, LLC.
1999		X			Additional sentry wells installed to complete array of down-gradient monitoring; additional wells installed in vicinity of Building 53.
1999-2001		X			Drum and contaminated soil removal from Area F and Building 53 performed. Excavation Summary Report submitted to NYSDEC in March 2001.
2001		X			Sediment excavation from Area K completed.
2001		X			Soil vapor extraction tested and found to be ineffective. SVE/VER Test Report submitted to NYSDEC.
2001-2002		X			Building 13 seep investigation and IRM completed. Building 13 Seep Investigation Report submitted to NYSDEC in October 2002.
2001-2005				X	Pollutant Minimization Plan developed and implemented under SPDES permit to identify/conrol plant sources of mercury.
2001	June/July	X			NYSDEC conducts a fish study for West Branch of Ramapo River and issues a fact sheet.
2002		X			Groundwater remediation by biosparging commences.
2002-2005		X			Activities performed performed in MW-1S area. MW-1 Groundwater Evaluation Work Plan developed and implemented. Biosparge system installed and operated for two years. MW-1 Groundwater Evaluation Report submitted to NYSDEC in February 2004.
2003	November				Nepera, Inc. purchased by Rutherford Chemicals, LLC.
2004	September	X			Groundwater extraction wells taken off line.
2005	May	X			Riverbank Capping Work Plan submitted to NYSDEC.
2005	May				All manufacturing operations ceased.

TABLE 1-1
SITE CHRONOLOGY
NEPERA-HARRIMAN SITE

Year	Month	CERCLA Activities	RCRA Activities	SPDES Activities	Description
2005	May	X			Erosion control IRM implemented along the stream bank.
2005	July		X		Equipment shutdown, cleanout and decontamination begun.
2005	August		X		Incinerator shut down.
2005	September		X		NYSDEC issues Documentation of Environmental Indicator Determination; concludes current human exposures are under control.
2005	September				Last product shipped off site.
2005	November	X			Conceptual Plan for Riverbank Stabilization submitted to NYSDEC.
2005			X		Above-ground portions of all TSD units closed pursuant to permit and approved RCRA Closure Plan
2006	May		X		NYSDEC requires Rutherford Chemicals to prepare RFI Work Plan.
2006	August		X		Draft RFI Work Plan submitted to NYSDEC.
2006	October		X		Equipment shutdown, cleanout and deontamination completed.
2006	October		X		NYSDEC conditional approval of RFI Work Plan. RFI field investigation begun.
2006	November		X		Final RFI Work Plan submitted to NYSDEC.
2007	January		X		RFI field activities completed.
2007	April		X		RFI Report submitted to NYSDEC.
2007	April	X			Stream bank IRM repaired and enhanced following a flooding event that caused minor damage.
2007	July		X		NYSDEC comments on RFI Report; requires Phase II RFI Work Plan and CMS Plan.
2007	October		X		Addendum to RFI Report submitted to NYSDEC.
2007	November		X		Phase II RFI Work Plan, CMS Plan and Task I Report submitted to NYSDEC.
2007	November				ELT Harriman, LLC purchases the site.
2007	December			X	ELT Harriman submits application for transfer of existing SPDES permit.
2008	February		X		NYSDEC approves Phase II RFI Work Plan.
2008	May	X			Conceptual Site Model and Supplemental Remedial Action Work Plan submitted to NYSDEC.
2008	August		X		Phase II (Supplemental) RFI Technical Memo submitted to NYSDEC.
2008	September	X			Biosprage system taken off line.
2008	September		X		NYSDEC comments on CMS Plan and Task I Report. States that parking lot must be included in CMS.
2008-present		X			Semiannual groundwater samplign and analysis performed at on-site monitoring wells in accordance with Supplemental Remedial Action Work Plan.
2009	February		X		NYSDEC letter re CMS scope and schedule clarifies that parking lot is not to be included in CMS, requests interim CMS Report by March 16, 2009 and CMS Report by April 30, 2009.

TABLE 1-1
SITE CHRONOLOGY
NEPERA-HARRIMAN SITE

Year	Month	CERCLA Activities	RCRA Activities	SPDES Activities	Description
2009	March		X		Interim CMS Report submitted to NYSDEC on March 16, 2009.
2009	May		X		NYSDEC comments on Interim CMS report; requires additional mercury speciation analysis.
2009	September		X		Supplemental Mercury Speciation Work Plan submitted to NYSDEC.
2009	November		X		NYSDEC comments on Supplemental Mercury Speciation Work Plan and requests a conference call to further discuss the issues.
2010	April	X			Parking Lot investigation completed and report submitted to NYSDEC.
2010	April			X	SPDES permit expires after DEC elects not to transfer the existing permit to ELT Harriman.
2010	June			X	Closure Plan submitted to NYSDEC for SPDES Lagoon.
2010	August			X	ELT Harriman submits application for new SPDES permit.
2010	December	X	X		ELT/Trust meet with NYSDEC to provide site technical orientation and update.
2010	December	X	X		NYSDEC provides draft Scope of Work requiring additional investigation to address alleged data gaps.
2011	January	X	X		Response to draft Scope of Work submitted to NYSDEC.
2011	February	X	X		NYSDEC issues letter requesting submission of a Sitewide Characterization Summary Report within 30 days.

TABLE 4-1
SAMPLING AND ANALYSIS SUMMARY
NEPERA, A DIVISION OF RUTHERFORD CHEMICALS, LLC
HARRIMAN, NEW YORK

Location	Sample ID	Rationale (see notes)	Sample Depths (see notes)	Analytes
INACCESSIBLE SWMUs				
Area A	01-B-001	1	A	VOC, SVOC, Metals, Ammonia, PCBs
	01-B-002	1	A	VOC, SVOC, Metals, Ammonia, PCBs
	02-B-001	1	A	VOC, SVOC, Metals, Ammonia, PCBs
	02-B-002	1	A	VOC, SVOC, Metals, Ammonia, PCBs
	03-B-001	1	A	VOC, SVOC, Metals, Ammonia, PCBs
	04-B-001	1	A	VOC, SVOC, Metals, Ammonia, PCBs
	04-B-002	1	A	VOC, SVOC, Metals, Ammonia, PCBs
	05-B-001	1	A	VOC, SVOC, Metals, Ammonia, PCBs
	08-B-001	1	A	VOC, SVOC, Metals, Ammonia, PCBs
	09-B-001	1	A	VOC, SVOC, Metals, Ammonia, PCBs
	10-B-001	1	A	VOC, SVOC, Metals, Ammonia, PCBs
	12-B-001	1	A	VOC, SVOC, Metals, Ammonia, PCBs
	13-B-001	1	A	VOC, SVOC, Metals, Ammonia, PCBs
	13-B-002	1	A	VOC, SVOC, Metals, Ammonia, PCBs
	14-B-001	1	A	VOC, SVOC, Metals, Ammonia, PCBs
	15-B-001	1	A	VOC, SVOC, Metals, Ammonia, PCBs
	19-B-001	1	A	VOC, SVOC, Metals, Ammonia, PCBs
	20-B-001	1	A	VOC, SVOC, Metals, Ammonia, PCBs
	22-B-001	1	A	VOC, SVOC, Metals, Ammonia, PCBs
	23-B-001	1	A	VOC, SVOC, Metals, Ammonia, PCBs
	24-B-001	1	A	VOC, SVOC, Metals, Ammonia, PCBs
	25-B-001	1	A	VOC, SVOC, Metals, Ammonia, PCBs
	26-B-001	1	A	VOC, SVOC, Metals, Ammonia, PCBs
	27-B-001	1	A	VOC, SVOC, Metals, Ammonia, PCBs
	28-B-001	1	A	VOC, SVOC, Metals, Ammonia, PCBs
	28-B-002	1	A	VOC, SVOC, Metals, Ammonia, PCBs
	29A-B-001	1	A	VOC, SVOC, Metals, Ammonia, PCBs
	29-B-001	1	A	VOC, SVOC, Metals, Ammonia, PCBs
	29-B-002	1	A	VOC, SVOC, Metals, Ammonia, PCBs
	29-B-003	1	A	VOC, SVOC, Metals, Ammonia, PCBs
	31-B-001	1	A	VOC, SVOC, Metals, Ammonia, PCBs
	33-B-001	1	A	VOC, SVOC, Metals, Ammonia, PCBs
	34-B-001	1	A	VOC, SVOC, Metals, Ammonia, PCBs
	35-B-001	1	A	VOC, SVOC, Metals, Ammonia, PCBs
	37-B-001	1	A	VOC, SVOC, Metals, Ammonia, PCBs
	40-B-001	1	A	VOC, SVOC, Metals, Ammonia, PCBs
	44-B-001	1	A	VOC, SVOC, Metals, Ammonia, PCBs
	45-B-001	1	A	VOC, SVOC, Metals, Ammonia, PCBs
	49-B-001	1	A	VOC, SVOC, Metals, Ammonia, PCBs
	50-B-001	1	A	VOC, SVOC, Metals, Ammonia, PCBs
	51-B-001	1	A	VOC, SVOC, Metals, Ammonia, PCBs
	52-B-001	1	A	VOC, SVOC, Metals, Ammonia, PCBs
	57-B-001	1	A	VOC, SVOC, Metals, Ammonia, PCBs
	58-B-001	1	A	VOC, SVOC, Metals, Ammonia, PCBs
	60-B-001	1	A	VOC, SVOC, Metals, Ammonia, PCBs
	62-B-001	1	A	VOC, SVOC, Metals, Ammonia, PCBs
	70-B-001	1	A	VOC, SVOC, Metals, Ammonia, PCBs
	71-B-001	1	A	VOC, SVOC, Metals, Ammonia, PCBs

TABLE 4-1
SAMPLING AND ANALYSIS SUMMARY
NEPERA, A DIVISION OF RUTHERFORD CHEMICALS, LLC
HARRIMAN, NEW YORK

Location	Sample ID	Rationale (see notes)	Sample Depths (see notes)	Analytes
	74-B-001	1	A	VOC, SVOC, Metals, Ammonia, PCBs
	76-B-001	1	A	VOC, SVOC, Metals, Ammonia, PCBs
	80-B-001	1	A	VOC, SVOC, Metals, Ammonia, PCBs
	81-B-001	1	A	VOC, SVOC, Metals, Ammonia, PCBs
Area B	38-B-001	1	A	VOC, SVOC, Metals, Ammonia, PCBs
Area E	73-B-001	1	A	VOC, SVOC, Metals, Ammonia, PCBs
Area G	46-B-001	1	A	VOC, SVOC, Metals, Ammonia, PCBs
	56-B-001	1	A	VOC, SVOC, Metals, Ammonia, PCBs
	59-B-001	1	A	VOC, SVOC, Metals, Ammonia, PCBs
	67-B-001	1	A	VOC, SVOC, Metals, Ammonia, PCBs
	67-B-002	1	A	VOC, SVOC, Metals, Ammonia, PCBs
	75-B-001	1	A	VOC, SVOC, Metals, Ammonia, PCBs
	75-B-002	1	A	VOC, SVOC, Metals, Ammonia, PCBs
Area H	63-B-001	1	A	VOC, SVOC, Metals, Ammonia, PCBs
	64-B-001	1	A	VOC, SVOC, Metals, Ammonia, PCBs
	66-B-001	1	A	VOC, SVOC, Metals, Ammonia, PCBs
Area I	32N-B-001	1	A	VOC, SVOC, Metals, Ammonia, PCBs
	32S-B-001	1	A	VOC, SVOC, Metals, Ammonia, PCBs
	48-B-001	1	A	VOC, SVOC, Metals, Ammonia, PCBs
	54-B-001	1	A	VOC, SVOC, Metals, Ammonia, PCBs
	55-B-001	1	A	VOC, SVOC, Metals, Ammonia, PCBs
<u>TSD UNITS</u>				
Area A	11-B-001	2	A	VOC, SVOC, Metals, Ammonia, PCBs
	11-B-002	2	A	VOC, SVOC, Metals, Ammonia, PCBs
	11-B-003	2	A	VOC, SVOC, Metals, Ammonia, PCBs
	18-B-001	2	A	VOC, SVOC, Metals, Ammonia, PCBs
	18-B-002	2	A	VOC, SVOC, Metals, Ammonia, PCBs
	61-B-001	2	A	VOC, SVOC, Metals, Ammonia, PCBs
	61-B-002	2	A	VOC, SVOC, Metals, Ammonia, PCBs
	61-B-003	2	A	VOC, SVOC, Metals, Ammonia, PCBs
	61-B-004	2	A	VOC, SVOC, Metals, Ammonia, PCBs
	CSA-1-B-001	2	A	VOC, SVOC, Metals, Ammonia, PCBs
	CSA-1-B-002	2	A	VOC, SVOC, Metals, Ammonia, PCBs
	CSA-1-B-003	2	A	VOC, SVOC, Metals, Ammonia, PCBs
	CSA-1-B-004	2	A	VOC, SVOC, Metals, Ammonia, PCBs
	CSA-2-B-001	2	A	VOC, SVOC, Metals, Ammonia, PCBs
<u>SEWERS</u>				
Area A	A-B-101	3	B	VOC, SVOC, Metals, Ammonia, PCBs
	A-B-102	3	B	VOC, SVOC, Metals, Ammonia, PCBs
	A-B-103	3	B	VOC, SVOC, Metals, Ammonia, PCBs
	A-B-104	3	B	VOC, SVOC, Metals, Ammonia, PCBs
	A-B-105	3	B	VOC, SVOC, Metals, Ammonia, PCBs

TABLE 4-1
SAMPLING AND ANALYSIS SUMMARY
NEPERA, A DIVISION OF RUTHERFORD CHEMICALS, LLC
HARRIMAN, NEW YORK

Location	Sample ID	Rationale (see notes)	Sample Depths (see notes)	Analytes
	A-B-106	3	B	VOC, SVOC, Metals, Ammonia, PCBs
	A-B-107	3	B	VOC, SVOC, Metals, Ammonia, PCBs
	A-B-108	3	B	VOC, SVOC, Metals, Ammonia, PCBs
	A-B-109	3	B	VOC, SVOC, Metals, Ammonia, PCBs
	A-B-110	3	B	VOC, SVOC, Metals, Ammonia, PCBs
	A-B-111	3	B	VOC, SVOC, Metals, Ammonia, PCBs
	A-B-112	3	B	VOC, SVOC, Metals, Ammonia, PCBs
	A-B-113	3	B	VOC, SVOC, Metals, Ammonia, PCBs
	A-B-114	3	B	VOC, SVOC, Metals, Ammonia, PCBs
	A-B-115	3	B	VOC, SVOC, Metals, Ammonia, PCBs
	A-B-116	3	B	VOC, SVOC, Metals, Ammonia, PCBs
	A-B-117	3	B	VOC, SVOC, Metals, Ammonia, PCBs
	A-B-118	3	B	VOC, SVOC, Metals, Ammonia, PCBs
	A-B-119	3	B	VOC, SVOC, Metals, Ammonia, PCBs
	A-B-120	3	B	VOC, SVOC, Metals, Ammonia, PCBs
	A-B-121	3	B	VOC, SVOC, Metals, Ammonia, PCBs
	A-B-122	3	B	VOC, SVOC, Metals, Ammonia, PCBs
	A-B-123	3	B	VOC, SVOC, Metals, Ammonia, PCBs
	A-B-124	3	B	VOC, SVOC, Metals, Ammonia, PCBs
Area B	B-B-101	3	B	VOC, SVOC, Metals, Ammonia, PCBs
	B-B-102	3	B	VOC, SVOC, Metals, Ammonia, PCBs
	B-B-103	3	B	VOC, SVOC, Metals, Ammonia, PCBs
	B-B-104	3	B	VOC, SVOC, Metals, Ammonia, PCBs
		3	B	VOC, SVOC, Metals, Ammonia, PCBs
Area C	C-B-101	3	B	VOC, SVOC, Metals, Ammonia, PCBs
	C-B-102	3	B	VOC, SVOC, Metals, Ammonia, PCBs
	C-B-103	3	B	VOC, SVOC, Metals, Ammonia, PCBs
Area D	D-B-101	3	B	VOC, SVOC, Metals, Ammonia, PCBs
	D-B-102	3	B	VOC, SVOC, Metals, Ammonia, PCBs
Area E	E-B-101	3	B	VOC, SVOC, Metals, Ammonia, PCBs
Area F	F-B-101	3	B	VOC, SVOC, Metals, Ammonia, PCBs
	F-B-102	3	B	VOC, SVOC, Metals, Ammonia, PCBs
Area G	G-B-101	3	B	VOC, SVOC, Metals, Ammonia, PCBs
	G-B-102	3	B	VOC, SVOC, Metals, Ammonia, PCBs
	G-B-103	3	B	VOC, SVOC, Metals, Ammonia, PCBs
	G-B-104	3	B	VOC, SVOC, Metals, Ammonia, PCBs
Area H	H-B-101	3	B	VOC, SVOC, Metals, Ammonia, PCBs
	H-B-102	3	B	VOC, SVOC, Metals, Ammonia, PCBs

TABLE 4-1
SAMPLING AND ANALYSIS SUMMARY
NEPERA, A DIVISION OF RUTHERFORD CHEMICALS, LLC
HARRIMAN, NEW YORK

Location	Sample ID	Rationale (see notes)	Sample Depths (see notes)	Analytes
LAGOON				
Area C	C-SD-001	4	C	VOC, SVOC, Metals, Ammonia, PCBs, RCRA Characteristics
	C-SD-002	4	C	VOC, SVOC, Metals, Ammonia, PCBs, RCRA Characteristics
	C-SD-003	4	C	VOC, SVOC, Metals, Ammonia, PCBs, RCRA Characteristics
	C-SD-004	4	C	VOC, SVOC, Metals, Ammonia, PCBs, RCRA Characteristics
	C-SD-005	4	C	VOC, SVOC, Metals, Ammonia, PCBs, RCRA Characteristics
OTHER AREAS				
Area A	A-B-001	5	D	VOC, SVOC, Metals, Ammonia, PCBs
	A-B-002	5	D	VOC, SVOC, Metals, Ammonia, PCBs
	A-B-003	6	D	VOC, SVOC, Metals, Ammonia, PCBs
	A-B-004	7	D	VOC, SVOC, Metals, Ammonia, PCBs
	A-B-005	8	D	VOC, SVOC, Metals, Ammonia, PCBs
	A-B-006	9	D	VOC, SVOC, Metals, Ammonia, PCBs
	A-B-007	10	D	VOC, SVOC, Metals, Ammonia, PCBs
	A-B-008	10	D	VOC, SVOC, Metals, Ammonia, PCBs
	A-B-009	10	D	VOC, SVOC, Metals, Ammonia, PCBs
	A-B-010	10	D	VOC, SVOC, Metals, Ammonia, PCBs
	A-B-011	10	D	VOC, SVOC, Metals, Ammonia, PCBs
	A-B-012	11	D	VOC, SVOC, Metals, Ammonia, PCBs
	A-B-013	11	D	VOC, SVOC, Metals, Ammonia, PCBs
	A-B-014	12	D	VOC, SVOC, Metals, Ammonia, PCBs
	A-B-015	13	D	VOC, SVOC, Metals, Ammonia, PCBs
	A-B-016	7	D	VOC, SVOC, Metals, Ammonia, PCBs
	A-B-017	7	D	VOC, SVOC, Metals, Ammonia, PCBs
	A-B-018	8	D	VOC, SVOC, Metals, Ammonia, PCBs
	A-B-019	8	D	VOC, SVOC, Metals, Ammonia, PCBs
	A-B-020	8	D	VOC, SVOC, Metals, Ammonia, PCBs
	A-B-021	14	D	VOC, SVOC, Metals, Ammonia, PCBs
	A-B-022	7	D	VOC, SVOC, Metals, Ammonia, PCBs
	A-B-023	7	D	VOC, SVOC, Metals, Ammonia, PCBs
	A-B-024	15	D	VOC, SVOC, Metals, Ammonia, PCBs
	A-B-025	7	D	VOC, SVOC, Metals, Ammonia, PCBs
	A-B-026	7	D	VOC, SVOC, Metals, Ammonia, PCBs
	A-B-027	7	D	VOC, SVOC, Metals, Ammonia, PCBs
	A-B-028	7	D	VOC, SVOC, Metals, Ammonia, PCBs
	A-B-029	6	D	VOC, SVOC, Metals, Ammonia, PCBs
	A-B-030	18	D	VOC, SVOC, Metals, Ammonia, PCBs
	A-B-031	19	D	VOC, SVOC, Metals, Ammonia, PCBs
	A-B-032	19	D	VOC, SVOC, Metals, Ammonia, PCBs
	A-B-033	20	D	VOC, SVOC, Metals, Ammonia, PCBs
	A-B-034	18	D	VOC, SVOC, Metals, Ammonia, PCBs
	A-B-035	18	D	VOC, SVOC, Metals, Ammonia, PCBs
	A-B-036	18	D	VOC, SVOC, Metals, Ammonia, PCBs
	A-B-037	18	D	VOC, SVOC, Metals, Ammonia, PCBs
	A-B-038	22	D	VOC, SVOC, Metals, Ammonia, PCBs
	A-B-039	22	D	VOC, SVOC, Metals, Ammonia, PCBs
	A-B-040	22	D	VOC, SVOC, Metals, Ammonia, PCBs
	A-B-041	22	D	VOC, SVOC, Metals, Ammonia, PCBs

TABLE 4-1
SAMPLING AND ANALYSIS SUMMARY
NEPERA, A DIVISION OF RUTHERFORD CHEMICALS, LLC
HARRIMAN, NEW YORK

Location	Sample ID	Rationale (see notes)	Sample Depths (see notes)	Analytes
Area C	C-B-001	7	D	VOC, SVOC, Metals, Ammonia, PCBs
	C-B-002	7	D	VOC, SVOC, Metals, Ammonia, PCBs
	C-B-003	7	D	VOC, SVOC, Metals, Ammonia, PCBs
	C-B-004	7	D	VOC, SVOC, Metals, Ammonia, PCBs
	C-B-005	7	D	VOC, SVOC, Metals, Ammonia, PCBs
Area D	D-B-001	7	D	VOC, SVOC, Metals, Ammonia, PCBs
	D-B-002	7	D	VOC, SVOC, Metals, Ammonia, PCBs
	D-B-003	7	D	VOC, SVOC, Metals, Ammonia, PCBs
Area E	E-B-001	7	D	VOC, SVOC, Metals, Ammonia, PCBs
	E-B-002	7	D	VOC, SVOC, Metals, Ammonia, PCBs
	E-B-003	7	D	VOC, SVOC, Metals, Ammonia, PCBs
	E-B-004	7	D	VOC, SVOC, Metals, Ammonia, PCBs
	E-B-005	7	D	VOC, SVOC, Metals, Ammonia, PCBs
Area F	F-B-001	16	D	VOC, SVOC, Metals, Ammonia, PCBs
	F-B-002	16	D	VOC, SVOC, Metals, Ammonia, PCBs
	F-B-003	16	D	VOC, SVOC, Metals, Ammonia, PCBs
	F-B-004	7	D	VOC, SVOC, Metals, Ammonia, PCBs
	F-B-005	7	D	VOC, SVOC, Metals, Ammonia, PCBs
	F-B-006	7	D	VOC, SVOC, Metals, Ammonia, PCBs
	F-B-007	7	D	VOC, SVOC, Metals, Ammonia, PCBs
Area G	G-B-001	17	D	VOC, SVOC, Metals, Ammonia, PCBs
	G-B-002	7	D	VOC, SVOC, Metals, Ammonia, PCBs
	G-B-003	7	D	VOC, SVOC, Metals, Ammonia, PCBs
	G-B-004	7	D	VOC, SVOC, Metals, Ammonia, PCBs
	G-B-005	7	D	VOC, SVOC, Metals, Ammonia, PCBs
	G-B-006	7	D	VOC, SVOC, Metals, Ammonia, PCBs
	G-B-007	7	D	VOC, SVOC, Metals, Ammonia, PCBs
	G-B-008	7	D	VOC, SVOC, Metals, Ammonia, PCBs
	G-B-009	7	D	VOC, SVOC, Metals, Ammonia, PCBs
	G-B-010	7	D	VOC, SVOC, Metals, Ammonia, PCBs
	G-B-011	21	D	VOC, SVOC, Metals, Ammonia, PCBs
	G-B-012	21	D	VOC, SVOC, Metals, Ammonia, PCBs
Area H	H-B-001	7	D	VOC, SVOC, Metals, Ammonia, PCBs
	H-B-002	7	D	VOC, SVOC, Metals, Ammonia, PCBs
	H-B-003	7	D	VOC, SVOC, Metals, Ammonia, PCBs
	H-B-004	16	D	VOC, SVOC, Metals, Ammonia, PCBs
	H-B-005	21	D	VOC, SVOC, Metals, Ammonia, PCBs
Area I	I-B-001	11	D	VOC, SVOC, Metals, Ammonia, PCBs
	I-B-002	11	D	VOC, SVOC, Metals, Ammonia, PCBs
	I-B-003	17	D	VOC, SVOC, Metals, Ammonia, PCBs
	I-B-004	17	D	VOC, SVOC, Metals, Ammonia, PCBs

TABLE 4-1
SAMPLING AND ANALYSIS SUMMARY
NEPERA, A DIVISION OF RUTHERFORD CHEMICALS, LLC
HARRIMAN, NEW YORK

Location	Sample ID	Rationale (see notes)	Sample Depths (see notes)	Analytes

NOTES - RATIONALE:
1 - Inaccessible SWMU listed in RCRA Permit. Sampling required pursuant to RCRA Permit.
2 - RCRA TSD Unit undergoing closure. Sampling required pursuant to RCRA Permit. Note, technically, tanks T-105, T-911, T-936, T-937 and T-939 are 90-day storage units and not TSDs.
3 - Sewers identified as a SWMU in RCRA Permit. No prior sampling performed.
4 - Lagoon identified as a SWMU in RCRA Permit. Sampling for characterization of sediments prior to closure.
5 - Upgradient/background location.
6 - AST formerly located in this area.
7 - Aerial photographs indicated areas used to store or dispose of drums, as well as areas where use, topography or drainage features suggest the potential for contaminant accumulation.
8 - Possible historic mercury catalyst spill in this area.
9 - Former truck loading area.
10 - Former railroad car loading and unloading areas.
11 - Location of historical benzene spill.
12 - Former (pre-1980) process pad for cyano-pyridine manufacture.
13 - Location of former UST.
14 - Former pyridium storage area.
15 - Location of former (pre-1970) pyridium manufacuring.
16 - Location of drum fragments, stained soil, odors.
17 - Former location of above ground tank farm.
18 - Location of historic lutidine spill.
19 - Soil berm of unknown origin.
20 - Location of historic pyridine spill.
21 - Former drum washing and storage area.
22 - Location of historic pyridine residue whole (PRW) spill.

NOTES - SAMPLE DEPTHS:
A - Areas covered by concrete pad/slab or asphalt pavement - Two samples will be collected per location (where feasible). Sample will be collected from 0-1 ft below the slab, pad, pavement or sub-base material (when present) and when a change in lithology is observed or immediately above the water table.
B - Samples along sewer lines - One sample will be collected at each location. If the sewer line is above the water table, the sample will be collected at the pipe invert elevation. If the pipe is submerged, the sample will be collected immediately above the water table.
C - Lagoon Samples - A sediment sample will be collected from each 1 vertical foot of accumulated sediment. Up to 3 samples will be composited across selected vertical intervals.
D - Samples in other unpaved/uncovered areas - Three samples will be collected at each location (where feasible). Sample depths will be 0-1 ft bgs, 1-2 ft bgs, and when a change in lithology is observed or immediately above the water table. If any of these locations are paved, the procedures outlined in Note A will be applied.
General Note - A tiered analysis may be applied where feasible. In these cases, deeper samples will be analyzed for those analytes that were detected at elevated concentrations in shallower samples.

NOTES - ANALYTES:
- VOCs to be analyzed by Method 8260B.
- SVOCs to be analyzed by Method 8270C and to include pyridine and alpha-picoline.
- Metals to be analyzed by Method 7000/7471A/6020 and to include lead and total mercury.
- Methyl-mercury to be analyzed by Method 1630M.
- PCBs to be analyzed by Method 8082.
- Ammonia to be analyzed by MCAW 350.2M.
- RCRA Characteristics to be analyzed by SW-846 Methods and include ignitability, corrosivity, reactivity and full TCLP. Samples will be composited across selected vertical intervals.
- Mercury Speciation will be performed from select samples.

TABLE 4-1A

SUMMARY FOR VOLATILE ORGANIC COMPOUNDS IN SOIL EXCEEDING SUBPART 375.6[a] VALUES

FORMER NEPERA PLANT SITE, HARRIMAN, NY

Constituent	Depth Interval (ft)	Number of Samples	Number Detects	Detection Frequency	Maximum Result (mg/kg)	Minimum Result (mg/kg)	Average Result (mg/kg)	Geometric Mean (mg/kg)
1,2-Dichlorobenzene	0-2	150	1	1%	0.22	0.01	0.02	0.01
1,2-Dichlorobenzene	>2	201	3	1%	0.62	0.01	0.04	0.01
1,3-Dichlorobenzene	0-2	150	1	1%	0.36	0.01	0.02	0.01
1,3-Dichlorobenzene	>2	201	2	1%	0.62	0.01	0.04	0.01
1,4-Dichlorobenzene	0-2	150	1	1%	0.57	0.01	0.02	0.01
1,4-Dichlorobenzene	>2	201	2	1%	0.62	0.01	0.04	0.01
2-Butanone	0-2	150	2	1%	0.22	0.01	0.02	0.01
2-Butanone	>2	201	1	0%	0.62	0.01	0.04	0.01
Acetone	0-2	150	18	12%	68.10	0.01	0.54	0.02
Acetone	>2	201	45	22%	4.16	0.01	0.28	0.04
Benzene	0-2	150	24	16%	33.50	0.00	0.64	0.01
Benzene	>2	201	58	29%	780.00	0.00	9.18	0.02
Chlorobenzene	0-2	150	6	4%	5.00	0.00	0.05	0.01
Chlorobenzene	>2	201	12	6%	1.46	0.01	0.06	0.01
Ethylbenzene	0-2	150	13	9%	0.56	0.01	0.03	0.01
Ethylbenzene	>2	201	28	14%	23.50	0.00	0.20	0.01
Methylene Chloride	0-2	150	1	1%	0.22	0.01	0.02	0.01
Methylene Chloride	>2	201	3	1%	0.62	0.01	0.04	0.01
Tetrachloroethylene	0-2	150	2	1%	0.22	0.01	0.02	0.01
Tetrachloroethylene	>2	201	4	2%	0.62	0.01	0.04	0.01
Toluene	0-2	150	13	9%	16.20	0.01	0.26	0.01
Toluene	>2	201	26	13%	452.00	0.01	3.24	0.02
Trans-1,2-Dichloroethene	0-2	150	0	0%	0.22	0.01	0.02	0.01
Trans-1,2-Dichloroethene	>2	201	2	1%	0.62	0.01	0.04	0.01
Trichloroethene	0-2	150	1	1%	0.75	0.01	0.02	0.01
Trichloroethene	>2	201	2	1%	10.40	0.01	0.09	0.01

TABLE 4-1A

SUMMARY FOR VOLATILE ORGANIC COMPOUNDS IN SOIL EXCEEDING SUBPART 375.6[a] VALUES

FORMER NEPERA PLANT SITE, HARRIMAN, NY

Constituent	Depth Interval (ft)	Number of Samples	Number Detects	Detection Frequency	Maximum Result (mg/kg)	Minimum Result (mg/kg)	Average Result (mg/kg)	Geometric Mean (mg/kg)
Vinyl Chloride	0-2	150	0	0%	0.22	0.01	0.02	0.01
Vinyl Chloride	>2	201	2	1%	0.84	0.01	0.04	0.01
Xylenes	0-2	150	16	11%	4.94	0.01	0.14	0.01
Xylenes	>2	201	33	16%	174.00	0.00	1.48	0.02

TABLE 4-1A

SUMMARY FOR VOLATILE ORGANIC COMPOUNDS IN SOIL EXCEEDING SUBPART 375.6[a] VALUES

FORMER NEPERA PLANT SITE, HARRIMAN, NY

Constituent	Depth Interval (ft)	Unrestricted (mg/kg)	Number Exceeding Unrestricted	Unrestricted Exceedance Frequency	Residential (mg/kg)	Number Exceeding Residential	Residential Exceedance Frequency	Restricted Residential (mg/kg)	Number Exceeding Restricted Residential	Restricted Residential Exceedance Frequency
1,2-Dichlorobenzene	0-2	1.1	0	0%	100	0	0%	100	0	0%
1,2-Dichlorobenzene	>2	1.1	0	0%	100	0	0%	100	0	0%
1,3-Dichlorobenzene	0-2	2.4	0	0%	17	0	0%	17	0	0%
1,3-Dichlorobenzene	>2	2.4	0	0%	17	0	0%	17	0	0%
1,4-Dichlorobenzene	0-2	1.8	0	0%	9.8	0	0%	13	0	0%
1,4-Dichlorobenzene	>2	1.8	0	0%	9.8	0	0%	13	0	0%
2-Butanone	0-2	0.12	0	0%	100	0	0%	100	0	0%
2-Butanone	>2	0.12	0	0%	100	0	0%	100	0	0%
Acetone	0-2	0.05	9	6%	100	0	0%	100	0	0%
Acetone	>2	0.05	30	15%	100	0	0%	100	0	0%
Benzene	0-2	0.06	15	10%	2.9	6	4%	4.8	5	3%
Benzene	>2	0.06	38	19%	2.9	8	4%	4.8	8	4%
Chlorobenzene	0-2	1.1	1	1%	100	0	0%	100	0	0%
Chlorobenzene	>2	1.1	2	1%	100	0	0%	100	0	0%
Ethylbenzene	0-2	1	0	0%	30	0	0%	41	0	0%
Ethylbenzene	>2	1	4	2%	30	0	0%	41	0	0%
Methylene Chloride	0-2	0.05	0	0%	51	0	0%	100	0	0%
Methylene Chloride	>2	0.05	1	<1%	51	0	0%	100	0	0%
Tetrachloroethylene	0-2	1.3	0	0%	5.5	0	0%	19	0	0%
Tetrachloroethylene	>2	1.3	0	0%	5.5	0	0%	19	0	0%
Toluene	0-2	0.7	4	3%	100	0	0%	100	0	0%
Toluene	>2	0.7	10	5%	100	2	1%	100	2	1%
Trans-1,2-Dichloroethene	0-2	0.19	0	0%	100	0	0%	100	0	0%
Trans-1,2-Dichloroethene	>2	0.19	0	0%	100	0	0%	100	0	0%
Trichloroethene	0-2	0.47	1	1%	10	0	0%	21	0	0%
Trichloroethene	>2	0.47	1	<1%	10	1	<1%	21	0	0%

TABLE 4-1A

SUMMARY FOR VOLATILE ORGANIC COMPOUNDS IN SOIL EXCEEDING SUBPART 375.6[a] VALUES

FORMER NEPERA PLANT SITE, HARRIMAN, NY

Constituent	Depth Interval (ft)	Unrestricted (mg/kg)	Number Exceeding Unrestricted	Unrestricted Exceedance Frequency	Residential (mg/kg)	Number Exceeding Residential	Residential Exceedance Frequency	Restricted Residential (mg/kg)	Number Exceeding Restricted Residential	Restricted Residential Exceedance Frequency
Vinyl Chloride	0-2	0.02	0	0%	0.21	0	0%	0.9	0	0%
Vinyl Chloride	>2	0.02	1	<1%	0.21	1	<1%	0.9	0	0%
Xylenes	0-2	0.26	10	7%	100	0	0%	100	0	0%
Xylenes	>2	0.26	20	10%	100	1	<1%	100	1	<1%

TABLE 4-1A

SUMMARY FOR VOLATILE ORGANIC COMPOUNDS IN SOIL EXCEEDING SUBPART 375.6[a] VALUES

FORMER NEPERA PLANT SITE, HARRIMAN, NY

Constituent	Depth Interval (ft)	Commercial (mg/kg)	Number Exceeding Commercial	Commercial Exceedance Frequency	Industrial (mg/kg)	Number Exceeding Industrial	Industrial Exceedance Frequency
1,2-Dichlorobenzene	0-2	500	0	0%	1000	0	0%
1,2-Dichlorobenzene	>2	500	0	0%	1000	0	0%
1,3-Dichlorobenzene	0-2	280	0	0%	560	0	0%
1,3-Dichlorobenzene	>2	280	0	0%	560	0	0%
1,4-Dichlorobenzene	0-2	130	0	0%	250	0	0%
1,4-Dichlorobenzene	>2	130	0	0%	250	0	0%
2-Butanone	0-2	500	0	0%	1000	0	0%
2-Butanone	>2	500	0	0%	1000	0	0%
Acetone	0-2	500	0	0%	1000	0	0%
Acetone	>2	500	0	0%	1000	0	0%
Benzene	0-2	44	0	0%	89	0	0%
Benzene	>2	44	6	3%	89	4	2%
Chlorobenzene	0-2	500	0	0%	1000	0	0%
Chlorobenzene	>2	500	0	0%	1000	0	0%
Ethylbenzene	0-2	390	0	0%	780	0	0%
Ethylbenzene	>2	390	0	0%	780	0	0%
Methylene Chloride	0-2	500	0	0%	1000	0	0%
Methylene Chloride	>2	500	0	0%	1000	0	0%
Tetrachloroethylene	0-2	150	0	0%	300	0	0%
Tetrachloroethylene	>2	150	0	0%	300	0	0%
Toluene	0-2	500	0	0%	1000	0	0%
Toluene	>2	500	0	0%	1000	0	0%
Trans-1,2-Dichloroethene	0-2	500	0	0%	1000	0	0%
Trans-1,2-Dichloroethene	>2	500	0	0%	1000	0	0%
Trichloroethene	0-2	200	0	0%	400	0	0%
Trichloroethene	>2	200	0	0%	400	0	0%

TABLE 4-1A
SUMMARY FOR VOLATILE ORGANIC COMPOUNDS IN SOIL EXCEEDING SUBPART 375.6[a] VALUES
FORMER NEPERA PLANT SITE, HARRIMAN, NY

Constituent	Depth Interval (ft)	Commercial (mg/kg)	Number Exceeding Commercial	Commercial Exceedance Frequency	Industrial (mg/kg)	Number Exceeding Industrial	Industrial Exceedance Frequency
Vinyl Chloride	0-2	13	0	0%	27	0	0%
Vinyl Chloride	>2	13	0	0%	27	0	0%
Xylenes	0-2	500	0	0%	1000	0	0%
Xylenes	>2	500	0	0%	1000	0	0%

Notes:
ft - feet.
a - Part 375.6 NYSDEC 6 NYCRR Subpart 375.6 Remedial Program Soil Cleanup Objectives.
mg/kg - milligram per kilogram.
> - greater than.
< - less than.

TABLE 4-2A

SUMMARY FOR SEMI-VOLATILE ORGANIC COMPOUNDS IN SOIL EXCEEDING SUBPART 375.6[a] VALUES

FORMER NEPERA PLANT SITE, HARRIMAN, NY

Constituent	Depth Interval (ft)	Number of Samples	Number Detects	Detection Frequency	Maximum Result (mg/kg)	Minimum Result (mg/kg)	Average Result (mg/kg)	Geometric Mean (mg/kg)	Unrestricted (mg/kg)
2-Picoline	0-2	151	11	7%	72.9	0.16	1.01	0.33	--
2-Picoline	>2	202	19	9%	8.97	0.18	0.45	0.31	--
3-Picoline	0-2	151	7	5%	72.6	0.07	0.91	0.13	--
3-Picoline	>2	202	6	3%	18.6	0.07	0.39	0.12	--
Acenaphthene	0-2	150	4	3%	0.412	0.04	0.08	0.06	20
Acenaphthene	>2	201	10	5%	37.4	0.04	0.29	0.07	20
Acenaphthylene	0-2	150	1	1%	0.292	0.03	0.06	0.05	100
Acenaphthylene	>2	201	2	1%	1.37	0.03	0.08	0.05	100
Anthracene	0-2	150	9	6%	1.26	0.06	0.11	0.09	100
Anthracene	>2	201	14	7%	86.3	0.06	0.73	0.10	100
Benzo (a) Anthracene	0-2	150	28	19%	4.67	0.03	0.18	0.07	1
Benzo (a) Anthracene	>2	201	21	10%	153	0.03	1.15	0.06	1
Benzo (a) Pyrene	0-2	150	17	11%	3.81	0.03	0.14	0.06	1
Benzo (a) Pyrene	>2	201	16	8%	98.2	0.03	0.70	0.06	1
Benzo (b) Fluoranthene	0-2	150	17	11%	3.23	0.06	0.18	0.11	1
Benzo (b) Fluoranthene	>2	201	15	7%	80.4	0.06	0.71	0.11	1
Benzo (g,h,i) Perylene	0-2	150	12	8%	2.38	0.13	0.22	0.19	100
Benzo (g,h,i) Perylene	>2	201	13	6%	68.3	0.13	0.61	0.19	100
Benzo (k) Fluoranthene	0-2	150	17	11%	3.59	0.05	0.16	0.09	0.8
Benzo (k) Fluoranthene	>2	201	15	7%	87.1	0.05	0.67	0.09	0.8
Chrysene	0-2	150	29	19%	4.08	0.05	0.21	0.10	1
Chrysene	>2	201	21	10%	130	0.05	1.06	0.09	1
Dibenz (a,h) Anthracene	0-2	150	5	3%	1.01	0.09	0.15	0.13	0.33
Dibenz (a,h) Anthracene	>2	201	9	4%	26.3	0.09	0.31	0.13	0.33
Dibenzofuran	0-2	150	4	3%	0.73	0.02	0.07	0.04	7
Dibenzofuran	>2	201	9	4%	30.4	0.03	0.29	0.05	7
Fluoranthene	0-2	150	46	31%	7.61	0.03	0.31	0.11	100
Fluoranthene	>2	201	41	20%	357	0.03	2.47	0.09	100
Fluorene	0-2	150	13	9%	1.68	0.03	0.10	0.06	30
Fluorene	>2	201	14	7%	34.2	0.03	0.39	0.06	30

TABLE 4-2A

SUMMARY FOR SEMI-VOLATILE ORGANIC COMPOUNDS IN SOIL EXCEEDING SUBPART 375.6[a] VALUES

FORMER NEPERA PLANT SITE, HARRIMAN, NY

Constituent	Depth Interval (ft)	Number of Samples	Number Detects	Detection Frequency	Maximum Result (mg/kg)	Minimum Result (mg/kg)	Average Result (mg/kg)	Geometric Mean (mg/kg)	Unrestricted (mg/kg)
Indeno (1,2,3-c,d) Pyrene	0-2	150	12	8%	2.22	0.11	0.20	0.16	0.5
Indeno (1,2,3-c,d) Pyrene	>2	201	12	6%	64.6	0.11	0.58	0.17	0.5
Naphthalene	0-2	150	7	5%	3.02	0.03	0.12	0.05	12
Naphthalene	>2	201	9	4%	8.46	0.03	0.15	0.05	12
Phenanthrene	0-2	150	35	23%	4.92	0.05	0.26	0.12	100
Phenanthrene	>2	201	40	20%	336	0.05	2.82	0.12	100
Phenol	0-2	150	0	0%	0.363	0.06	0.10	0.09	0.33
Phenol	>2	201	1	1%	3.39	0.06	0.13	0.09	0.33
Pyrene	0-2	150	47	31%	7.8	0.03	0.27	0.10	100
Pyrene	>2	201	44	22%	282	0.03	1.93	0.08	100
Pyridine	0-2	150	5	3%	67.2	0.10	0.72	0.15	--
Pyridine	>2	201	12	6%	409	0.10	2.54	0.16	--

TABLE 4-2A

SUMMARY FOR SEMI-VOLATILE ORGANIC COMPOUNDS IN SOIL EXCEEDING SUBPART 375.6[a] VALUES

FORMER NEPERA PLANT SITE, HARRIMAN, NY

Constituent	Depth Interval (ft)	Number of Samples	Number Exceeding Unrestricted	Unrestricted Exceedance Frequency	Residential (mg/kg)	Number Exceeding Residential	Residential Exceedance Frequency	Restricted Residential (mg/kg)	Number Exceeding Restricted Residential	Restricted Residential Exceedance Frequency	Commercial (mg/kg)
2-Picoline	0-2	151	--	--	--	--	--	--	--	--	--
2-Picoline	>2	202	--	--	--	--	--	--	--	--	--
3-Picoline	0-2	151	--	--	--	--	--	--	--	--	--
3-Picoline	>2	202	--	--	--	--	--	--	--	--	--
Acenaphthene	0-2	150	0	0%	100	0	0%	100	0	0%	500
Acenaphthene	>2	201	1	<1%	100	0	0%	100	0	0%	500
Acenaphthylene	0-2	150	0	0%	100	0	0%	100	0	0%	500
Acenaphthylene	>2	201	0	0%	100	0	0%	100	0	0%	500
Anthracene	0-2	150	0	0%	100	0	0%	100	0	0%	500
Anthracene	>2	201	0	0%	100	0	0%	100	0	0%	500
Benzo (a) Anthracene	0-2	150	5	3%	1	5	3%	1	5	3%	5.6
Benzo (a) Anthracene	>2	201	8	4%	1	8	4%	1	8	4%	5.6
Benzo (a) Pyrene	0-2	150	4	3%	1	4	3%	1	4	3%	1
Benzo (a) Pyrene	>2	201	7	3%	1	7	3%	1	7	3%	1
Benzo (b) Fluoranthene	0-2	150	4	3%	1	4	3%	1	4	3%	5.6
Benzo (b) Fluoranthene	>2	201	8	4%	1	8	4%	1	8	4%	5.6
Benzo (g,h,i) Perylene	0-2	150	0	0%	100	0	0%	100	0	0%	500
Benzo (g,h,i) Perylene	>2	201	0	0%	100	0	0%	100	0	0%	500
Benzo (k) Fluoranthene	0-2	150	5	3%	1	4	3%	3.9	0	0%	56
Benzo (k) Fluoranthene	>2	201	8	4%	1	7	3%	3.9	3	1%	56
Chrysene	0-2	150	7	5%	1	7	5%	1	7	5%	56
Chrysene	>2	201	8	4%	1	8	4%	1	8	4%	56
Dibenz (a,h) Anthracene	0-2	150	2	1%	0.33	2	1%	0.33	2	1%	0.56
Dibenz (a,h) Anthracene	>2	201	6	3%	0.33	6	3%	0.33	6	3%	0.56
Dibenzofuran	0-2	150	0	0%	14	0	0%	59	0	0%	350
Dibenzofuran	>2	201	2	1%	14	1	<1%	59	0	0%	350
Fluoranthene	0-2	150	0	0%	100	0	0%	100	0	0%	500
Fluoranthene	>2	201	1	<1%	100	1	<1%	100	1	<1%	500
Fluorene	0-2	150	0	0%	100	0	0%	100	0	0%	500
Fluorene	>2	201	1	<1%	100	0	0%	100	0	0%	500

TABLE 4-2A

SUMMARY FOR SEMI-VOLATILE ORGANIC COMPOUNDS IN SOIL EXCEEDING SUBPART 375.6[a] VALUES

FORMER NEPERA PLANT SITE, HARRIMAN, NY

Constituent	Depth Interval (ft)	Number of Samples	Number Exceeding Unrestricted	Unrestricted Exceedance Frequency	Residential (mg/kg)	Number Exceeding Residential	Residential Exceedance Frequency	Restricted Residential (mg/kg)	Number Exceeding Restricted Residential	Restricted Residential Exceedance Frequency	Commercial (mg/kg)
Indeno (1,2,3-c,d) Pyrene	0-2	150	5	3%	0.5	5	3%	0.5	5	3%	5.6
Indeno (1,2,3-c,d) Pyrene	>2	201	8	4%	0.5	8	4%	0.5	8	4%	5.6
Naphthalene	0-2	150	0	0%	100	0	0%	100	0	0%	500
Naphthalene	>2	201	0	0%	100	0	0%	100	0	0%	500
Phenanthrene	0-2	150	0	0%	100	0	0%	100	0	0%	500
Phenanthrene	>2	201	2	1%	100	2	1%	100	2	1%	500
Phenol	0-2	150	0	0%	100	0	0%	100	0	0%	500
Phenol	>2	201	1	<1%	100	0	0%	100	0	0%	500
Pyrene	0-2	150	0	0%	100	0	0%	100	0	0%	500
Pyrene	>2	201	1	<1%	100	1	<1%	100	1	<1%	500
Pyridine	0-2	150	--	--	--	--	--	--	--	--	--
Pyridine	>2	201	--	--	--	--	--	--	--	--	--

Notes:
ft - feet.
a - Part 375.(
mg/kg - mill
> - greater tl
< - less than
-- no part 37

TABLE 4-2A

SUMMARY FOR SEMI-VOLATILE ORGANIC COMPOUNDS IN SOIL EXCEEDING SUBPART 375.6[a] VALUES

FORMER NEPERA PLANT SITE, HARRIMAN, NY

Constituent	Depth Interval (ft)	Number of Samples	Number Exceeding Commercial	Commercial Exceedance Frequency	Industrial (mg/kg)	Number Exceeding Industrial	Industrial Exceedance Frequency
2-Picoline	0-2	151	--	--	--	--	--
2-Picoline	>2	202	--	--	--	--	--
3-Picoline	0-2	151	--	--	--	--	--
3-Picoline	>2	202	--	--	--	--	--
Acenaphthene	0-2	150	0	0%	1000	0	0%
Acenaphthene	>2	201	0	0%	1000	0	0%
Acenaphthylene	0-2	150	0	0%	1000	0	0%
Acenaphthylene	>2	201	0	0%	1000	0	0%
Anthracene	0-2	150	0	0%	1000	0	0%
Anthracene	>2	201	0	0%	1000	0	0%
Benzo (a) Anthracene	0-2	150	0	0%	11	0	0%
Benzo (a) Anthracene	>2	201	3	1%	11	3	1%
Benzo (a) Pyrene	0-2	150	4	3%	1.1	3	2%
Benzo (a) Pyrene	>2	201	7	3%	1.1	6	3%
Benzo (b) Fluoranthene	0-2	150	0	0%	11	0	0%
Benzo (b) Fluoranthene	>2	201	3	1%	11	3	1%
Benzo (g,h,i) Perylene	0-2	150	0	0%	1000	0	0%
Benzo (g,h,i) Perylene	>2	201	0	0%	1000	0	0%
Benzo (k) Fluoranthene	0-2	150	0	0%	110	0	0%
Benzo (k) Fluoranthene	>2	201	1	<1%	110	0	0%
Chrysene	0-2	150	0	0%	110	0	0%
Chrysene	>2	201	1	<1%	110	1	<1%
Dibenz (a,h) Anthracene	0-2	150	1	1%	1.1	0	0%
Dibenz (a,h) Anthracene	>2	201	4	2%	1.1	3	1%
Dibenzofuran	0-2	150	0	0%	1000	0	0%
Dibenzofuran	>2	201	0	0%	1000	0	0%
Fluoranthene	0-2	150	0	0%	1000	0	0%
Fluoranthene	>2	201	0	0%	1000	0	0%
Fluorene	0-2	150	0	0%	1000	0	0%
Fluorene	>2	201	0	0%	1000	0	0%

TABLE 4-2A

SUMMARY FOR SEMI-VOLATILE ORGANIC COMPOUNDS IN SOIL EXCEEDING SUBPART 375.6[a] VALUES

FORMER NEPERA PLANT SITE, HARRIMAN, NY

Constituent	Depth Interval (ft)	Number of Samples	Number Exceeding Commercial	Commercial Exceedance Frequency	Industrial (mg/kg)	Number Exceeding Industrial	Industrial Exceedance Frequency
Indeno (1,2,3-c,d) Pyrene	0-2	150	0	0%	11	0	0%
Indeno (1,2,3-c,d) Pyrene	>2	201	2	1%	11	1	<1%
Naphthalene	0-2	150	0	0%	1000	0	0%
Naphthalene	>2	201	0	0%	1000	0	0%
Phenanthrene	0-2	150	0	0%	1000	0	0%
Phenanthrene	>2	201	0	0%	1000	0	0%
Phenol	0-2	150	0	0%	1000	0	0%
Phenol	>2	201	0	0%	1000	0	0%
Pyrene	0-2	150	0	0%	1000	0	0%
Pyrene	>2	201	0	0%	1000	0	0%
Pyridine	0-2	150	--	--	--	--	--
Pyridine	>2	201	--	--	--	--	--

5 NYSDEC 6 NYCRR Subpart 375.6 Remedial Program Soil Cleanup Objectives.
igram per kilogram.
ıan.

5.6 values for constituent.

TABLE 4-3A

SUMMARY FOR POLYCHLORINATED BIPHENYLS IN SOIL EXCEEDING SUBPART 375.6[a] VALUES

FORMER NEPERA PLANT SITE, HARRIMAN, NY

Constituent	Depth Interval (ft)	Number of Samples	Number Detects	Detection Frequency	Maximum Result (mg/kg)	Minimum Result (mg/kg)	Average Result (mg/kg)	Geometric Mean (mg/kg)
Aroclor 1254	0-2	150	95	63%	51.7	0.02	0.87	0.10
Aroclor 1254	>2	201	57	28%	2.71	0.02	0.12	0.03

TABLE 4-3A
SUMMARY FOR POLYCHLORINATED BIPHENYLS IN SOIL EXCEEDING SUBPART 375.6[a] VALUES
FORMER NEPERA PLANT SITE, HARRIMAN, NY

Constituent	Depth Interval (ft)	Unrestricted (mg/kg)	Number Exceeding Unrestricted	Unrestricted Exceedance Frequency	Residential (mg/kg)	Number Exceeding Residential	Residential Exceedance Frequency	Restricted Residential (mg/kg)	Number Exceeding Restricted Residential	Restricted Residential Exceedance Frequency
Aroclor 1254	0-2	0.1	72	48%	1	20	13%	1	20	13%
Aroclor 1254	>2	0.1	35	17%	1	5	2%	1	5	2%

TABLE 4-3A
SUMMARY FOR POLYCHLORINATED BIPHENYLS IN SOIL EXCEEDING SUBPART 375.6[a] VALUES
FORMER NEPERA PLANT SITE, HARRIMAN, NY

Constituent	Depth Interval (ft)	Commercial (mg/kg)	Number Exceeding Commercial	Commercial Exceedance Frequency	Industrial (mg/kg)	Number Exceeding Industrial	Industrial Exceedance Frequency
Aroclor 1254	0-2	1	20	13%	25	1	1%
Aroclor 1254	>2	1	5	2%	25	0	0%

Notes:
ft - feet.
a - Part 375.6 NYSDEC 6 NYCRR Subpart 375.6 Remedial Program Soil Cleanup Objectives.
mg/kg - milligram per kilogram.
> - greater than.

TABLE 4-4A

SUMMARY FOR METALS IN SOIL EXCEEDING SUBPART 375.6[a] VALUES

FORMER NEPERA PLANT SITE, HARRIMAN, NY

Constituent	Depth Interval (ft)	Number of Samples	Number Detects	Detection Frequency (mg/kg)	Maximum Result (mg/kg)	Minimum Result (mg/kg)	Average Result (mg/kg)	Geometric Mean (mg/kg)
Arsenic	0-2	150	150	100%	122	1.91	5.93	4.85
Arsenic	>2	201	199	99%	62.6	1.37	5.09	4.22
Barium	0-2	150	150	100%	431	19.60	48.92	44.54
Barium	>2	201	199	99%	196	13.70	46.66	41.25
Beryllium	0-2	150	150	100%	1.61	0.25	0.55	0.53
Beryllium	>2	201	199	99%	0.965	0.17	0.52	0.51
Cadmium	0-2	150	55	37%	5.64	0.08	0.38	0.32
Cadmium	>2	201	41	20%	7.17	0.09	0.37	0.31
Copper	0-2	150	150	100%	287	3.86	56.02	41.85
Copper	>2	201	201	100%	1190	3.85	48.57	30.18
Lead	0-2	150	150	100%	319	8.61	37.90	25.82
Lead	>2	201	201	100%	1180	6.13	36.26	19.20
Manganese	0-2	150	150	100%	1370	64.00	591.05	548.01
Manganese	>2	201	201	100%	3720	19.60	566.81	495.00
Mercury	0-2	150	149	99%	1600	0.01	46.61	3.95
Mercury	>2	201	199	99%	1370	0.01	40.60	1.81
Nickel	0-2	150	150	100%	63.6	9.73	24.27	23.38
Nickel	>2	201	201	100%	116	1.75	21.93	20.65
Selenium	0-2	150	28	19%	2.44	0.22	1.12	1.05
Selenium	>2	201	18	9%	3.11	0.26	1.22	1.14
Silver	0-2	150	8	5%	36.1	0.11	0.80	0.50
Silver	>2	201	10	5%	47.7	0.11	0.90	0.56
Zinc	0-2	150	150	100%	1090	29.90	101.45	86.50
Zinc	>2	201	201	100%	3260	5.36	108.64	74.61

TABLE 4-4A

SUMMARY FOR METALS IN SOIL EXCEEDING SUBPART 375.6[a] VALUES

FORMER NEPERA PLANT SITE, HARRIMAN, NY

Constituent	Depth Interval (ft)	Unrestricted (mg/kg)	Number Exceeding Unrestricted	Unrestricted Exceedance Frequency	Residential (mg/kg)	Number Exceeding Residential	Residential Exceedance Frequency	Restricted Residential (mg/kg)	Number Exceeding Restricted Residential	Restricted Residential Exceedance Frequency
Arsenic	0-2	13	4	3%	16	3	2%	16	3	2%
Arsenic	>2	13	8	4%	16	6	3%	16	6	3%
Barium	0-2	350	1	1%	350	1	1%	400	1	1%
Barium	>2	350	0	0%	350	0	0%	400	0	0%
Beryllium	0-2	7.2	0	0%	14	0	0%	72	0	0%
Beryllium	>2	7.2	0	0%	14	0	0%	72	0	0%
Cadmium	0-2	2.5	1	1%	2.5	1	1%	4.3	1	1%
Cadmium	>2	2.5	2	1%	2.5	2	1%	4.3	1	<1%
Copper	0-2	50	48	32%	270	3	2%	270	3	2%
Copper	>2	50	40	20%	270	4	2%	270	4	2%
Lead	0-2	63	25	17%	400	0	0%	400	0	0%
Lead	>2	63	14	7%	400	2	1%	400	2	1%
Manganese	0-2	1600	0	0%	2000	0	0%	2000	0	0%
Manganese	>2	1600	4	2%	2000	1	<1%	2000	1	<1%
Mercury	0-2	0.18	129	86%	0.81	108	72%	0.81	108	72%
Mercury	>2	0.18	156	78%	0.81	112	56%	0.81	112	56%
Nickel	0-2	30	15	10%	140	0	0%	310	0	0%
Nickel	>2	30	13	6%	140	0	0%	310	0	0%
Selenium	0-2	3.9	0	0%	36	0	0%	180	0	0%
Selenium	>2	3.9	0	0%	36	0	0%	180	0	0%
Silver	0-2	2	2	1%	36	1	1%	180	0	0%
Silver	>2	2	5	2%	36	1	<1%	180	0	0%
Zinc	0-2	109	37	25%	2200	0	0%	10000	0	0%
Zinc	>2	109	27	13%	2200	1	<1%	10000	0	0%

TABLE 4-4A

SUMMARY FOR METALS IN SOIL EXCEEDING SUBPART 375.6[a] VALUES
FORMER NEPERA PLANT SITE, HARRIMAN, NY

Constituent	Depth Interval (ft)	Commercial (mg/kg)	Number Exceeding Commercial	Commercial Exceedance Frequency	Industrial (mg/kg)	Number Exceeding Industrial	Industrial Exceedance Frequency
Arsenic	0-2	16	3	2%	16	3	2%
Arsenic	>2	16	6	3%	16	6	3%
Barium	0-2	400	1	1%	10000	0	0%
Barium	>2	400	0	0%	10000	0	0%
Beryllium	0-2	590	0	0%	2700	0	0%
Beryllium	>2	590	0	0%	2700	0	0%
Cadmium	0-2	9.3	0	0%	60	0	0%
Cadmium	>2	9.3	0	0%	60	0	0%
Copper	0-2	270	3	2%	10000	0	0%
Copper	>2	270	4	2%	10000	0	0%
Lead	0-2	1000	0	0%	3900	0	0%
Lead	>2	1000	1	<1%	3900	0	0%
Manganese	0-2	10000	0	0%	10000	0	0%
Manganese	>2	10000	0	0%	10000	0	0%
Mercury	0-2	2.8	87	58%	5.7	69	46%
Mercury	>2	2.8	84	42%	5.7	72	36%
Nickel	0-2	310	0	0%	10000	0	0%
Nickel	>2	310	0	0%	10000	0	0%
Selenium	0-2	1500	0	0%	6800	0	0%
Selenium	>2	1500	0	0%	6800	0	0%
Silver	0-2	1500	0	0%	6800	0	0%
Silver	>2	1500	0	0%	6800	0	0%
Zinc	0-2	10000	0	0%	10000	0	0%
Zinc	>2	10000	0	0%	10000	0	0%

Notes:
ft - feet.

TABLE 6.3
SUMMARY OF SURFACE SOIL RESULTS
THE HARRIMAN SITE
HARRIMAN, NEW YORK

Sample ID	SSWW03	SSWW04	SSWW05 / SSWW06 (Duplicate)
Volatile Organics			
TPH (mg/kg)	88	18	10.5 / 6
Semi-Volatile Organics (μg/kg)			
Phenanthrene	160 J	ND(690)	ND(680) / ND(690)
Fluoranthene	420 J	100 J	ND(680) / ND(690)
Pyrene	240 J	ND(690)	ND(680) / ND(690)
Benzo(a)anthracene	190 J	ND(690)	ND(680) / ND(690)
Chrysene	280 J	ND(690)	ND(680) / ND(690)
bis(2-Ethylhexyl)phthalate	ND(3,400)	2,500	ND(820) / ND(2,200)
Di-n-octylphthalate	ND(1,800)	780	230 J / 880
Benzo(b)fluoranthene	600 J	97 J	ND(680) / ND(690)
Benzo(k)fluoranthene	220 J	ND(690)	ND(680) / ND(690)
Benzo(a)pyrene	350 J	ND(690)	ND(680) / ND(690)
Ideno(1,2,3-cd)pyrene	300 J	ND(690)	ND(680) / ND(690)
Dibenz(a,h)anthracene	84 J	ND(690)	ND(680) / ND(690)
Benzo(g,h,i)perylene	270 J	ND(690)	ND(680) / ND(690)
TICS (μg/kg)			
Ethylmethylbenzene Isomer 1	--	700 J	-- / 800 J
Ethylmethylbenzene Isomer 2	--	500 J	-- / 1000 J
Ethylmethylcyclohexane Isomer 1	--	300 J	-- / 300 J
Ethylmethylcyclohexane Isomer 2	--	--	-- / 300 J
Tetramethylcyclopropane Isomer	--	600 J	-- / --
Trimethylbenzene Isomer 1	--	300 J	500 J / 400 J
Trimethylbenzene Isomer 2	--	1000 J	-- / --
Unknown 1	1000 J	1000 J	500 J / 1000 J
Unknown 2	700 J	--	2000 J / 1000 J
Unknown 3	400 J	--	2000 J / 500 J
Unknown 4	1000 J	--	-- / --
Unknown 5	700 J	--	-- / --
Unknown 6	400 J	--	-- / --
Unknown 7	600 J	--	-- / --
Unknown 8	400 J	--	-- / --
Unknown 9	7000 J	--	-- / --
Unknown 10	700 J	--	-- / --
Unknown 11	500 J	--	-- / --
Unknown 12	900 J	--	-- / --
Unknown Hydrocarbon 1	1000 J	2000 J	600 J / 2000 J
Unknown Hydrocarbon 2	20000 J	20000 J	6000 J / 20000 J
Unknown Hydrocarbon 3	1000 J	600 J	-- / 500 J
Unknown Hydrocarbon 4	1000 J	--	-- / --
Unknown Hydrocarbon 5	500 J	--	-- / --
Unknown Cyclic CPD	3000 J	8000 J	3000 J / 8000 J

TABLE 6.3
SUMMARY OF SURFACE SOIL RESULTS
THE HARRIMAN SITE
HARRIMAN, NEW YORK

Sample ID	SSWW03	SSWW04	SSWW05 / SSWW06 (Duplicate)
Pesticides/PCBs (µg/kg)			
Aroclor-1254	ND(180)	210	ND(160) / 160
Inorganics (mg/kg)			
Aluminum	9,130	16,800	11,800 / 17,800
Arsenic	10.5	12.1	3 / 3.8
Barium	25	92.1	36.8 / 46.6
Beryllium	0.35	1	0.53 / 0.72
Cadmium	1.3	2.1	1.6 / 1.6
Calcium	8,180	4,860	20,900 / 24,000
Chromium	24.6	38.4	20.1 / 25.8
Cobalt	7.7	13.5	9.3 / 14.4
Copper	31.8	63.8	50.4 J / 40.9
Iron	19,700	35,700	24,000 / 36,300
Lead	50	48.1	28.3 J / 42.8
Magnesium	6,850	6,870	10,600 / 11,800
Manganese	327	1,560	642 / 976
Mercury	20.1	1.8	3.3 J / 1.2
Nickel	24.4	55	34.4 J / 36.8
Potassium	1,030	1,870	1160 J / 1,660
Silver	ND(2.2)	4.2	2 / 2.1
Sodium	9,690	155	107 / 142
Vanadium	24.4	33.8	22.6 / 29.9
Zinc	112	279	151 J / 107
Cyanide	ND(1.1)	2.5	3.2 / ND(1.0)

Notes:
ND - Not Detected.
J - Compounds are an estimated value.
-- - Not Analyzed
/ - Duplicate Result

TABLE 6.1
SUMMARY OF BACKGROUND SOIL RESULTS FOR METALS
THE HARRIMAN SITE
HARRIMAN, NEW YORK

Sample ID	SSWW01	SSWW02	SSWW07	SSWW08	Mean Value*	Literature References Eastern U.S. Observed Ranges (1)	Literature References New York State Southeastern Area Observed Range (1)
Inorganics (mg/kg)							
Aluminum	10300	11200	14400	17000	13225	7000-10000	50000->100000
Arsenic	2.2	3.4	6.1	3.2	3.725	<0.1-73	6.5-10
Barium	31.1	39.7	58.9	63.9	48.4	10-1500	10-300
Beryllium	0.38	0.46	0.47	0.5	0.4525	<1.0-7	<1.0-1.0
Cadmium	1.7	1.8	1.6	1.6	1.675	0.01-7 (2)	--
Calcium	6230	13200	1480	1150	5515	100-28000 (3)	130-2300
Chromium	18.4	15.6	16.9	19.5	17.6	1-1000	50-70
Cobalt	7.3	8.3	6.5	6.9	7.25	<0.3-70	3-7
Copper	16.7	18.7	13	14.6	15.75	<1-700	20-30
Iron	18300	21200	17900	20300	19425	100-100000	20000->100000
Lead	25.3	34.3	26.7	18.1	26.1	<10-300	20-700
Magnesium	4390	4840	3200	3680	4027.5	50-50000 (3)	2000-3000
Manganese	384	592	541	524	510.25	<2-7000	<2-500
Mercury	1.6	4.6	0.23	0.17	1.65	0.01-3.4	0.051-0.13
Nickel	21.3	23.7	17.8	18.5	20.325	<5-700	<5-15
Potassium	1190	1140	1160	1250	1185	50-37000 (3)	2200-6800
Selenium	ND(0.57)	ND(0.05)	ND(0.36)	0.92	0.3525	--	<0.1-0.1
Silver	ND(2.4)	ND(2.3)	ND(2.3)	2.3	1.45	--	--
Sodium	96.9	77.7	204	40.6	104.8	50-50000 (3)	3000-5000
Thallium	0.42	0.51	ND(0.35)	0.41	0.37875	--	--
Vanadium	29.1	27.1	29	28.4	28.4	<7-300	70-100
Zinc	62.3	61.8	63.4	63.1	62.65	<5-2400	45-74
Cyanide	--	--	--	--	--	--	--

Notes:
* - non-detects taken as 50% of detection limit for determination of mean
ND - Not Detected
-- - Not Analyzed
(1) - Element Concentrations in Soils and Other Surface Materials of the Conterminous United States
(2) - The Soil Chemistry of Hazardous Materials. Author: Dragon, James. Hazardous Materials Control Research Institute, 1988.
(3) - Common Soil Element

TABLE 6.2
SUMMARY OF TEST PIT SAMPLING RESULTS
THE HARRIMAN SITE
HARRIMAN, NEW YORK

Sample Locations:	TP-1	TP-3	TP-4	TP-5	TP-7	TP-9	TP-13	TP-15	TP-21B	TP-23	TP-26	TP-28
Depth (ft):	3'	5'-6'	5'	4'	5'-6'	8'	2'-3'	4'-7'	3'	3'-5'	3'-4'	4'
Volatile Organics (μ g/kg)												
Acetone	26 J	ND(13)	1800 J	ND(54)	270 E	ND(61) J	42	26	160	ND(12)	12	120
Carbon Disulfide	ND(7) J	ND(7)	ND(80) J	ND(27)	23	ND(31) J	ND(6)	ND(6)	ND(6)	ND(6)	ND(6)	ND(7)
2-Butanone	ND(13) J	ND(13)	300 J	ND(54)	ND(13)	ND(61) J	ND(11)	ND(12)	ND(12)	ND(12)	ND(12)	ND(14)
Trichloroethene	ND(7) J	ND(7)	ND(37) J	ND(27)	ND(6)	ND(31) J	ND(6)	ND(6)	ND(6)	14	24 JD	ND(7)
Benzene	ND(7) J	ND(7)	4100 J	ND(27)	22000 D	230000 D	3900 D	ND(6)	740 D	3500 E	1700 ED	340 J
4-Methyl-2-Pentanone	ND(13) J	ND(13)	2900 J	ND(54)	ND(13) J	ND(61) J	ND(11)	ND(12)	ND(12)	ND(12)	ND(12)	ND(14) J
Toluene	450 J	110	11000 D	ND(27)	960 J	8,500 J	870 D	ND(6)	410 D	100	27 JD	860 J
Chlorobenzene	ND(7) J	ND(7)	ND(37) J	ND(27)	5 J	240 J	4 J	ND(6)	23 D	ND(6)	ND(6)	ND(7) J
Ethylbenzene	200 J	ND(7)	36000 D	ND(27)	74 J	300 J	52	ND(6)	27 D	7	6 J	590 J
Xylene (total)	460 J	ND(7)	110000 D	79	200 J	1500 J	1200 D	ND(6)	120 D	470 JD	20	2200 J
TPH (mg/kg)	402	12.7	35.8	1160	6.2	592	10	50.7	75.3	6	43	620
TICS (ug/kg)												
Cyclohexene, 3-methyl- (8CI9CI)	--	--	--	--	50 J	--	--	--	--	--	--	--
Dimethyl-cyclohexane Isomer	--	--	--	--	--	--	--	--	--	--	--	--
Dimethyl-hexadiene Isomer	30 J	--	--	--	--	--	--	--	--	--	--	--
Ethyl-dimethylbenzene Isomer 1	--	--	--	--	--	--	--	--	--	--	--	--
Ethyl-dimethylbenzene Isomer 2	--	--	--	--	--	--	--	--	--	--	--	--
Ethyl-methylbenzene Isomer 1	100 J	--	--	--	--	--	--	--	--	--	10 J	
Ethyl-methylbenzene Isomer 2	--	--	--	--	--	--	--	--	--	--	--	--
Ethyl-methylbenzene Isomer 3	--	--	--	--	--	--	--	--	--	--	--	--
Ethyl-methyl-pyridine Isomer	--	60 J	--	--	--	--	--	400 J	--	--	--	--
Methyl-hexadiene Isomer 1	--	--	--	--	100 J	--	--	--	--	--	--	--
Methyl-hexadiene Isomer 2	--	--	--	--	80 J	--	--	--	--	--	--	--
Methyl-propylbenzene Isomer	--	--	--	--	--	--	--	--	--	--	--	--
Methyl-pyridine Isomer	--	--	--	--	--	--	30 J	--	--	200 J	--	--
N-Butyl ether	--	--	--	--	--	--	--	500 J	--	--	--	--
Substit. Benzene	--	--	--	--	--	--	--	--	--	20 J	--	--
Trimethylbenzene Isomer 1	200 J	--	--	--	--	--	50 J	--	--	20 J	10 J	--
Trimethylbenzene Isomer 2	--	--	--	--	--	--	--	--	--	--	--	--
Trimethyl-cyclohexane Isomer	--	--	--	--	--	--	--	--	--	--	--	--
Trimethyl-cyclopentane Isomer	--	--	--	--	--	--	--	--	--	--	--	--
Unknown 1	100 J	8 J	200 J	20 J	200 J	70 J	20 J	--	30 JD	40 J	--	--
Unknown 2	50 J	--	--	200 J	200 J	200 J	--	--	--	10	--	--
Unknown 3	--	--	--	80 J	20 J	--	--	--	--	--	--	--
Unknown 4	--	--	--	200 J	50 J	--	--	--	--	--	--	--
Unknown 5	--	--	--	100 J	100 J	--	--	--	--	--	--	--
Unknown 6	--	--	--	40 J	300 J	--	--	--	--	--	--	--
Unknown 7	--	--	--	--	50 J	--	--	--	--	--	--	--
Unknown Aromatic 1	--	--	--	--	--	--	40 J	--	--	--	--	--
Unknown Aromatic 2	--	--	--	--	--	--	30	--	--	--	--	--
Unknown Aromatic 3	--	--	--	--	--	--	60 J	--	--	--	--	--
Unknown Aromatic 4	--	--	--	--	--	--	10 J	--	--	--	--	--
Unknown Aromatic 5	--	--	--	--	--	--	8 J	--	--	--	--	--
Unknown Aromatic 6	--	--	--	--	--	--	10 J	--	--	--	--	--
Unknown Aromatic 7	--	--	--	--	--	--	30 J	--	--	--	--	--
Unknown Hydrocarbon 1	40 J	--	--	--	--	1000 J	--	--	--	--	--	1000 J
Unknown Hydrocarbon 2	200 J	--	--	--	--	300 J	--	--	--	--	--	--
Unknown Hydrocarbon 3	200 J	--	--	--	--	100 J	--	--	--	--	--	--
Unknown Hydrocarbon 4	200 J	--	--	--	--	400 J	--	--	--	--	--	--
Unknown Hydrocarbon 5	100 J	--	--	--	--	1000 J	--	--	--	--	--	--
Unknown Hydrocarbon 6	--	--	--	--	--	1000 J	--	--	--	--	--	--
Unknown Hydrocarbon 7	--	--	--	--	--	500 J	--	--	--	--	--	--
Unknown Hydrocarbon 8	--	--	--	--	--	1000 J	--	--	--	--	--	--
Semi-Volatile Organics (μ g/kg)												
Phenol	ND(380)	ND(430)	170 J	ND(410)	ND(420)	ND(490)	ND(420)	ND(410)	ND(410)	ND(410)	ND(400)	ND(410)
4-Methylphenol	ND(380)	ND(430)	4100	ND(410)	ND(420)	ND(490)	ND(420)	ND(410)	ND(410)	ND(410)	ND(400)	ND(410)
2,4-Dimethylphenol	ND(380)	ND(430)	140 J	ND(410)	ND(420)	ND(490)	ND(420)	ND(410)	ND(410)	ND(410)	ND(400)	ND(410)
Benzoic acid	ND(1,900)	ND(2,200)	ND(2,900)	1900 J	ND(2,100)	ND(2,500)	ND(2,100)	ND(2,100)	ND(2,000)	ND(2,000)	ND(2,000)	ND(2,100)
Phenanthrene	ND(380)	ND(430)	ND(580)	170 J	ND(420)	130 J	ND(420)	ND(410)	ND(410)	ND(410)	ND(400)	160 J
Fluoranthene	ND(380)	ND(430)	ND(580)	95 J	ND(420)	ND(490)	ND(420)	ND(410)	160 J	ND(410)	ND(400)	ND(410)
Pyrene	ND(380)	ND(430)	ND(580)	99 J	ND(420)	ND(490)	ND(420)	ND(410)	160 J	ND(410)	ND(400)	160 J
Benzo(a)anthracene	ND(380)	ND(430)	ND(580)	52 J	ND(420)	ND(490)	ND(420)	ND(410)	84 J	ND(410)	ND(400)	ND(410)
Chrysene	ND(380)	ND(430)	ND(580)	56 J	ND(420)	ND(490)	ND(420)	ND(410)	92 J	ND(410)	ND(400)	ND(410)
bis(2-Ethylhexyl)phthalate	ND(380)	ND(430)	ND(580)	ND(540)	110 J	ND(490)	ND(420)	ND(410)	190 J	ND(410)	ND(400)	ND(410)
Di-n-octylphthalate	ND(380)	ND(430)	ND(580)	ND(410)	ND(420)	ND(490)	ND(420)	ND(410)	ND(410)	ND(410)	ND(400)	ND(410)
Pyridine	ND(380)	ND(430)	220 J	ND(410)	ND(420)	ND(490)	ND(420)	ND(410)	ND(410)	ND(410)	ND(400)	ND(410)
Alpha-picoline	ND(380)	210 J	470 J	ND(410)	ND(420)	1900	1100	ND(410)	560	1900	ND(400)	ND(410)
2-Amino-pyridine	ND(380)	ND(430)	5000	400 J	900	ND(490)	ND(420)	ND(410)	ND(410)	ND(410)	410	200 J

TABLE 6.2
SUMMARY OF TEST PIT SAMPLING RESULTS
THE HARRIMAN SITE
HARRIMAN, NEW YORK

Sample Locations:	TP-1	TP-3	TP-4	TP-5	TP-7	TP-9	TP-13	TP-15	TP-21B	TP-23	TP-26	TP-28
Depth (ft):	3'	5'-6'	5'	4'	5'-6'	8'	2'-3'	4'-7'	3'	3'-5'	3'-4'	4'
TICS (ug/kg)												
Benzaldehyde (ACN)(DOT)(8CI9CI)	--	--	--	700 J	--	--	--	--	--	--	--	--
Benzenamine, N-ethyl- (9CI)	--	--	--	--	--	900 J	--	--	--	--	--	--
Benzene, 1-chloro-4- (1-methyl)	--	--	--	--	--	--	--	--	--	--	--	--
Benzene, 1,1'-oxybis- (9CI)	--	--	--	800 J	--	--	--	--	200 J	--	--	--
Benzoic acid, methyl ester	--	--	--	500 J	--	--	--	--	--	--	--	--
1,1-Biphenyl (9CI)	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Bipyridyl	--	--	--	--	--	--	--	--	300 J	--	--	490 J
2,2'-Bipyridine	--	--	--	--	--	--	--	--	--	--	--	--
3,3'-Bipyridine (8CI9CI)	--	--	--	--	--	--	--	--	--	--	--	--
Bipyridine Isomer	--	--	500 J	--	--	--	--	--	--	--	--	--
Cyclopentane, 2-ethyllidene-1	500	--	--	--	--	--	--	--	--	--	--	--
Dimethylpyridine Isomer 1	--	--	--	--	--	2000 J	--	--	--	200 J	--	--
Dimethylpyridine Isomer 2	--	--	--	--	--	1000 J	--	--	--	--	--	--
Dimethylpyridine Isomer 3	--	--	--	--	--	3000 J	--	--	--	--	--	--
Dimethylpyridine Isomer 4	--	--	--	--	--	2000 J	--	--	--	--	--	--
Ethyl-methyl-pyridine Isomer	--	--	--	--	2000 J	--	--	--	--	--	--	--
Heptane, 2,3-dimethyl- (8CI9CI)	500 J	--	--	--	--	--	--	--	--	--	--	--
Heptane, 3-ethyl-5-methyl-	1000 J	--	--	--	--	--	--	--	--	--	--	--
1,4-Hexadiene, 3-ethyl- (8CI9CI)	--	--	--	--	300 J	--	--	--	--	--	--	--
Hexachloro-1,1'-biphenyl Isomer	--	--	--	--	--	--	--	--	700 J	--	--	--
1H-Indene, octahydro-2,2,4,4	--	--	--	--	300 J	--	--	--	--	--	--	--
Pentachloro-1,1'-biphenyl Isomer 1	--	--	--	--	--	--	--	--	1000 J	--	--	--
Pentachloro-1,1'-biphenyl Isomer 2	--	--	--	--	--	--	--	--	800 J	--	--	--
Pentachloro-1,1'-biphenyl Isomer 3	--	--	--	--	--	--	--	--	300 1	--	--	--
Pentachloro-1,1'-biphenyl Isomer 4	--	--	--	--	--	--	--	--	1000 J	--	--	--
Pyridinamine Isomer	--	--	1000 J	--	--	--	--	--	--	--	--	--
Pyridine, 3-ethenyl- (9CI)	--	--	--	--	--	--	--	--	6000 J	--	--	--
Pyridine, 2,5-dimethyl- (9CI)	--	700 1	--	--	--	--	--	--	400 J	--	--	--
Pyridine, 2,3-dimethyl- (9CI)	--	--	--	--	--	--	--	--	--	--	--	--
2-Pyredinecarboxylic acid (9CI)	--	--	--	--	--	--	--	--	700 J	--	--	--
Pyridine, 3-methyl- (9CI)	--	--	--	--	--	--	--	--	--	400 J	--	--
Pyridine, 2-ethyl- (8CI9CI)	--	--	--	--	--	--	170 J	--	--	200 J	--	--
Pyridine, 4-ethyl- (8CI9CI)	--	--	--	--	--	--	--	--	--	--	--	530 J
Pyridine, 5-ethyl-2-methyl-	--	2000 J	500 J	--	--	--	--	--	--	--	--	1200 J
Spiro (4,5) decane (8CI9CI)	--	--	--	200 J	--	--	--	--	--	--	--	--
Sulfur, moL. (S8) (8CI9CI)	--	--	--	--	--	--	--	--	--	--	--	--
Trimethylbenzene Isomer	--	--	--	--	--	--	--	--	--	--	--	--
Trimethylnaphthalene Isomer	--	--	--	1000 J	--	--	--	--	--	--	--	--
Trimethylpyridine Isomer	--	--	--	--	--	500 J	--	--	--	--	--	--
Unknown 1	500 J	--	200 J	400 J	700 J	--	--	--	200	200 J	--	490 J
Unknown 2	1000 J	--	700 J	300 J	500 J	--	--	--	300 J	--	--	330 J
Unknown 3	2000 J	--	2000 J	--	300 J	--	--	--	200 J	--	--	580 J
Unknown 4	2000 J	--	2000 J	--	--	--	--	--	--	--	--	330 J
Unknown 5	400 J	--	200 J	--	--	--	--	--	--	--	--	410 J
Unknown 6	600 J	--	200 J	--	--	--	--	--	--	--	--	740 J
Unknown 7	800 J	--	400 J	--	--	--	--	--	--	--	--	1400 1
Unknown Alcohol	--	--	--	--	--	--	--	--	--	--	--	--
Unknown Aliphatic Hydrocarbon 1	900 J	--	--	300 J	200 J	700 J	--	--	--	--	--	250 J
Unknown Aliphatic Hydrocarbon 2	700 J	--	--	400 J	800 J	600 J	--	--	--	--	--	290 J
Unknown Aliphatic Hydrocarbon 3	600 J	--	--	1000 J	400 J	2000 J	--	--	--	--	--	370 J
Unknown Aliphatic Hydrocarbon 4	3000 J	--	--	1000 J	500 J	600 J	--	--	--	--	--	--
Unknown Aliphatic Hydrocarbon 5	500 J	--	--	500 J	400 J	3000 J	--	--	--	--	--	--
Unknown Aliphatic Hydrocarbon 6	4000 J	--	--	600 J	3000 J	1000 J	--	--	--	--	--	--
Unknown Aliphatic Hydrocarbon 7	3000 J	--	--	500 J	2000 J	1000 J	--	--	--	--	--	--
Unknown Aliphatic Hydrocarbon 8	3000 J	--	--	2000 J	--	900 J	--	--	--	--	--	--
Unknown Aliphatic Hydrocarbon 9	6000 J	--	--	3000 J	--	1000 J	--	--	--	--	--	--
Unknown Aliphatic Hydrocarbon 10	--	--	--	1000 J	--	3000 J	--	--	--	--	--	--
Unknown Aliphatic Hydrocarbon 11	--	--	--	--	--	1000 J	--	--	--	--	--	--
Unknown Aliphatic Hydrocarbon 12	--	--	--	--	--	6000 J	--	--	--	--	--	--
Unknown Aliphatic Hydrocarbon 13	--	--	--	--	--	600 J	--	--	--	--	--	--
Unknown Aliphatic Hydrocarbon 14	--	--	--	--	--	--	--	--	--	--	--	--
Unknown Aliphatic Hydrocarbon 15	--	--	--	--	--	--	--	--	--	--	--	--
Unknown Cyclic Compound 1	500 J	--	--	1000 J	--	1000 J	--	--	--	--	--	210 J
Unknown Cyclic Compound 2	--	--	--	--	--	--	--	--	--	--	--	--
Unknown Cyclic Compound 3	--	--	--	--	--	--	--	--	--	--	--	--
Unknown Cyclic Compound 4	--	--	--	--	--	--	--	--	--	--	--	--
Unknown Phthalate	--	--	--	--	--	--	--	--	--	--	--	--
Pesticides/PCBs (μ g/kg)												
Aroclor-1254	ND(180)	ND(210)	ND(280)	710	ND(200)	ND(470)	ND(180)	ND(200)	11000	ND(200)	ND(190)	ND(200)

TABLE 6.2
SUMMARY OF TEST PIT SAMPLING RESULTS
THE HARRIMAN SITE
HARRIMAN, NEW YORK

Sample Locations:	TP-1	TP-3	TP-4	TP-5	TP-7	TP-9	TP-13	TP-15	TP-21B	TP-23	TP-26	TP-28
Depth (ft):	3'	5'-6'	5'	4'	5'-6'	8'	2'-3'	4'-7'	3'	3'-5'	3'-4'	4'
Inorganics (mg/kg)												
Aluminum	11800 J	9930	14100	10900	11100	18200	14800	16000	90000	14300	12700	18000 J
Antimony	ND(6.9)	ND(7.8)	ND(10.6)	ND(7.4)	ND(7.5)	ND(8.9)	ND(10.6)	ND(37.4)	ND(3701)	7.6 B	ND(7.3)	ND(7.5)
Arsenic	4	9.1	16.4	9.3	8.4	18.6	11.3	1.5 B	23.6 J	13	10.1	6.4
Barium	38.5 B	27.4 B	101	89.2	42.2 B	46.2 B	80.2	12.9 B	246	54.5	56.5	77.3
Beryllium	0.52 B	0.47 B	0.98 B	0.86 B	0.52 B	1 B	0.74 B	15.6	3.1 B	0.53 B	0.51 B	0.76 B
Cadmium	2.9	3.5	3.7	4.6	2.9	4.1	2.9	ND(5.9)	32.8	4.3	4.5	4.4
Calcium	2420	1260 B	7570	12600	5710	3200	12400	208000	5500 B	1710	2000	8270
Chromium	14.8	16.6	20.8	53.3	14.9	22.7	17.9	4.9	22.1	14.6	19.3	52.4
Cobalt	8.6 B	7.2 B	8.7 B	6.3 B	6.4 B	8.4 B	7.5 B	10.5 B	52.9 B	12.2	11.2 B	10.4 B
Copper	21.7	21	22.6	74.7	74.3	50.1	72.2	139	389	24.9	24.3	1440
Iron	24200	21500	23400	28700	17700	33400	23600	28600	186000	29000	25400	32800
Lead	20.5	9.5	17.8	71.9 J	26.8	27.4	34.4	25.9	55.7	18.6	15	71.3
Magnesium	4290	4730	3520	4550	3880	6600	9180	5940 B	36000	5900	4110	7020
Manganese	746	192	527	525	198	715	556	696	3660	902	1210	641
Mercury	9	379	4.3	74.5	53	ND(16.5)	247	832	17.2	ND(0.10)	2.3	106
Nickel	25.1	25.8	25.8	32.5	28.7	40.5	32.2	45.7 B	205	33	32.1	46.2
Potassium	1660	993 B	1870	1320	752 B	1960	1440	1670	5070 B	933 B	799 B	2240
Selenium	0.1 B	0.1 B	1.1 B	0.27 B	0.15 B	0.24 B	0.3 B	0.05 J	0.39 B	0.1 B	0.12 B	0.26 B
Silver	ND(2.3)	ND(2.6)	ND(3.5)	ND(2.5)	ND(1.0)	ND(2.9)	ND(0.94)	12 B	ND(5.1)	ND(1.0)	ND(1.0)	ND(2.5)
Sodium	96.3 B	107 B	19400	227 B	178 B	312 B	195 B	635 B	751 B	105 B	197 B	849 B
Thallium	0.66 B	0.85 B	1.2 B	0.81 B	ND(0.37)	1 B	ND(0.34)	ND(0.37)	ND(0.37)	0.68 B	ND(0.36)	0.71 B
Vanadium	18.5	15.7	44.9	46.7	18.5	45.7	23.3	33.8 B	151	21.5	19.6	27.2
Zinc	56	52.5	68	224	76.1	100	87.1	226	768	77	63.6	357
Cyanide	4.9	3.1	51.6	2.9	3.1	44.2	3	5.7	3.2	ND(1.2)	ND(1.2)	5.9

Notes:
B - The reported value is less than the Contract Required Detection Limit, but greater than the IDL.
E - Compound concentrations outside the calibration range of analysis.
D - Compounds identified in an analysis at a secondary dilution factor.
J - Compounds are an estimated value.
R - Associated value is not usable.
ND - Not detected.
/ - Duplicate Result

TABLE 6.2
SUMMARY OF TEST PIT SAMPLING RESULTS
THE HARRIMAN SITE
HARRIMAN, NEW YORK

Sample Locations:	TP-29A	TP-30	TP-31	TP-32	TP-35	TP-36	TP-37	TP-38
Depth (ft):	1.5'	3'-4'	2'	2'-3'	3'-4'	1'-5'	2'-9'	6'
Volatile Organics (µ g/kg)								
Acetone	ND(48) / ND(52)	130	23	ND(96)	ND(34)	ND(39) / ND(42)	49	32 / ND(39)
Carbon Disulfide	ND(24) / ND(26)	ND(6)	ND(6)	ND(48)	ND(17)	ND(19) / ND(21)	21	ND(16) / ND(20)
2-Butanone	ND(48) / ND(52)	36	ND(12)	ND(96)	ND(34)	ND(39) / ND(42)	ND(19)	ND(32) / ND(39)
Trichloroethene	ND(24) / ND(26)	ND(6)	8	ND(48)	ND(17)	ND(19) / ND(21)	ND(9)	ND(16) / ND(20)
Benzene	ND(24) / ND(26)	300 E	81	ND(48)	ND(17)	ND(19) / ND(21)	ND(9)	ND(16) / ND(20)
4-Methyl-2-Pentanone	ND(48) / ND(52)	ND(12)	ND(12)	ND(96)	ND(34)	ND(39) / ND(42)	ND(19)	ND(32) / ND(39)
Toluene	590 J / 59 J	1600 D	74	380 J	41	240 / 250	50	220 / 220
Chlorobenzene	ND(24) / ND(26)	260 J	20	ND(48)	ND(17)	ND(19) / ND(21)	ND(9)	ND(16) / ND(20)
Ethylbenzene	44 J / ND(26) J	50	12	ND(48)	ND(17)	ND(19) / ND(21)	ND(9)	ND(16) / ND(20)
Xylene (total)	1000 J / 310 J	1100 D	34	ND(48)	31	ND(19) / ND(21)	ND(9)	ND(16) / ND(20)
TPH (mg/kg)	724 J / 147 J	9.9	13	383	<5	30.1 / 27.6	18	11.2 / 12.4
TICS (ug/kg)								
Cyclohexene, 3-methyl- (8CI9CI)	--	--	--	--	--	--	--	--
Dimethyl-cyclohexane Isomer	--	--	--	200 J	--	--	--	--
Dimethyl-hexadiene Isomer	--	--	--	--	--	--	--	--
Ethyl-dimethylbenzene Isomer 1	1000 J/--	40 J	--	--	--	--	--	--
Ethyl-dimethylbenzene Isomer 2	--	10 J	--	--	--	--	--	--
Ethyl-methylbenzene Isomer 1	1000 J/--	10 J	--	--	--	--	--	--
Ethyl-methylbenzene Isomer 2	700 J/--	30 J	--	--	--	--	--	--
Ethyl-methylbenzene Isomer 3	600/--	--	--	--	--	--	--	--
Ethyl-methyl-pyridine Isomer	--	--	--	--	--	--	--	--
Methyl-hexadiene Isomer 1	--	--	--	--	--	--	--	--
Methyl-hexadiene Isomer 2	--	--	--	--	--	--	--	--
Methyl-propylbenzene Isomer	700 J/--	--	--	--	--	--	--	--
Methyl-pyridine Isomer	--	7 J	--	--	--	--	--	--
N-Butyl ether	--	--	--	--	--	--	--	--
Substit. Benzene	--	--	--	--	--	--	--	--
Trimethylbenzene Isomer 1	1000 J/--	10 J	--	--	--	--	--	--
Trimethylbenzene Isomer 2	500 J/--	--	--	--	--	--	--	--
Trimethyl-cyclohexane Isomer	--	--	--	50 J	--	--	--	--
Trimethyl-cyclopentane Isomer	--	--	--	100	--	--	--	--
Unknown 1	--/50 J	30 J	--	200 J	--	--	--	--/70 J
Unknown 2	--/30 J	--	--	100 J	--	--	--	--
Unknown 3	--/60 J	--	--	100	--	--	--	--
Unknown 4	--	--	--	--	--	--	--	--
Unknown 5	--	--	--	--	--	--	--	--
Unknown 6	--	--	--	--	--	--	--	--
Unknown 7	--	--	--	--	--	--	--	--
Unknown Aromatic 1	400 J/--	9 J	1000 J	--	--	--	--	--
Unknown Aromatic 2	--	--	--	--	--	--	--	--
Unknown Aromatic 3	--	--	--	--	--	--	--	--
Unknown Aromatic 4	--	--	--	--	--	--	--	--
Unknown Aromatic 5	--	--	--	--	--	--	--	--
Unknown Aromatic 6	--	--	--	--	--	--	--	--
Unknown Aromatic 7	--	--	--	--	--	--	--	--
Unknown Hydrocarbon 1	300 J/300 J	--	--	100 J	--	--	--	--
Unknown Hydrocarbon 2	400 J/200 J	--	--	200 J	--	--	--	--
Unknown Hydrocarbon 3	--/50 J	--	--	--	--	--	--	--
Unknown Hydrocarbon 4	--	--	--	--	--	--	--	--
Unknown Hydrocarbon 5	--	--	--	--	--	--	--	--
Unknown Hydrocarbon 6	--	--	--	--	--	--	--	--
Unknown Hydrocarbon 7	--	--	--	--	--	--	--	--
Unknown Hydrocarbon 8	--	--	--	--	--	--	--	--
Semi-Volatile Organics (µ g/kg)								
Phenol	ND(370) / ND(370)	ND(410)	ND(400)	ND(690)	ND(1,200)	ND(720) J / ND(720) J	ND(1,100)	ND(840) / ND(830)
4-Methylphenol	ND(370) / ND(370)	ND(410)	ND(400)	ND(690)	ND(1,200)	ND(720) / ND(720)	ND(1,100)	ND(840) / ND(830)
2,4-Dimethylphenol	ND(370) / ND(370)	ND(410)	ND(400)	ND(690)	ND(1,200)	ND(720) / ND(720)	ND(1,100)	ND(840) / ND(830)
Benzoic acid	ND(1,800) / ND(1,800)	ND(2,100)	ND(2,000)	ND(3,500)	ND(5,800)	ND(3,600) / ND(3,600)	ND(5,600)	ND(4,200) / ND(4,200)
Phenanthrene	180 J / ND(370)	ND(410)	ND(400)	ND(690) J	ND(1,200)	ND(720) / ND(720)	ND(1,100)	ND(840) / ND(830)
Fluoranthene	280 J / ND(370)	ND(410)	ND(400)	ND(690) J	ND(1,200)	ND(720) / ND(720)	ND(1,100)	ND(840) / ND(830)
Pyrene	220 J / ND(370)	ND(410)	ND(400)	ND(690) J	ND(1,200)	ND(720) J / ND(720) J	ND(1,100)	ND(840) / ND(830)
Benzo(a)anthracene	73 J / ND(370)	ND(410)	ND(400)	ND(690) J	ND(1,200)	ND(720) / ND(720)	ND(1,100)	ND(840) / ND(830)
Chrysene	91 J / ND(370)	ND(410)	ND(400)	ND(690) J	ND(1,200)	ND(720) / ND(720)	ND(1,100)	ND(840) / ND(830)
bis(2-Ethylhexyl)phthalate	ND(1,700) / ND(1100)	200 J	45 J	ND(690) J	ND(1,200)	310 J / 2600 J	ND(1,100)	ND(840) / ND(830)
Di-n-octylphthalate	ND(370) / ND(370)	ND(410)	ND(400)	ND(690) J	ND(1,200)	ND(720) / ND(720)	600 J	ND(840) / ND(830)
Pyridine	ND(370) / ND(370)	ND(410)	ND(400)	ND(690)	ND(1,200)	ND(720) / ND(720)	ND(1,100)	ND(840) / ND(830)
Alpha-picoline	ND(370) / ND(370)	270 J	ND(400)	ND(690)	ND(1,200)	ND(720) / ND(720)	ND(1,100)	ND(840) / ND(830)
2-Amino-pyridine	ND(370) / ND(370)	87 J	ND(400)	ND(690)	ND(1,200)	ND(720) / ND(720)	ND(1,100)	ND(840) / ND(830)

TABLE 6.2
SUMMARY OF TEST PIT SAMPLING RESULTS
THE HARRIMAN SITE
HARRIMAN, NEW YORK

Sample Locations:	TP-29A	TP-30	TP-31	TP-32	TP-35	TP-36	TP-37	TP-38
Depth (ft):	1.5'	3'-4'	2'	2'-3'	3'-4'	1'-5'	2'-9'	6'
TICS (ug/kg)								
Benzaldehyde (ACN)(DOT)(8CI9CI)	--	--	--	--	--	--	--	--
Benzenamine, N-ethyl- (9CI)	--	--	--	--	--	--	--	--
Benzene, 1-chloro-4- (1-methyl)	--	500 J	--	--	--	--	--	--
Benzene, 1,1'-oxybis- (9CI)	--	4000 J	200 J	--	--	--	--	--
Benzoic acid, methyl ester	--	--	--	--	--	--	--	--
1,1-Biphenyl (9CI)	--	3000 J	--	--	--	--	--	--
2,4-Bipyridyl	--	--	--	--	--	--	--	--
2,2'-Bipyridine	--	--	--	700 J	--	--	--	--
3,3'-Bipyridine (8CI9CI)	--	700 J	--	--	--	--	--	--
Bipyridine Isomer	--	--	--	--	--	--	--	--
Cyclopentane, 2-ethyllidene-1	--	--	--	--	--	--	--	--
Dimethylpyridine Isomer 1	--	--	--	--	--	--	--	--
Dimethylpyridine Isomer 2	--	--	--	--	--	--	--	--
Dimethylpyridine Isomer 3	--	--	--	--	--	--	--	--
Dimethylpyridine Isomer 4	--	--	--	--	--	--	--	--
Ethyl-methyl-pyridine Isomer	--	300 J	--	--	--	--	--	--
Heptane, 2,3-dimethyl- (8CI9CI)	--	--	--	--	--	--	--	--
Heptane, 3-ethyl-5-methyl-	--	--	--	--	--	--	--	--
1,4-Hexadiene, 3-ethyl- (8CI9CI)	--	--	--	--	--	--	--	--
Hexachloro-1,1'-biphenyl Isomer	--	--	--	--	--	--	--	--
1H-Indene, octahydro-2,2,4,4	--	--	--	--	--	--	--	--
Pentachloro-1,1'-biphenyl Isomer 1	--	200 J	--	--	--	--	--	--
Pentachloro-1,1'-biphenyl Isomer 2	--	--	--	--	--	--	--	--
Pentachloro-1,1'-biphenyl Isomer 3	--	--	--	--	--	--	--	--
Pentachloro-1,1'-biphenyl Isomer 4	--	--	--	--	--	--	--	--
Pyridinamine Isomer	--	--	--	--	--	--	--	--
Pyridine, 3-ethenyl- (9CI)	--	--	--	--	--	--	--	--
Pyridine, 2,5-dimethyl- (9CI)	--	--	--	--	--	--	--	--
Pyridine, 2,3-dimethyl- (9CI)	--	200 J	--	--	--	--	--	--
2-Pyredinecarboxylic acid (9CI)	--	--	--	--	--	--	--	--
Pyridine, 3-methyl- (9CI)	--	--	--	--	--	--	--	--
Pyridine, 2-ethyl- (8CI9CI)	--	--	--	--	--	--	--	--
Pyridine, 4-ethyl- (8CI9CI)	--	--	--	--	--	--	--	--
Pyridine, 5-ethyl-2-methyl-	--	--	--	--	--	--	--	--
Spiro (4,5) decane (8CI9CI)	--	--	--	--	--	--	--	--
Sulfur. moL. (S8) (8CI9CI)	--	--	--	--	--	--	3000 J	700 J/1000 J
Trimethylbenzene Isomer	200 J/--	--	--	--	--	--	--	--
Trimethylnaphthalene Isomer	--	--	--	--	--	--	--	--
Trimethylpyridine Isomer	--	--	--	--	--	--	--	--
Unknown 1	200 J/200 J	1000 J	--	300 J	--	--	2000 J	--
Unknown 2	600 J/--	--	--	--	--	--	2000 J	--
Unknown 3	--	--	--	--	--	--	--	--
Unknown 4	--	--	--	--	--	--	--	--
Unknown 5	--	--	--	--	--	--	--	--
Unknown 6	--	--	--	--	--	--	--	--
Unknown 7	--	--	--	--	--	--	--	--
Unknown Alcohol	--	--	--	--	--	400 J/300 J	--	--
Unknown Aliphatic Hydrocarbon 1	200 J/200 J	--	--	800 J	--	--	--	--
Unknown Aliphatic Hydrocarbon 2	200 J/300 J	--	--	600 J	--	--	--	--
Unknown Aliphatic Hydrocarbon 3	200 J/100 J	--	--	400 J	--	--	--	--
Unknown Aliphatic Hydrocarbon 4	300 J/200 J	--	--	--	--	--	--	--
Unknown Aliphatic Hydrocarbon 5	400 J/600 J	--	--	--	--	--	--	--
Unknown Aliphatic Hydrocarbon 6	300 J/1000 J	--	--	--	--	--	--	--
Unknown Aliphatic Hydrocarbon 7	200 J/300 J	--	--	--	--	--	--	--
Unknown Aliphatic Hydrocarbon 8	300 J/300 J	--	--	--	--	--	--	--
Unknown Aliphatic Hydrocarbon 9	400 J/800 J	--	--	--	--	--	--	--
Unknown Aliphatic Hydrocarbon 10	2000 J/500 J	--	--	--	--	--	--	--
Unknown Aliphatic Hydrocarbon 11	300 J/400 J	--	--	--	--	--	--	--
Unknown Aliphatic Hydrocarbon 12	500 J/2000 J	--	--	--	--	--	--	--
Unknown Aliphatic Hydrocarbon 13	2000 J/700 J	--	--	--	--	--	--	--
Unknown Aliphatic Hydrocarbon 14	2000 J/2000 J	--	--	--	--	--	--	--
Unknown Aliphatic Hydrocarbon 15	--/400 J	--	--	--	--	--	--	--
Unknown Cyclic Compound 1	200 J/300 J	--	--	500 J	--	--	--	--
Unknown Cyclic Compound 2	400 J/100 J	--	--	--	--	--	--	--
Unknown Cyclic Compound 3	--/400 J	--	--	--	--	--	--	--
Unknown Cyclic Compound 4	--/400 J.	--	--	--	--	--	--	--
Unknown Phthalate	--	--	--	--	--	--	1000 J	--
Pesticides/PCBs (μ g/kg)								
Aroclor-1254	ND(180) / ND(180)	570	ND(190)	ND(330)	ND(280)	ND(170) / ND(170)	ND(270)	ND(200) / ND(200)

TABLE 6.2
SUMMARY OF TEST PIT SAMPLING RESULTS
THE HARRIMAN SITE
HARRIMAN, NEW YORK

Sample Locations:	TP-29A	TP-30	TP-31	TP-32	TP-35	TP-36	TP-37	TP-38
Depth (ft):	1.5'	3'-4'	2'	2'-3'	3'-4'	1'-5'	2'-9'	6'
Inorganics (mg/kg)								
Aluminum	15400 J / 13300 J	11900	13200	102 B	175000	11900 / 13300	7750	14700 J / 9190
Antimony	ND(6.6) / ND(6.7)	ND(7.5)	ND(7.3)	ND(12.8)	22.5	ND(6.1) J / ND(30.2)	ND(9.3)	ND(7.1) J / ND(7.0)
Arsenic	5/5	7.3	9.3	ND(1.1)	ND(8.1)	4.3 J / 12.4 J	1.6	5.6 J / 7.7 J
Barium	35.7 B / 44 B	49.6	72.4	3.2 B	15.4	38.6 / 47.8	493	33.6 J / 23.3 J
Beryllium	0.9 B / 0.88 B	0.52 B	0.75 B	4.8	ND(0.21)	ND(0.87) / ND(0.65)	ND(3.3)	ND(0.69) / ND(0.45)
Cadmium	3.9 / 4.3	3.3	3.7	ND(2.0)	ND(1.7)	ND(1.0) / ND(5.1)	2.1	ND(1.2) / ND(1.2)
Calcium	17900 / 9710	8490	12400	301000	1250	28300 J / 10400 J	179000	1390 J / 969 J
Chromium	18.2 / 24.7	19.7	14.5	ND(3.7)	5.6	16.9 / 22.2	10.9	25.2 J / 12.7 J
Cobalt	8.7 B / 11.6	6.2 B	10.1 B	ND(2.3)	ND(2.4)	8.7 / 11.8	5.1	11.7 J / 8 J
Copper	55.6 / 64.2	108	61.3	26.2	10.8	33.1 / 33.5	52.2	20.3 J / 9.6 J
Iron	26500 / 30200	18700	25300	790 J	6970	24900 / 30300	12100	29400 J / 19900 J
Lead	25.6 / 24.9	26.6	54.7	27.4 J	3	82.7 / 106 J	42.5	7.1 J / 10.4 J
Magnesium	15600 J / 10700 J	3910	5460	125 B	1740	6010 / 7360	2170	7080 J / 3430 J
Manganese	651 / 721	452	470	13.1 J	243	679 / 852	195	236 J / 172
Mercury	5.3 J / 10.2 J	2.1	67.1	758	0.16	1.5 J / 50.1 J	323	0.17 / 0.17
Nickel	46.2 / 42.8	34	45.4	ND(6.2)	8.8	25 / 30.9	43.2	31.7 J / 20.4 J
Potassium	1520 / 1300	904 B	1090 B	255 B	318	1190 / 1300	725	1180 J / 597 J
Selenium	ND(0.04) / ND(0.04)	0.32 B	0.45 B	ND(0.08) J	ND(0.64)	ND(0.39) / ND(0.39)	ND(0.60)	ND(0.46) / ND(0.45)
Silver	ND(2.2) / ND(2.2)	ND(1.0)	ND(1.0)	8.4	ND(3.5)	ND(2.2) / ND(2.2)	ND(3.3)	ND(0.56) / ND(2.5)
Sodium	239 B / 207 B	136 B	152 B	842 B	388	61 / 70.7	249	215 J / 508 J
Thallium	ND(0.33) / ND(0.33)	ND(0.37)	ND(0.36)	ND(0.63)	ND(0.25)	ND(0.15) / ND(0.28)	ND(0.23)	ND(0.18) / ND(0.28)
Vanadium	37.8 / 28.9	23.6	30.2	ND(2.4)	5.5	18.6 / 24	11.4	20.8 J / 10.8 J
Zinc	79.6 / 108	141	2810	7.3 B	42.5	87.1 / 92.9	56.7	92.9 / 70.4
Cyanide	1.3 / ND(1.1)	4.2	3	157	ND(1.8)	2 / 1.6	45	ND(1.3) / ND(1.3)

Notes:
B - The reported value is less than the Contract Required Detection Limit, but greater than the IDL.
E - Compound concentrations outside the calibration range of analysis.
D - Compounds identified in an analysis at a secondary dilution factor.
J - Compounds are an estimated value.
R - Associated value is not usable.
ND - Not detected.
/ - Duplicate Result

TABLE 1

Summary of historical mercury analytical results, Study Area B (Parking Lot and Surrounding Area) by medium

Groundwater (ug/l) - results indicate total mercury unless otherwise noted. (d) - indicates dissolved result

Well ID	Date										Reference
	Jun-85	Sep-91	Sep-00	Apr-01	Dec-01	Jul-02	Jul-05	Jun-06	Oct-07	Apr-08	
MW-1	1.6	0.4									RI - CRA, November, 1995
MW-22			0.135	0.0275	0.239						Arcadis River Bank Study
MW-22			.0058 (d)	.0178 (d)	.0028 (d)						Arcadis River Bank Study
MW-24			0.416	0.416	0.765	0.551					Arcadis River Bank Study
MW-24			.338 (d)	.283 (d)	.598 (d)	.279 (d)					Arcadis River Bank Study
MW-24S							0.31	0.3	0.392	1.1	Groundwater Monitoring
MW-28S			0.344	0.215	0.186	0.27					Arcadis River Bank Study
MW-28S			.270 (d)	.0823 (d)	.156 (d)	.0918 (d)					Arcadis River Bank Study
MW-30S			0.133	0.0571	0.0039						Arcadis River Bank Study
MW-30S			.0104 (d)	.028 (d)	.0012 (d)						Arcadis River Bank Study
MW-32						0.59					Arcadis River Bank Study
MW-32						0.301 (d)					Arcadis River Bank Study

Calcium Sulfate from Test Pits (mg/kg)

	Date	
	1991	
TP-32	756	RI - CRA, November, 1995
TP-37	323	RI - CRA, November, 1996

Note: Mercury results are consistent with those from samples collected in test pits on the main plant site by both CRA (1995) and Brown & Caldwell (2007)

TABLE 2
DETECTED VOLATILE ORGANIC COMPOUNDS IN SOIL SAMPLES

Sample ID	Sample Interval (Ft bgs)	Sample Discription	PID Reading (ppm)	Detected Volatile Organic Compounds (all values in ug/kg)							
				Acetone	Benzene	Carbon disulfide	Ethy benzene	Methyl Ethyl Ketone	Methylene Chloride	Toluene	Total Xylenes
SB#1-A4-9.5'	9' - 9.5'	Black silty clay, organic	32	120		12		32	4.2	0.84	1.1
SB#2-A6- 4.75-5'	4.75' - 5.25'	Black silty clay, organic. At contact with overlying Calcium Sulfate.	13	16		2.4			2.3	0.38	
SB#6-A1- 6-9bg"	0.5' - 0.8'	Fill - C-F Sand and Gravel	444						1.5	0.47	
SB#7A5 8-8 1/2	8' - 8.5'	Brown Peat,	0	130		3.9	1.1	47		1.3	8.4
SB#8A3 9-9 1/2'	9' - 9.5'	C- F Sand and Gravel	354	49	9.2	4.3	130		19	17	680
SB#9A2 8'bg	8' - 8.5'	C- F Sand and Gravel	180		120	7.2	11		7.1	7.6	26

TABLE 3
TOTAL MERCURY CONCENTRATIONS IN CALCIUM SULFATE AND SOIL SAMPLES

Sample ID	Sample Interval	Total Mercury (mg/Kg	Mercury Vapor (mg/M^3)	Sample Description
		Discrete Samples		
SB#1A4 9 1/2'bg	9.5' - 10'	3.3	0.774	Black silty clay, organic
SB#3A3 9'bg	9.0' - 9.5'	1900	0.999	Black silty clay, organic. At contact with Calcium Sulfate.
SB#6A2 2 1/2'bg	2.5' - 3.0'	502	0.901	White Calcium Sulfate
SB#8A5 9-10 1/2	9.0' - 10.0'	1.1	0.047	Brown Peat,
SB#9A1 8-8 1/2'	8.0' - 8.5'	417	0.918	Mixture of Calcium Sulfate and f-c Gravel
SB#9A6 4-4 1/2'	4.0' - 4.5'	319	0.000	White Calcium Sulfate/Peat
		Composite Samples		
Composite Area 1	NA	484	NA	Calcium Sulfate
Composite Area 2	NA	529	NA	Calcium Sulfate
Composite Area 3	NA	598	NA	Calcium Sulfate
Composite Area 4	NA	577	NA	Calcium Sulfate
Composite Area 5	NA	572	NA	Calcium Sulfate
Composite Area 6	NA	356	NA	Calcium Sulfate

Table 6-1
Overburden Groundwater Quality Comparison to Part 703 Standards -- COC Selection
RI Data

Well ID	*Part 703*	MW-1						MW-2		MW-3					
Sampling Date	*GW Standard*	6/8/1985	6/20/1988	9/20/1988	12/29/1988	3/23-29/89	9/16/1991	6/8/1985	9/26/1991	6/8/1985	6/20/1988	9/20/1988	12/29/1988	3/23-29/89	9/30/1991
Volatile Organics (μg/l)															
Methylene Chloride	5	--	--	--	--	--	ND(5)	--	ND(5)	--	--	--	--	--	ND(5) / ND(5)
Acetone	N/A	--	--	--	--	--	ND(10)	--	ND(10)	--	--	--	--	--	ND(10) / ND(10)
1,1-Dichloroethene	5	--	--	--	--	--	ND(5) J	--	ND(5)	--	--	--	--	--	ND(5) / ND(5)
1,2-Dichloroethane	0.6	--	--	--	--	--	ND(5)	--	ND(5)	--	--	--	--	--	ND(5) / ND(5)
2-Butanone	N/A	--	--	--	--	--	ND(10)	--	ND(10)	--	--	--	--	--	ND(10) / ND(10)
1,1,1-Trichloroethane	5	--	--	--	--	--	ND(5)	--	ND(5)	--	--	--	--	--	ND(5) / ND(5)
Trichloroethene	5	--	--	--	--	--	ND(5) J	--	ND(5)	--	--	--	--	--	ND(5) / ND(5)
Benzene	1	--	**260**	**600**	**380**	**220**	ND(5) J	--	ND(5)	--	ND(-)	ND(-)	ND(-)	ND(-)	ND(5) / ND(5)
Toluene	5	--	ND(-)	ND	--	ND(-)	ND(5) J	--	ND(5)	--	ND(-)	ND(-)	--	ND(-)	ND(5) / ND(5)
Chlorobenzene	5	--	--	--	--	--	ND(5) J	--	ND(5)	--	--	--	--	--	ND(5) / ND(5)
Ethylbenzene	5	--	ND(-)	--	--	ND(-)	ND(5)	--	ND(5)	--	ND(-)	--	--	ND(-)	ND(5) / ND(5)
Xylene (total)	5	--	ND(-)	--	--	ND(-)	ND(5)	--	ND(5)	--	ND(-)	--	--	ND(-)	ND(5) / ND(5)
TPH (mg/l)		--	--	--	--	--	<5	--	<5	--	--	--	--	--	<5 / <5
Semi-Volatile Organics (μg/l)															
Pentachlorophenol	5	--	--	--	--	--	ND(52)	--	ND(50)	--	--	--	--	--	ND(51) / ND(52)
bis(2-Ethylhexyl)phthalate	5	--	--	--	--	--	**15**	--	**10 J**	--	--	--	--	--	**8 J / 13 J**
Di-n-octylphthalate	N/A	--	--	--	--	--	ND(10)	--	ND(10)	--	--	--	--	--	**4 J / ND(10)**
Pyridine	5	ND(1000)	--	--	--	--	ND(10)	ND(1000)	ND(10)	ND(1000)	--	--	--	--	ND(10) / ND(10)
Alpha-picoline	5	--	--	--	--	--	ND(10)	--	ND(10)	--	--	--	--	--	ND(10) / ND(10)
2-Amino-pyridine	5	--	--	--	--	--	ND(10)	--	ND(10)	--	--	--	--	--	ND(10) / ND(10)
Inorganics (μg/l)															
Aluminum	N/A	--	--	--	--	--	ND(19.2)	--	**3600**	--	--	--	--	--	**471 J / 269 J**
Antimony	3	--	--	--	--	--	ND(30.3)	--	ND(30.3)	--	--	--	--	--	ND(30.3) / ND(30.3)
Arsenic	25	**26**	--	--	--	--	**17.5**	**9**	ND(2.5)	ND(1)	--	--	--	--	ND(2.5) / ND(2.5)
Barium	1000	**610**	--	--	--	--	**118**	**400**	**61.8**	**260**	--	--	--	--	**17.8 / 15.2**
Beryllium	N/A	--	--	--	--	--	ND(0.30)	--	**0.3**	--	--	--	--	--	ND(0.30) / ND(0.30)
Cadmium	5	ND(3)	--	--	--	--	ND(5.0)	ND(3)	ND(4.8)	ND(3)	--	--	--	--	ND(4.8) / ND(4.8)
Calcium	N/A	--	--	--	--	--	**99700**	--	**76500**	--	--	--	--	--	**61300 / 55600**
Chromium	50	--	--	--	--	--	ND(8.7)	--	ND(8.7)	--	--	--	--	--	ND(8.7) / ND(8.7)
Cobalt	N/A	--	--	--	--	--	ND(5.4)	--	ND(5.4)	--	--	--	--	--	ND(5.4) / ND(5.4)
Copper	200	--	--	--	--	--	**5**	--	**17.3**	--	--	--	--	--	**6 / 6**
Iron	300	--	--	--	--	--	**4040**	--	**7270**	--	--	--	--	--	**404 / 352**
Lead	25	--	--	--	--	--	ND(1.1)	--	**8.1**	--	--	--	--	--	**5 J / 3.2 J**
Magnesium	35,000	--	--	--	--	--	**33500**	--	**30800**	--	--	--	--	--	**3030 J / 1560 J**
Manganese	300	--	--	--	--	--	**1030**	--	**3120**	--	--	--	--	--	**765 J /407 J**
Mercury	0.7	**1.6**	--	--	--	--	**0.4**	**0.4**	**0.75**	**0.2**	--	--	--	--	ND(0.20) / ND(0.20)
Nickel	100	**36**	--	--	--	--	ND(14.7)	ND(20)	**42.7**	ND(20)	--	--	--	--	**40.6 J / 15.4 J**
Potassium	N/A	--	--	--	--	--	**7300**	--	**2610**	--	--	--	--	--	**2720 / 2880**
Selenium	10	**12**	--	--	--	--	ND(0.20)	**6**	ND(0.20)	**3**	--	--	--	--	ND(0.45) / ND(0.55)
Silver	50	ND(6)	--	--	--	--	ND(10.0)	ND(6)	ND(10.0)	ND(6)	--	--	--	--	ND(10.0) / ND(10.0)
Sodium	N/A	**196500**	--	--	--	--	**115000**	**65900**	**66800**	**44000**	--	--	--	--	**40700 / 41400**
Thallium	N/A	--	--	--	--	--	ND(1.5) J	--	ND(1.5)	--	--	--	--	--	ND(1.5) / ND(1.5)
Vanadium	N/A	--	--	--	--	--	ND(5.7)	--	ND(5.7)	--	--	--	--	--	ND(5.7) / ND(5.7)
Zinc	N/A	**130**	--	--	--	--	**8.8**	**118**	**134**	**117**	--	--	--	--	**48.3 J /68.8 J**
Cyanide	200	**20**	--	--	--	--	ND(10.0)	ND(20)	ND(10.0)	ND(20)	--	--	--	--	**12 / ND(10.0)**

Notes:
Toned cells greater than Part 703 standard
ND - Not Detected.
ND(-) - Not Detected and No Detection Limit Stated
J - Compounds are an estimated value.
D - Compounds identified in an analysis at a secondary dilution factor
E - Compounds whose concentrations are outside the calibration range.
R - Data is unusable.
/ - Duplicate Result
-- -Not Analyzed for

Table 6-1
Overburden Groundwater Quality Comparison to Part 703 Standards -- COC Selection
RI Data

Well ID	*Part 703*	MW-4						MW-5					
Sampling Date	*GW Standard*	6/8/1985	6/20/1988	9/20/1988	12/29/1988	3/23-29/89	9/12/1991	6/8/1985	6/20/1988	9/20/1988	12/29/1988	3/23-29/89	9/13/1991
Volatile Organics (µg/l)													
Methylene Chloride	5	--	--	--	--	--	ND(5) / ND(5)	--	--	--	--	--	ND(5)
Acetone	N/A	--	--	--	--	--	ND(10) / ND(10)	--	--	--	--	--	ND(10)
1,1-Dichloroethene	5	--	--	--	--	--	ND(5) / ND(5)	--	--	--	--	--	ND(5)
1,2-Dichloroethane	0.6	--	--	--	--	--	ND(5) / ND(5)	--	--	--	--	--	ND(5)
2-Butanone	N/A	--	--	--	--	--	ND(10) / ND(10)	--	--	--	--	--	ND(10)
1,1,1-Trichloroethane	5	--	--	--	--	--	ND(5) / ND(5)	--	--	--	--	--	ND(5)
Trichloroethene	5	--	--	--	--	--	ND(5) / ND(5)	--	--	--	--	--	ND(5)
Benzene	1	--	**1**	ND(-)	**1.1**	ND(-)	**3 J / 3 J**	--	5.6	ND(-)	**1200**	**680**	**2 J**
Toluene	5	--	ND(-)	ND(-)	--	ND(-)	**ND(5) / 3 J**	--	ND(-)	ND(-)	--	ND(-)	ND(5)
Chlorobenzene	5	--	--	--	--	--	**3 J / 3 J**	--	--	--	--	--	ND(5)
Ethylbenzene	5	--	ND(-)	--	--	ND(-)	ND(5) / ND(5)	--	ND(-)	--	--	ND(-)	ND(5)
Xylene (total)	5	--	ND(-)	--	--	ND(-)	ND(5) / ND(5)	--	ND(-)	--	--	ND(-)	ND(5)
TPH (mg/l)		--	--	--	--	--	<5 / <5	--	--	--	--	--	<5
Semi-Volatile Organics (µg/l)													
Pentachlorophenol	5	--	--	--	--	--	ND(52) / ND(53)	--	--	--	--	--	ND(57)
bis(2-Ethylhexyl)phthalate	5	--	--	--	--	--	**33 / 31**	--	--	--	--	--	ND(10)
Di-n-octylphthalate	N/A	--	--	--	--	--	ND(10) / ND(11)	--	--	--	--	--	ND(11)
Pyridine	5	ND(1000)	--	--	--	--	ND(10) / ND(11)	ND(1000)	--	--	--	--	ND(11)
Alpha-picoline	5	--	--	--	--	--	ND(10) / ND(11)	--	--	--	--	--	ND(11)
2-Amino-pyridine	5	--	--	--	--	--	ND(10) / ND(11)	--	--	--	--	--	ND(11)
Inorganics (µg/l)													
Aluminum	N/A	--	--	--	--	--	**2740 J / 2220 J**	--	--	--	--	--	**1800**
Antimony	3	--	--	--	--	--	ND(30.3) / ND(30.3)	--	--	--	--	--	ND(30.3)
Arsenic	25	**3**	--	--	--	--	**7.7 / 7.9**	ND(1)	--	--	--	--	**4**
Barium	1000	**580**	--	--	--	--	**41.5 / 41.3**	**400**	--	--	--	--	**92.1**
Beryllium	N/A	--	--	--	--	--	0.5 / ND(0.30)	--	--	--	--	--	ND(0.30)
Cadmium	5	ND(3)	--	--	--	--	ND(5.0) / ND(5.0)	ND(3)	--	--	--	--	ND(5.0)
Calcium	N/A	--	--	--	--	--	**42200 / 44600**	--	--	--	--	--	**126000**
Chromium	50	--	--	--	--	--	ND(8.7) / ND(8.7)	--	--	--	--	--	ND(8.7)
Cobalt	N/A	--	--	--	--	--	ND(5.4) / ND(5.4)	--	--	--	--	--	**5.4**
Copper	200	--	--	--	--	--	**16.4 / 12.1**	--	--	--	--	--	ND(12.3)
Iron	300	--	--	--	--	--	**5450 / 4580**	--	--	--	--	--	**3450**
Lead	25	--	--	--	--	--	**4.9 J / 6.3 J**	--	--	--	--	--	**4.1**
Magnesium	35,000	--	--	--	--	--	**15500 / 16500**	--	--	--	--	--	**6050**
Manganese	300	--	--	--	--	--	**896 / 976**	--	--	--	--	--	**505**
Mercury	0.7	**0.2**	--	--	--	--	ND(0.20) / ND(0.20)	**0.2**	--	--	--	--	ND(0.20)
Nickel	100	ND(20)	--	--	--	--	ND(14.7) / ND(10.0)	**40**	--	--	--	--	ND(14.7)
Potassium	N/A	--	--	--	--	--	**5640 / 5380**	--	--	--	--	--	**3530**
Selenium	10	**6**	--	--	--	--	**0.25 / ND(0.20)**	**4**	--	--	--	--	ND(0.20)
Silver	50	ND(6)	--	--	--	--	ND(10.0) / ND(10.0)	ND(6)	--	--	--	--	**10**
Sodium	N/A	**32600**	--	--	--	--	**74300 / 72900**	**110600**	--	--	--	--	**34000**
Thallium	N/A	--	--	--	--	--	ND(1.5) / ND(1.5)	--	--	--	--	--	ND(1.5)
Vanadium	N/A	--	--	--	--	--	**10.5 / 8.3**	--	--	--	--	--	**7.5**
Zinc	N/A	**159**	--	--	--	--	**42.7 J / 27.2 J**	**167**	--	--	--	--	**18.3**
Cyanide	200	ND(20)	--	--	--	--	ND(10.0) / ND(10.0)	ND(20)	--	--	--	--	ND(10.0)

Notes:
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ND(-) - Not Detected and No Detection Limit Stated
J - Compounds are an estimated value.
D - Compounds identified in an analysis at a secondary
E - Compounds whose concentrations are outside the ca
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Table 6-1
Overburden Groundwater Quality Comparison to Part 703 Standards -- COC Selection
RI Data

Well ID	*Part 703*	MW-7						MW-8						
Sampling Date	*GW Standard*	6/8/1985	6/20/1988	9/20/1988	12/29/1988	3/23-29/89	9/13/1991	6/8/1985	6/20/1988	21/7/88	9/20/1988	12/29/1988	3/23-29/89	9/20/1991
Volatile Organics (µg/l)														
Methylene Chloride	5	--	--	--	--	--	ND(5)	--	--	--	--	--	--	ND(5)
Acetone	N/A	--	--	--	--	--	1100 E	--	--	--	--	--	--	ND(10)
1,1-Dichloroethene	5	--	--	--	--	--	ND(5)	--	--	--	--	--	--	ND(5)
1,2-Dichloroethane	0.6	--	--	--	--	--	ND(5)	--	--	--	--	--	--	**5**
2-Butanone	N/A	--	--	--	--	--	ND(10)	--	--	--	--	--	--	ND(10)
1,1,1-Trichloroethane	5	--	--	--	--	--	ND(5)	--	--	--	--	--	--	ND(5)
Trichloroethene	5	--	--	--	--	--	ND(5)	--	--	--	--	--	--	ND(5)
Benzene	1	--	ND(-)	ND(-)	ND(-)	ND(-)	**44**	--	**37**	**250**	**320**	**1500**	**15**	**310**
Toluene	5	--	ND(-)	ND(-)	--	ND(-)	ND(5)	--	ND(-)	**1.2**	**1.6**	--	ND(-)	ND(5)
Chlorobenzene	5	--	--	--	--	--	ND(5)	--	--	--	--	--	--	ND(5)
Ethylbenzene	5	--	ND(-)	--	--	ND(-)	ND(5)	--	ND(-)	--	--	--	ND(-)	ND(5)
Xylene (total)	5	--	ND(-)	--	--	ND(-)	ND(5)	--	ND(-)	--	--	--	ND(-)	ND(5)
TPH (mg/l)		--	--	--	--	--	<5	--	--	--	--	--	--	<5
Semi-Volatile Organics (µg/l)														
Pentachlorophenol	5	--	--	--	--	--	ND(59)	--	--	--	--	--	--	ND(59)
bis(2-Ethylhexyl)phthalate	5	--	--	--	--	--	ND(16)	--	--	--	--	--	--	**52**
Di-n-octylphthalate	N/A	--	--	--	--	--	ND(12)	--	--	--	--	--	--	ND(12)
Pyridine	5	ND(1000)	--	--	--	--	ND(12)	ND(1000)	--	--	--	--	--	ND(12)
Alpha-picoline	5	--	--	--	--	--	ND(12)	--	--	--	--	--	--	ND(12)
2-Amino-pyridine	5	--	--	--	--	--	ND(12)	--	--	--	--	--	--	**150**
Inorganics (µg/l)														
Aluminum	N/A	--	--	--	--	--	**5300**	--	--	--	--	--	--	**140**
Antimony	3	--	--	--	--	--	**46.9**	--	--	--	--	--	--	ND(30.3)
Arsenic	25	**28**	--	--	--	--	**4.1**	**96**	--	--	--	--	--	**4.5**
Barium	1000	**260**	--	--	--	--	**164**	**300**	--	--	--	--	--	**122**
Beryllium	N/A	--	--	--	--	--	ND(0.30)	--	--	--	--	--	--	ND(0.30)
Cadmium	5	ND(3)	--	--	--	--	ND(5.0)	**160**	--	--	--	--	--	ND(4.8)
Calcium	N/A	--	--	--	--	--	**121000**	--	--	--	--	--	--	**44600**
Chromium	50	--	--	--	--	--	**17.4**	--	--	--	--	--	--	ND(8.7)
Cobalt	N/A	--	--	--	--	--	ND(5.4)	--	--	--	--	--	--	ND(5.4)
Copper	200	--	--	--	--	--	**18.1**	--	--	--	--	--	--	ND(3.0)
Iron	300	--	--	--	--	--	**10500**	--	--	--	--	--	--	**3310**
Lead	25	--	--	--	--	--	**8.4**	--	--	--	--	--	--	**2.9**
Magnesium	35,000	--	--	--	--	--	**44100**	--	--	--	--	--	--	**20400**
Manganese	300	--	--	--	--	--	**848**	--	--	--	--	--	--	**246**
Mercury	0.7	**2**	--	--	--	--	ND(0.20)	**0.8**	--	--	--	--	--	ND(0.20)
Nickel	100	**40**	--	--	--	--	**18.1**	**44**	--	--	--	--	--	ND(10.0)
Potassium	N/A	--	--	--	--	--	**2460**	--	--	--	--	--	--	**10700**
Selenium	10	**16**	--	--	--	--	ND(0.20)	**52**	--	--	--	--	--	ND(0.20)
Silver	50	ND(6)	--	--	--	--	**10**	ND(6)	--	--	--	--	--	ND(10.0)
Sodium	N/A	**74500**	--	--	--	--	**45800**	**223600**	--	--	--	--	--	**47800**
Thallium	N/A	--	--	--	--	--	ND(1.5)	--	--	--	--	--	--	ND(1.5)
Vanadium	N/A	--	--	--	--	--	**13**	--	--	--	--	--	--	ND(5.7)
Zinc	N/A	**145**	--	--	--	--	**41**	**201**	--	--	--	--	--	**57.1**
Cyanide	200	**160**	--	--	--	--	ND(10.0)	**90**	--	--	--	--	--	ND(10.0)

<u>Notes:</u>
Toned cells greater than Part 703 standard
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D - Compounds identified in an analysis at a secondary
E - Compounds whose concentrations are outside the ca
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/ - Duplicate Result
-- -Not Analyzed for

Table 6-1
Overburden Groundwater Quality Comparison to Part 703 Standards -- COC Selection
RI Data

Well ID	*Part 703*	MW-9						MW-11						
Sampling Date	*GW Standard*	6/8/1985	6/20/1988	9/20/1988	12/29/1988	3/23-29/89	9/26/1991	6/5/1988	6/20/1988	6/8/1985	9/20/1988	12/29/1988	3/23-29/89	9/13/1991
Volatile Organics (µg/l)														
Methylene Chloride	5	- -	- -	- -	- -	- -	ND(5) / ND(5)	- -	- -	- -	- -	- -	- -	ND(5)
Acetone	N/A	- -	- -	- -	- -	- -	ND(10) / ND(10)	- -	- -	- -	- -	- -	- -	ND(10)
1,1-Dichloroethene	5	- -	- -	- -	- -	- -	ND(5) / ND(5)	- -	- -	- -	- -	- -	- -	ND(5)
1,2-Dichloroethane	0.6	- -	- -	- -	- -	- -	ND(5) / ND(5)	- -	- -	- -	- -	- -	- -	ND(5)
2-Butanone	N/A	- -	- -	- -	- -	- -	ND(10) / ND(10)	- -	- -	- -	- -	- -	- -	ND(10)
1,1,1-Trichloroethane	5	- -	- -	- -	- -	- -	ND(5) / ND(5)	- -	- -	- -	- -	- -	- -	ND(5)
Trichloroethene	5	- -	- -	- -	- -	- -	ND(5) / ND(5)	- -	- -	- -	- -	- -	- -	ND(5)
Benzene	1	- -	ND(-)	ND(-)	ND(-)	ND(-)	ND(5) / ND(5)	ND(5)	**240**	**180**	ND(-)	**230**	**150**	ND(5)
Toluene	5	- -	ND(-)	ND(-)	- -	ND(-)	ND(5) / ND(5)	ND(5)	ND(-)	ND(-)	ND(-)	- -	ND(-)	ND(5)
Chlorobenzene	5	- -	- -	- -	- -	- -	ND(5) / ND(5)	- -	- -	- -	- -	- -	- -	ND(5)
Ethylbenzene	5	- -	ND(-)	- -	- -	ND(-)	ND(5) / ND(5)	- -	ND(-)	- -	- -	- -	ND(-)	ND(5)
Xylene (total)	5	- -	ND(-)	- -	- -	ND(-)	ND(5) / ND(5)	- -	ND(-)	- -	- -	- -	ND(-)	ND(5)
TPH (mg/l)		- -	- -	- -	- -	- -	<5 / <5	- -	- -	- -	- -	- -	- -	<5
Semi-Volatile Organics (µg/l)														
Pentachlorophenol	5	- -	- -	- -	- -	- -	ND(50) / ND(50)	- -	- -	- -	- -	- -	- -	ND(52)
bis(2-Ethylhexyl)phthalate	5	- -	- -	- -	- -	- -	**7 J / 20 J**	- -	- -	- -	- -	- -	- -	**130**
Di-n-octylphthalate	N/A	- -	- -	- -	- -	- -	ND(10) / ND(10) J	- -	- -	- -	- -	- -	- -	ND(10)
Pyridine	5	ND(1000)	- -	- -	- -	- -	ND(10) / ND(10)	ND(1000)	- -	- -	- -	- -	- -	ND(10)
Alpha-picoline	5	- -	- -	- -	- -	- -	ND(10) / ND(10)	- -	- -	- -	- -	- -	- -	ND(10)
2-Amino-pyridine	5	- -	- -	- -	- -	- -	ND(10) / ND(10)	- -	- -	- -	- -	- -	- -	ND(10)
Inorganics (µg/l)														
Aluminum	N/A	- -	- -	- -	- -	- -	**482 J / 1180 J**	- -	- -	- -	- -	- -	- -	**267**
Antimony	3	- -	- -	- -	- -	- -	**ND(30.3) / 73.3**	- -	- -	- -	- -	- -	- -	**45**
Arsenic	25	**107**	- -	- -	- -	- -	ND(2.5) / ND(2.5)	ND(1)	- -	- -	- -	- -	- -	**6.9**
Barium	1000	**670**	- -	- -	- -	- -	**28.4 / 39.5**	**220**	- -	- -	- -	- -	- -	**134**
Beryllium	N/A	- -	- -	- -	- -	- -	**ND(0.30) / 1.4**	ND(3)	- -	- -	- -	- -	- -	ND(0.30)
Cadmium	5	ND(3)	- -	- -	- -	- -	**ND(4.8) J / 8.6 J**	- -	- -	- -	- -	- -	- -	ND(5.0)
Calcium	N/A	- -	- -	- -	- -	- -	**68500 / 72100**	- -	- -	- -	- -	- -	- -	**78400**
Chromium	50	- -	- -	- -	- -	- -	**ND(8.7) / 14.8**	- -	- -	- -	- -	- -	- -	ND(8.7)
Cobalt	N/A	- -	- -	- -	- -	- -	**ND(5.4) / 9.7**	- -	- -	- -	- -	- -	- -	ND(5.4)
Copper	200	- -	- -	- -	- -	- -	**8.2 / 28.3**	ND(10)	- -	- -	- -	- -	- -	ND(6.1)
Iron	300	- -	- -	- -	- -	- -	**1440 J / 2080 J**	- -	- -	- -	- -	- -	- -	**1590**
Lead	25	- -	- -	- -	- -	- -	**2.5 / 4**	ND(25)	- -	- -	- -	- -	- -	**1.5**
Magnesium	35,000	- -	- -	- -	- -	- -	**27100 / 28200**	- -	- -	- -	- -	- -	- -	**35700**
Manganese	300	- -	- -	- -	- -	- -	**574 J / 733 J**	- -	- -	- -	- -	- -	- -	**522**
Mercury	0.7	ND(0.5)	- -	- -	- -	- -	**0.45 / 0.55**	ND(0.5)	- -	- -	- -	- -	- -	ND(0.20)
Nickel	100	**480**	- -	- -	- -	- -	**20.2 / 38.9**	ND(20)	- -	- -	- -	- -	- -	ND(14.7)
Potassium	N/A	- -	- -	- -	- -	- -	1790 / 2270	- -	- -	- -	- -	- -	- -	**4190**
Selenium	10	**12**	- -	- -	- -	- -	ND(0.20) / ND(0.20)	**19**	- -	- -	- -	- -	- -	ND(0.20)
Silver	50	ND(6)	- -	- -	- -	- -	ND(10.0) / ND(10.0)	- -	- -	- -	- -	- -	- -	ND(10.0)
Sodium	N/A	**54900**	- -	- -	- -	- -	**61300 / 62000**	**307900**	- -	- -	- -	- -	- -	**116000**
Thallium	N/A	- -	- -	- -	- -	- -	ND(1.5) / ND(1.5)	- -	- -	- -	- -	- -	- -	ND(1.5)
Vanadium	N/A	- -	- -	- -	- -	- -	**ND(5.7) / 29.6**	- -	- -	- -	- -	- -	- -	**6.7**
Zinc	N/A	**109**	- -	- -	- -	- -	**64.1 J / 98.2 J**	**41**	- -	- -	- -	- -	- -	**5**
Cyanide	200	ND(20)	- -	- -	- -	- -	ND(10.0) /ND(10.0)	ND(20)	- -	- -	- -	- -	- -	ND(10.0)

Notes:
Toned cells greater than Part 703 standard
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ND(-) - Not Detected and No Detection Limit Stated
J - Compounds are an estimated value.
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E - Compounds whose concentrations are outside the ca
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Table 6-1
Overburden Groundwater Quality Comparison to Part 703 Standards -- COC Selection
RI Data

Well ID / *Sampling Date*	*Part 703* *GW Standard*	MW-12 6/8/1985	MW-12 9/30/1991	MW-13 10/22/1985	MW-13 9/30/1991	MW-14 10/22/1985	MW-14 3/23-29/89	MW-14 9/25/1991	MW-15 10/22/1985	MW-15 9/27/1991
Volatile Organics (µg/l)										
Methylene Chloride	5	- -	ND(5)	- -	ND(5)	- -	- -	ND(5)	- -	**7 J**
Acetone	N/A	- -	ND(10)	- -	ND(10)	- -	- -	ND(10)	- -	ND(5)
1,1-Dichloroethene	5	- -	ND(5)	- -	ND(5)	- -	- -	ND(5)	- -	ND(5)
1,2-Dichloroethane	0.6	- -	ND(5)	- -	ND(5)	- -	- -	ND(5)	- -	ND(5)
2-Butanone	N/A	- -	ND(10)	- -	ND(10)	- -	- -	ND(10)	- -	ND(10)
1,1,1-Trichloroethane	5	- -	ND(5)	- -	ND(5)	- -	- -	ND(5)	- -	ND(5)
Trichloroethene	5	- -	ND(5)	- -	ND(5)	- -	- -	ND(5)	- -	ND(5)
Benzene	1	ND(5)	ND(5)	**18**	ND(5)	ND(5)	ND(-)	**2 J**	ND(5)	**390**
Toluene	5	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(-)	ND(5)	ND(5)	ND(5)
Chlorobenzene	5	- -	ND(5)	- -	ND(5)	- -	- -	**3 J**	- -	ND(5)
Ethylbenzene	5	- -	ND(5)	- -	ND(5)	- -	ND(-)	ND(5)	- -	ND(5)
Xylene (total)	5	- -	ND(5)	- -	ND(5)	- -	ND(-)	ND(5)	- -	ND(5)
TPH (mg/l)		- -	<5	- -	<5	- -	- -	<5	- -	<5
Semi-Volatile Organics (µg/l)										
Pentachlorophenol	5	- -	ND(53) R	- -	ND(54)	- -	- -	ND(56) R	- -	ND(59)
bis(2-Ethylhexyl)phthalate	5	- -	ND(11)	- -	**5 J**	- -	- -	**17 J**	- -	**5 J**
Di-n-octylphthalate	N/A	- -	ND(11)	- -	ND(11)	- -	- -	ND(11)	- -	ND(12)
Pyridine	5	ND(1000)	ND(11)	ND(1000)	ND(11)	ND(1000)	- -	ND(11)	**1930**	ND(12)
Alpha-picoline	5	- -	ND(11)	- -	ND(11)	- -	- -	ND(11)	- -	ND(12)
2-Amino-pyridine	5	- -	ND(11)	- -	ND(11)	- -	- -	ND(11)	- -	ND(12)
Inorganics (µg/l)										
Aluminum	N/A	- -	**254**	- -	**437**	- -	- -	**16200**	- -	**2150**
Antimony	3	- -	ND(30.3)	- -	ND(30.3)	- -	- -	ND(30.3)	- -	ND(30.3)
Arsenic	25	**5**	**2.9**	**13**	**3.2**	**10**	- -	**21.5**	**23**	ND(2.5)
Barium	1000	**820**	**35.7**	ND(50)	**45.5**	ND(50)	- -	**274**	**123**	**205**
Beryllium	N/A	ND(3)	ND(0.30)	**100**	ND(0.30)	**6**	- -	**0.7**	ND(3)	ND(0.30)
Cadmium	5	- -	**11.3**	- -	**9.2**	- -	- -	**6.3**	- -	ND(4.8)
Calcium	N/A	- -	**76500**	- -	**76200**	- -	- -	**63700**	- -	**54900**
Chromium	50	- -	**28.4**	- -	**37.4**	- -	- -	**23.8**	- -	**13.8**
Cobalt	N/A	- -	**68.8**	- -	**15.4**	- -	- -	**5.4**	- -	ND(5.4)
Copper	200	ND(10)	**20.3**	**34**	**18.4**	**36**	- -	**31.9**	**71**	**28.4**
Iron	300	- -	**66100**	- -	**62300**	- -	- -	**34900**	- -	**21500**
Lead	25	ND(25)	**17.8**	**117**	**34.3**	ND(25)	- -	**52.1**	ND(25)	**20**
Magnesium	35,000	- -	**30400**	- -	**30500**	- -	- -	**13100**	- -	**9880**
Manganese	300	- -	**1600**	- -	**1840**	- -	- -	**5160**	- -	**2820**
Mercury	0.7	**0.2**	ND(0.20)	**3.8**	**0.85**	**6.4**	- -	**1.1**	**2.8**	**0.95**
Nickel	100	ND(20)	**47.5**	**49**	**34.7**	**27**	- -	**63**	**34**	**31.5**
Potassium	N/A	- -	**1370**	- -	**1180**	- -	- -	**11800**	- -	**10300**
Selenium	10	**10**	ND(0.20)	ND(1)	ND(0.20)	**1**	- -	ND(1.3)	ND(1)	ND(0.55)
Silver	50	- -	ND(10.0)	- -	ND(10.0)	- -	- -	ND(10.0)	- -	ND(10.0)
Sodium	N/A	**45600**	**66400**	**46310**	**65400**	**282300**	- -	**103000**	**61850**	**33100**
Thallium	N/A	- -	ND(1.5)	- -	ND(1.5)	- -	- -	ND(1.5)	- -	ND(1.5)
Vanadium	N/A	- -	ND(5.7)	- -	ND(5.7)	- -	- -	**17.6**	- -	ND(5.7)
Zinc	N/A	**73**	**192**	**156**	**435**	**110**	- -	**165**	**162**	**69.1**
Cyanide	200	ND(20)	ND(10.0)	ND(20)	ND(10.0)	**40**	- -	ND(10.0)	**20**	**16.4**

Notes:
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Table 6-1
Overburden Groundwater Quality Comparison to Part 703 Standards -- COC Selection
RI Data

Well ID / Sampling Date	Part 703 GW Standard	MW16 10/22/1985	MW16 6/20/1988	MW16 7/21/1988	MW16 9/20/1988	MW16 12/29/1988	MW16 3/23-29/89	MW16 9/13/1991	MW-17 10/22/1985	MW-17 9/27/1991
Volatile Organics (µg/l)										
Methylene Chloride	5	--	--	--	--	--	--	ND(5) J	--	ND(5)
Acetone	N/A	--	--	--	--	--	--	ND(10) J	--	**68**
1,1-Dichloroethene	5	--	--	--	--	--	--	**9 J**	--	ND(5)
1,2-Dichloroethane	0.6	--	--	--	--	--	--	ND(5) J	--	ND(5)
2-Butanone	N/A	--	--	--	--	--	--	ND(10) J	--	**27**
1,1,1-Trichloroethane	5	--	--	--	--	--	--	ND(5) J	--	ND(5)
Trichloroethene	5	--	--	--	--	--	--	**9 J**	--	ND(5)
Benzene	1	**16853**	**58000**	**41000**	**33000**	**30000**	**21000**	**12000 D**	ND(5)	ND(5)
Toluene	5	ND(5)	**49**	ND(-)	ND(-)	--	ND(-)	**23 J**	ND(5)	ND(5)
Chlorobenzene	5	--	--	--	--	--	--	**10 J**	--	ND(5)
Ethylbenzene	5	--	**42**	--	--	--	ND(-)	**15 J**	--	ND(5)
Xylene (total)	5	--	**110**	--	--	--	ND(-)	**39 J**	--	ND(5)
TPH (mg/l)		--	--	--	--	--	--	<5	--	<5
Semi-Volatile Organics (µg/l)										
Pentachlorophenol	5	--	--	--	--	--	--	ND(55)	--	ND(55)
bis(2-Ethylhexyl)phthalate	5	--	--	--	--	--	--	ND(10) J	--	**9 J**
Di-n-octylphthalate	N/A	--	--	--	--	--	--	ND(11)	--	ND(11)
Pyridine	5	**1670**	--	--	--	--	--	**22 J**	**1870**	ND(11)
Alpha-picoline	5	--	--	--	--	--	--	**460 J**	**620**	ND(11)
2-Amino-pyridine	5	--	--	--	--	--	--	**37 J**	--	ND(11)
Inorganics (µg/l)										
Aluminum	N/A	--	--	--	--	--	--	**266**	--	**5770**
Antimony	3	--	--	--	--	--	--	ND(30.3)	--	ND(30.3)
Arsenic	25	**14**	--	--	--	--	--	**5**	**51**	**3.7**
Barium	1000	**363**	--	--	--	--	--	**86.6**	ND(50)	**319**
Beryllium	N/A	ND(3)	--	--	--	--	--	ND(0.30)	**12**	**0.5**
Cadmium	5	--	--	--	--	--	--	ND(5.0)	--	**11.1**
Calcium	N/A	--	--	--	--	--	--	**89500**	--	**75200**
Chromium	50	--	--	--	--	--	--	ND(8.7)	--	**11.2**
Cobalt	N/A	--	--	--	--	--	--	ND(5.4)	--	ND(5.4)
Copper	200	**53**	--	--	--	--	--	ND(8.7)	**749**	**374**
Iron	300	--	--	--	--	--	--	**1290**	--	**65600**
Lead	25	ND(25)	--	--	--	--	--	**2**	**144**	**5.2**
Magnesium	35,000	--	--	--	--	--	--	**9820**	--	**14200**
Manganese	300	--	--	--	--	--	--	**311**	--	**4560**
Mercury	0.7	**1.6**	--	--	--	--	--	**0.2**	**7.6**	**4.7**
Nickel	100	**42**	--	--	--	--	--	ND(14.7)	**54**	**43.8**
Potassium	N/A	--	--	--	--	--	--	**11900**	--	**12200**
Selenium	10	ND(1)	--	--	--	--	--	ND(0.20)	**5**	ND(0.20)
Silver	50	---	--	--	--	--	--	ND(10.0)	--	ND(10.0)
Sodium	N/A	**46180**	--	--	--	--	--	**47400**	**79600**	**43200**
Thallium	N/A	--	--	--	--	--	--	ND(1.5)	--	ND(1.5)
Vanadium	N/A	--	--	--	--	--	--	**8**	--	**10.6**
Zinc	N/A	**209**	--	--	--	--	--	**7.6**	**198**	**107**
Cyanide	200	ND(20)	--	--	--	--	--	ND(10.0)	**20**	**15**

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Table 6-1
Overburden Groundwater Quality Comparison to Part 703 Standards -- COC Selection
RI Data

Well ID	Part 703	MW-19			MW-20S		MW-21S		MW-22		MW-23S	
Sampling Date	*GW Standard*	10/22/1985	3/23-29/89	9/25/1991	3/23-29/89	9/11/1991	3/23-29/89	9/27/1991	3/23-29/89	9/11/1991	3/23-29/89	9/11/1991
Volatile Organics (µg/l)												
Methylene Chloride	5	--	--	ND(5)	--	ND(5)	--	ND(5)	--	ND(5)	--	ND(5) / ND(5)
Acetone	N/A	--	--	ND(10)	--	530 D	--	15	--	ND(5)	--	ND(5) / ND(5)
1,1-Dichloroethene	5	--	--	ND(5) J	--	ND(5)	--	ND(5)	--	ND(5)	--	ND(5) / ND(5)
1,2-Dichloroethane	0.6	--	--	ND(5)	--	ND(5)	--	ND(5)	--	ND(5)	--	ND(5) / ND(5)
2-Butanone	N/A	--	--	ND(10)	--	ND(10)	--	ND(10)	--	ND(10)	--	ND(10) / ND(10)
1,1,1-Trichloroethane	5	--	--	ND(5)	--	ND(5)	--	ND(5)	--	ND(5)	--	ND(5) / ND(5)
Trichloroethene	5	--	--	ND(5) J	--	ND(5)	--	ND(5)	--	ND(5)	--	ND(5) / ND(5)
Benzene	1	ND(5)	3.9	ND(5) J	2200	1000 D	ND(-)	ND(5)	ND(-)	ND(5)	ND(-)	ND(5) / ND(5)
Toluene	5	2	ND(-)	ND(5) J	83	620 D	ND(-)	ND(5)	ND(-)	ND(5)	ND(-)	ND(5) / ND(5)
Chlorobenzene	5	--	--	ND(5) J	--	ND(5)	--	ND(5)	--	ND(5)	--	ND(5) / ND(5)
Ethylbenzene	5	--	ND(-)	ND(5)	1.4	ND(5)	ND(-)	ND(5)	ND(-)	ND(5)	ND(-)	ND(5) / ND(5)
Xylene (total)	5	--	ND(-)	ND(5)	7.4	ND(5)	ND(-)	ND(5)	ND(-)	ND(5)	ND(-)	ND(5) / ND(5)
TPH (mg/l)		--	--	<5	--	<5	--	<5	--	<5	--	<5 / <5
Semi-Volatile Organics (µg/l)												
Pentachlorophenol	5	--	--	ND(52)	--	ND(53) R	--	ND(55)	--	ND(61)	--	ND(53) / ND(54)
bis(2-Ethylhexyl)phthalate	5	--	--	25	--	9 J	--	190	--	ND(28)	--	ND(11) / ND(94)
Di-n-octylphthalate	N/A	--	--	ND(10)	--	ND(11)	--	ND(11)	--	ND(11)	--	ND(11) / ND(11)
Pyridine	5	ND(1000)	--	ND(10)	--	2500 E	--	ND(11)	--	ND(12)	--	ND(11) / ND(11)
Alpha-picoline	5	--	--	ND(10)	--	1000 E	--	ND(11)	--	ND(12)	--	ND(11) / ND(11)
2-Amino-pyridine	5	--	--	ND(10)	--	2400 JE	--	ND(11)	--	ND(12)	--	ND(11) / ND(11)
Inorganics (µg/l)												
Aluminum	N/A	--	--	3570	--	1330	--	6630	--	13000	--	20800 J / 14200 J
Antimony	3	--	--	ND(30.3)	--	ND(30.3)	--	ND(30.3)	--	ND(30.3)	--	ND(30.3) / ND(30.3)
Arsenic	25	18	--	4.9	--	24.7	--	5.6	--	9	--	8.3 / 4.1
Barium	1000	ND(50)	--	88.2	--	69.9	--	112	--	92.3	--	106 / 82.3
Beryllium	N/A	ND(3)	--	ND(0.30)	--	ND(1.1)	--	0.7	--	1.6	--	ND(1.5) / ND(1.3)
Cadmium	5	--	--	ND(4.8)	--	ND(4.8)	--	ND(4.8)	--	8.2	--	10.1 J / ND(4.8) J
Calcium	N/A	--	--	34000	--	51700	--	254000	--	49200	--	29800 / 33600
Chromium	50	--	--	12.4	--	ND(8.7)	--	ND(8.7)	--	22.4	--	25.2 J / 18.6 J
Cobalt	N/A	--	--	ND(5.4)	--	ND(5.4)	--	ND(5.4)	--	12.1	--	13.8 / ND(5.4)
Copper	200	75	--	31.3	--	9.7	--	10.9	--	24.9	--	40.5 J / 25.7 J
Iron	300	--	--	9070	--	4630	--	10800	--	19800	--	30700 J / 18900 J
Lead	25	106	--	19.9	--	6.6	--	2	--	9.6	--	26.1 J / 8.8 J
Magnesium	35,000	--	--	8580	--	24900	--	93900	--	9000	--	12100 / 10500
Manganese	300	--	--	5530	--	655	--	492	--	1600	--	845 / 767
Mercury	0.7	6.8	--	0.45	--	3	--	0.5	--	ND(0.20)	--	ND(0.20) /ND(0.20)
Nickel	100	44	--	40.1	--	ND(14.7)	--	18.5	--	41.7	--	24.6 / 20.2
Potassium	N/A	--	--	3990	--	9430	--	21300	--	7750	--	9190 / 9020
Selenium	10	ND(1)	--	ND(0.20)	--	ND(0.35)	--	ND(0.50)	--	ND(0.20)	--	0.2 / ND(0.20)
Silver	50	--	--	ND(10.0)	--	ND(4.2)	--	ND(10.0)	--	ND(4.2)	--	ND(4.2) / ND(4.2)
Sodium	N/A	52980	--	24800	--	133000	--	14000	--	6900	--	25800 / 30800
Thallium	N/A	--	--	ND(1.5)	--	ND(1.5)	--	ND(1.5)	--	ND(1.5)	--	ND(1.5) / ND(1.5)
Vanadium	N/A	--	--	ND(5.7)	--	16.7	--	7.9	--	17.4	--	32.8 / 22.1
Zinc	N/A	234	--	94.5 J	--	40	--	36.7	--	170	--	160 J / 80 J
Cyanide	200	ND(20)	--	ND(10.0)	--	430	--	ND(10.0)	--	ND(10.0)	--	ND(10.0) / ND(10.0)

Notes:
Toned cells greater than Part 703 standard
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J - Compounds are an estimated value.
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Table 6-1
Overburden Groundwater Quality Comparison to Part 703 Standards -- COC Selection
RI Data

Well ID	*Part 703*	MW-24		MW-25S	MW-26S	MW-27S	RW-1/R-3	R-3		RW-1	Background	Background
Sampling Date	*GW Standard*	3/23-29/89	9/11/1991	9/5/1991	9/5/1991	9/5/1991	10/2/1991	6/8/1985	3/23-29/89	3/23-29/89	10/15/1991	10/15/1991
Volatile Organics (µg/l)												
Methylene Chloride	5	--	ND(5)	ND(5)	ND(5)	ND(5)	ND(1) / ND(2)	--	--	--	**3 J**	**ND(2) J / 2 J**
Acetone	N/A	--	ND(5)	ND(10)	ND(10)	**63**	**23 JD / 39 J**	--	--	--	ND(10)	ND(10) / ND(10)
1,1-Dichloroethene	5	--	ND(5)	ND(5)	ND(5)	ND(5)	ND(5) / ND(5)	--	--	--	ND(5)	ND(5) / ND(5)
1,2-Dichloroethane	0.6	--	ND(5)	ND(5)	ND(5)	ND(5)	ND(5) / ND(5)	--	--	--	ND(5)	ND(5) / ND(5)
2-Butanone	N/A	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10) / ND(10)	--	--	--	ND(10)	ND(10) / ND(10)
1,1,1-Trichloroethane	5	--	ND(5)	ND(5)	ND(5)	ND(5)	ND(5) / ND(5)	--	--	--	**3 J**	ND(5) / ND(5)
Trichloroethene	5	--	ND(5)	ND(5)	ND(5)	ND(5)	ND(5) / ND(5)	--	--	--	**22**	ND(5) / ND(5)
Benzene	1	ND(-)	ND(5)	ND(5)	**270 E**	ND(5)	**850 JD / 670 E**	--	**3.5**	**1.8**	ND(5)	ND(5) / ND(5)
Toluene	5	**3.4**	ND(5)	ND(5)	ND(5)	ND(5)	ND(5) / ND(5)	--	ND(-)	**1.1**	ND(5)	ND(5) / ND(5)
Chlorobenzene	5	--	ND(5)	ND(5)	**39**	ND(5)	ND(5) / ND(5)	--	--	--	ND(5)	ND(5) / ND(5)
Ethylbenzene	5	ND(-)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5) / ND(5)	--	ND(-)	ND(-)	ND(5)	ND(5) / ND(5)
Xylene (total)	5	ND(-)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5) / ND(5)	--	ND(-)	ND(-)	ND(5)	ND(5) / ND(5)
TPH (mg/l)		--	<5	<5	7.7	<5	<5 / <5	--	--	--	<5	<5 / <5
Semi-Volatile Organics (µg/l)												
Pentachlorophenol	5	--	ND(54)	ND(50)	ND(50)	ND(50)	ND(50) / ND(52)	--	--	--	ND(56)	ND(50) / ND(50)
bis(2-Ethylhexyl)phthalate	5	--	ND(31)	ND(13)	**630**	ND(22)	ND(10) / ND(10)	--	--	--	ND(130)	ND(10) J / ND(23)
Di-n-octylphthalate	N/A	--	ND(11)	ND(10)	ND(10)	ND(10)	ND(10) / ND(10)	--	--	--	ND(11)	ND(10) J / ND(10)
Pyridine	5	--	ND(11)	ND(10)	ND(10)	ND(10)	ND(10) / ND(10)	ND(1000)	--	--	ND(11)	ND(10) J / ND(10)
Alpha-picoline	5	--	ND(11)	ND(10)	ND(10)	**200**	**22 / 21**	--	--	--	ND(11)	ND(10) J / ND(10)
2-Amino-pyridine	5	--	ND(11)	ND(10)	**11 J**	ND(10)	ND(10) / ND(10)	--	--	--	ND(11)	ND(10) J / ND(10)
Inorganics (µg/l)												
Aluminum	N/A	--	**58600**	**24900**	**327 J**	**16100 J**	ND(19.2) / ND(19.2)	--	--	--	ND(19.2)	**ND(19.2) / 19.9**
Antimony	3	--	ND(30.3)	ND(30.3)	ND(30.3)	ND(30.3)	ND(34.0) / ND(30.3)	--	--	--	ND(30.3)	ND(30.3) / ND(30.3)
Arsenic	25	--	**30.6**	**15**	**6.9**	**14.9**	**ND(2.5) J / 3.3**	**6**	--	--	ND(2.5)	ND(2.5) / ND(2.5)
Barium	1000	--	**378**	**154**	**137**	**310**	**34.1 / 35.7**	**640**	--	--	**21.3**	**55.3 / 56.6**
Beryllium	N/A	--	**9.7**	**2.7**	**3.1**	**2.2**	ND(0.30) / ND(0.30)	--	--	--	ND(0.30)	ND(0.30) / ND(0.30)
Cadmium	5	--	**33**	**11.7**	ND(4.8)	**7.3**	ND(4.8) / ND(4.8)	ND(3)	--	--	ND(4.8)	ND(4.8) / ND(4.8)
Calcium	N/A	--	**551000**	**108000**	**213000 J**	**82900 J**	**73300 / 75800**	--	--	--	**76300**	**66600 / 68000**
Chromium	50	--	**89.6**	**38.2**	ND(8.7)	**35.4**	ND(8.7) / ND(8.7)	--	--	--	ND(8.7)	ND(8.7) / ND(8.7)
Cobalt	N/A	--	**40.2**	**20.4**	ND(5.4)	**8.3**	ND(5.4) / ND(5.4)	--	--	--	ND(5.4)	**6.4 / ND(5.4)**
Copper	200	--	**164**	**62.7**	**13.3**	**47.7**	ND(3.0) / ND(3.0)	--	--	--	**6.6**	**13 J / 5 J**
Iron	300	--	**115000**	**46800**	**3280 J**	**24300 J**	**173 / 158**	--	--	--	**200**	**520 J / 390 J**
Lead	25	--	**92.7**	**29.1**	**1.9**	**53.9**	**2.3 J / ND(1.1)**	--	--	--	**2.5**	**2.5 / 2.5**
Magnesium	35,000	--	**64200**	**33600**	**31300 J**	**13600 J**	**34600 / 35200**	--	--	--	**22400**	**21200 / 21700**
Manganese	300	--	**4120**	**6820**	**2430 J**	**965 J**	**1260 J / 1300**	--	--	--	**40.1**	**45.8 / 45.9**
Mercury	0.7	--	**45.2**	**0.4**	ND(0.20)	ND(0.20)	ND(0.20) / ND(0.20)	**0.5**	--	--	ND(0.20)	ND(0.20) / ND(0.20)
Nickel	100	--	**150**	**66.3**	**19.6**	**37.9**	ND(14.7) / ND(14.7)	**53**	--	--	ND(14.7)	ND(14.7) / ND(14.7)
Potassium	N/A	--	**19900**	**9130**	**12800 J**	**139000 J**	**2890 / 2970**	--	--	--	**2460**	**1540 / 1610**
Selenium	10	--	ND(0.50)	ND(0.65)	ND(0.75)	**0.75**	ND(0.20) / ND(0.20)	**6**	--	--	**0.55**	**0.95 J / ND(0.20)**
Silver	50	--	ND(4.2)	ND(4.2)	ND(4.2)	ND(4.2)	**5.2 / ND(4.2)**	ND(6)	--	--	ND(4.2)	**13.2 J / 5.2 J**
Sodium	N/A	--	**235000**	**46900**	**345000**	**184000**	**58200 / 58600**	**39600**	--	--	**73500**	**29500 / 30500**
Thallium	N/A	--	ND(1.5)	ND(1.5)	ND(1.5)	ND(1.5)	**1.5 / ND(1.5)**	--	--	--	ND(1.5)	ND(1.5) / ND(1.5)
Vanadium	N/A	--	**104**	**38.2**	ND(5.7) J	**34 J**	ND(5.7) / ND(5.7)	--	--	--	ND(5.7)	ND(5.7) / ND(5.7)
Zinc	N/A	--	**300**	**130**	**20 J**	**90 J**	**23.3 J / 14.2 J**	**100**	--	--	**20**	**150 / 140**
Cyanide	200	--	**564**	ND(10.0)	ND(10.0)	**58**	ND(10.0) / ND(10.0)	ND(20)	--	--	ND(10.0)	ND(10.0) / ND(10.0)

Notes:
Toned cells greater than Part 703 standard
ND - Not Detected.
ND(-) - Not Detected and No Detection Limit Stated
J - Compounds are an estimated value.
D - Compounds identified in an analysis at a secondary
E - Compounds whose concentrations are outside the ca
R - Data is unusable.
/ - Duplicate Result
-- -Not Analyzed for

Table 6-2
Bedrock Groundwater Quality Comparison to Part 703 Standards – COC Selection
RI Data

Well ID / *Sampling Date*	*Part 703* *GW Standard*	MW-6 6/8/1985	MW-6 6/20/1988	MW-6 9/20/1988	MW-6 12/29/1988	MW-6 3/23-29/89	MW-6 9/16/1991	MW-10 6/8/1985	MW-10 6/20/1988	MW-10 9/20/1988	MW-10 12/29/1988	MW-10 3/23-29/89	MW-10 9/26/1991
Volatile Organics (µg/l)													
Methylene Chloride	5	--	--	--	--	--	ND(5)	--	--	--	--	--	ND(5)
Acetone	N/A	--	--	--	--	--	ND(10)	--	--	--	--	--	ND(10)
1,1-Dichloroethene	5	--	--	--	--	--	ND(5)	--	--	--	--	--	ND(5)
1,2-Dichloroethane	0.6	--	--	--	--	--	ND(5)	--	--	--	--	--	ND(5)
2-Butanone	N/A	--	--	--	--	--	ND(10)	--	--	--	--	--	ND(10)
1,1,1-Trichloroethane	5	--	--	--	--	--	ND(5)	--	--	--	--	--	ND(5)
Trichloroethene	5	--	--	--	--	--	ND(5)	--	--	--	--	--	ND(5)
Benzene	1	--	ND(-)	ND(-)	ND(-)	ND(-)	ND(5)	ND(5)	ND(-)	ND(-)	ND(-)	ND(-)	ND(5)
Toluene	5	--	ND(-)	ND(-)	--	ND(-)	ND(5)	ND(5)	ND(-)	ND(-)	--	ND(-)	ND(5)
Chlorobenzene	5	--	--	--	--	--	ND(5)	--	--	--	--	--	ND(5)
Ethylbenzene	5	--	ND(-)	--	--	ND(-)	ND(5)	--	ND(-)	--	--	ND(-)	ND(5)
Xylene (total)	5	--	ND(-)	--	--	ND(-)	ND(5)	--	ND(-)	--	--	ND(-)	ND(5)
TPH (mg/l)		--	--	--	--	--	<5	--	--	--	--	--	<5
Semi-Volatile Organics (µg/l)													
Pentachlorophenol	5	--	--	--	--	--	ND(50) J	--	--	--	--	--	ND(50)
bis(2-Ethylhexyl)phthalate	5	--	--	--	--	--	**84 J**	--	--	--	--	--	**16 J**
Di-n-octylphthalate	N/A	--	--	--	--	--	ND(10) J	--	--	--	--	--	ND(10)
Pyridine	5	ND(1000)	--	--	--	--	ND(10) J	ND(1000)	--	--	--	--	ND(10)
Alpha-picoline	5	--	--	--	--	--	ND(10) J	--	--	--	--	--	ND(10)
2-Amino-pyridine	5	--	--	--	--	--	ND(10) J	--	--	--	--	--	ND(10)
Inorganics (µg/l)													
Aluminum	N/A	--	--	--	--	--	**41.2**	--	--	--	--	--	**254**
Antimony	3	--	--	--	--	--	**30.9**	--	--	--	--	--	ND(30.3)
Arsenic	25	**3**	--	--	--	--	**3.3**	**3**	--	--	--	--	ND(2.5)
Barium	1000	**150**	--	--	--	--	**100**	**180**	--	--	--	--	**28.4**
Beryllium	N/A	--	--	--	--	--	ND(0.30)	ND(3)	--	--	--	--	ND(0.30)
Cadmium	5	ND(3)	--	--	--	--	ND(5.0)	--	--	--	--	--	**9.3**
Calcium	N/A	--	--	--	--	--	**33700**	--	--	--	--	--	**75800**
Chromium	50	--	--	--	--	--	ND(8.7)	--	--	--	--	--	ND(8.7)
Cobalt	N/A	--	--	--	--	--	ND(5.4)	--	--	--	--	--	ND(5.4)
Copper	200	--	--	--	--	--	ND(7.1)	ND(10)	--	--	--	--	**7.7**
Iron	300	--	--	--	--	--	**1510**	--	--	--	--	--	**57300**
Lead	25	--	--	--	--	--	**1.7**	ND(25)	--	--	--	--	**2.5**
Magnesium	35,000	--	--	--	--	--	**19100**	--	--	--	--	--	**32200**
Manganese	300	--	--	--	--	--	**27**	--	--	--	--	--	**168**
Mercury	0.7	**0.2**	--	--	--	--	ND(0.20)	**0.2**	--	--	--	--	ND(0.20)
Nickel	100	ND(20)	--	--	--	--	**14.9**	ND(20)	--	--	--	--	**24.5**
Potassium	N/A	--	--	--	--	--	**1780**	--	--	--	--	--	**1320**
Selenium	10	**9**	--	--	--	--	ND(0.20)	**2**	--	--	--	--	ND(0.20)
Silver	50	ND(6)	--	--	--	--	ND(10.0)	--	--	--	--	--	ND(10.0)
Sodium	N/A	**12200**	--	--	--	--	**13500**	**41900**	--	--	--	--	**67400**
Thallium	N/A	--	--	--	--	--	ND(1.5)	--	--	--	--	--	ND(1.5)
Vanadium	N/A	--	--	--	--	--	ND(5.7)	--	--	--	--	--	ND(5.7)
Zinc	N/A	**698**	--	--	--	--	**19.6**	**144**	--	--	--	--	**88.5**
Cyanide	200	ND(20)	--	--	--	--	ND(10.0)	ND(20)	--	--	--	--	ND(10.0)

Notes:
Toned cells greater than Part 703 standard
ND - Not Detected.
ND(-) - Not Detected and No Detection Limit Stated
J - Compounds are an estimated value.
D - Compounds identified in an analysis at a secondary dilution factor.
E - Compounds whose concentrations are outside the calibration range.
R - Data is unusable.
/ - Duplicate Result
-- -Not Analyzed for

Table 6-2
Bedrock Groundwater Quality Comparison to Part 703 Standards -- COC Selection
RI Data

Well ID	MW-18			MW-20D		MW-21D	MW-23D		MW-25D	MW-26D	MW-27D
Sampling Date	10/22/1985	3/23-29/89	10/1/1991	4/14/1989	10/3/1991	9/27/1991	3/23-29/89	9/20/1991	9/6/1991	9/23/1991	4/21/92
Volatile Organics (µg/l)											
Methylene Chloride	--	--	ND(5)	--	ND(5)	ND(5)	--	ND(5)	ND(5)	**14**	ND(5) / ND(5)
Acetone	--	--	ND(10)	--	ND(35)	ND(5)	--	ND(10)	ND(5)	**44**	ND(10) / ND(10)
1,1-Dichloroethene	--	--	ND(5)	--	ND(5)	ND(5)	--	ND(5)	ND(5)	ND(5)	ND(5) / ND(5)
1,2-Dichloroethane	--	--	ND(5)	--	ND(5)	ND(5)	--	ND(5)	ND(5)	ND(5)	ND(5) / ND(5)
2-Butanone	--	--	ND(10)	--	ND(10)	ND(10)	--	ND(10)	ND(10)	ND(10)	ND(10) / ND(10)
1,1,1-Trichloroethane	--	--	ND(5)	--	ND(5)	ND(5)	--	ND(5)	ND(5)	ND(5)	ND(5) / ND(5)
Trichloroethene	--	--	ND(5)	--	ND(5)	ND(5)	--	ND(5)	ND(5)	ND(5)	ND(5) / ND(5)
Benzene	**15**	ND(-)	ND(5)	**1.2**	**12**	ND(5)	ND(-)	ND(5)	**25**	ND(5)	**8 / 10**
Toluene	**1**	ND(-)	ND(5)	**5.4**	**32**	ND(5)	**11**	ND(5)	ND(5)	**5 J**	ND(5) / ND(5)
Chlorobenzene	--	--	ND(5)	--	ND(5)	ND(5)	--	ND(5)	ND(5)	ND(5)	ND(5) / ND(5)
Ethylbenzene	--	ND(-)	ND(5)	ND(-)	ND(5)	ND(5)	**1**	ND(5)	ND(5)	ND(5)	ND(5) / ND(5)
Xylene (total)	--	ND(-)	ND(5)	ND(-)	ND(5)	ND(5)	**6.3**	ND(5)	ND(5)	ND(5)	ND(5) / ND(5)
TPH (mg/l)	--	--	<5	--	<5	<5	--	<5	<5	<5	<5 / <5
Semi-Volatile Organics (µg/l)											
Pentachlorophenol	--	--	**13 J**	--	ND(66)	ND(54)	--	ND(58)	ND(54)	ND(52)	ND(66) / ND(50) J
bis(2-Ethylhexyl)phthalate	--	--	**9 J**	--	**31**	**5 J**	--	**29**	ND(21)	**40**	ND(44) / ND(73) J
Di-n-octylphthalate	--	--	ND(10)	--	ND(13)	ND(11)	--	ND(12)	ND(11)	ND(10)	ND(13) / ND(10) J
Pyridine	ND(1000)	--	ND(10)	--	**22 J**	ND(11)	--	ND(12)	ND(11)	ND(10)	ND(13) / ND(10) J
Alpha-picoline	--	--	ND(10)	--	**19**	ND(11)	--	ND(12)	**9 J**	ND(10)	ND(13) / ND(10) J
2-Amino-pyridine	--	--	ND(10)	--	**10 J**	ND(11)	--	ND(12)	ND(11)	ND(10)	**3 J** / ND(10) J
Inorganics (µg/l)											
Aluminum	--	--	**144**	--	**73800**	**4580**	--	**452**	**119**	**1740**	**68.9 / 195**
Antimony	--	--	ND(30.3)	--	ND(49.2)	ND(30.3)	--	ND(30.3)	ND(30.3)	ND(30.3)	ND(21.4) / ND(21.4)
Arsenic	**11**	--	**3.7**	--	**34.4**	**23.5**	--	ND(2.5)	**7.4**	**68.4**	ND(1.6) / ND(1.6)
Barium	ND(50)	--	ND(6.9)	--	**1980**	**35.4**	--	**147**	**147**	**203**	**137 / 127**
Beryllium	**5**	--	ND(0.30)	--	**8.5**	**0.3**	--	ND(0.30)	**1.7**	**0.3**	ND(0.50) / ND(0.50)
Cadmium	--	--	ND(4.8)	--	**45.1**	ND(4.8)	--	ND(4.8)	ND(4.8)	ND(4.8)	ND(2.7) / ND(2.7)
Calcium	--	--	7590	--	**2810000**	**74600**	--	**41100**	107000	**156000**	**62,600 / 58,500**
Chromium	--	--	ND(8.7)	--	**114**	ND(8.7)	--	ND(8.7)	ND(8.7)	**31.7**	ND(6.0) / ND(6.0)
Cobalt	--	--	ND(5.4)	--	**78.6**	ND(5.4)	--	ND(5.4)	ND(5.4)	ND(5.4)	ND(5.5) / ND(5.5)
Copper	**16**	--	**4.8**	--	**136**	**13.1**	--	ND(3.0)	**6.5**	**5.7**	**6.1 / 3.9**
Iron	--	--	**15300**	--	**92600**	**6800**	--	**1400**	**257**	**3030**	**477J / 664**
Lead	**59**	--	**10.6**	--	**94.4**	**12.9**	--	**2.4**	**9.1**	**38.3**	**2.7 / 3.8**
Magnesium	--	--	**29500**	--	**1240000**	**33700**	--	**20200**	**27000**	**13000**	**30,200 / 28,500**
Manganese	--	--	**339**	--	**6050**	**288**	--	**25**	**12.2**	**80.5**	**322 / 293**
Mercury	**0.3**	--	ND(0.20)	--	**16.4**	**0.2**	--	ND(0.20)	ND(0.20)	ND(0.20)	ND(0.20) / ND(0.20)
Nickel	**48**	--	ND(14.7)	--	**178**	**34.1**	--	ND(14.7)	ND(14.7)	ND(14.7)	ND(12.8) / ND(12.8)
Potassium	--	--	**2040**	--	**81400**	**2470**	--	**3910**	**13300**	**66500**	**28400 / 33700**
Selenium	ND(1)	--	ND(0.75)	--	ND(0.20)	ND(0.40)	--	ND(0.20)	ND(0.20)	ND(0.3)	ND(1.1) / ND(1.1)
Silver	--	--	ND(10.0)	--	ND(4.2)	ND(10.0)	--	**70**	ND(4.2)	ND(10.0)	ND(10) / ND(10)
Sodium	**48940**	--	**62600**	--	**46700**	**39700**	--	**13000**	**22800**	**60300**	**66,600 / 68,600**
Thallium	--	--	ND(1.5)	--	ND(3.0)	ND(1.5)	--	ND(1.5)	ND(1.5)	ND(1.5)	ND(0.80) / **3.1**
Vanadium	--	--	ND(5.7)	--	77.5	ND(5.7)	--	ND(5.7)	ND(5.7)	ND(5.7)	ND(5.0) / ND(5.0)
Zinc	**700**	--	**664**	--	**1010**	**85.3**	--	**64.2**	**50**	**131**	**19.7 / 31**
Cyanide	ND(20)	--	ND(10.0)	--	ND(10.0)	ND(10.0)	--	ND(10.0)	ND(10.0)	ND(10.0)	ND(10.0) / ND(10.0)

Notes:
Toned cells greater than Part 703 stan
ND - Not Detected.
ND(-) - Not Detected and No Detect
J - Compounds are an estimated value
D - Compounds identified in an analy
E - Compounds whose concentrations
R - Data is unusable.
/ - Duplicate Result
-- -Not Analyzed for

Table 6-2
Bedrock Groundwater Quality Comparison to Part 703 Standards -- COC Selection
RI Data

Well ID	R-2			Background	Background
Sampling Date	6/8/1985	3/23-29/89	10/2/1991	10/15/1991	10/15/1991
Volatile Organics (µg/l)					
Methylene Chloride	--	--	**1 J**	**3 J**	**ND(2) J / 2 J**
Acetone	--	--	ND(10)	ND(10)	ND(10) / ND(10)
1,1-Dichloroethene	--	--	ND(5)	ND(5)	ND(5) / ND(5)
1,2-Dichloroethane	--	--	ND(5)	ND(5)	ND(5) / ND(5)
2-Butanone	--	--	ND(10)	ND(10)	ND(10) / ND(10)
1,1,1-Trichloroethane	--	--	ND(5)	**3 J**	ND(5) / ND(5)
Trichloroethene	--	--	ND(5)	**22**	ND(5) / ND(5)
Benzene	--	ND(-)	ND(5)	ND(5)	ND(5) / ND(5)
Toluene	--	ND(-)	ND(5)	ND(5)	ND(5) / ND(5)
Chlorobenzene	--	--	ND(5)	ND(5)	ND(5) / ND(5)
Ethylbenzene	--	ND(-)	ND(5)	ND(5)	ND(5) / ND(5)
Xylene (total)	--	ND(-)	ND(5)	ND(5)	ND(5) / ND(5)
TPH (mg/l)	--	--	<5	<5	<5 / <5
Semi-Volatile Organics (µg/l)					
Pentachlorophenol	--	--	ND(53)	ND(56)	ND(50) / ND(50)
bis(2-Ethylhexyl)phthalate	--	--	ND(18)	ND(130)	ND(10) J / ND(23)
Di-n-octylphthalate	--	--	ND(11)	ND(11)	ND(10) J / ND(10)
Pyridine	ND(1000)	--	ND(11)	ND(11)	ND(10) J / ND(10)
Alpha-picoline	--	--	ND(11)	ND(11)	ND(10) J / ND(10)
2-Amino-pyridine	--	--	ND(11)	ND(11)	ND(10) J / ND(10)
Inorganics (µg/l)					
Aluminum	--	--	**503**	ND(19.2)	**ND(19.2) / 19.9**
Antimony	--	--	ND(30.3)	ND(30.3)	ND(30.3) / ND(30.3)
Arsenic	**18**	--	ND(2.5)	ND(2.5)	ND(2.5) / ND(2.5)
Barium	**270**	--	**39.8**	**21.3**	**55.3 / 56.6**
Beryllium	--	--	ND(0.30)	ND(0.30)	ND(0.30) / ND(0.30)
Cadmium	ND(3)	--	ND(4.8)	ND(4.8)	ND(4.8) / ND(4.8)
Calcium	--	--	**71000**	**76300**	**66600 / 68000**
Chromium	--	--	ND(8.7)	ND(8.7)	ND(8.7) / ND(8.7)
Cobalt	--	--	ND(5.4)	ND(5.4)	**6.4 / ND(5.4)**
Copper	--	--	**14.1**	**6.6**	**13 J / 5 J**
Iron	--	--	**2960**	**200**	**520 J / 390 J**
Lead	--	--	**19.6**	**2.5**	**2.5 / 2.5**
Magnesium	--	--	**28900**	**22400**	**21200 / 21700**
Manganese	--	--	**1270**	**40.1**	**45.8 / 45.9**
Mercury	**0.1**	--	ND(0.20)	ND(0.20)	ND(0.20) / ND(0.20)
Nickel	**30**	--	ND(14.7)	ND(14.7)	ND(14.7) / ND(14.7)
Potassium	--	--	**2010**	**2460**	**1540 / 1610**
Selenium	**11**	--	ND(0.25)	**0.55**	**0.95 J / ND(0.20)**
Silver	**ND(6)**	--	ND(4.2)	ND(4.2)	**13.2 J / 5.2 J**
Sodium	**51300**	--	**58500**	**73500**	**29500 / 30500**
Thallium	--	--	ND(1.5)	ND(1.5)	ND(1.5) / ND(1.5)
Vanadium	--	--	ND(5.7)	ND(5.7)	ND(5.7) / ND(5.7)
Zinc	**152**	--	**114**	**20**	**150 / 140**
Cyanide	ND(20)	--	ND(10.0)	ND(10.0)	ND(10.0) / ND(10.0)

Notes:
Toned cells greater than Part 703 stan
ND - Not Detected.
ND(-) - Not Detected and No Detect
J - Compounds are an estimated value
D - Compounds identified in an analy
E - Compounds whose concentrations
R - Data is unusable.
/ - Duplicate Result
-- -Not Analyzed for

Table 1
Summary of Analytical Results
Former Nepera Plant, Harriman, NY
Sampled September 8, 2008

Volatile Organic Compounds
Reported in Micrograms per Liter (µg/L)

Parameter	*Overburden Aquifer Wells*						*Bedrock Well*	*QA/QC*			**NYSDEC Class GA Standard**
	MW-101	**MW-102**	**MW-103**	**MW-104**	**MW-105**	**MW-106**	**MW-20DR**	**FB 9-8**	**DUP 9-8**	**TB 9-8**	
Acetone	1.40 JB	1.00 JB	ND(1.00)	1.30 J	ND(1.00)	1.2 J	2.50 J	3.20 J	ND(1.00)	1.20 J	***NS***
Benzene	ND(0.74)	ND(0.74)	ND(0.74)	ND(0.74)	**2.6 J**	**9.00**	ND(0.74)	ND(0.74)	ND(0.74)	ND(0.74)	***1.0***
Bromodichloromethane	ND(0.48)	ND(0.48)	ND(0.48)	ND(0.48)	ND(0.48)	ND(0.48)	ND(0.48)	ND(0.48)	ND(0.48)	ND(0.48)	***NS***
Bromoform	ND(0.46)	ND(0.46)	ND(0.46)	ND(0.46)	ND(0.46)	ND(0.46)	ND(0.46)	ND(0.46)	ND(0.46)	ND(0.46)	***NS***
Bromomethane	ND(2.10)	ND(2.10)	ND(2.10)	ND(2.10)	ND(2.10)	ND(2.10)	ND(2.10)	ND(2.10)	ND(2.10)	ND(2.10)	***5.0***
Methyl Ethyl Ketone	ND(1.10)	ND(1.10)	ND(1.10)	ND(1.10)	ND(1.10)	ND(1.10)	ND(1.10)	ND(1.10)	ND(1.10)	ND(1.10)	***NS***
Carbon disulfide	ND(0.90)	ND(0.90)	ND(0.90)	ND(0.90)	ND(0.90)	ND(0.90)	ND(0.90)	ND(0.90)	ND(0.90)	ND(0.90)	***NS***
Carbon tetrachloride	ND(1.10)	ND(1.10)	ND(1.10)	ND(1.10)	ND(1.10)	ND(1.10)	ND(1.10)	ND(1.10)	ND(1.10)	ND(1.10)	***5.0***
Chlorobenzene	ND(0.72)	ND(0.72)	ND(0.72)	ND(0.72)	ND(0.72)	ND(0.72)	ND(0.72)	ND(0.72)	ND(0.72)	ND(0.72)	***5.0***
Chloroethane	ND(1.10)	ND(1.10)	ND(1.10)	ND(1.10)	ND(1.10)	ND(1.10)	ND(1.10)	ND(1.10)	ND(1.10)	ND(1.10)	***5.0***
Chloroform	ND(0.67)	ND(0.67)	ND(0.67)	ND(0.67)	ND(0.67)	ND(0.67)	ND(0.67)	ND(0.67)	ND(0.67)	ND(0.67)	***7.0***
Chloromethane	ND(1.10)	ND(1.10)	ND(1.10)	ND(1.10)	ND(1.10)	ND(1.10)	ND(1.10)	ND(1.10)	ND(1.10)	ND(1.10)	***5.0***
Dibromochloromethane	ND(0.55)	ND(0.55)	ND(0.55)	ND(0.55)	ND(0.55)	ND(0.55)	ND(0.55)	ND(0.55)	ND(0.55)	ND(0.55)	***NS***
1,1-Dichloroethane	ND(1.00)	ND(1.00)	ND(1.00)	ND(1.00)	ND(1.00)	ND(1.00)	ND(1.00)	ND(1.00)	ND(1.00)	ND(1.00)	***5.0***
1,2-Dichloroethane	ND(0.72)	ND(0.72)	ND(0.72)	ND(0.72)	ND(0.72)	ND(0.72)	ND(0.72)	ND(0.72)	ND(0.72)	ND(0.72)	***0.6***
1,1-Dichloroethene	ND(0.83)	ND(0.83)	ND(0.83)	ND(0.83)	ND(0.83)	ND(0.83)	ND(0.83)	ND(0.83)	ND(0.83)	ND(0.83)	***5.0***
1,2-Dichloropropane	ND(0.71)	ND(0.71)	ND(0.71)	ND(0.71)	ND(0.71)	ND(0.71)	ND(0.71)	ND(0.71)	ND(0.71)	ND(0.71)	***1.0***
cis-1,3-Dichloropropene	ND(0.28)	ND(0.28)	ND(0.28)	ND(0.28)	ND(0.28)	ND(0.28)	ND(0.28)	ND(0.28)	ND(0.28)	ND(0.28)	***0.4****
trans-1,3-Dichloropropene	ND(0.57)	ND(0.57)	ND(0.57)	ND(0.57)	ND(0.57)	ND(0.57)	ND(0.57)	ND(0.57)	ND(0.57)	ND(0.57)	***0.4****
Ethylbenzene	ND(0.87)	ND(0.87)	ND(0.87)	ND(0.87)	ND(0.87)	ND(0.87)	ND(0.87)	ND(0.87)	ND(0.87)	ND(0.87)	***5.0***
2-Hexanone	ND(1.10)	ND(1.10)	ND(1.10)	ND(1.10)	ND(1.10)	ND(1.10)	ND(1.10)	ND(1.10)	ND(1.10)	ND(1.10)	***NS***
Methylene Chloride	ND(0.78)	ND(0.78)	ND(0.78)	ND(0.78)	ND(0.78)	ND(0.78)	ND(0.78)	1.00 JB	ND(0.78)	0.83 JB	***5.0***
methyl isobutyl ketone	ND(0.38)	ND(0.38)	ND(0.38)	ND(0.38)	ND(0.38)	ND(0.38)	ND(0.38)	ND(0.38)	ND(0.38)	ND(0.38)	***NS***
Styrene	ND(0.64)	ND(0.64)	ND(0.64)	ND(0.64)	ND(0.64)	ND(0.64)	ND(0.64)	ND(0.64)	ND(0.64)	ND(0.64)	***5.0***
1,1,2,2-Tetrachloroethane	ND(0.81)	ND(0.81)	ND(0.81)	ND(0.81)	ND(0.81)	ND(0.81)	ND(0.81)	ND(0.81)	ND(0.81)	ND(0.81)	***5.0***
Tetrachloroethene	ND(0.81)	ND(0.81)	ND(0.81)	ND(0.81)	ND(0.81)	ND(0.81)	ND(0.81)	ND(0.81)	ND(0.81)	ND(0.81)	***5.0***

Table 1
Summary of Analytical Results
Former Nepera Plant, Harriman, NY
Sampled September 8, 2008

Parameter	*Overburden Aquifer Wells*						*Bedrock Well*	*QA/QC*			NYSDEC Class GA Standard
	MW-101	MW-102	MW-103	MW-104	MW-105	MW-106	MW-20DR	FB 9-8	DUP 9-8	TB 9-8	
Toluene	ND(0.72)	ND(0.72)	ND(0.72)	ND(0.72)	ND(0.72)	1.50 J	ND(0.72)	ND(0.72)	ND(0.72)	ND(0.72)	***5.0***
1,1,1-Trichloroethane	ND(0.69)	ND(0.69)	ND(0.69)	ND(0.69)	ND(0.69)	ND(0.69)	ND(0.69)	ND(0.69)	ND(0.69)	ND(0.69)	***5.0***
1,1,2-Trichloroethane	ND(0.65)	ND(0.65)	ND(0.65)	ND(0.65)	ND(0.65)	ND(0.65)	ND(0.65)	ND(0.65)	ND(0.65)	ND(0.65)	***1.0***
Trichloroethene	ND(0.62)	ND(0.62)	ND(0.62)	ND(0.62)	ND(0.62)	ND(0.62)	ND(0.62)	ND(0.62)	ND(0.62)	ND(0.62)	***5.0***
Vinyl chloride	ND(0.99)	ND(0.99)	ND(0.99)	ND(0.99)	ND(0.99)	ND(0.99)	ND(0.99)	ND(0.99)	ND(0.99)	ND(0.99)	***2.0***
Xylenes, Total	ND(2.30)	ND(2.30)	ND(2.30)	ND(2.30)	ND(2.30)	ND(2.30)	ND(2.30)	ND(2.30)	ND(2.30)	ND(2.30)	***5.0***
cis-1,2-Dichloroethene	ND(0.99)	ND(0.99)	ND(0.99)	ND(0.99)	ND(0.99)	ND(0.99)	ND(0.99)	ND(0.99)	ND(0.99)	ND(0.99)	***5.0***
trans-1,2-Dichloroethene	ND(0.76)	ND(0.76)	ND(0.76)	ND(0.76)	ND(0.76)	ND(0.76)	ND(0.76)	ND(0.76)	ND(0.76)	ND(0.76)	***5.0***

Note:

ND( ): *Compound not detected at the method detection limit*

J: *Indicates an estimated value*

B: *The analyte was found in an associated blank, as well as in the sample*

NYSDEC Class GA Standards: *New York State Department of Environmental Conservation Ambient Water Quality Standards for Source of Drinking Water Title 6 Part 703 (per August 1999 Amendment)*

NS: *No NYSDEC Standard*

*: *Applies to the sum of cis- and trans-1,3-dichloropropene*

Table 2
Summary of Analytical Results
Former Nepera Plant, Harriman, NY
Sampled September 8, 2008

Semi-Volatile Organic Compounds

Reported in Micrograms per Liter (µg/L)

Parameter	*Overburden Aquifer Wells*						*Bedrock Well*	*QA/QC*			NYSDEC Class GA Standard
	MW-101	MW-102	MW-103	MW-104	MW-105	MW-106	MW-20DR	FB 9-8	DUP 9-8	TB 9-8	
Phenol	ND(0.29)	ND(0.29)	ND(0.29)	ND(0.29)	ND(0.29)	ND(0.29)	ND(0.29)	ND(0.29)	ND(0.29)	ND(0.29)	***1.0***
Bis(2-chloroethyl)ether	ND(1.00)	ND(1.00)	ND(1.00)	ND(1.00)	ND(1.00)	ND(1.00)	ND(1.00)	ND(1.00)	ND(1.00)	ND(1.00)	***1.0***
2-Chlorophenol	ND(0.61)	ND(0.61)	ND(0.61)	ND(0.61)	ND(0.61)	ND(0.61)	ND(0.61)	ND(0.61)	ND(0.61)	ND(0.61)	***NS***
1,3-Dichlorobenzene	ND(0.43)	ND(0.43)	ND(0.43)	ND(0.43)	ND(0.43)	ND(0.43)	ND(0.43)	ND(0.43)	ND(0.43)	ND(0.43)	***3.0***
1,4-Dichlorobenzene	ND(0.51)	ND(0.51)	ND(0.51)	ND(0.51)	ND(0.51)	ND(0.51)	ND(0.51)	ND(0.51)	ND(0.51)	ND(0.51)	***3.0***
Benzyl alcohol	ND(0.39)	ND(0.39)	ND(0.39)	ND(0.39)	ND(0.39)	ND(0.39)	ND(0.39)	ND(0.39)	ND(0.39)	ND(0.39)	***NS***
1,2-Dichlorobenzene	ND(0.48)	ND(0.48)	ND(0.48)	ND(0.48)	ND(0.48)	ND(0.48)	ND(0.48)	ND(0.48)	ND(0.48)	ND(0.48)	***3.0***
2,2'-oxybis[1-chloropropane]	ND(0.71)	ND(0.71)	ND(0.71)	ND(0.71)	ND(0.71)	ND(0.71)	ND(0.71)	ND(0.71)	ND(0.71)	ND(0.71)	***5.0***
2-Methylphenol	ND(0.60)	ND(0.60)	ND(0.60)	ND(0.60)	ND(0.60)	ND(0.60)	ND(0.60)	ND(0.60)	ND(0.60)	ND(0.60)	***NS***
Hexachloroethane	ND(0.52)	ND(0.52)	ND(0.52)	ND(0.52)	ND(0.52)	ND(0.52)	ND(0.52)	ND(0.52)	ND(0.52)	ND(0.52)	***5.0***
N-Nitrosodi-n-propylamine	ND(0.41)	ND(0.41)	ND(0.41)	ND(0.41)	ND(0.41)	ND(0.41)	ND(0.41)	ND(0.41)	ND(0.41)	ND(0.41)	***NS***
4-Methylphenol	ND(0.39)	ND(0.39)	ND(0.39)	ND(0.39)	ND(0.39)	ND(0.39)	ND(0.39)	ND(0.39)	ND(0.39)	ND(0.39)	***NS***
Nitrobenzene	ND(0.73)	ND(0.73)	ND(0.73)	ND(0.73)	ND(0.73)	ND(0.73)	ND(0.73)	ND(0.73)	ND(0.73)	ND(0.73)	***0.4***
Isophorone	ND(0.38)	ND(0.38)	ND(0.38)	ND(0.38)	ND(0.38)	ND(0.38)	ND(0.38)	ND(0.38)	ND(0.38)	ND(0.38)	***NS***
2-Nitrophenol	ND(0.51)	ND(0.51)	ND(0.51)	ND(0.51)	ND(0.51)	ND(0.51)	ND(0.51)	ND(0.51)	ND(0.51)	ND(0.51)	***NS***
2,4-Dimethylphenol	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	***NS***
Bis(2-chloroethoxy)methane	ND(1.10)	ND(1.10)	ND(1.10)	ND(1.10)	ND(1.10)	ND(1.10)	ND(1.10)	ND(1.10)	ND(1.10)	ND(1.10)	***NS***
2,4-Dichlorophenol	ND(0.55)	ND(0.55)	ND(0.55)	ND(0.55)	ND(0.55)	ND(0.55)	ND(0.55)	ND(0.55)	ND(0.55)	ND(0.55)	***5.0***
1,2,4-Trichlorobenzene	ND(0.65)	ND(0.65)	ND(0.65)	ND(0.65)	ND(0.65)	ND(0.65)	ND(0.65)	ND(0.65)	ND(0.65)	ND(0.65)	***5.0***
Naphthalene	ND(0.42)	ND(0.42)	ND(0.42)	ND(0.42)	ND(0.42)	ND(0.42)	ND(0.42)	ND(0.42)	ND(0.42)	ND(0.42)	***NS***
4-Chloroaniline	ND(0.67)	ND(0.67)	ND(0.67)	ND(0.67)	ND(0.67)	ND(0.67)	ND(0.67)	ND(0.67)	ND(0.67)	ND(0.67)	***5.0***
Hexachlorobutadiene	ND(0.86)	ND(0.86)	ND(0.86)	ND(0.86)	ND(0.86)	ND(0.86)	ND(0.86)	ND(0.86)	ND(0.86)	ND(0.86)	***0.5***
4-Chloro-3-methylphenol	ND(1.30)	ND(1.30)	ND(1.30)	ND(1.30)	ND(1.30)	ND(1.30)	ND(1.30)	ND(1.30)	ND(1.30)	ND(1.30)	***NS***
2-Methylnaphthalene	ND(0.47)	ND(0.47)	ND(0.47)	ND(0.47)	ND(0.47)	ND(0.47)	ND(0.47)	ND(0.47)	ND(0.47)	ND(0.47)	***NS***
Hexachlorocyclopentadiene	ND(0.75)	ND(0.75)	ND(0.75)	ND(0.75)	ND(0.75)	ND(0.75)	ND(0.75)	ND(0.75)	ND(0.75)	ND(0.75)	***5.0***
2,4,6-Trichlorophenol	ND(0.49)	ND(0.49)	ND(0.49)	ND(0.49)	ND(0.49)	ND(0.49)	ND(0.49)	ND(0.49)	ND(0.49)	ND(0.49)	***NS***

Table 2
Summary of Analytical Results
Former Nepera Plant, Harriman, NY
Sampled September 8, 2008

Parameter	*Overburden Aquifer Wells*						*Bedrock Well*	*QA/QC*			NYSDEC Class GA Standard
	MW-101	MW-102	MW-103	MW-104	MW-105	MW-106	MW-20DR	FB 9-8	DUP 9-8	TB 9-8	
2,4,5-Trichlorophenol	ND(0.54)	ND(0.54)	ND(0.54)	ND(0.54)	ND(0.54)	ND(0.54)	ND(0.54)	ND(0.54)	ND(0.54)	ND(0.54)	***NS***
2-Chloronaphthalene	ND(0.49)	ND(0.49)	ND(0.49)	ND(0.49)	ND(0.49)	ND(0.49)	ND(0.49)	ND(0.49)	ND(0.49)	ND(0.49)	***NS***
2-Nitroaniline	ND(0.53)	ND(0.53)	ND(0.53)	ND(0.53)	ND(0.53)	ND(0.53)	ND(0.53)	ND(0.53)	ND(0.53)	ND(0.53)	***5.0***
Acenaphthylene	ND(0.47)	ND(0.47)	ND(0.47)	ND(0.47)	ND(0.47)	ND(0.47)	ND(0.47)	ND(0.47)	ND(0.47)	ND(0.47)	***NS***
Dimethyl phthalate	ND(0.33)	ND(0.33)	ND(0.33)	ND(0.33)	ND(0.33)	ND(0.33)	ND(0.33)	ND(0.33)	ND(0.33)	ND(0.33)	***NS***
2,6-Dinitrotoluene	ND(0.42)	ND(0.42)	ND(0.42)	ND(0.42)	ND(0.42)	ND(0.42)	ND(0.42)	ND(0.42)	ND(0.42)	ND(0.42)	***5.0***
Acenaphthene	ND(0.38)	ND(0.38)	ND(0.38)	ND(0.38)	ND(0.38)	ND(0.38)	ND(0.38)	ND(0.38)	ND(0.38)	ND(0.38)	***NS***
3-Nitroaniline	ND(0.37)	ND(0.37)	ND(0.37)	ND(0.37)	ND(0.37)	ND(0.37)	ND(0.37)	ND(0.37)	ND(0.37)	ND(0.37)	***5.0***
2,4-Dinitrophenol	ND(1.10)	ND(1.10)	ND(1.10)	ND(1.10)	ND(1.10)	ND(1.10)	ND(1.10)	ND(1.10)	ND(1.10)	ND(1.10)	***NS***
Dibenzofuran	ND(0.39)	ND(0.39)	ND(0.39)	ND(0.39)	ND(0.39)	ND(0.39)	ND(0.39)	ND(0.39)	ND(0.39)	ND(0.39)	***NS***
2,4-Dinitrotoluene	ND(0.30)	ND(0.30)	ND(0.30)	ND(0.30)	ND(0.30)	ND(0.30)	ND(0.30)	ND(0.30)	ND(0.30)	ND(0.30)	***5.0***
4-Nitrophenol	ND(0.38)	ND(0.38)	ND(0.38)	ND(0.38)	ND(0.38)	ND(0.38)	ND(0.38)	ND(0.38)	ND(0.38)	ND(0.38)	***NS***
Fluorene	ND(0.48)	ND(0.48)	ND(0.48)	ND(0.48)	ND(0.48)	ND(0.48)	ND(0.48)	ND(0.48)	ND(0.48)	ND(0.48)	***NS***
4-Chlorophenyl phenyl ether	ND(0.49)	ND(0.49)	ND(0.49)	ND(0.49)	ND(0.49)	ND(0.49)	ND(0.49)	ND(0.49)	ND(0.49)	ND(0.49)	***NS***
Diethyl phthalate	ND(0.42)	ND(0.42)	ND(0.42)	ND(0.42)	ND(0.42)	ND(0.42)	ND(0.42)	ND(0.42)	ND(0.42)	ND(0.42)	***NS***
4-Nitroaniline	ND(0.28)	ND(0.28)	ND(0.28)	ND(0.28)	ND(0.28)	ND(0.28)	ND(0.28)	ND(0.28)	ND(0.28)	ND(0.28)	***5.0***
4,6-Dinitro-2-methylphenol	ND(0.37)	ND(0.37)	ND(0.37)	ND(0.37)	ND(0.37)	ND(0.37)	ND(0.37)	ND(0.37)	ND(0.37)	ND(0.37)	***NS***
N-Nitrosodiphenylamine	ND(0.35)	ND(0.35)	ND(0.35)	ND(0.35)	ND(0.35)	ND(0.35)	ND(0.35)	ND(0.35)	ND(0.35)	ND(0.35)	***NS***
4-Bromophenyl phenyl ether	ND(0.49)	ND(0.49)	ND(0.49)	ND(0.49)	ND(0.49)	ND(0.49)	ND(0.49)	ND(0.49)	ND(0.49)	ND(0.49)	***NS***
Hexachlorobenzene	ND(0.48)	ND(0.48)	ND(0.48)	ND(0.48)	ND(0.48)	ND(0.48)	ND(0.48)	ND(0.48)	ND(0.48)	ND(0.48)	***0.04***
Pentachlorophenol	ND(1.20)	ND(1.20)	ND(1.20)	ND(1.20)	ND(1.20)	ND(1.20)	ND(1.20)	ND(1.20)	ND(1.20)	ND(1.20)	***1.0***
Phenanthrene	ND(0.39)	ND(0.39)	ND(0.39)	ND(0.39)	ND(0.39)	ND(0.39)	ND(0.39)	ND(0.39)	ND(0.39)	ND(0.39)	***NS***
Carbazole	ND(0.35)	ND(0.35)	ND(0.35)	ND(0.35)	ND(0.35)	ND(0.35)	ND(0.35)	ND(0.35)	ND(0.35)	ND(0.35)	***NS***
Anthracene	ND(0.42)	ND(0.42)	ND(0.42)	ND(0.42)	ND(0.42)	ND(0.42)	ND(0.42)	ND(0.42)	ND(0.42)	ND(0.42)	***NS***
Di-n-butyl phthalate	ND(0.49)	ND(0.49)	ND(0.49)	ND(0.49)	ND(0.49)	ND(0.49)	ND(0.49)	ND(0.49)	ND(0.49)	ND(0.49)	***50.0***
Fluoranthene	ND(0.42)	ND(0.42)	ND(0.42)	ND(0.42)	ND(0.42)	ND(0.42)	ND(0.42)	ND(0.42)	ND(0.42)	ND(0.42)	***NS***
Pyrene	ND(0.42)	ND(0.42)	ND(0.42)	ND(0.42)	ND(0.42)	ND(0.42)	ND(0.42)	ND(0.42)	ND(0.42)	ND(0.42)	***NS***
Butyl benzyl phthalate	ND(0.48)	ND(0.48)	ND(0.48)	ND(0.48)	ND(0.48)	ND(0.48)	ND(0.48)	ND(0.48)	ND(0.48)	ND(0.48)	***NS***
3,3'-Dichlorobenzidine	ND(0.66)	ND(0.66)	ND(0.66)	ND(0.66)	ND(0.66)	ND(0.66)	ND(0.66)	ND(0.66)	ND(0.66)	ND(0.66)	***5.0***
Benzo[a]anthracene	ND(0.37)	ND(0.37)	ND(0.37)	ND(0.37)	ND(0.37)	ND(0.37)	ND(0.37)	ND(0.37)	ND(0.37)	ND(0.37)	***NS***

Table 3
Summary of Analytical Results
Former Nepera Plant, Harriman, NY
Sampled September 8, 2008
General Chemistry

	Iron (µg/L)	Manganese (µg/L)	Sulfate (mg/L)	Nitrate (mg/L)	Ammonia (mg/L)
Overburden Aquifer Wells					
MW-101	**10,800.00**	**1,800.00**	**362.00**	ND(0.047)	**8.50**
MW-102	**14,700.00**	**1,400.00**	72.20	ND(0.047)	**15.40**
MW-103	**1,700.00**	230.00	25.00	0.74	0.14
MW-104	**2,300.00**	**1,200.00**	30.80	0.081 J	**2.40**
MW-105	**6,700.00**	**580.00**	45.70	ND(0.047)	**3.40**
MW-106	**2,800.00**	**720.00**	77.70	ND(0.047)	**4.70**
Bedrock Well					
MW-20DR	**64,200.00**	**540.00**	**660.00**	0.33	0.37
QA/QC					
FB 9-8	ND(62.0)	ND(2.3)	0.18 J	ND(0.047)	0.057 J
DUP 9-8	**1,900.00**	210.00	25.40	0.52	0.091 J
NYSDEC Class GA Standard	***300.0***	***300.0***	***250.0***	***10.0***	***2.0***

Note:

ND( ): *Compound not detected at the method detection limit*

J: *Indicates an estimated value*

NYSDEC Class GA Standards: *New York State Department of Environmental Conservation*

Ambient Water Quality Standards for Source of Drinking Water Title 6 Part 703 (per August 1999 Amendment)

NS: *No NYSDEC Standard Established*

NA: *Not Applicable*

Table 2
Summary of Analytical Results
Former Nepera Plant, Harriman, NY
Sampled April 19-21, 2010
Volatile Organic Compounds
Reported in Micrograms per Liter (µg/L)

	Benzene	Toluene	Ethylbenzene	Xylenes, (Total)
Overburden Aquifer Wells				
MW-1S	ND(0.74)	ND(0.72)	ND(0.87)	ND(2.30)
MW-5S	ND(0.74)	ND(0.72)	ND(0.87)	ND(2.30)
MW-7S	ND(0.74)	ND(0.72)	ND(0.87)	ND(2.30)
MW-8S	ND(0.74)	ND(0.72)	ND(0.87)	ND(2.30)
MW-11S	ND(0.74)	ND(0.72)	ND(0.87)	ND(2.30)
MW-12S	ND(0.74)	ND(0.72)	ND(0.87)	ND(2.30)
MW-16S	81.00	ND(0.72)	ND(0.87)	ND(2.30)
MW-20S	**99.00**	1.50 J	ND(0.87)	ND(2.30)
MW-24S	ND(0.74)	ND(0.72)	ND(0.87)	ND(2.30)
MW-25S	**83.00**	ND(0.72)	ND(0.87)	ND(2.30)
MW-33S	**20.00**	0.94 J	ND(0.87)	ND(2.30)
MW-35S	ND(0.74)	ND(0.72)	ND(0.87)	ND(2.30)
MW-37S	**380.00**	**6.70 J**	ND(3.50)	ND(9.10)
OW-6	**3,400.00**	ND(14.00)	ND(17.00)	ND(45.00)
OW-7	**1,100.00**	ND(7.20)	ND(8.70)	ND(23.00)
RW-1R	ND(0.74)	ND(0.72)	ND(0.87)	ND(2.30)
MW-53D	**94.00**	ND(0.72)	ND(0.87)	ND(2.30)
MW-101	ND(0.74)	ND(0.72)	ND(0.87)	ND(2.30)
MW-102	ND(0.74)	ND(0.72)	ND(0.87)	ND(2.30)
MW-103	**2.90 J**	ND(0.72)	ND(0.87)	ND(2.30)
MW-104	ND(0.74)	ND(0.72)	ND(0.87)	ND(2.30)
MW-105	ND(0.74)	ND(0.72)	ND(0.87)	ND(2.30)
MW-106	ND(0.74)	ND(0.72)	ND(0.87)	ND(2.30)
Bedrock Wells				
MW-6D	ND(0.74)	ND(0.72)	ND(0.87)	ND(2.30)
MW-20D	**41.00**	**190.00**	1.40 J	ND(2.30)
MW-23D	ND(0.74)	ND(0.72)	ND(0.87)	ND(2.30)
MW-26D	ND(0.74)	ND(0.72)	ND(0.87)	ND(2.30)
MW-27D	ND(0.74)	ND(0.72)	ND(0.87)	3.40 J
MW-20DR	ND(0.74)	ND(0.72)	ND(0.87)	ND(2.30)
QA/QC				
TB 4-19	ND(0.74)	ND(0.72)	ND(0.87)	ND(2.30)
TB 4-20	ND(0.74)	ND(0.72)	ND(0.87)	ND(2.30)
TB 4-21	ND(0.74)	ND(0.72)	ND(0.87)	ND(2.30)
FB 4-19	ND(0.74)	ND(0.72)	ND(0.87)	ND(2.30)
MW-DUP	ND(0.74)	ND(0.72)	ND(0.87)	ND(2.30)
NYSDEC Class GA Standard	*1.0*	*5.0*	*5.0*	*5.0*

Note:
ND( ): *Compound not detected at the method detection limit*
J: *Indicates an estimated value*
NYSDEC Class GA Standards: *New York State Department of Environmental Conservation Ambient Water Quality Standards for Source of Drinking Water Title 6 Part 703 (per August 1999 Amendment)*
* Analytical detection not valid, compound detected in associated QA/QC Trip Blank TB 10-21

Table 3
Summary of Analytical Results
Former Nepera Plant, Harriman, NY
Sampled April 19-21, 2010
Semi-Volatile Organic Compounds
Reported in Micrograms per Liter (μg/L)

	Pyridine	alpha-Picoline	2-Aminopyridine
Overburden Aquifer Wells			
MW-1S	ND(4.20)	ND(1.30)	ND(1.20)
MW-5S	ND(3.90)	ND(1.20)	ND(1.10)
MW-7S	ND(3.90)	ND(1.20)	ND(1.10)
MW-8S	ND(4.10)	ND(1.30)	ND(1.20)
MW-11S	ND(4.30)	ND(1.30)	ND(1.30)
MW-12S	ND(4.00)	ND(1.20)	ND(1.20)
MW-16S	ND(4.20)	21.00	ND(1.20)
MW-20S	ND(4.00)	8.50 J	71.00
MW-24S	ND(4.20)	ND(1.30)	ND(1.20)
MW-25S	ND(4.00)	24.00	ND(1.20)
MW-33S	ND(4.40)	6.80 J	ND(1.30)
MW-35S	ND(4.10)	ND(1.30)	ND(1.20)
MW-37S	ND(4.30)	ND(1.30)	ND(1.30)
OW-6	ND(40.00)	510.00	ND(12.00)
OW-7	ND(8.60)	150.00	ND(2.50)
RW-1R	ND(3.90)	ND(1.20)	ND(1.10)
MW-53D	ND(4.20)	ND(1.30)	ND(1.20)
MW-101	ND(4.00)	ND(1.20)	ND(1.20)
MW-102	ND(4.00)	ND(1.20)	ND(1.20)
MW-103	ND(4.20)	ND(1.30)	ND(1.20)
MW-104	ND(4.10)	ND(1.30)	ND(1.20)
MW-105	ND(3.90)	ND(1.20)	ND(1.10)
MW-106	ND(3.90)	ND(1.20)	ND(1.10)
Bedrock Wells			
MW-6D	ND(4.10)	ND(1.30)	ND(1.20)
MW-20D	30.00 J	28.00 J	250.00
MW-23D	ND(3.90)	ND(1.20)	ND(1.10)
MW-26D	ND(4.20)	ND(1.30)	ND(1.20)
MW-27D	ND(3.90)	ND(1.20)	ND(1.10)
MW-20DR	ND(4.00)	ND(1.20)	ND(1.20)
QA/QC			
FB 4-19	ND(4.10)	ND(1.30)	ND(1.20)
MW-DUP	ND(3.90)	ND(1.20)	ND(1.10)
NYSDEC Class GA Standard	***NS***	***NS***	***NS***

Note:
ND( ): *Compound not detected at the method detection limit*
J: *Indicates an estimated value*
NYSDEC Class GA Standards: *New York State Department of Environmental Conservation Ambient Water Quality Standards for Source of Drinking Water Title 6 Part 703 (per August 1999 Amendment)*
NS: *No NYSDEC Standard Established*

Table 4
Summary of Analytical Results
Former Nepera Plant, Harriman, NY
Sampied April 19-21, 2010
General Chemistry

	Iron (µg/L)	Manganese (µg/L)	Sulfate (mg/L)	Nitrate (mg/L)	Ammonia (mg/L)	Mercury (µg/L)
Overburden Aquifer Wells						
MW-1S	**24,800.00**	**1,010.00**	23.60	0.021 J	**22.50**	NA
MW-8S	**17,700.00**	**537.00**	25.60	ND(0.033)	**10.40**	NA
MW-11S	**4,490.00**	**614.00**	12.30	0.230	**18.20**	NA
MW-16S	**6,920.00**	**968.00**	1.20	ND(0.033)	**13.20**	NA
MW-20S	**3,580.00**	**1,730.00**	15.20	ND(0.033)	**22.40**	NA
MW-24S	NA	NA	NA	NA	NA	0.33
MW-25S	**12,800.00**	**1,960.00**	40.80	ND(0.033)	**2.60**	NA
MW-33S	**77,000.00**	**2,260.00**	39.10	ND(0.033)	**381.00**	NA
MW-35S	**11,200.00**	**6,810.00**	**1,260.00**	0.021 J	**4.50**	NA
MW-37S	**9,700.00**	**1,190.00**	2.00	ND(0.033)	**65.60**	NA
OW-6	**23,900.00**	**6,230.00**	5.40	ND(0.033)	**9.50**	NA
OW-7	**51,400.00**	**6,310.00**	9.30	ND(0.033)	**4.10**	NA
RW-1R	**31,600.00**	1,600.00	211.00	ND(0.033)	**2.00**	NA
MW-53D	**5,420.00**	183.00	0.44 J	ND(0.033)	**29.90**	NA
MW-101	**13,500.00**	**1,530.00**	215.00	0.021 J	**12.80**	NA
MW-102	**17,000.00**	**1,140.00**	79.30	0.021 J	**18.90**	NA
MW-103	**4,440.00**	**529.00**	21.70	0.590	0.077 J	NA
MW-104	**6,740.00**	**1,370.00**	26.10	ND(0.033)	**2.60**	NA
MW-105	**15,600.00**	**856.00**	29.60	ND(0.033)	1.60	NA
MW-106	**3,590.00**	**744.00**	38.20	0.510	**5.20**	NA
QA/QC						
FB 4-19	ND(30.00)	ND(0.50)	0.24 J	0.030 J	0.042 J	NA
MW-DUP	**1,260.00**	**679.00**	37.80	0.041 J	**5.10**	NA
NYSDEC Class GA Standard	***300.0***	***300.0***	***250.0***	***10.0***	***2.0***	***0.7***

Note:
ND( ): *Compound not detected at the method detection limit*
J: *Indicates an estimated value*
NYSDEC Class GA Standards: *New York State Department of Environmental Conservation Ambient Water Quality Standards for Source of Drinking Water Title 6 Part 703 (per August 1999 Amendment)*
NS: *No NYSDEC Standard Established*
NA: *Not Applicable*

Table 6-1
SUMMARY OF SURFACE WATER SAMPLES -- RI DATA

Sample ID:	NYSDEC	SW-WW-04*	SW-WW-01	SW-WW-02	SW-WW-03
Sample Date:	Class GA WQS	August 1991	August 1991	August 1991	August 1991
	(Part 703)				Duplicate of WW-02
		Conc (MDL)	Conc (MDL)	Conc (MDL)	Conc (MDL)
Volatile Organics	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**
Acetone	-	21	ND (10)	ND (10)	ND (10)
Bromoform	-	6 J	3 J	8	5
2-Hexanone	-	3 J	ND (10)	ND (10)	ND (10)
4-Methyl-2-Pentanone	-	3 J	ND (10)	ND (10)	ND (10)
Toluene	5	2 J	4 J	ND (5)	ND (5)
Xylene (total)	5	1 J	ND (5)	ND (5)	ND (5)
TPH (mg/L)		<5	<5	<5	<5
TICS					
1,1,2-trichloro-1,2,2-trifluoroethane		--	8 J	10 J	--
Unknown Alkane			--	20 J	--
Semi-Volatile Organics	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**
1,2-Dichlorobenzene	3	**10 J**	ND (10) J	7 J	7 J
bis(2-Ethylhexyl)phthalate	3	ND (10) J	ND (10) J	7J	ND (10)
TICS					
cyclotrisiloxane, hexamethyl		--	--	--	60 J
5-Nonen-4-one (8Cl9Cl)		--	--	8 J	--
Unknown 1		10	10 J	10 J	30 J
Unknown 2		--	10 J	--	--
Unknown 3		--	8 J	--	--
Unknown 4		--	8 J	--	--
Unknown Acid 1		--	--	--	10 J
Unknown Acid 2		--	--	--	10 J
Unknown Hydrocarbon 1		30 J	10 J	10 J	--
Unknown Hydrocarbon 2		10 J	40 J	40 J	--
Unknown Hydrocarbon 3		--	--	10 J	--
Unknown Hydrocarbon 4		--	--	--	--
Inorganics	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**
Aluminum	-	108	242	192	162
Arsenic	50	ND (2.5)	ND (2.5)	ND (2.5)	ND (2.5)
Barium	1000	12.3	16.2	15.3	14.5
Beryllium	11	ND (0.30)	ND (0.30)	ND (0.30)	ND (0.30)
Cadmium	5	ND (4.8)	ND (4.8)	ND (4.8)	ND (4.8)
Calcium	-	41600	46400	51100	44100
Chromium	50	ND (8.7)	ND (8.7)	ND (8.7)	9.8
Cobalt	5 A(C)	ND (5.4)	ND (5.4)	ND (5.4)	5.4
Copper	200	12.4	14.3	9.9	10.2
Cyanide	200	ND (10)	ND (10)	ND (10)	ND (10)
Iron	300 E(WS)	255	**511**	**466**	**418**
Lead	50	1.6	1.8	2.2	2
Magnesium	35000	11100	11500	11300	10900
Manganese	300 E(WS)	169	132	164	155
Mercury	7×10^{-4}	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Nickel	100	ND (14.7)	ND (14.7)	ND (14.7)	ND (14.7)
Potassium	-	8700	7370	7700	7380
Sodium	-	100000	95400	94800	91500
Thallium	8 A(C)	ND (1.5)	ND (1.5)	ND (1.5)	ND (1.5)
Vanadium	14 A(C)	ND (5.7)	ND (5.7)	ND (5.7)	5.7
Zinc	-	44	96.8 J	33.5	48.6

Notes:
ND - Not Dectected
J - Compounds are an estimated value
A(C) - aquatic acute criteria
E (WS) - aesthetic water source criteria
BOLD - Exceeds criteria
* Background Sample

Table 6-2
SUMMARY OF SEDIMENT SAMPLING RESULTS
HARRIMAN, NEW YORK

Sample ID:	NYSDEC	SD-WW-04*	SD-WW-01	SD-WW-02	SD-WW-03
Sample Date:	Sediment Criteria	August 1991	August 1991	August 1991	August 1991
	(January 1999)				Duplicate of WW-02
		Conc (MDL)	Conc (MDL)	Conc (MDL)	Conc (MDL)
Volatile Organics		**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
Methylene chloride	-	12 J	8 J	ND (13)	ND (7)
TPH (mg/kg)		98.3	18.7 J	7.3	36.4
Semi-Volatile Organics		**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
Fluorene		140 J	ND (1,100)	ND (910)	ND (900)
Phenanthrene	OC	1400	170 J	420 J	100 J
Anthracene		240 J	ND (1,100)	ND (910)	ND (900)
Fluoranthene	OC	2200	300 J	610 J	210 J
Pyrene		2500	290 J	830 J	240 J
Benzo(a)anthracene		1300	160 J	320 J	140 J
Chrysene		1600	150 J	400 J	140 J
bis(2-Ethylhexyl)phthalate	OC	3000	3000 J	3500 J	3300 J
Di-n-octylphthalate		200 J	ND (1,100)	380 J	360 J
Benzo(b)fluoranthene		2700	360 J	510 J	310 J
Benzo(a)pyrene	OC	1600	ND (1,100)	410 J	170 J
Indeno(1,2,3-cd) pyrene		910 J	ND (1,100)	ND (910)	ND (900)
Dibenzo(a,h) anthracene		260 J	ND (1,100)	ND (910)	ND (900)
Benzo[g,h,i]perylene		960 J	ND (1,100)	240 J	ND (900)
TICS					
3-Hexen-1-ol (8Cl9Cl)		--	800 J	--	800 J
3-Penten-1-ol,2-methyl- (9 Cl)		--	--	500 J	--
Unknown 1		900 J	500 J	500 J	500 J
Unknown 2		600 J	500 J	500 J	700 J
Unknown 3		800 J	900 J	1000	1000 J
Unknown 4		1000 J	2000 J	400 J	3000 J
Unknown 5		3000 J	3000 J	500 J	4000 J
Unknown 6		4000 J	4000 J	600 J	5000 J
Unknown 7		6000 J	2000 J	500 J	3000 J
Unknown 8		3000 J	500 J	700 J	2000 J
Unknown 9		2000 J	500 J	2000 J	500 J
Unknown 10		600 J	700 J	400 J	700 J
Unknown 11		800 J	1000 J	--	1000 J
Unknown 12		2000 J	800 J	--	900 J
Unknown 13		1000 J	700 J	--	700 J
Unknown 14		700 J	--	--	--
Unknown Hydrocarbon 1		600 J	400 J	900 J	500 J
Unknown Hydrocarbon 2		1000 J	900 J	5000 J	1000 J
Unknown Hydrocarbon 3		20000 J	10000 J	1000 J	10000 J
Unknown Hydrocarbon 4		700 J	400 J	--	500 J
Unknown Hydrocarbon 5		600 J	1000 J	--	500 J
Unknown Hydrocarbon 6		1000 J	--	--	1000 J
Pesticides/PCBs		**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
Aldrin	OC	15	ND (11)	ND (11)	ND (11)
Inorganics	**SEL (mg/kg)**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**
Aluminum	--	17100	11700	17700	11600
Arsenic	33	7.6	1.8	4	3.1
Barium	--	253	46.8	69.2	50.2
Beryllium	--	1.1	0.55	0.85	0.54
Cadmium	9	3.1	3.3	2.5	2.2
Calcium	--	33300	3180	4590	2980
Chromium	110	42	28.3	31	22.4
Cobalt	--	16.8	10.2	13.7	10.4
Copper	110	**140**	25	38	27.7
Iron	4%	**44600**	24100	36800	24800
Lead	110	96.9	30.7 J	64.2	63.3
Magnesium	–	20900	5000 J	9200	5650
Manganese	1100	901	563 J	609	425
Mercury	1.3	0.17	0.43 J	0.28	0.22
Nickel	50	**108**	26.3	41.8	29.6
Potassium	--	2060	1120	1830	1210
Selenium	--	ND (0.21)	ND (1.5)	ND (0.52)	ND (0.52)
Sodium		270	165	156	117
Thallium	--	ND (0.46)	ND (49)	ND (0.41)	ND (0.41)
Vanadium	--	32.9	21.2	30.7	19.7
Zinc	270	**450**	124 J	210	148

Notes:
ND - Not Dectected
J - Compounds are an estimated value
OC - Human health bioaccumulation sediment criteria based on grams organic carbon
SEL - Severe Effect Level
BOLD - Exceeds criteria
* Background Sample

TABLE
SUMMARY OF SOIL RESULTS
SUPPLEMENTAL RFI
FORMER NEPERA SITE, HARRIMAN, NY

Client ID:	SB-1-0-2			SB-1-2-24			SB-2-0-2			SB-2-2-24			SB-3-0-2			SB-3-2-24		
Sampled Date	6/10/08			6/10/08			6/10/08			6/10/08			6/10/08			6/10/08		
PARAMETER (mg/kg)	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL
PCBs																		
Aroclor-1016	ND		0.027	ND		0.017	ND		0.021	ND		0.018	ND		0.021	ND		0.02
Aroclor-1221	ND		0.027	ND		0.017	ND		0.021	ND		0.018	ND		0.021	ND		0.02
Aroclor-1232	ND		0.027	ND		0.017	ND		0.021	ND		0.018	ND		0.021	ND		0.02
Aroclor-1242	ND		0.027	ND		0.017	ND		0.021	ND		0.018	ND		0.021	ND		0.02
Aroclor-1248	ND		0.027	ND		0.017	ND		0.021	ND		0.018	ND		0.021	ND		0.02
Aroclor-1254	0.100		0.027	ND		0.017	0.079		0.021	ND		0.018	0.071		0.021	0.031		0.02
Aroclor-1260	ND		0.027	ND		0.017	ND		0.021	ND		0.018	ND		0.021	ND		0.02
Mercury	0.479		0.021	0.055		0.015	0.208		0.017	0.096		0.015	0.334		0.019	0.135		0.016

Client ID:	SB-4-0-2			SB-4-2-24			SB-5-0-2			SB-5-2-24			SB-6-0-2			SB-6-2-24		
Sampled Date	6/10/08			6/10/08			6/10/08			6/10/08			6/10/08			6/10/08		
PARAMETER (mg/kg)	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL
PCBs																		
Aroclor-1016	ND		0.018	ND		0.018	ND		0.018	ND		0.018	ND		0.018	ND		0.016
Aroclor-1221	ND		0.018	ND		0.018	ND		0.018	ND		0.018	ND		0.018	ND		0.016
Aroclor-1232	ND		0.018	ND		0.018	ND		0.018	ND		0.018	ND		0.018	ND		0.016
Aroclor-1242	ND		0.018	ND		0.018	ND		0.018	ND		0.018	ND		0.018	ND		0.016
Aroclor-1248	ND		0.018	ND		0.018	ND		0.018	ND		0.018	ND		0.018	ND		0.016
Aroclor-1254	0.082		0.018	ND		0.018	0.064		0.018	ND		0.018	0.061		0.018	ND		0.016
Aroclor-1260	ND		0.018	ND		0.018	ND		0.018	ND		0.018	ND		0.018	ND		0.016
Mercury	0.457		0.015	0.041		0.015	0.388		0.015	0.058		0.015	0.384		0.015	0.175		0.014

Client ID:	SB-7-0-2			SB-7-2-24			SB-8-0-2			SB-8-2-24			SB-9-0-2			SB-9-2-24		
Sampled Date	6/10/08			6/10/08			6/10/08			6/10/08			6/10/08			6/10/08		
PARAMETER (mg/kg)	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL
PCBs																		
Aroclor-1016	ND		0.016	ND		0.015	ND		0.018	ND		0.016	ND		0.019	ND		0.017
Aroclor-1221	ND		0.016	ND		0.015	ND		0.018	ND		0.016	ND		0.019	ND		0.017
Aroclor-1232	ND		0.016	ND		0.015	ND		0.018	ND		0.016	ND		0.019	ND		0.017
Aroclor-1242	ND		0.016	ND		0.015	ND		0.018	ND		0.016	ND		0.019	ND		0.017
Aroclor-1248	ND		0.016	ND		0.015	ND		0.018	ND		0.016	ND		0.019	ND		0.017
Aroclor-1254	ND		0.016	ND		0.015	ND		0.018	ND		0.016	ND		0.019	ND		0.017
Aroclor-1260	ND		0.016	ND		0.015	ND		0.018	ND		0.016	ND		0.019	ND		0.017
Mercury	0.387		0.014	0.056		0.014	0.383		0.015	0.102		0.013	0.343		0.015	0.124		0.014

Client ID:	SB-10-0-2			SB-10-2-24			SB-11-0-2			SB-11-2-24			SB-12-0-2			SB-12-2-24		
Sampled Date	6/11/08			6/11/08			6/11/08			6/11/08			6/11/08			6/11/08		
PARAMETER (mg/kg)	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL
PCBs																		
Aroclor-1016	ND		0.019	ND		0.017	ND		0.021	ND		0.016	ND		0.019	ND		0.017
Aroclor-1221	ND		0.019	ND		0.017	ND		0.021	ND		0.016	ND		0.019	ND		0.017
Aroclor-1232	ND		0.019	ND		0.017	ND		0.021	ND		0.016	ND		0.019	ND		0.017
Aroclor-1242	ND		0.019	ND		0.017	ND		0.021	ND		0.016	ND		0.019	ND		0.017
Aroclor-1248	ND		0.019	ND		0.017	ND		0.021	ND		0.016	ND		0.019	ND		0.017
Aroclor-1254	ND		0.019	ND		0.017	ND		0.021	ND		0.016	ND		0.019	ND		0.017
Aroclor-1260	ND		0.019	ND		0.017	ND		0.021	ND		0.016	ND		0.019	ND		0.017
Mercury	0.26		0.015	0.058		0.014	0.197		0.018	0.072		0.014	0.072		0.016	0.062		0.015

Client ID:	SB-13-0-2			SB-13-2-24			SB-14-0-2			SB-14-2-24			SB-15-0-2		
Date Sampled:	6/11/08			6/11/08			6/11/08			6/11/08			6/11/08		
PARAMETER (mg/kg)	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL
PCBs															
Aroclor-1016	ND		0.017	ND		0.018	ND		0.161	ND		0.156	ND		0.015
Aroclor-1221	ND		0.017	ND		0.018	ND		0.161	ND		0.156	ND		0.015
Aroclor-1232	ND		0.017	ND		0.018	ND		0.161	ND		0.156	ND		0.015
Aroclor-1242	ND		0.017	ND		0.018	ND		0.161	ND		0.156	ND		0.015
Aroclor-1248	ND		0.017	ND		0.018	ND		0.161	ND		0.156	ND		0.015
Aroclor-1254	ND		0.017	ND		0.018	ND		0.161	ND		0.156	ND		0.015
Aroclor-1260	ND		0.017	ND		0.018	ND		0.161	ND		0.156	ND		0.015
Mercury	0.032		0.014	0.018		0.015	0.042		0.013	0.112		0.014	0.547		0.013

Client ID:	SB-15-2-24			SB-15-5-6			SB-16-0-2			SB-16-2-24			SB-16-5-6		
Date Sampled:	6/11/08			6/11/08			6/11/08			6/11/08			6/11/08		
PARAMETER (mg/kg)	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL
PCBs															
Aroclor-1016	ND		0.016	ND		0.017	ND		0.016	ND		0.016	ND		0.018
Aroclor-1221	ND		0.016	ND		0.017	ND		0.016	ND		0.016	ND		0.018
Aroclor-1232	ND		0.016	ND		0.017	ND		0.016	ND		0.016	ND		0.018
Aroclor-1242	ND		0.016	ND		0.017	ND		0.016	ND		0.016	ND		0.018
Aroclor-1248	ND		0.016	ND		0.017	ND		0.016	ND		0.016	ND		0.018
Aroclor-1254	ND		0.016	ND		0.017	ND		0.016	ND		0.016	ND		0.018
Aroclor-1260	ND		0.016	ND		0.017	ND		0.016	ND		0.016	ND		0.018
Mercury	1.01		0.069	0.172		0.014	0.989		0.068	0.310		0.014	0.021		0.015

Part 375 Soil Cleanup Standards (mg/kg):	Unrestricted	Industrial
Total PCBs	0.1	25
Mercury	0.18	5.7

ND = Analyzed for but not detected at the MDL

NA - Not analyzed; sample was collected and held pending review of shallower samples; no additional analysis requested

0-2 sample IDs correspond to 0-2-inch depth interval

2-24 sample IDs correspond to 2-24-inch depth interval

Pending - lab has been requested to analyze for mercury; preliminary results will be available on or around 7/21

Results were screened against the industrial standards for ELT property samples and the unrestricted standards for Village of Harriman samples to determine the need to analyze the deepest sample

BROWN AND CALDWELL

Table 6-5
Summary of Source Area and Sediment Remediation

Location	Description	Media	Quantities	Notes/Remarks
Area F	Drum/soil removal	Drums/soil	454 drums & 2960 cubic yards of soil	
Area F	Gas cylinders	Gas	Contents of cylinders disposed	Chlorodifluoromethane and methyl bromide gas
Building 53	Drum removal	Drums	103 drums & 360 cubic yards of soil	Added. Not part of originally selected remedy.
Area F & Bldg 53	Injection of oxygen release compound	Soil		Below the perched water table
Area K	Excavation of sediment	Sediment	200 cubic yards	Based on potential impacts observed on Avon parcel. Not a source area.

TABLE 4-6
SUMMARY OF SEQUENTIAL EXTRACTION RESULTS
FORMER NEPERA PLANT SITE, HARRIMAN, NY

Sample Location[a]	Depth Interval (feet)	Sample Date	Total Mercury	Hg^0 (CVAF)	Fraction % of Total	F1 (CVAF)	Fraction % of Total	F2 (CVAF)	Fraction % of Total	F3 (CVAA)	Fraction % of Total	F4 (CVAA)	Fraction % of Total	F5 (CVAA)	Fraction % of Total
C-SD[b]	1-2	13/11/06	9.87	0.000911 U	<1%	0.0502	1%	0.00157	<1%	8.44	91%	0.715	8%	0.0478	1%
G-B-005	0-1	12/11/06	0.687	0.000911 U	<1%	0.110	16%	0.000911 U	<1%	0.226	33%	0.349	50%	0.00880	1%
A-B-012	5-6	12/14/06	63.1	0.00405	<1%	0.786	2%	0.00771	<1%	25.6	60%	16.0	37%	0.342	1%
CSA-1-B-002	0-1	12/14/06	5.91	0.000911 U	<1%	0.0554	1%	0.00183	<1%	2.40	35%	4.04	58%	0.420	6%
E-B-002	0-1	12/14/06	369	0.000911 U	<1%	0.386	<1%	0.635	<1%	3.18	1%	280	96%	7.16	2%
D-B-002	0-1	12/15/06	2.24	0.00200	<1%	0.0358	2%	0.00177	<1%	1.13	66%	0.515	30%	0.0199	1%
70-B-001	6-7	12/18/06	687.00	0.000926	<1%	0.0392	<1%	0.0669	<1%	44.9	9%	474	91%	2.15	<1%
02-B-002	0-1	01/03/07	1795	0.00420	<1%	2.80	<1%	0.0515	<1%	9.69	1%	1300	85%	225	15%

Notes:
Concentration units are expressed as µg/g (microgram per gram) on a dry weight basis.
a - Sample Locations are shown on Figure 3-1.
b - Lagoon solids sample.
U - constituent not detected above the associated value.
< - less than.
Hg^0 - elemental mercury.
F1 - water soluble fraction.
F2 - 'human stomach acid' soluble fraction.
F3 - organo-chelated fraction.
F4 - elemental mercury fraction.
F5 - mercuric sulfide fraction.
CVAF - cold vapor atomic fluorescence.
CVAA - cold vapor atomic absorption.

TABLE 4-6A
SUMMARY OF METHYL MERCURY RESULTS
FORMER NEPERA PLANT SITE, HARRIMAN, NY

Sample Location[a]	Depth interval (feet)	Sample Date	Total Mercury (µg/g dry)	Percent Dry Weight	Methyl Mercury (ng/g dry)		Fraction % of Total
C-SD[b]	1-2	13/11/06	9.87	20.3	0.9105		0.009%
G-B-005	0-1	12/11/06	0.687	88.1	0.0156	U	0.002%
A-B-012	5-6	12/14/06	63.1	85.0	21.9		0.035%
CSA-1-B-002	0-1	12/14/06	5.91	83.7	1.21		0.020%
E-B-002	0-1	12/14/06	369	75.6	6.76		0.002%
D-B-002	0-1	12/15/06	2.24	87.2	0.161		0.007%
70-B-001	6-7	12/18/06	687.00	78.1	0.9670		0.000%
02-B-002	0-1	01/03/07	1795	82.2	146		0.008%

Notes:
a - Sample Locations are shown on Figure 3-1.
b - Lagoon solids sample.
µg/g -microgram per gram.
ng/g -nanogram per gram.
U - constituent not detected above the associated value.

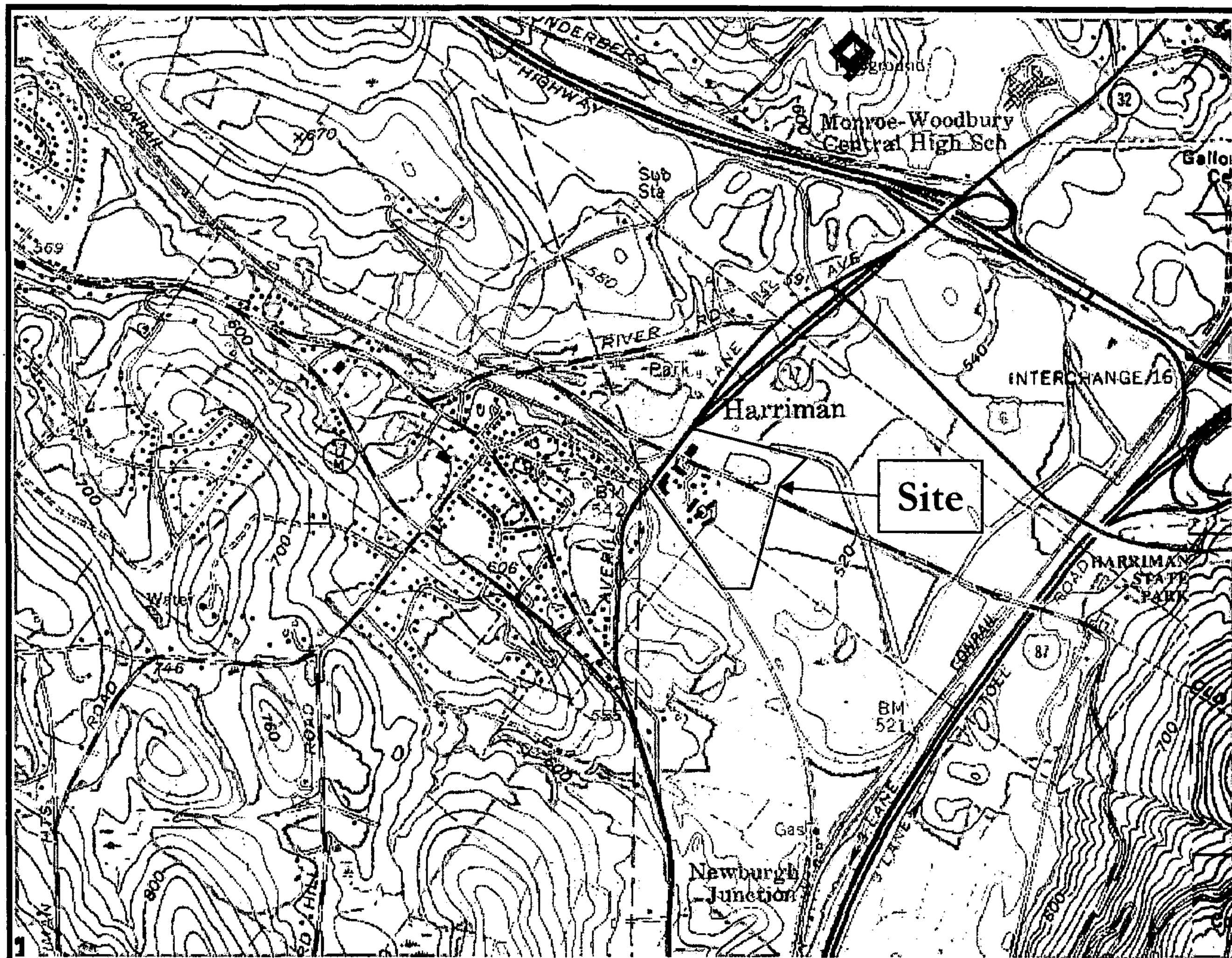
Soil Vapor	benzene, mercury	Inhalation of Soil Vapor	No	Yes	Since there are no operations currently taking place at the Site, inhalation of soil vapor is unlikely in the current scenario. If the Site is redeveloped, a soil vapor intrusion evaluation will need to be conducted and vapor mitigation measures implemented, as necessary.
Ambient Air	benzene, mercury	Inhalation	No	Yes	Risk Assessment showed that on-site worker and off-site resident exposure scenarios result in estimated cancer risks below and within the target cancer risk range established by the USEPA. Future expsoure could occur during major earthwork activities for remediaion or redevelopment. A community air monitoring plan and mitigation measures would be implemented to control potential exposure during major ground-intrusive activities.

Notes:
BTEX - benzene, ethylbenzene, tolunes and xylenes
PCBs - Ploychlorinated Biphenyls
PAHs - Polynuclear Aromatic Hydrocarbons

Table 7-1
Qualitative Exposure Assessment Summary
Nepera-Harriman Site

Medium	Constituents of Concern	Potential Exposure Pathway	Pathway Potentially Complete		Comments
			Current	Future	
Groundwater	BTEX, chlorobenzene, pyridines/picolines, mercury, ammonia	Ingestion of Groundwater	No	Yes	There is currently no use of groundwater at the Site. Site-related constituents have not been identified in private domestic wells located off site. If ground-intrusive work is conducted in the future, direct contact with groundwater is possible. Potential future exposure if the groundwater is used for supply purposes. These pathways can be controlled through an environmental easement that restricts the use of groundwater and a site management plan.
		Direct Contact with Groundwater	No	Yes	
Surface Water	mercury	Direct Contact with Surface Water	No	No	Surface water analytical data indicate that the Site is not having an impact on overall surface water quality. The West Branch of the Ramapo River, in the vicinity of the Site, is not used for wading/swimming. NYSDEC's fish study concluded that a fish advisory associated with mercury is not necessary, thereby indicating that mercury is not propagating through the food chain at levels of concern.
		Ingestion of Fish	No	No	
Sediment	mercury	Direct Contact with Sediment	No	No	Sediment data suggest the potential for a localized mercury impact on sediment likely attributable to past erosion of calcium sulfate containing mercury. The concentrations, however, are below the ROD specified SCG and erosion controls are now in place. The NYSDEC's fish study concluded that a fish advisory associated with mercury is not necessary, indicating that it is not propagating through the food chain at levels of concern. A future exposure pathway is possible if erosion controls are not maintained and calcium sulfate material erodes into the stream. This pathway can be controlled through continued maintenance of the IRM cover system, an environmental easement along with a site management plan, and implementation of a final remedial measure as called for in the ROD.
		Incidental Ingestion of Sediment	No	No	
Calcium Sulfate Material	mercury	Dermal Exposure	No	Yes	The calcium sulfate material represents a potential concern relative to dermal exposure or through its transport in surface water and sediment if exposed to precipitation. The calcium sulfate material is currently covered so there is no current pathway. A future exposure pathway is possible if cover and erosion controls are not maintained and the calcium sulfate material is exposed. This potential pathway can be controlled by keeping the calcium sulfate material covered and maintaining erosion controls, and instituting an environmental easement along with a site management plan.
		Transport to Surface Water/Sediment	No	Yes	
Soil	mercury, benzene, PCBs, PAHs, pyridines/picolines, arsenic	Incidental Ingestion	Yes	Yes	The majority of the Site is covered with buildings and/or pavement and access is restricted by fencing. Under current conditions, trespassers and workers potentially could be exposed. A future pathway also is possible if ground-intrusive work is conducted as part of site remediation or redevelopment or if the Site is redeveloped for residential use. Potential exposures can be minimized by installing/maintaining a protective cover, a site management plan, and an environmental easement that limits future site use to industrial or commercial.
		Dermal Contact with Soil	Yes	Yes	

Figures

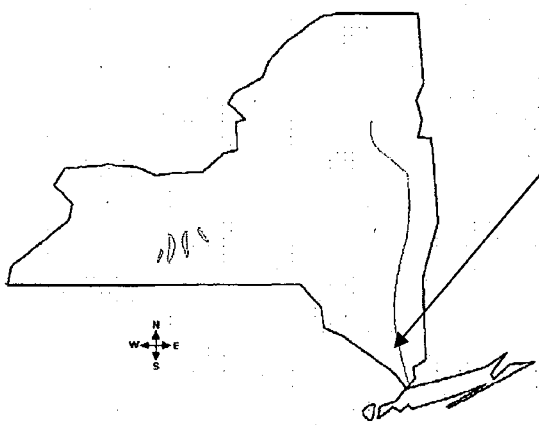


0 0.6 1.2 1.8 2.4 3 km

0 0.4 0.8 1.2 1.6 2 mi

N

Source: Harriman, NY, 7.5' Quadrangle Map, (USGS, 1991)
from www.topozone.com



Site
Location

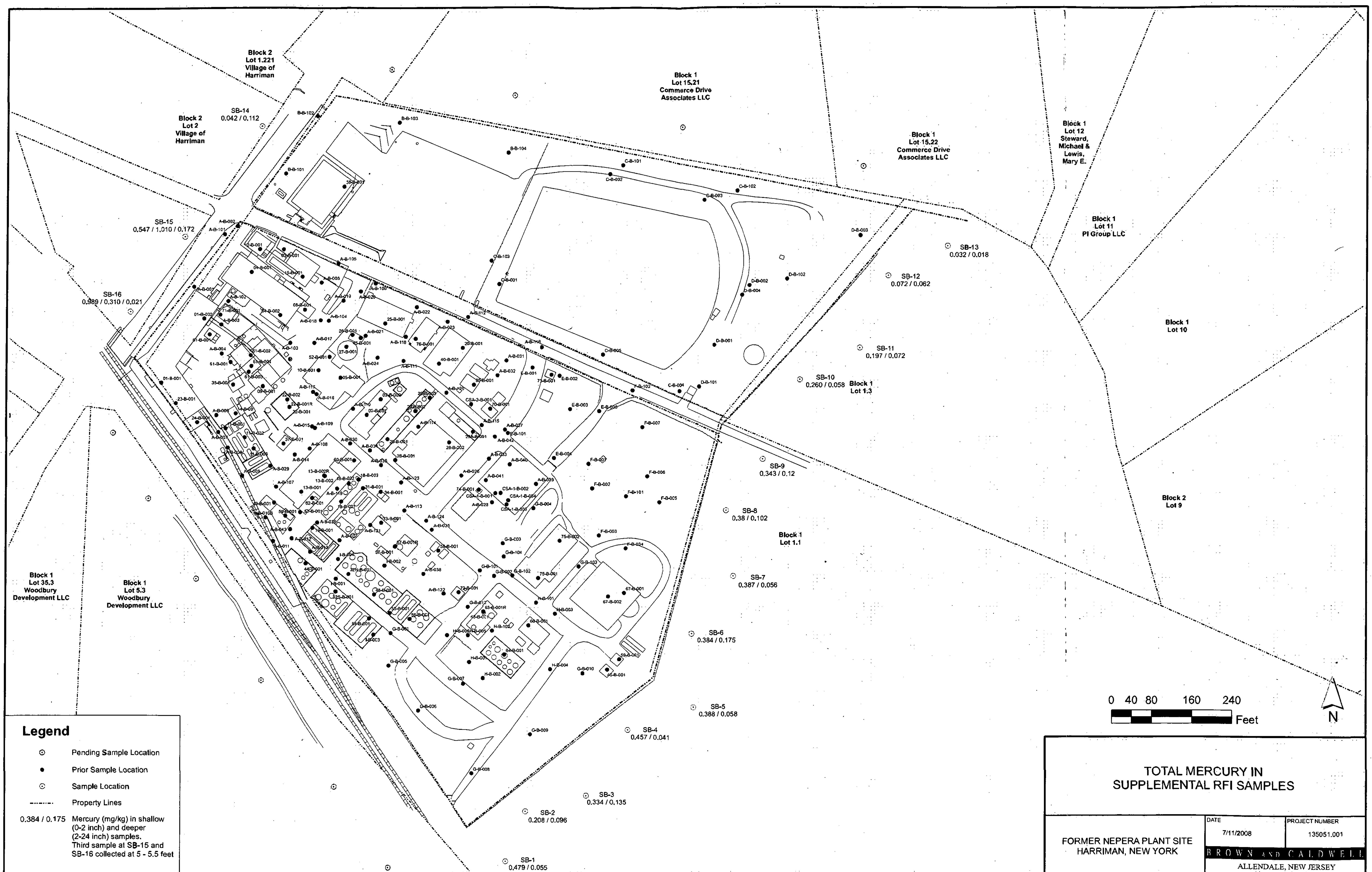
FIGURE 2-1

SITE LOCATION

Former Nepera Plant Site
Harriman., Orange Co., New York

B R O W N AND C A L D W E L L

\\bcmah01\projects\^Clients\Nepera\Harriman\130150(RCRA_Closure)\Work_Plan\Figures(Sampling)\Fig1(Site_Loc_Map).ppt



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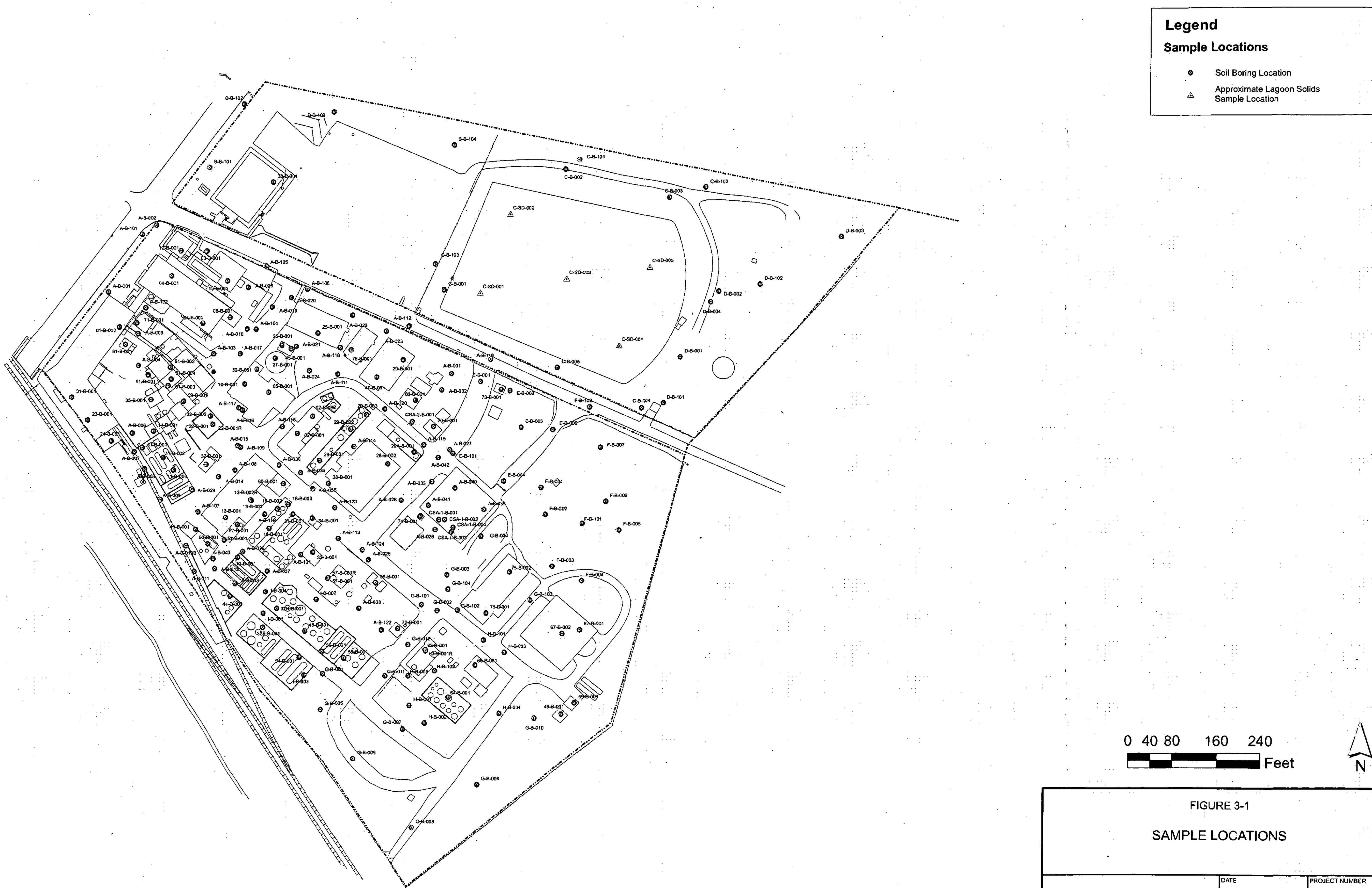


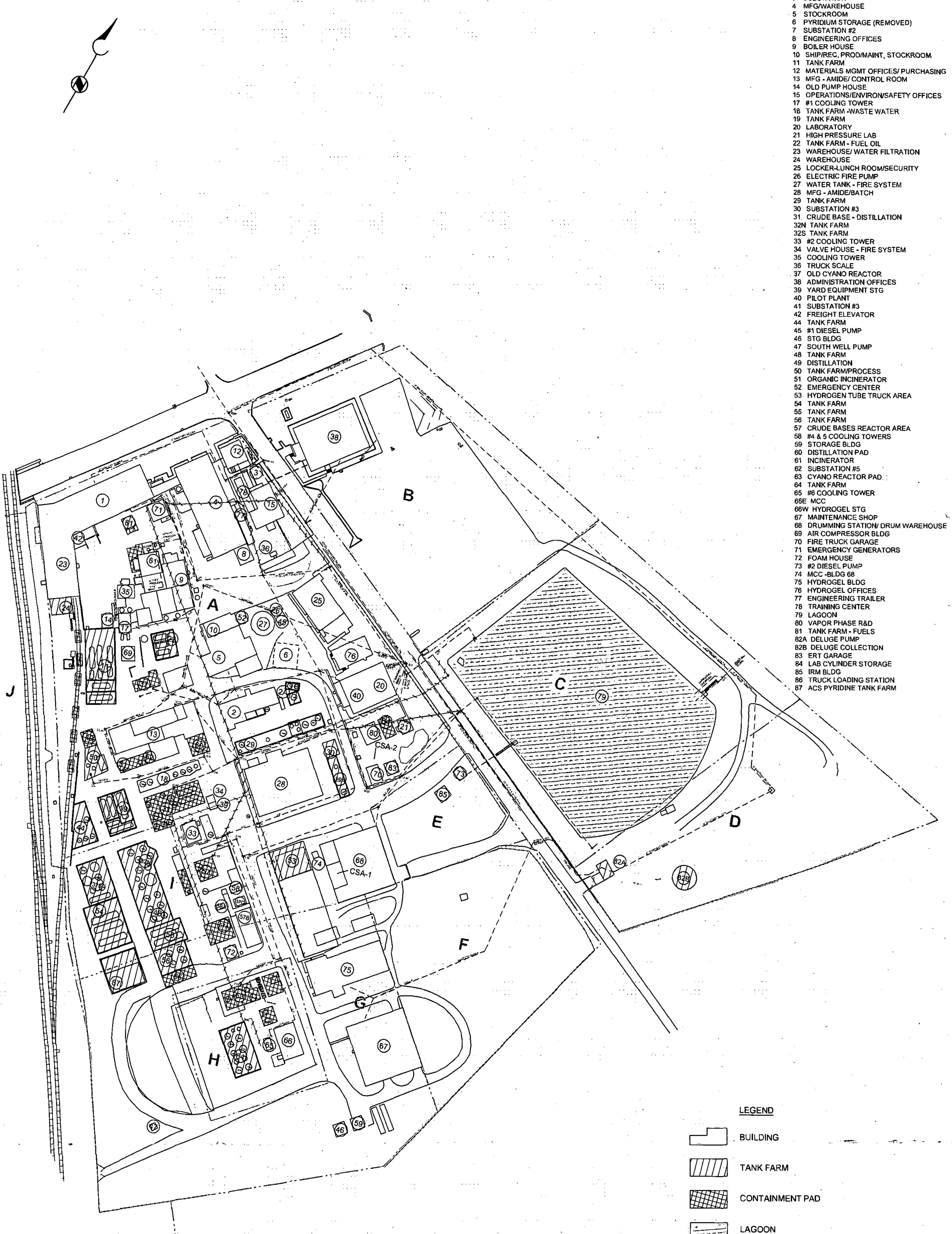
FIGURE 3-1

SAMPLE LOCATIONS

FORMER NEPERA PLANT SITE HARRIMAN, NEW YORK	DATE 04/12/2007	PROJECT NUMBER 131698.007
	BROWN AND CALDWELL ASSOCIATES	

P:/GIS/Nepera/Nepera_RI_Sample_Locations.mxd

P:\DRAFTING\NEPERA\130150\001\FIGURE 2-2 (SITE PLAN) (FOR PDF).DWG 04/18/2007 03:33:11PM By:Plaw XREFS: BASE_M-D Layout: Layout1



INDEX

1 WAREHOUSE
2 MFG DEPT A (2AP)
2A TANK FARM - BLDG 2
3 SUBSTATION
4 MFG/WAREHOUSE
5 STOCKROOM
6 PYRIDIUM STORAGE (REMOVED)
7 SUBSTATION #2
8 ENGINEERING OFFICES
9 BOILER HOUSE
10 SHIP/REC, PROD/MAINT, STOCKROOM
11 TANK FARM
12 MATERIALS MGMT OFFICES/ PURCHASING
13 MFG - AMIDE/ CONTROL ROOM
14 OLD PUMP HOUSE
15 OPERATIONS/ENVIRON/SAFETY OFFICES
17 #1 COOLING TOWER
18 TANK FARM -WASTE WATER
19 TANK FARM
20 LABORATORY
21 HIGH PRESSURE LAB
22 TANK FARM - FUEL OIL
23 WAREHOUSE/ WATER FILTRATION
24 WAREHOUSE
25 LOCKER-LUNCH ROOM/SECURITY
26 ELECTRIC FIRE PUMP
27 WATER TANK - FIRE SYSTEM
28 MFG - AMIDE/BATCH
29 TANK FARM
30 SUBSTATION #3
31 CRUDE BASE - DISTILLATION
32N TANK FARM
32S TANK FARM
33 #2 COOLING TOWER
34 VALVE HOUSE - FIRE SYSTEM
35 COOLING TOWER
36 TRUCK SCALE
37 OLD CYANO REACTOR
38 ADMINISTRATION OFFICES
39 YARD EQUIPMENT STG
40 PILOT PLANT
41 SUBSTATION #3
42 FREIGHT ELEVATOR
44 TANK FARM
45 #1 DIESEL PUMP
46 STG BLDG
47 SOUTH WELL PUMP
48 TANK FARM
49 DISTILLATION
50 TANK FARM/PROCESS
51 ORGANIC INCINERATOR
52 EMERGENCY CENTER
53 HYDROGEN TUBE TRUCK AREA
54 TANK FARM
55 TANK FARM
56 TANK FARM
57 CRUDE BASES REACTOR AREA
58 #4 & 5 COOLING TOWERS
59 STORAGE BLDG
60 DISTILLATION PAD
61 INCINERATOR
62 SUBSTATION #5
63 CYANO REACTOR PAD
64 TANK FARM
65 #6 COOLING TOWER
66E MCC
66W HYDROGEL STG
67 MAINTENANCE SHOP
68 DRUMMING STATION/ DRUM WAREHOUSE
69 AIR COMPRESSOR BLDG
70 FIRE TRUCK GARAGE
71 EMERGENCY GENERATORS
72 FOAM HOUSE
73 #2 DIESEL PUMP
74 MCC -BLDG 68
75 HYDROGEL BLDG
76 HYDROGEL OFFICES
77 ENGINEERING TRAILER
78 TRAINING CENTER
79 LAGOON
80 VAPOR PHASE R&D
81 TANK FARM - FUELS
82A DELUGE PUMP
82B DELUGE COLLECTION
83 ERT GARAGE
84 LAB CYLINDER STORAGE
85 IRM BLDG
86 TRUCK LOADING STATION
87 ACS PYRIDINE TANK FARM

LEGEND

- BUILDING
- TANK FARM
- CONTAINMENT PAD
- LAGOON
- INDUSTRIAL SEWER / SANITARY LINE
- ABANDONED INDUSTRIAL SEWER / SANITARY LINE

0 80 160
SCALE IN FEET

BROWN AND CALDWELL ASSOCIATES
ALLENDALE, NEW JERSEY

SUBMITTED: KEVIN McGUINNESS, PROJECT MANAGER — DATE: 4/16/2007
APPROVED: JEFF CAPUTI, BROWN AND CALDWELL — DATE: 4/16/2007

LINE IS 2 INCHES AT FULL SIZE (IF NOT 2" - SCALE ACCORDINGLY)

DESIGNED:
DRAWN:
CHECKED:
CHECKED:
APPROVED:

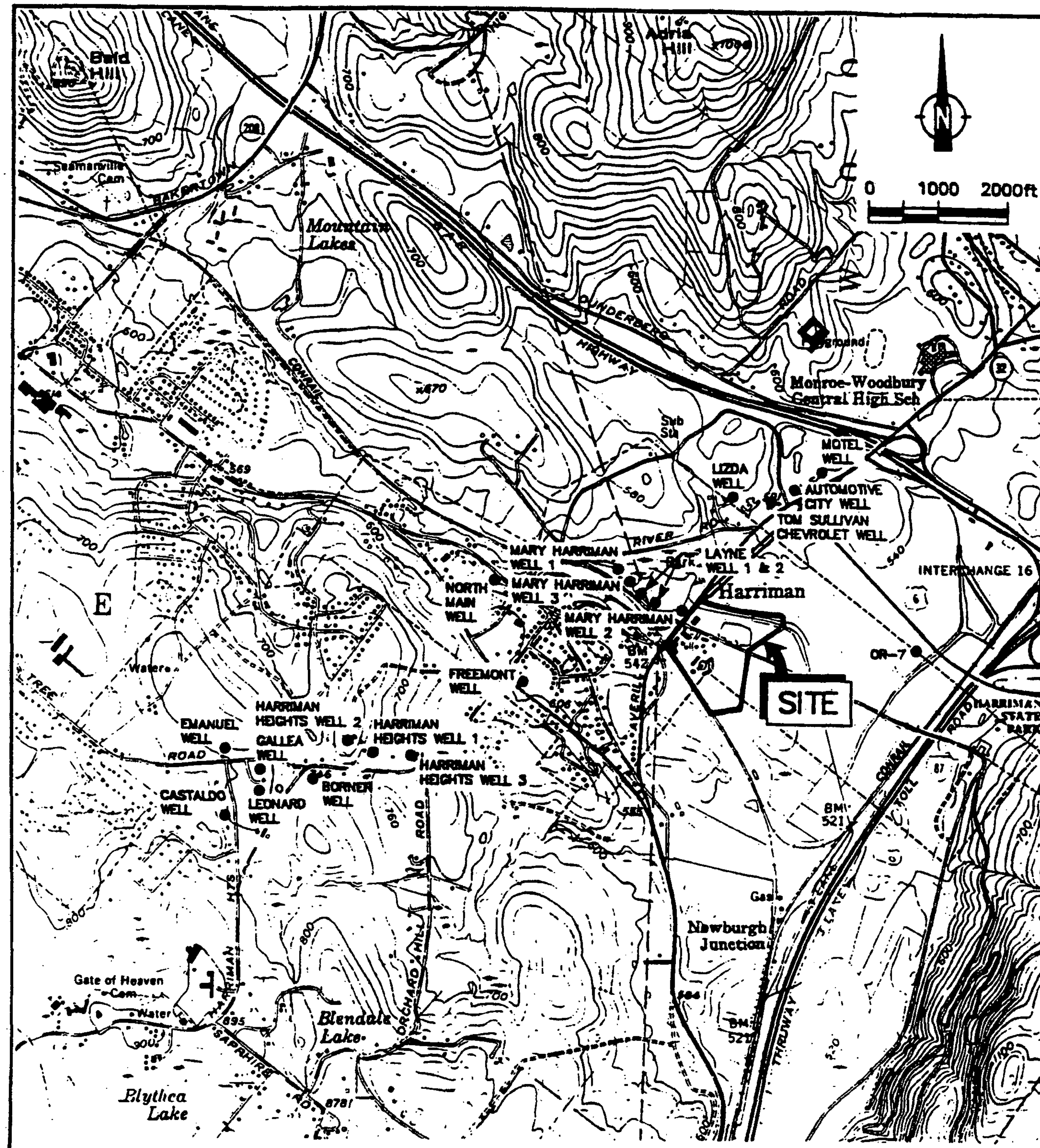
REVISIONS

ZONE	REV.	DESCRIPTION	BY	DATE	APP.

FIGURE 2-2
SITE PLAN

FORMER NEPERA SITE
HARRIMAN, NEW YORK

FILENAME: FIGURE 2-2
BC PROJECT NUMBER: 131698.007
CLIENT PROJECT NUMBER: NA
DRAWING NUMBER: NA
SHEET NUMBER



LEGEND

● WATER WELL LOCATION

figure 3.3

PUBLIC AND PRIVATE WATER SUPPLY WELLS HARRIMAN, NEW YORK

Nepera Inc.

CRA

3697(14)–MAY 26/92–REV.0

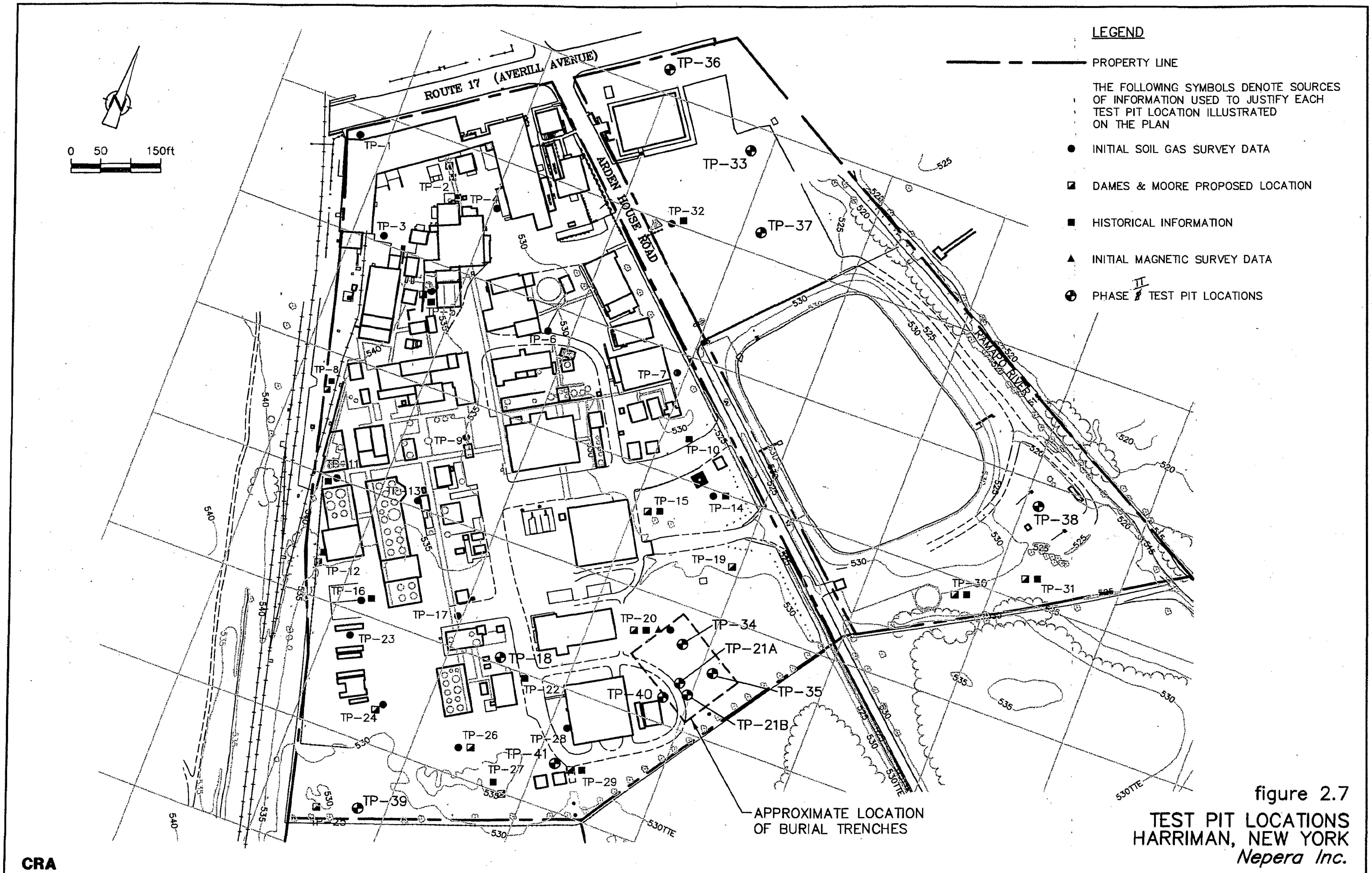


figure 2.7

TEST PIT LOCATIONS
HARRIMAN, NEW YORK
Nepera Inc.

CRA

3697(14)–MAY 26/92–REV.0 (P–26)

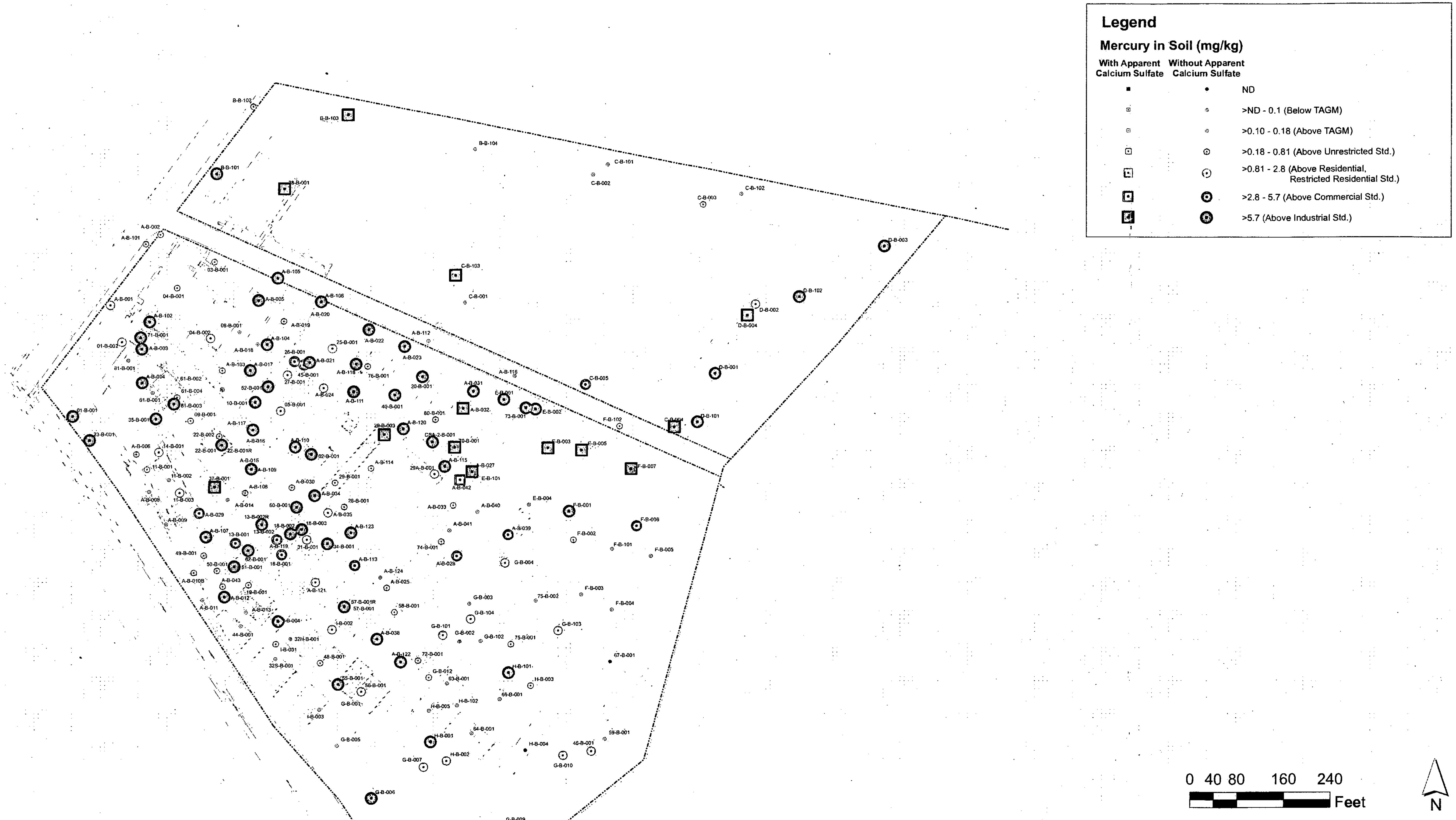


FIGURE 4-8A

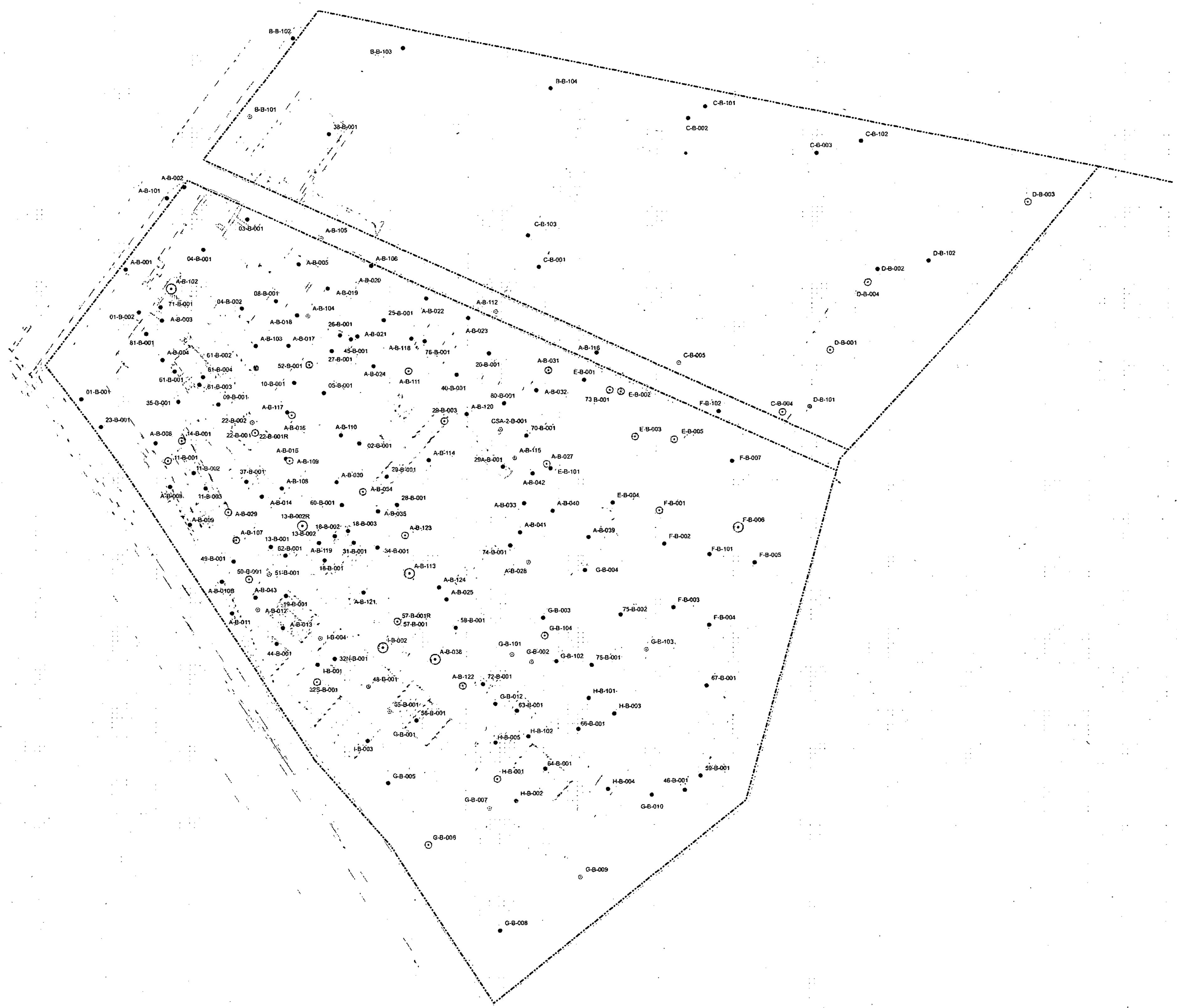
MERCURY IN SOIL
(>2 FT)

FORMER NEPERA PLANT SITE
HARRIMAN, NEW YORK

DATE	PROJECT NUMBER
04/12/2007	131698.007

BROWN AND CALDWELL
ASSOCIATES

P:/GIS/Nepera/Nepera_Hg_Soil_Brwnfld_All_Depths.mxd



Legend

Aroclor 1254 in Soil (mg/kg)

- ND
- >ND - 0.1 (Below Unrestricted Std.)
- >0.1 - 1.0 (Above Unrestricted Std.)
- >1.0 - 10 (Above Residential, Restricted Residential and Commercial Std.)
- > 10 - 25 (Above TAGM)
- > 25 (Above Industrial Std.)

Note:
The TAGM for Aroclor 1254 in Subsurface Soils is 10 mg/kg

0 40 80 160 240 Feet

N

FIGURE 4-6A

AROCLOR 1254 IN SOIL
(>2 FT)

FORMER NEPERA PLANT SITE
HARRIMAN, NEW YORK

DATE	PROJECT NUMBER
04/12/2007	131698.007

BROWN AND CALDWELL ASSOCIATES

P:/GIS/Nepera/Nepera_Aroclor1254_Soil_Brwnfld_Below_2ft.mxd

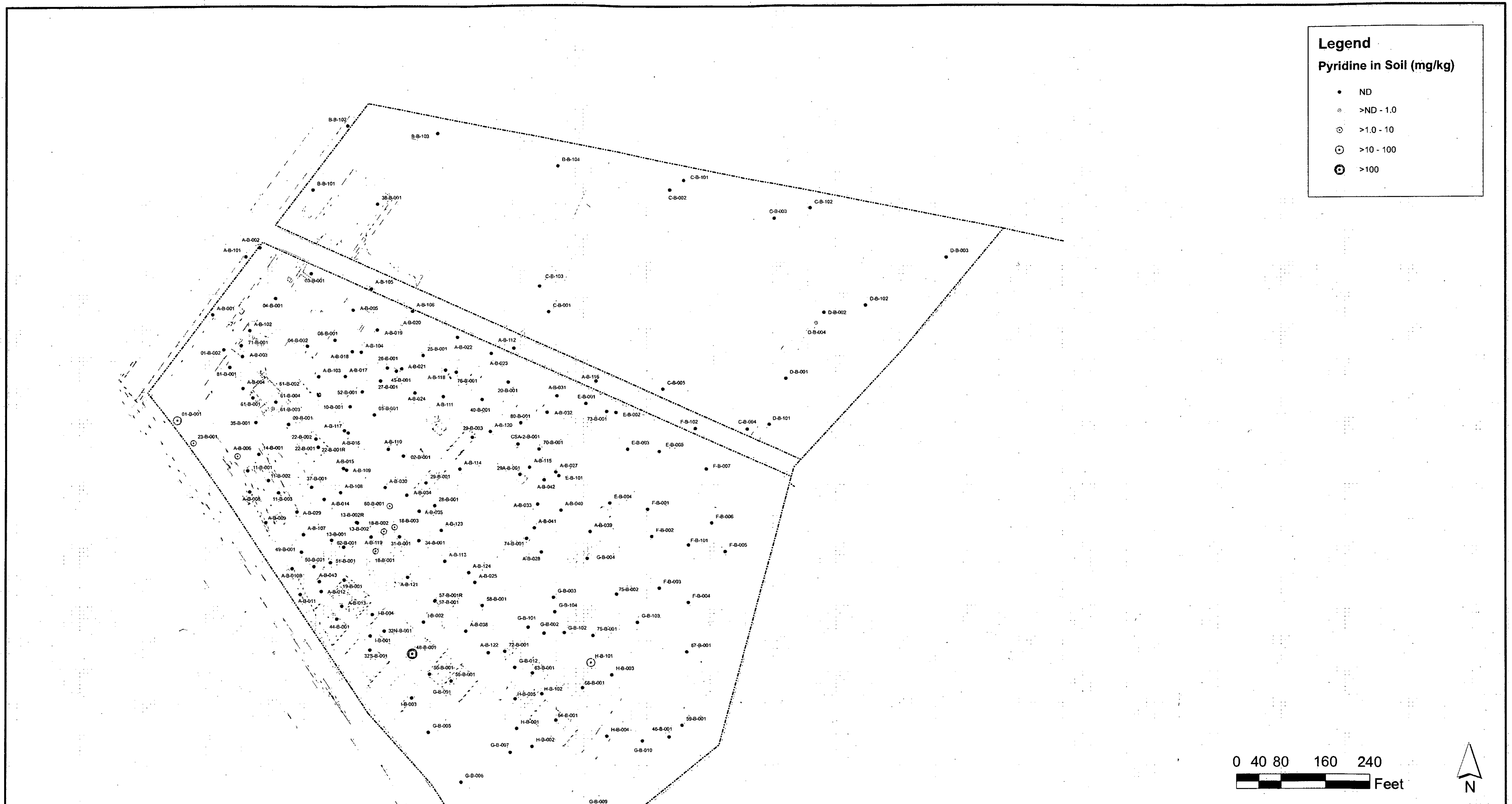


FIGURE 4-5A

PYRIDINE IN SOIL
(>2 FT)

FORMER NEPERA PLANT SITE
HARRIMAN, NEW YORK

DATE	PROJECT NUMBER
04/12/2007	131698.007

BROWN AND CALDWELL
ASSOCIATES

P:/GIS/Nepera/Nepera_Pyridine_Soil_Below_2ft.mxd

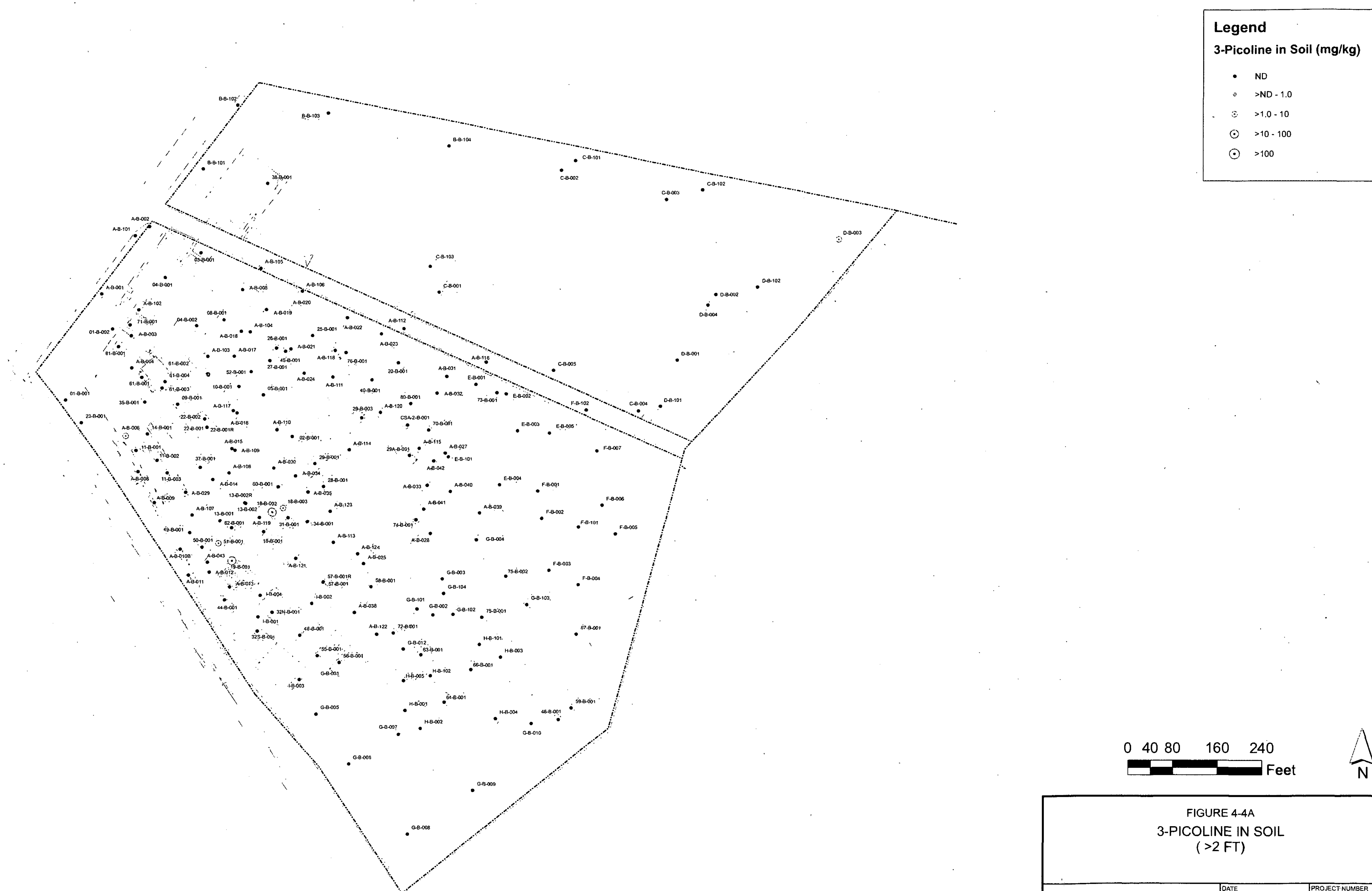


FIGURE 4-4A

3-PICOLINE IN SOIL
(>2 FT)

FORMER NEPERA PLANT SITE
HARRIMAN, NEW YORK

DATE	PROJECT NUMBER
04/12/2007	131698.007

BROWN AND CALDWELL
ASSOCIATES

P:/GIS/Nepera/Nepera_3-Picoline_Soil_Below_2ft.mxd

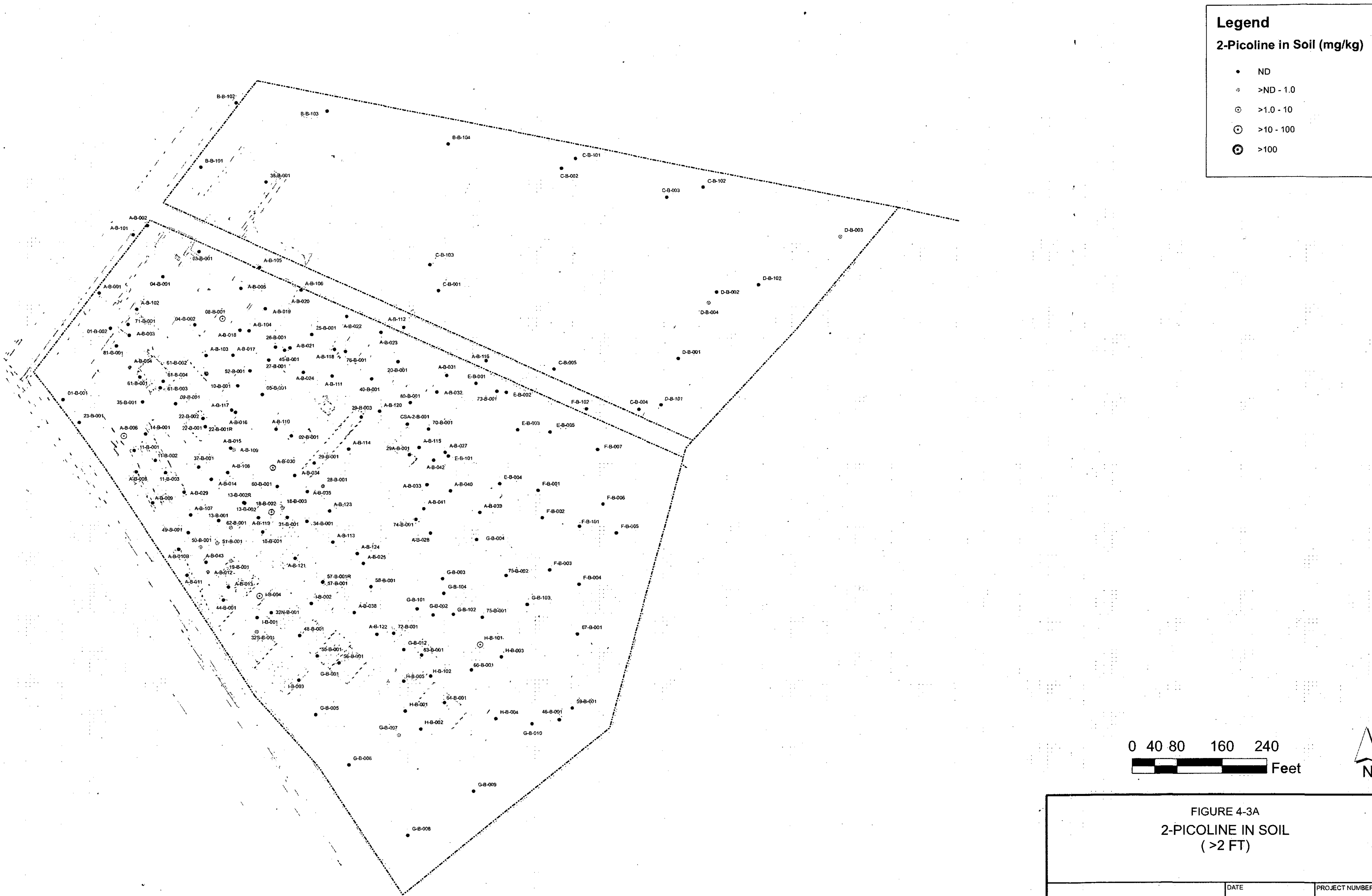


FIGURE 4-3A

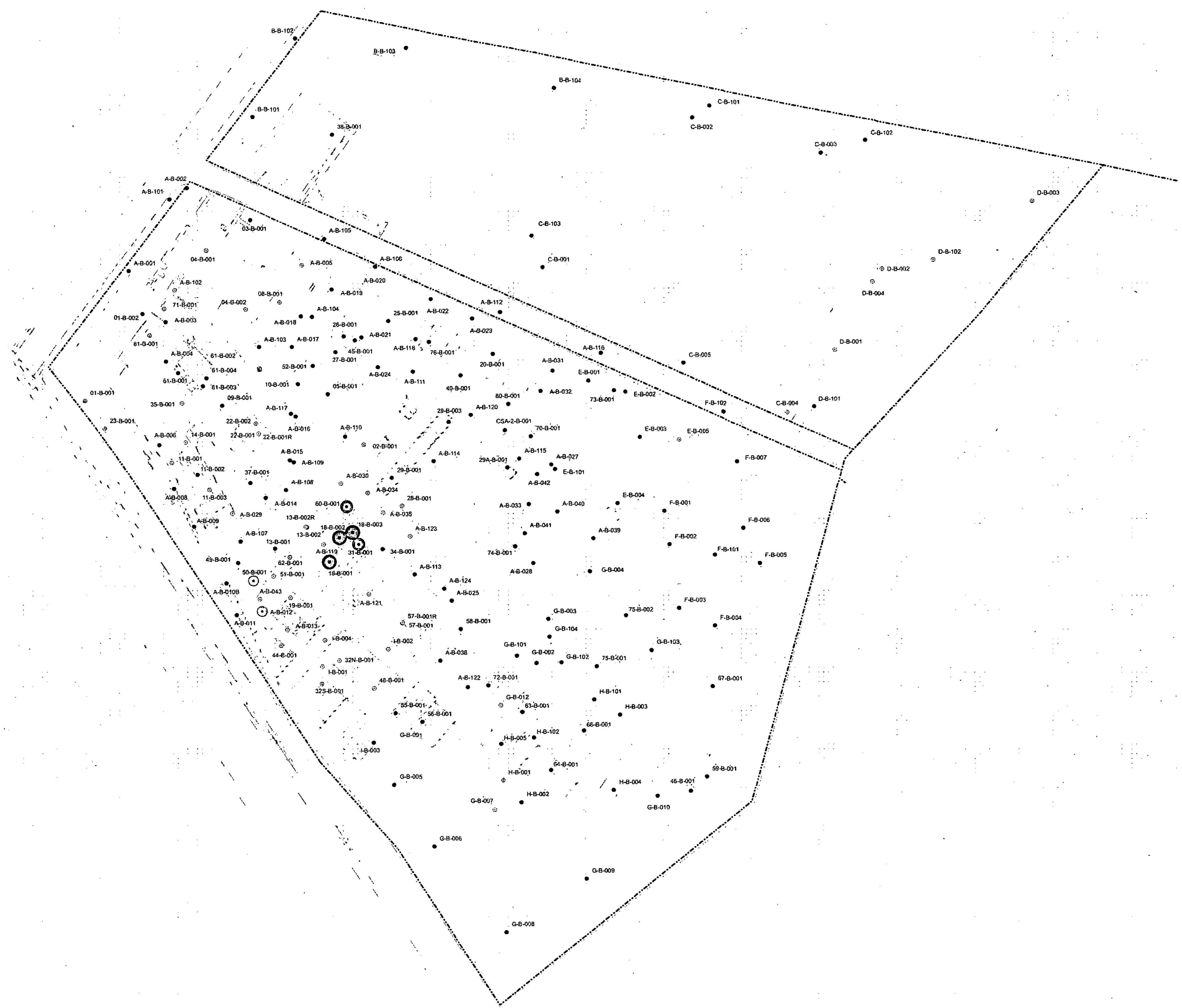
2-PICOLINE IN SOIL
(>2 FT)

FORMER NEPERA PLANT SITE
HARRIMAN, NEW YORK

DATE	PROJECT NUMBER
04/12/2007	131698.007

BROWN AND CALDWELL
ASSOCIATES

P:/GIS/Nepera/Nepera_2-Picoline_Soil_Below_2ft.mxd



Legend

Benzene in Soil (mg/kg)

- ND
- >ND - 0.06 (Below TAGM)
- >0.06 - 2.9 (Above TAGM and Unrestricted Std.)
- >2.9 - 4.8 (Above Residential Std.)
- >4.8 - 44 (Above Restricted Residential Std.)
- >44 - 89 (Above Commercial Std.)
- >89 (Above Industrial Std.)

0 40 80 160 240 Feet

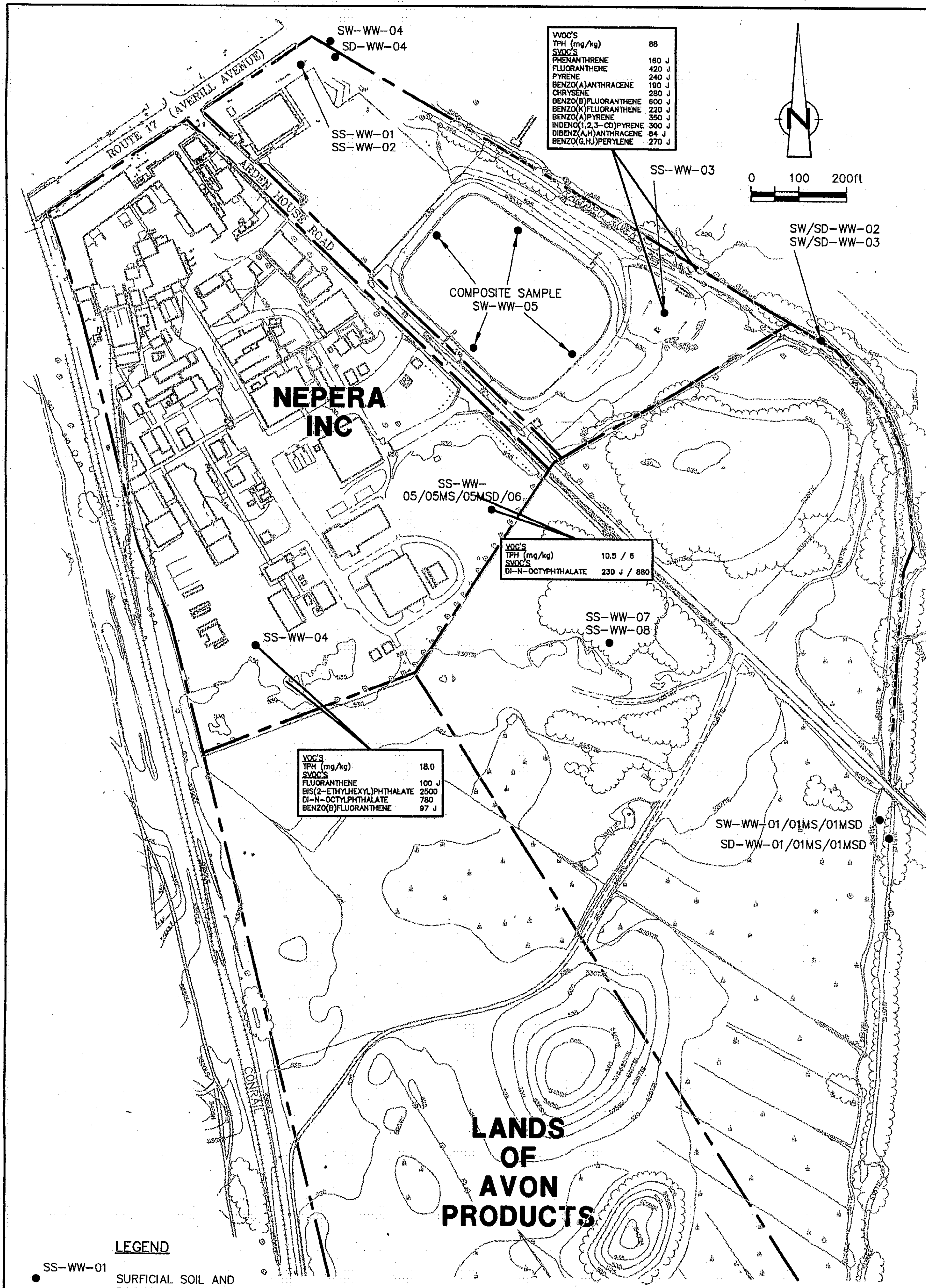
N

FIGURE 4-2A

BENZENE IN SOIL
(>2 FT)

FORMER NEPERA PLANT SITE HARRIMAN, NEW YORK	DATE 04/12/2007	PROJECT NUMBER 131698.007
	BROWN AND CALDWELL ASSOCIATES	

P:/GIS/Nepera/Nepera_Benzene_Soil_BrwnBd_Below_2ft.mxd



LEGEND

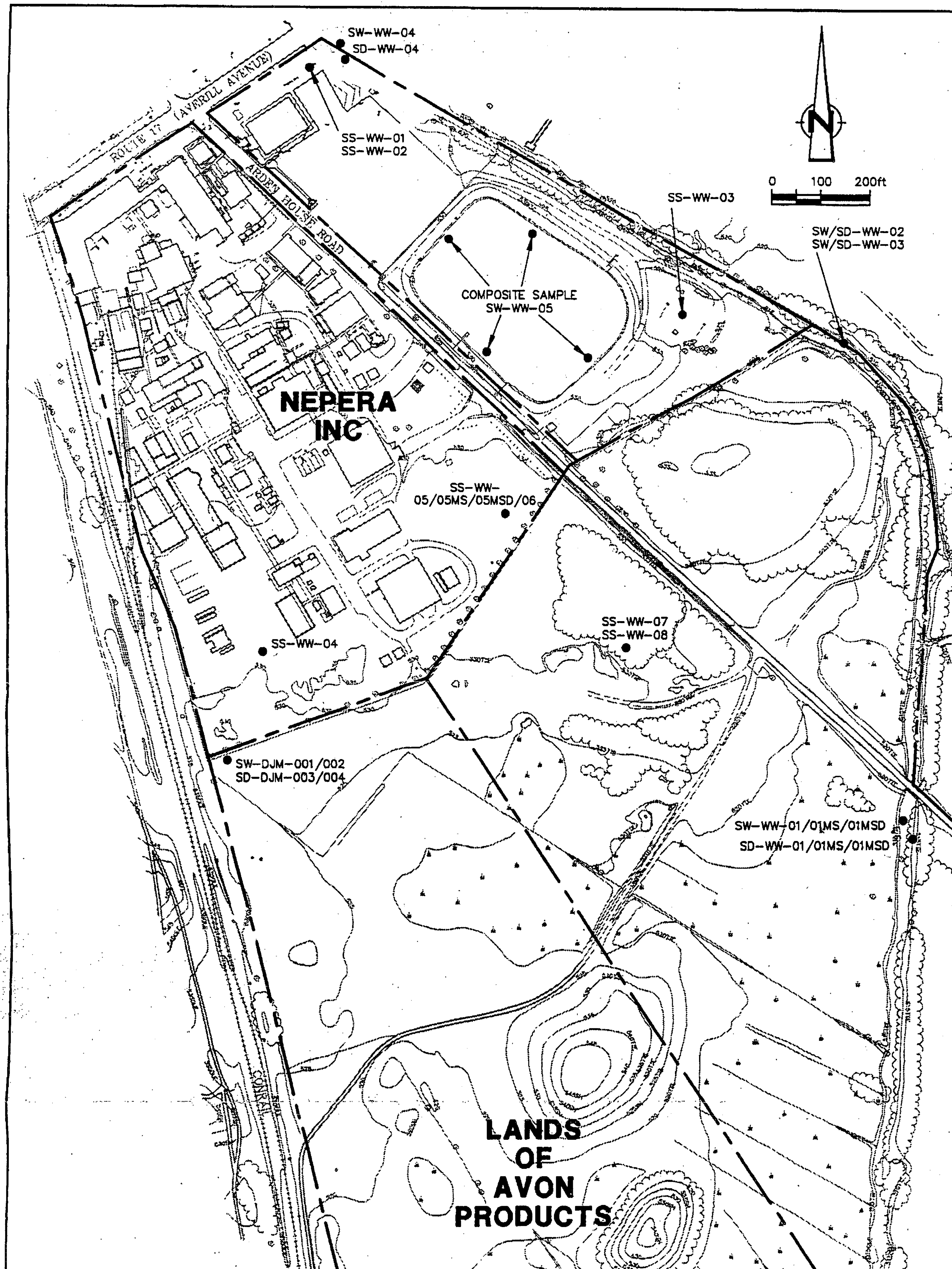
- SS-WW-01 SURFICIAL SOIL AND BACKGROUND SOIL SAMPLE
- SD-WW-02 SEDIMENT SAMPLE
- SW-WW-03 SURFACE SAMPLE

NOTES: CONCENTRATIONS ARE IN ug/kg UNLESS OTHERWISE NOTED.
ND– NOT DETECTED
J– COMPOUNDS ARE AN ESTIMATED VALUE.
/– DUPLICATE SAMPLE

figure 6.1
VOC AND SVOC DATA FOR SURFICIAL SOIL SAMPLING LOCATIONS
HARRIMAN, NEW YORK
Nepera Inc.

CRA

3697(14)–MAY 26/92–REV.0 (P-21)



LEGEND

SS-WW-01 ● SURFICIAL SOIL AND BACKGROUND SOIL SAMPLE

SD-WW-02 ● SEDIMENT SAMPLE

SW-WW-03 ● SURFACE SAMPLE

figure 2.6

SURFACE WATER, SEDIMENT, SURFICIAL SOIL AND BACKGROUND SOIL SAMPLING LOCATIONS
HARRIMAN, NEW YORK
Nepera Inc.

CRA

3697 (14) JUNE 29/95(W) REV.0 (P-25)

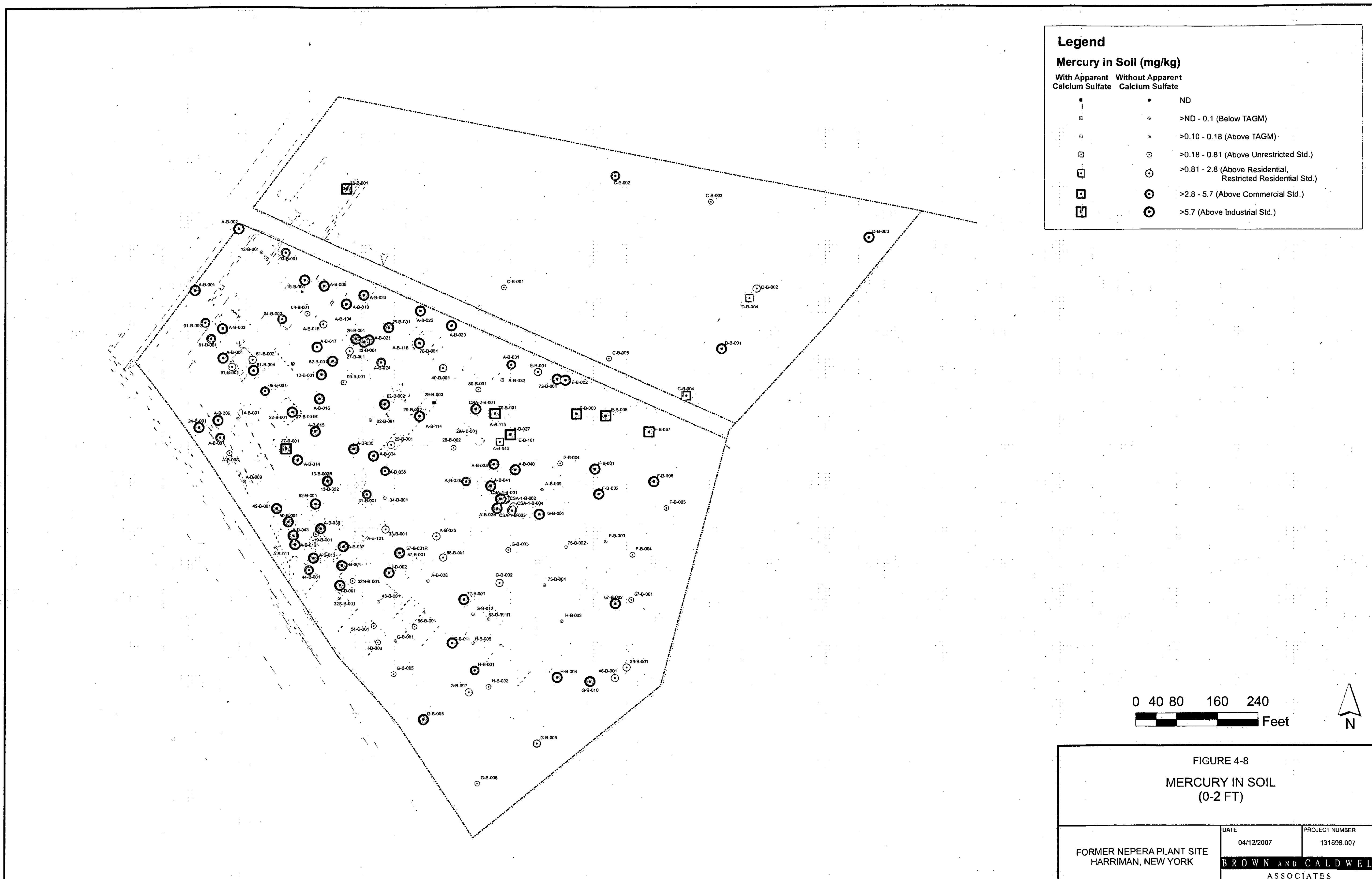


FIGURE 4-8

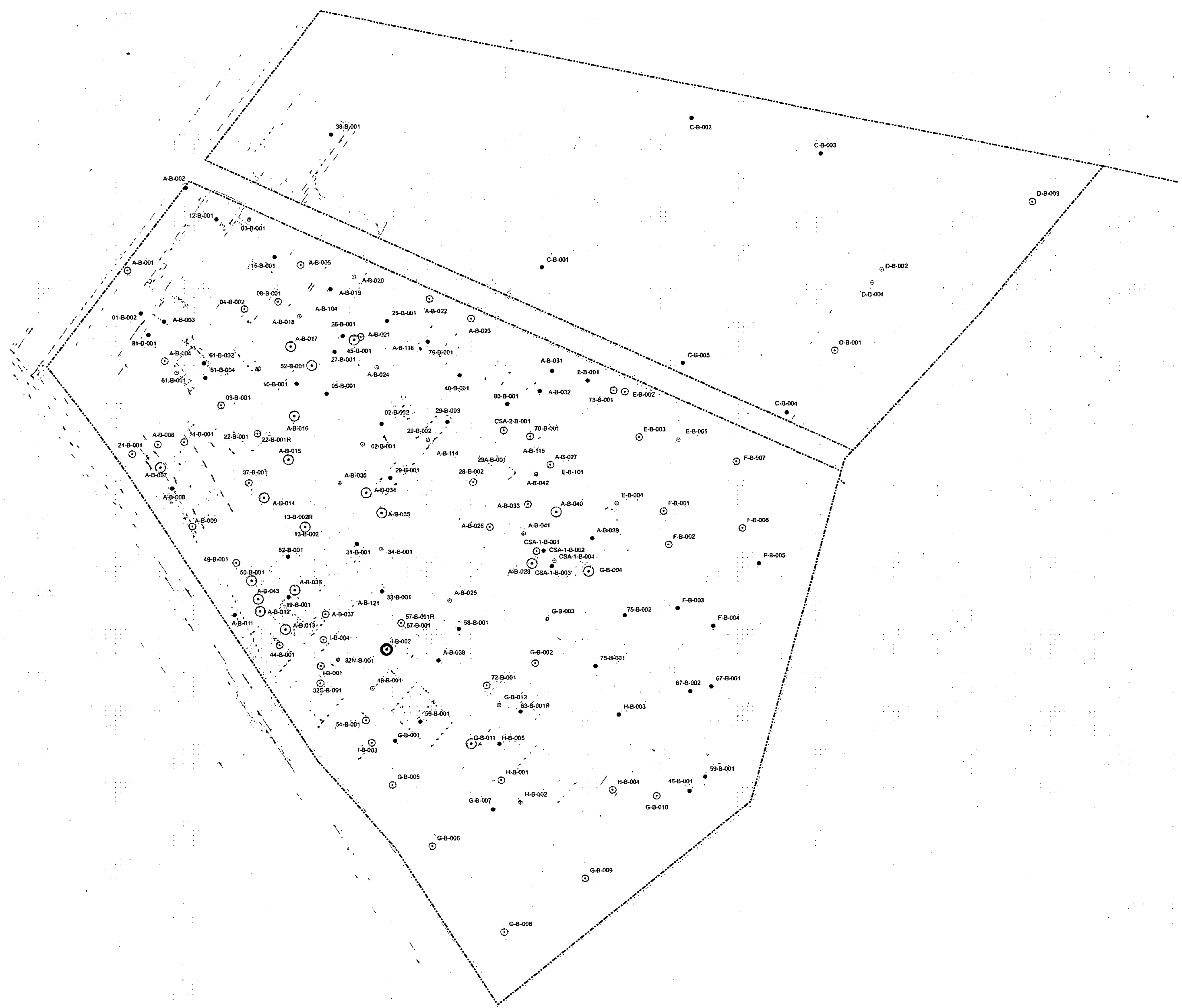
MERCURY IN SOIL
(0-2 FT)

FORMER NEPERA PLANT SITE
HARRIMAN, NEW YORK

DATE	PROJECT NUMBER
04/12/2007	131698.007

BROWN AND CALDWELL ASSOCIATES

P:/GIS/Nepera/Nepera_Hg_Soil_Brwnfld_All_Depths.mxd



Legend

Aroclor 1254 in Soil (mg/kg)

- ND
- >ND - 0.1 (Below Unrestricted Std.)
- >0.1 - 1.0 (Above Unrestricted Std., Below TAGM)
- >1.0 - 25 (Above TAGM, Residential, Restricted Residential, and Commercial Std.)
- > 25 (Above Industrial Std.)

Note:
The TAGM for Aroclor 1254 in Surficial Soils is 1.0 mg/kg.

0 40 80 160 240 Feet

N

FIGURE 4-6

AROCLOR 1254 IN SOIL
(0-2 FT)

FORMER NEPERA PLANT SITE
HARRIMAN, NEW YORK

DATE	PROJECT NUMBER
04/12/2007	131698.007

BROWN AND CALDWELL ASSOCIATES

P:/GIS/Nepera/Nepera_Aroclor1254_Soil_Brwnfld_0-2ft.mxd

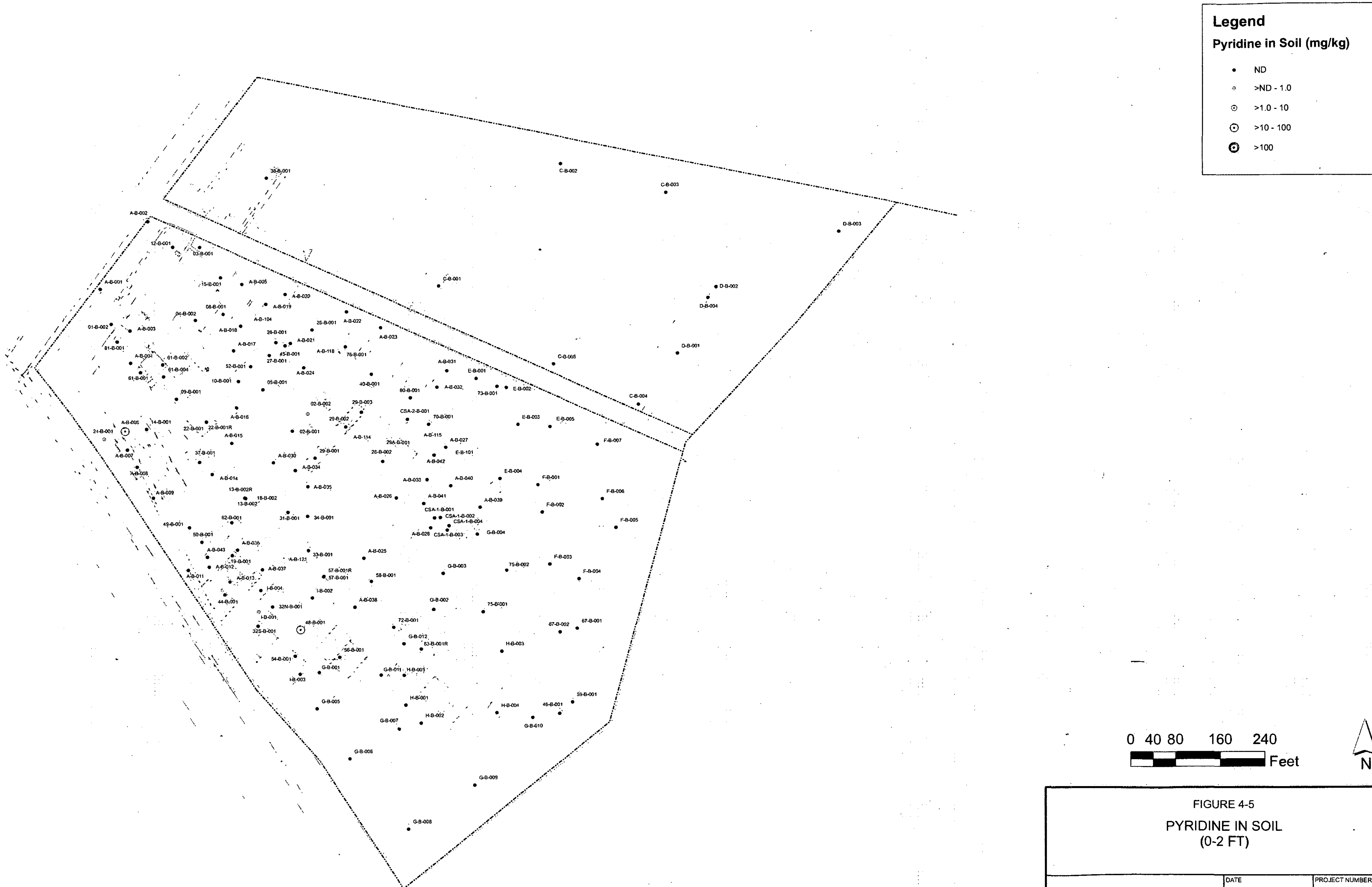


FIGURE 4-5

PYRIDINE IN SOIL
(0-2 FT)

FORMER NEPERA PLANT SITE
HARRIMAN, NEW YORK

DATE	PROJECT NUMBER
04/12/2007	131698.007

BROWN AND CALDWELL
ASSOCIATES

P:/GIS/Nepera/Nepera_Pyridine_Soil_0-2ft.mxd

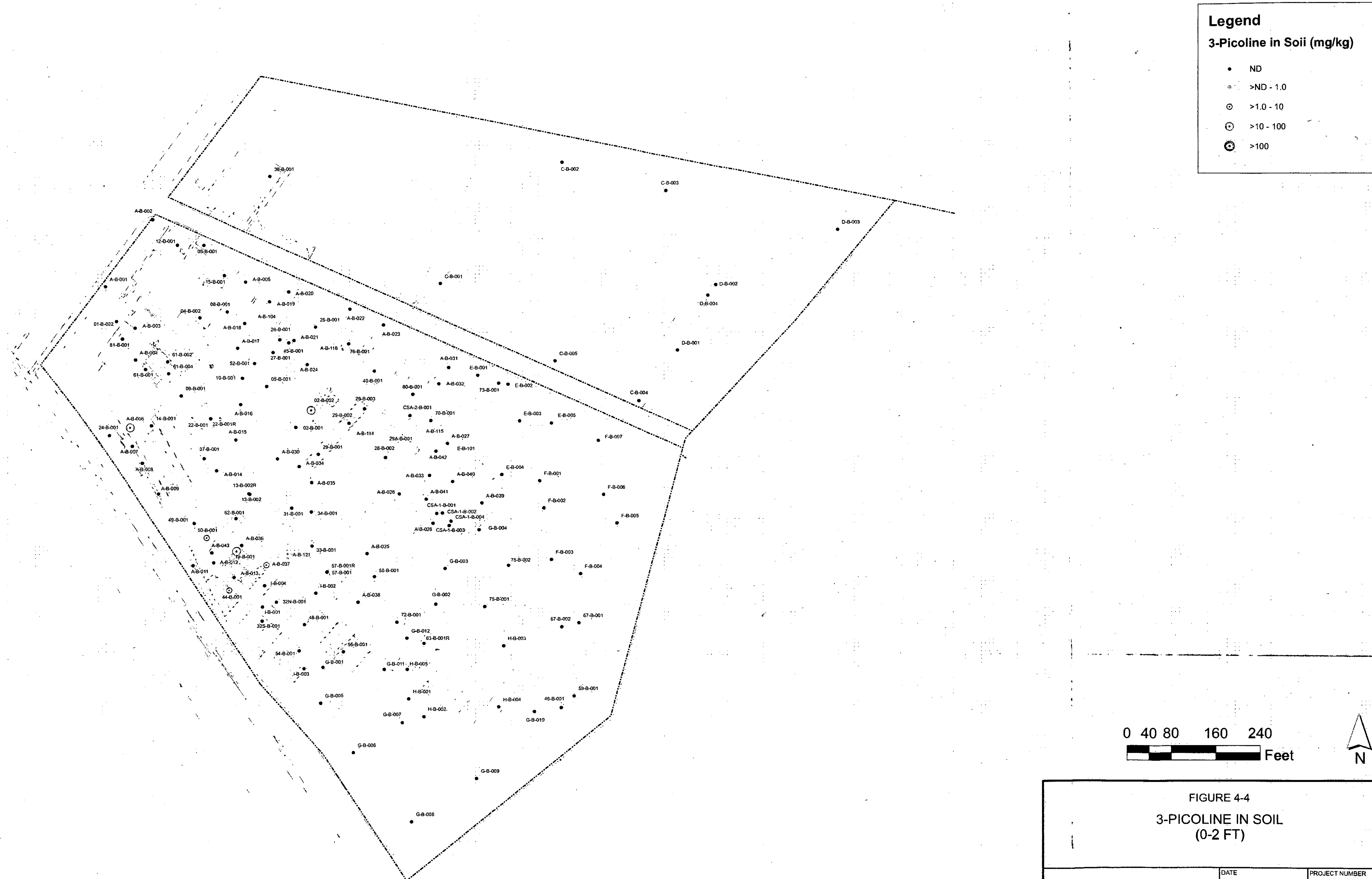


FIGURE 4-4

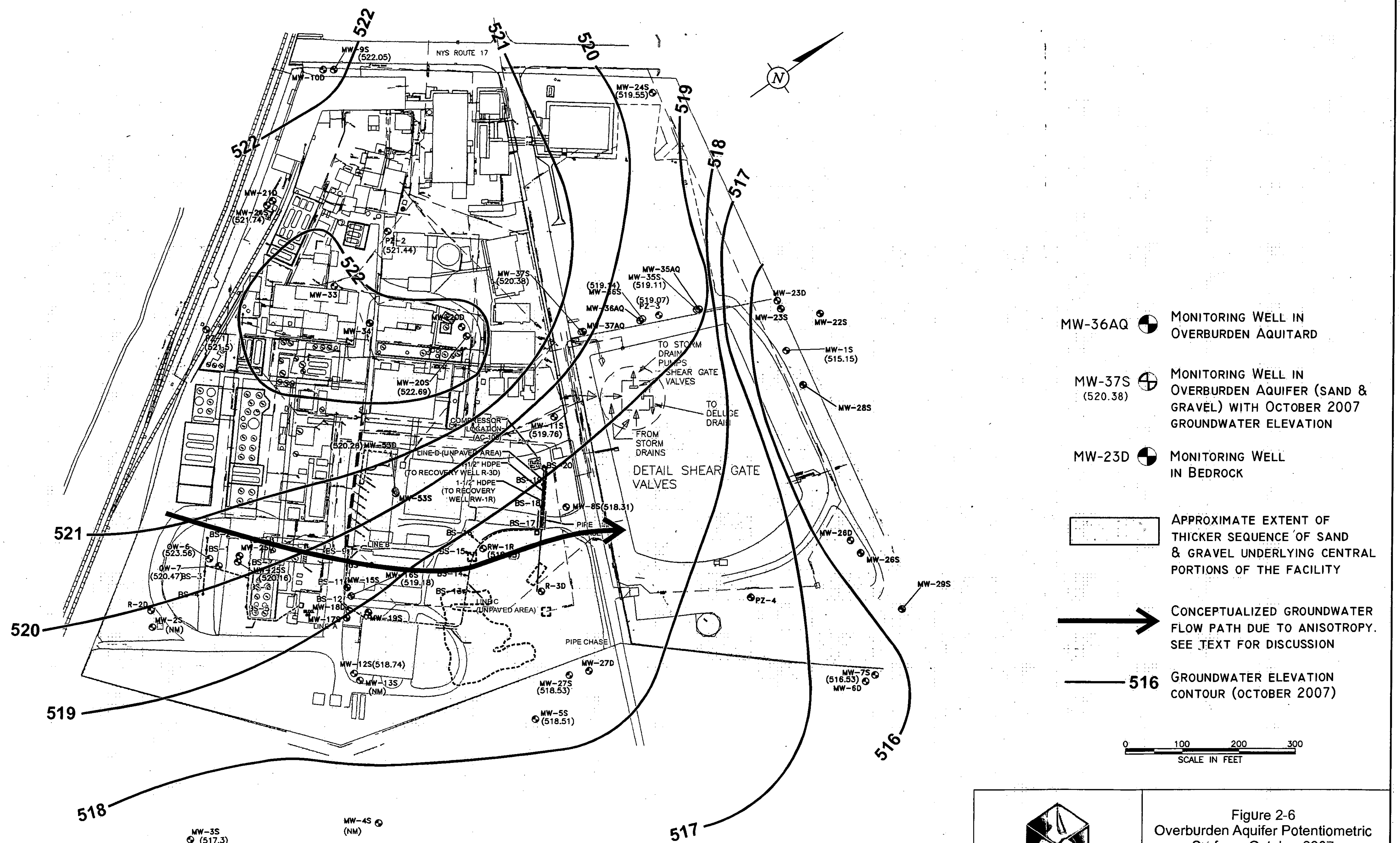
3-PICOLINE IN SOIL
(0-2 FT)

FORMER NEPERA PLANT SITE
HARRIMAN, NEW YORK

DATE	PROJECT NUMBER
04/12/2007	131698.007

BROWN AND CALDWELL ASSOCIATES

P:/GIS/Nepera/Nepera_3-Picoline_Soil_0-2ft.mxd



HydroQual
1200 MacArthur Boulevard
Mahwah, New Jersey 07430
(201)529-5151 F:(201)529-5728

Figure 2-6
Overburden Aquifer Potentiometric Surface, October 2007

Former Nepera Facility
Harriman, New York

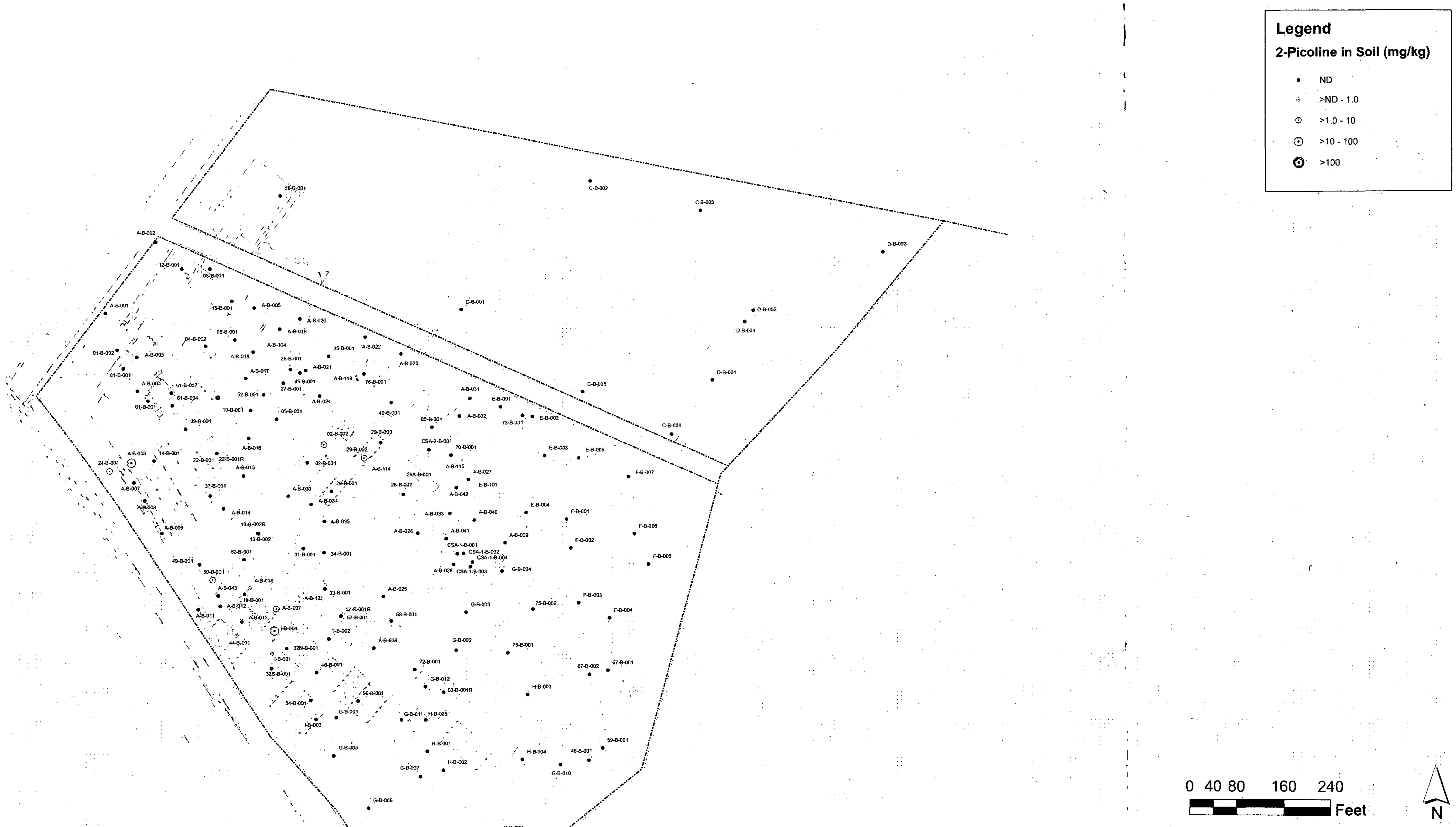


FIGURE 4-3

2-PICOLINE IN SOIL
(0-2 FT)

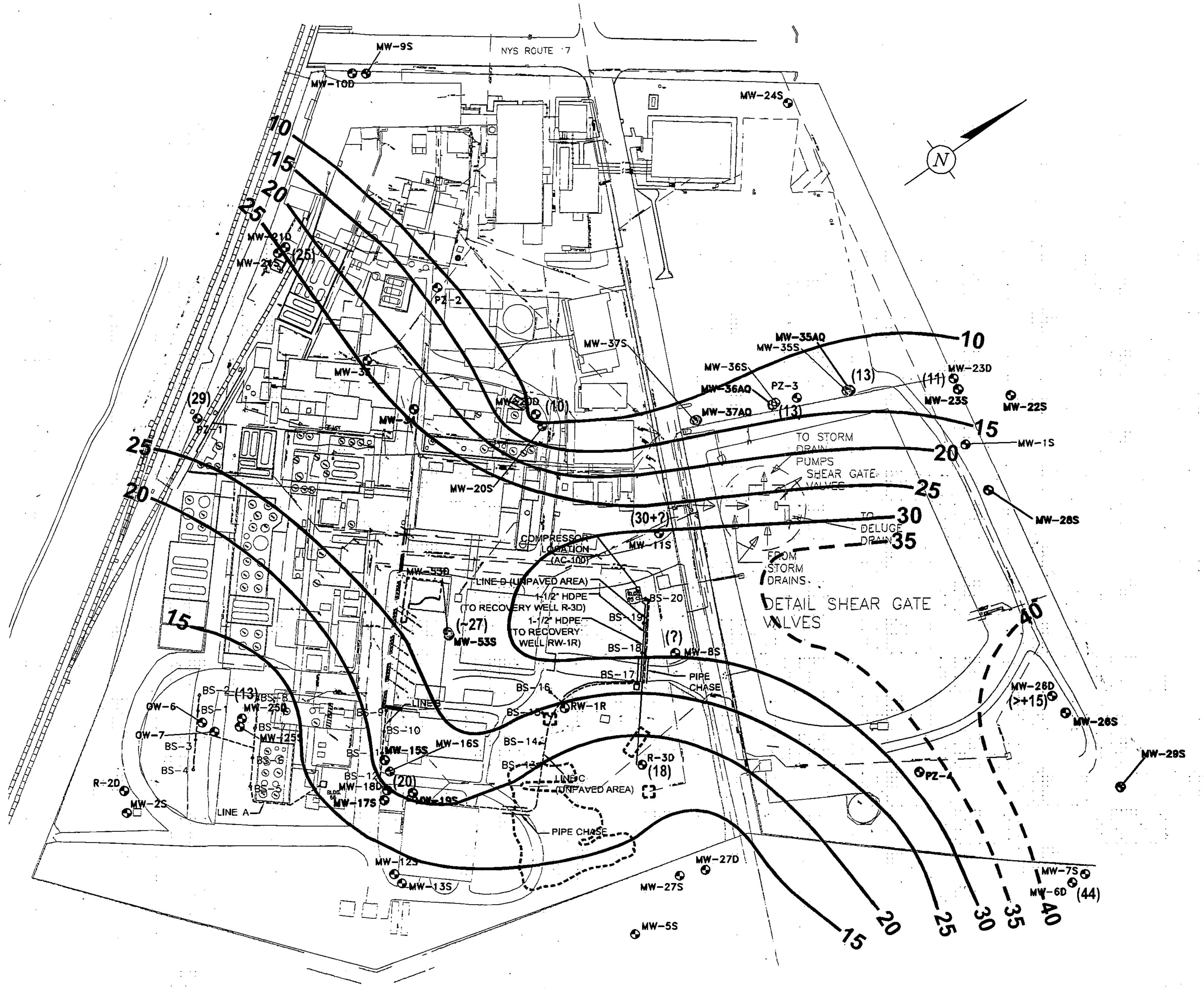
FORMER NEPERA PLANT SITE
HARRIMAN, NEW YORK

DATE 04/12/2007

PROJECT NUMBER 131698.007

BROWN AND CALDWELL ASSOCIATES

P:/GIS/Nepera/Nepera_2-Picoline_Soil_0-2ft.mxd



MW-36AQ — Monitoring Well in Overburden Aquitard

MW-37S — Monitoring Well in Overburden Aquifer (Sand & Gravel)

MW-23D — Monitoring Well in Bedrock

(44) — Approximate Sand and Gravel Thickness Observed at Boring Location

—20 — Approximate Outwash Thickness (Does Not Include Kame Deposits)

▭ — Approximate Extent of Thicker Sequence of Sand & Gravel Underlying Central Portions of the Facility

0 100 200 300
SCALE IN FEET

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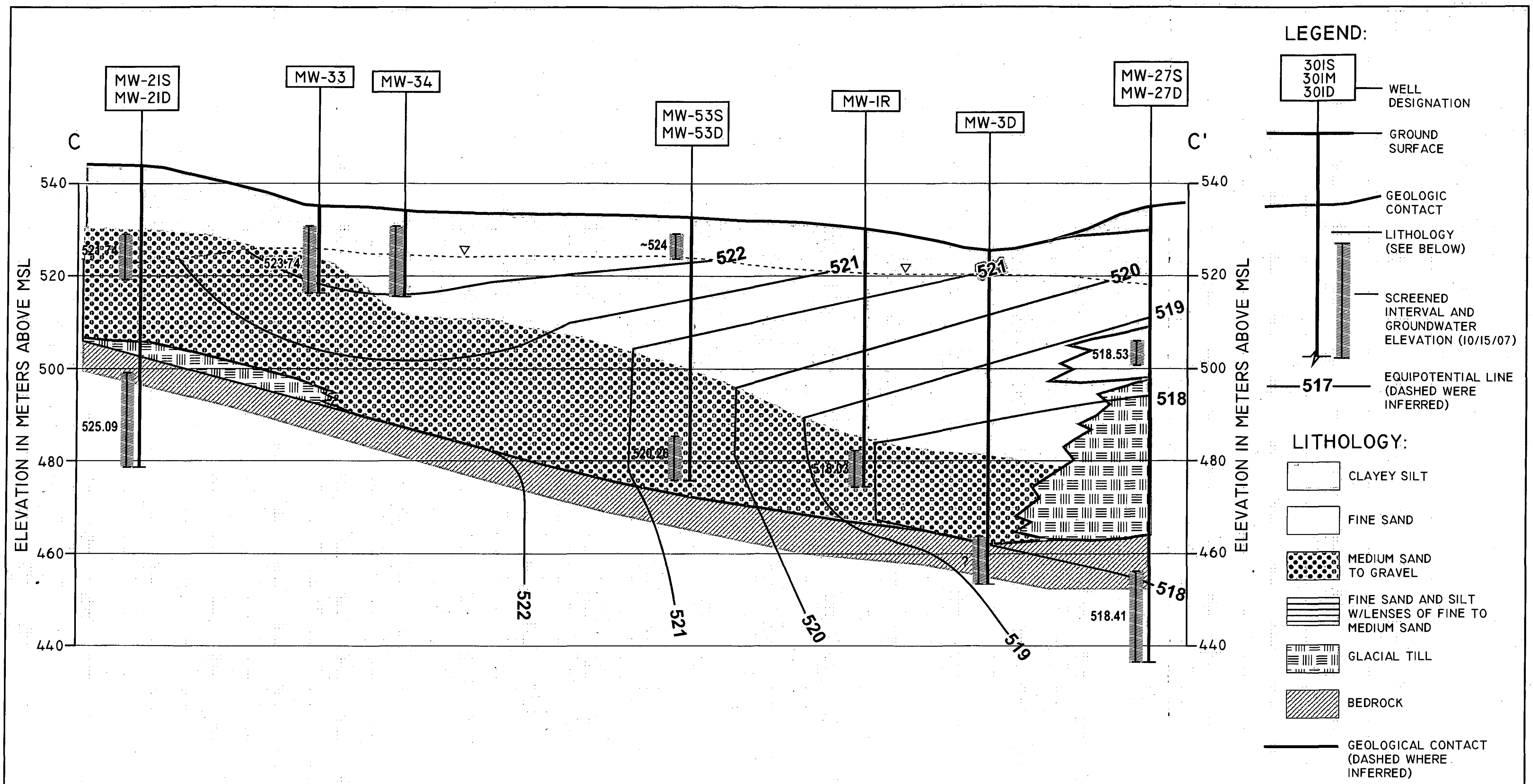
Figure 2-5
Isopach Map of Glacial Outwash Deposits (Overburden Aquifer)

Former Nepera Facility
Harriman, New York

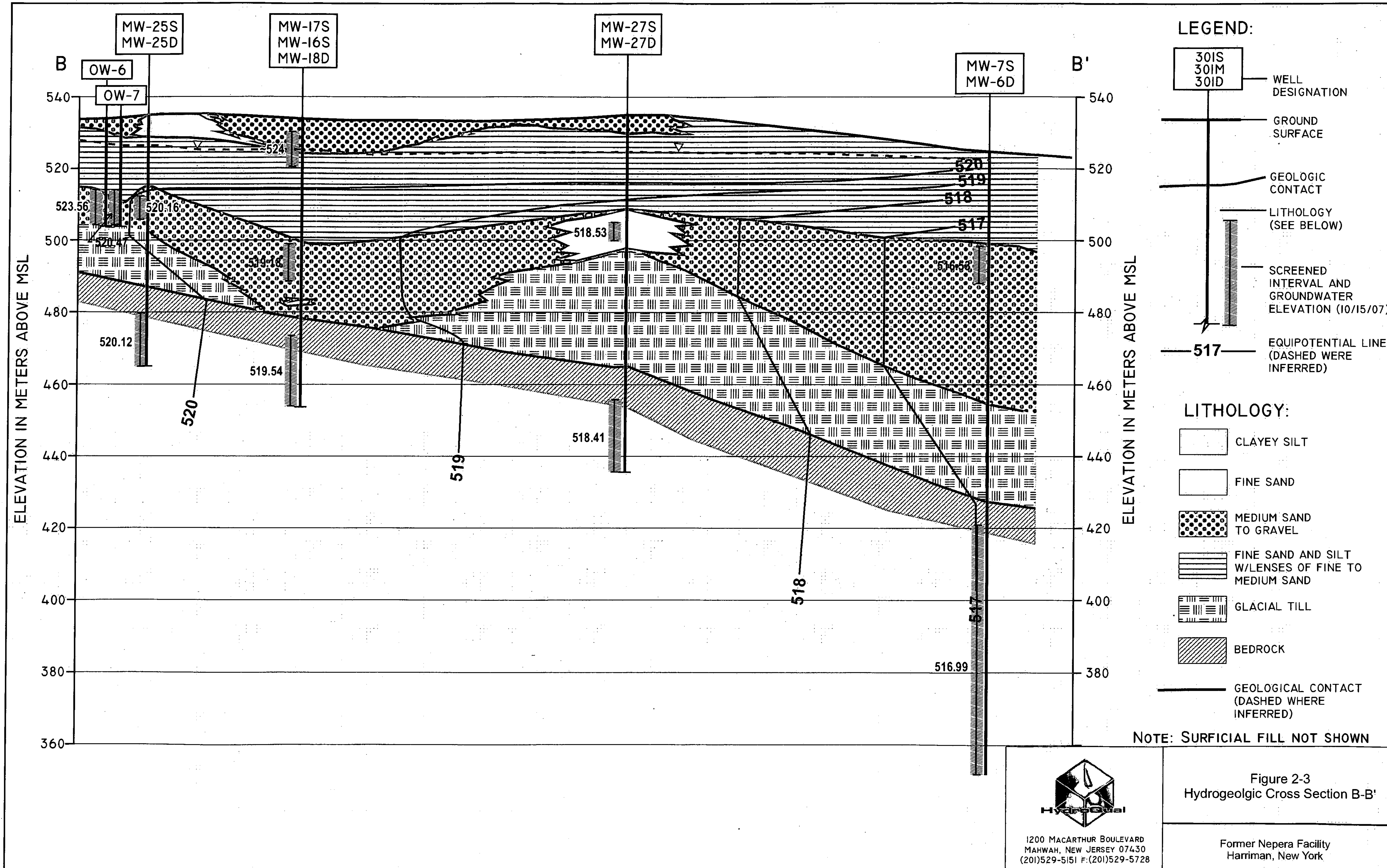


NOTE: SURFICIAL FILL NOT SHOWN

HydroQual
1200 MacArthur Boulevard
Mahwah, New Jersey 07430
(201)529-5151 F:(201)529-5728

Figure 2-4
Hydrogeologic Cross Section C-C'

Former Nepera Facility
Harriman, New York



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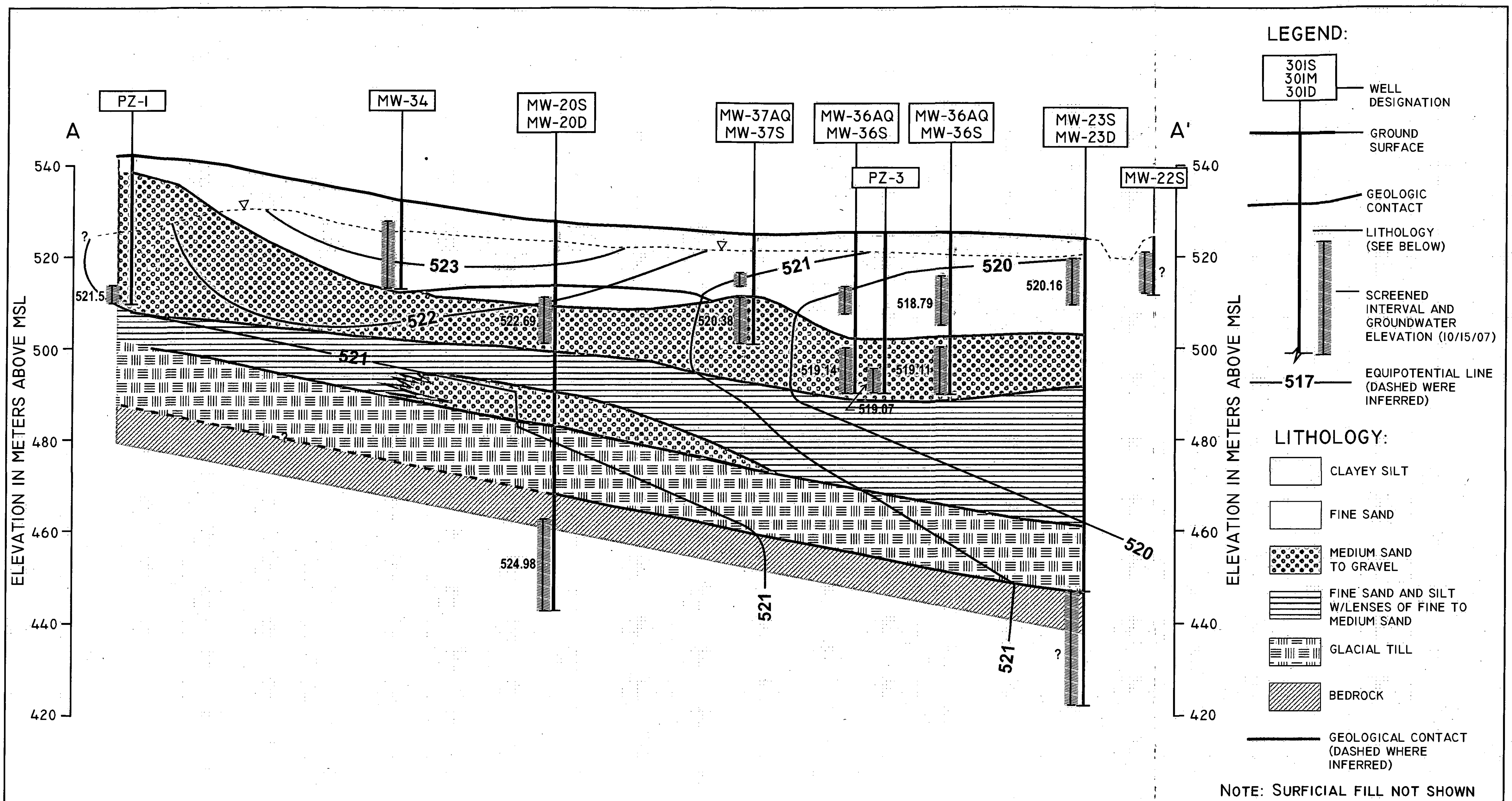
1200 MacArthur Boulevard
Mahwah, New Jersey 07430
(201)529-5151 F:(201)529-5728

Figure 2-3
Hydrogeolgic Cross Section B-B'

Former Nepera Facility
Harriman, New York



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Mahwah, New Jersey 07430
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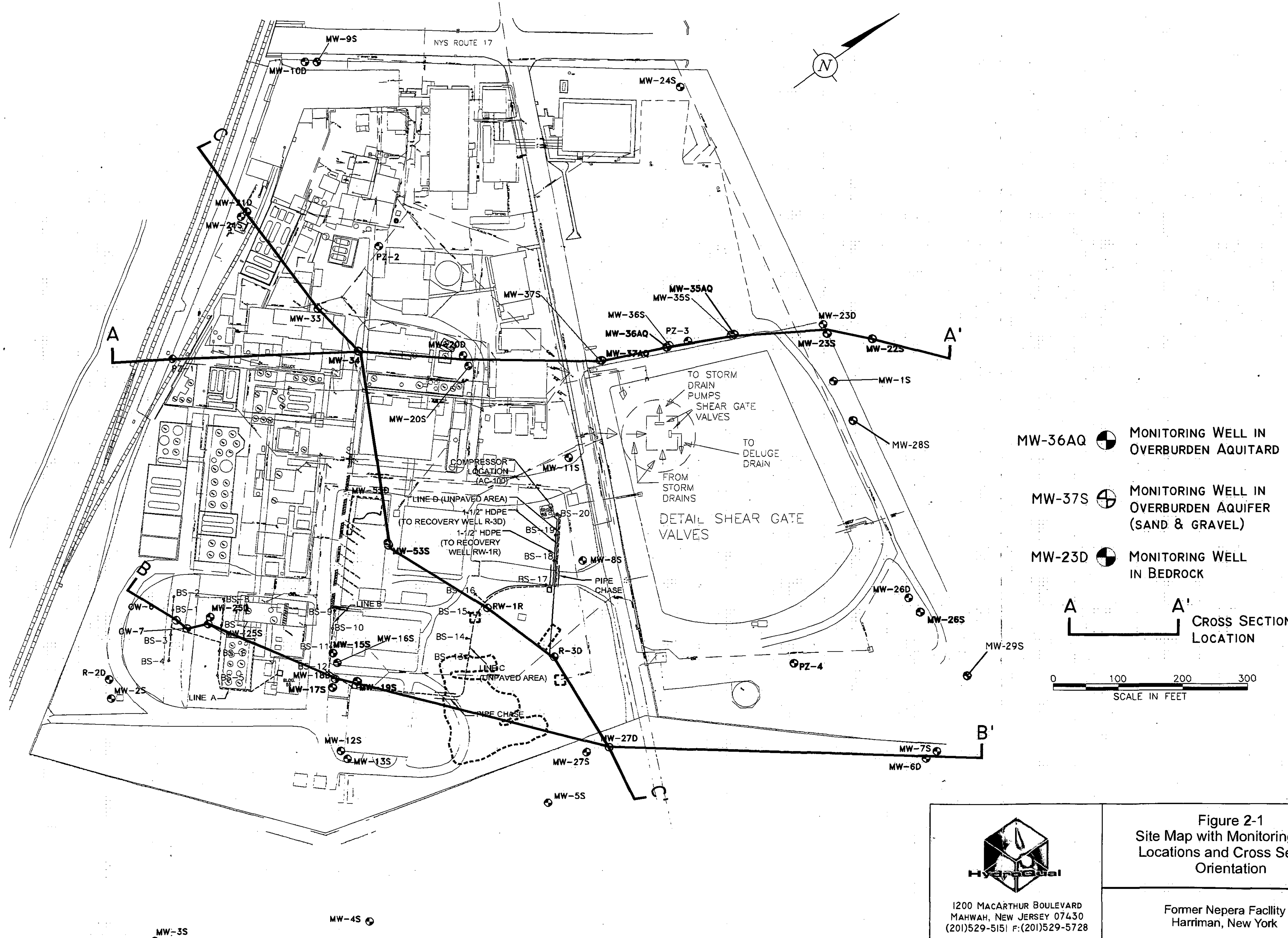
Figure 2-2
Hydrogeologic Cross Section A-A'

Former Nepera Facility
Harriman, New York

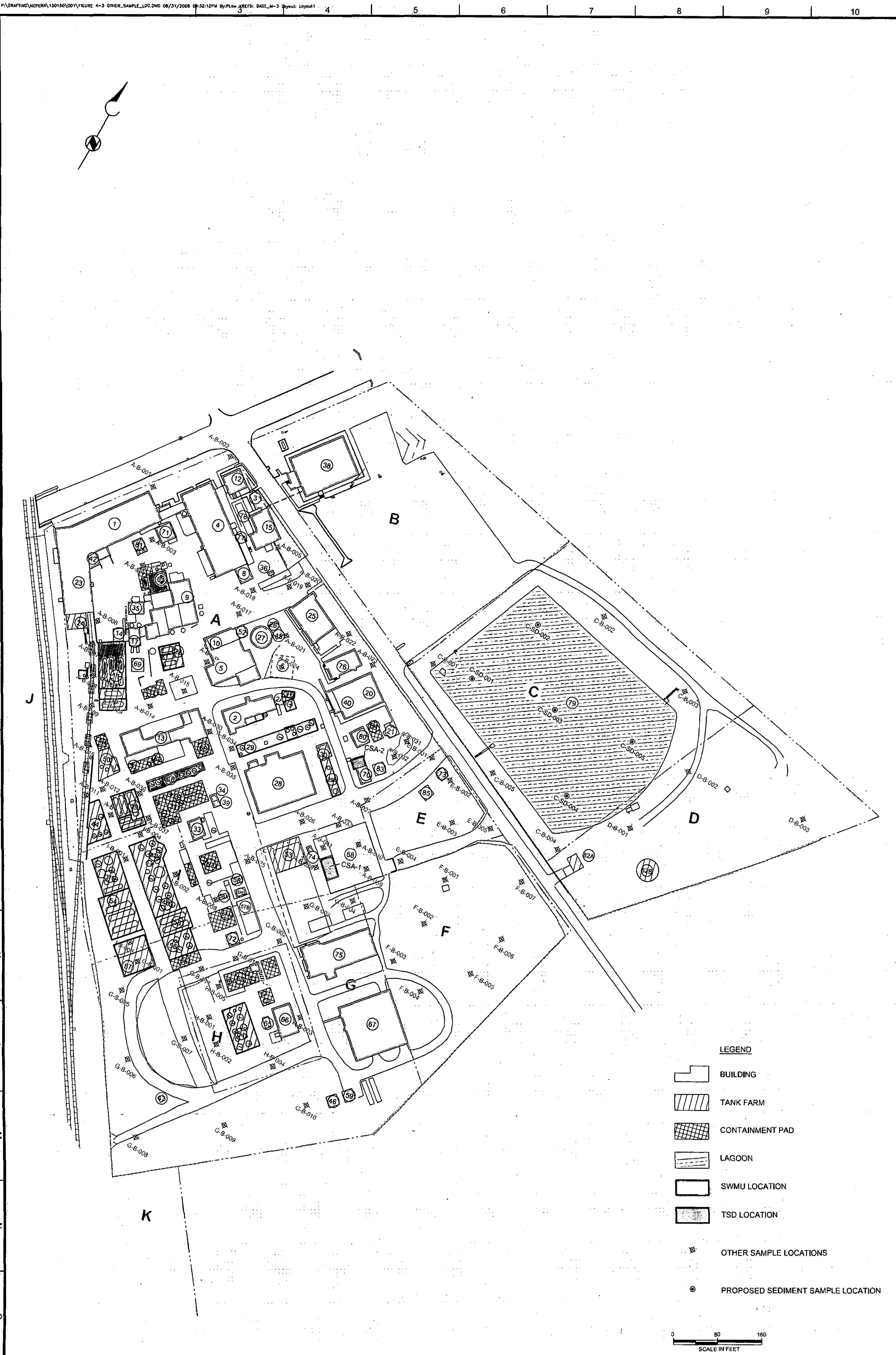


HydroQual

1200 MacArthur Boulevard
Mahwah, New Jersey 07430
(201)529-5151 F:(201)529-5728

Figure 2-1
Site Map with Monitoring Well Locations and Cross Section Orientation

Former Nepera Facility
Harriman, New York



BROWN AND CALDWELL ASSOCIATES
ALLENDALE, NEW JERSEY

SUBMITTED: KEVIN McGUINNESS, PROJECT MANAGER DATE: 8/31/06
APPROVED: JEFF CAPUTI, BROWN AND CALDWELL DATE: 8/31/06

LINE IS 2 INCHES AT FULL SIZE (IF NOT 2" - SCALE ACCORDINGLY)

DESIGNED:
DRAWN:
CHECKED:
CHECKED:
APPROVED:

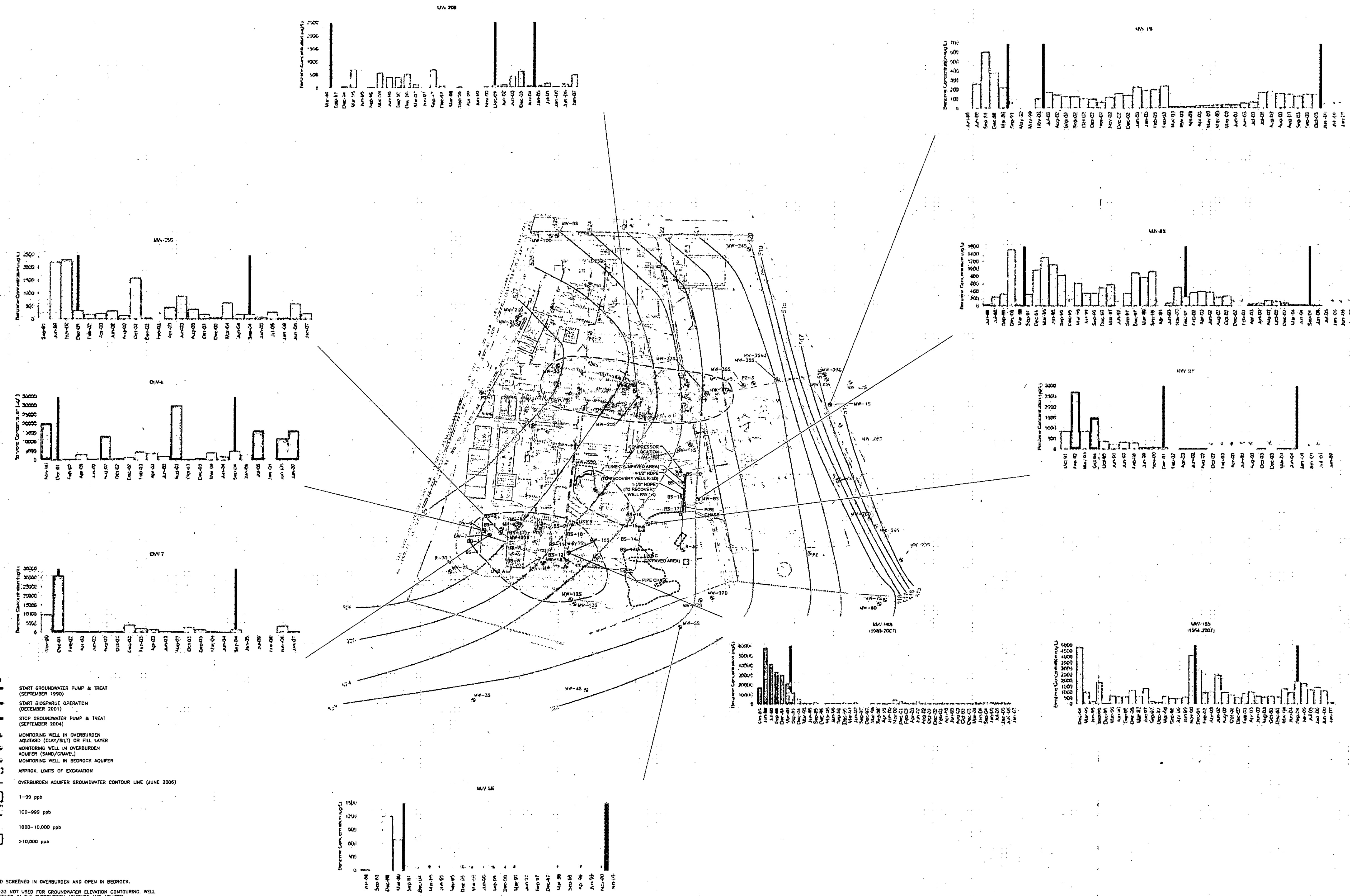
REVISIONS

ZONE	REV.	DESCRIPTION	BY	DATE	APP.

FIGURE 4-3
OTHER SAMPLE LOCATION PLAN
RFI WORK PLAN

NEPERA, A DIVISION OF RUTHERFORD CHEMICALS LLC
HARRIMAN, NEW YORK

FILENAME: FIGURE 4-3
BC PROJECT NUMBER: 130150.001
CLIENT PROJECT NUMBER: NA
DRAWING NUMBER: NA
SHEET NUMBER: 6 OF 6



LEGEND

- START GROUNDWATER PUMP & TREAT (SEPTEMBER 1990)
- START BIOSPARGE OPERATION (DECEMBER 2001)
- STOP GROUNDWATER PUMP & TREAT (SEPTEMBER 2004)
- MONITORING WELL IN OVERBURDEN AQUITARD (CLAY/SILT) OR FILL LAYER
- MONITORING WELL IN OVERBURDEN AQUIFER (SAND/GRAVEL)
- MONITORING WELL IN BEDROCK AQUIFER
- APPROX. LIMITS OF EXCAVATION
- OVERBURDEN AQUIFER GROUNDWATER CONTOUR LINE (JUNE 2006)
- 1–99 ppb
- 100–999 ppb
- 1000–10,000 ppb
- >10,000 ppb

NOTES:

1. R–20 SCREENED IN OVERBURDEN AND OPEN IN BEDROCK.
2. MW–33 NOT USED FOR GROUNDWATER ELEVATION CONTOURING. WELL SCREENED IN THE OVERBURDEN AQUITARD AND AQUIFER.
3. BENZENE PLUME REPRESENTS DATA FROM MONITORING WELLS IN THE OVERBURDEN AQUIFER.

0 100 200 300
SCALE IN FEET

REV. ISSUED DATE DESCRIPTION

KEYPLAN

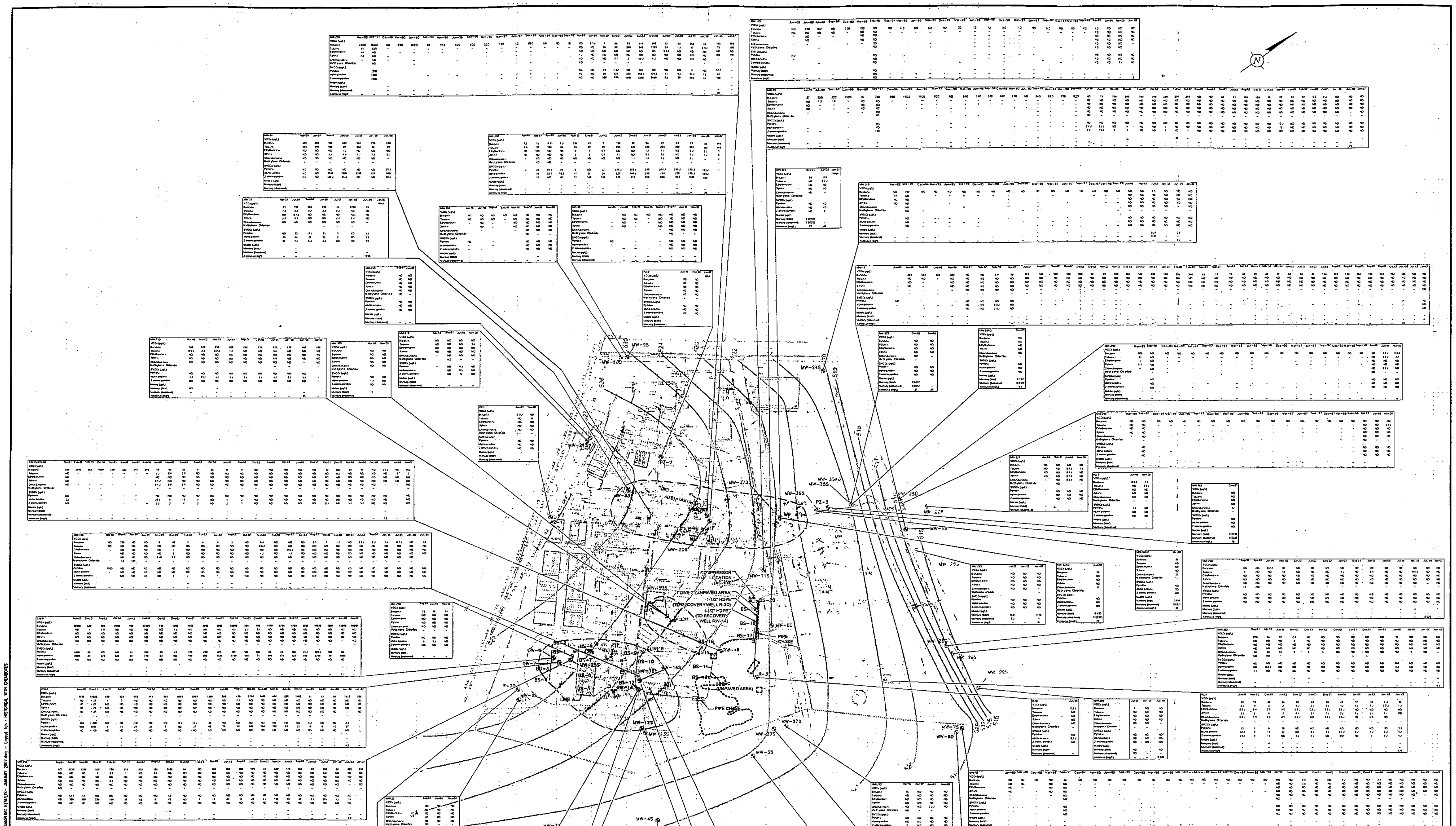
SEAL

SEAL

ARCADIS
105 Fieldcrest Avenue
Suite 5E
Edison, New Jersey 08837
Tel: 732.225.5061 Fax: 732.225.5067
www.arcadis-us.com

PROJECT TITLE
MAYBROOK TRUST
HARRIMAN, NEW YORK

PROJECT MANAGER	DEPARTMENT MANAGER	LEAD DESIGN PROF.	CHECKED BY
A. ROBINSON	C. MOTTA	D. HEUER	A. ROBINSON
SHEET TITLE		TASK/PHASE NUMBER 00007	DRAWN BY A. SANTINI
GROUNDWATER QUALITY TRENDS FOR SELECT MONITORING WELLS		PROJECT NUMBER NJ000389.0007	DRAWING NUMBER 4-1



LEGEND

- MONITORING WELL IN OVERBURDEN AQUITARD (CLAY/SILT) OR FILL LAYER
- MONITORING WELL IN OVERBURDEN AQUIFER (SAND/GRAVEL)
- MONITORING WELL IN BEDROCK AQUIFER
- DENOTES DATA GAP
- APPROX. LIMITS OF EXCAVATION
- OVERBURDEN AQUIFER GROUNDWATER CONTOUR LINE (JUNE 2006)
- 1–99 ppb
- 100–999 ppb
- 1000–10,000 ppb
- >10,000 ppb

NOTES:

1. R-2D SCREENED IN OVERBURDEN AND OPEN IN BEDROCK.
2. MW-33 NOT USED FOR GROUNDWATER ELEVATION CONTOURING. WELL SCREENED IN THE OVERBURDEN AQUITARD AND AQUIFER.
3. BENZENE PLUME REPRESENTS DATA FROM MONITORING WELLS IN THE OVERBURDEN AQUIFER SAMPLED IN JANUARY 2007.
4. GROUNDWATER QUALITY DATA FOR RW-1 FROM 1992 TO 1998 REPRESENTS HIGHEST CONCENTRATIONS OBSERVED DURING THE YEAR FROM ROUTINE SYSTEM INFLUENT SAMPLING.
5. WNA– WELL NOT ACCESSIBLE.
6. GROUNDWATER CONTOURS BASED ON MEASUREMENTS FROM JUNE 2006.

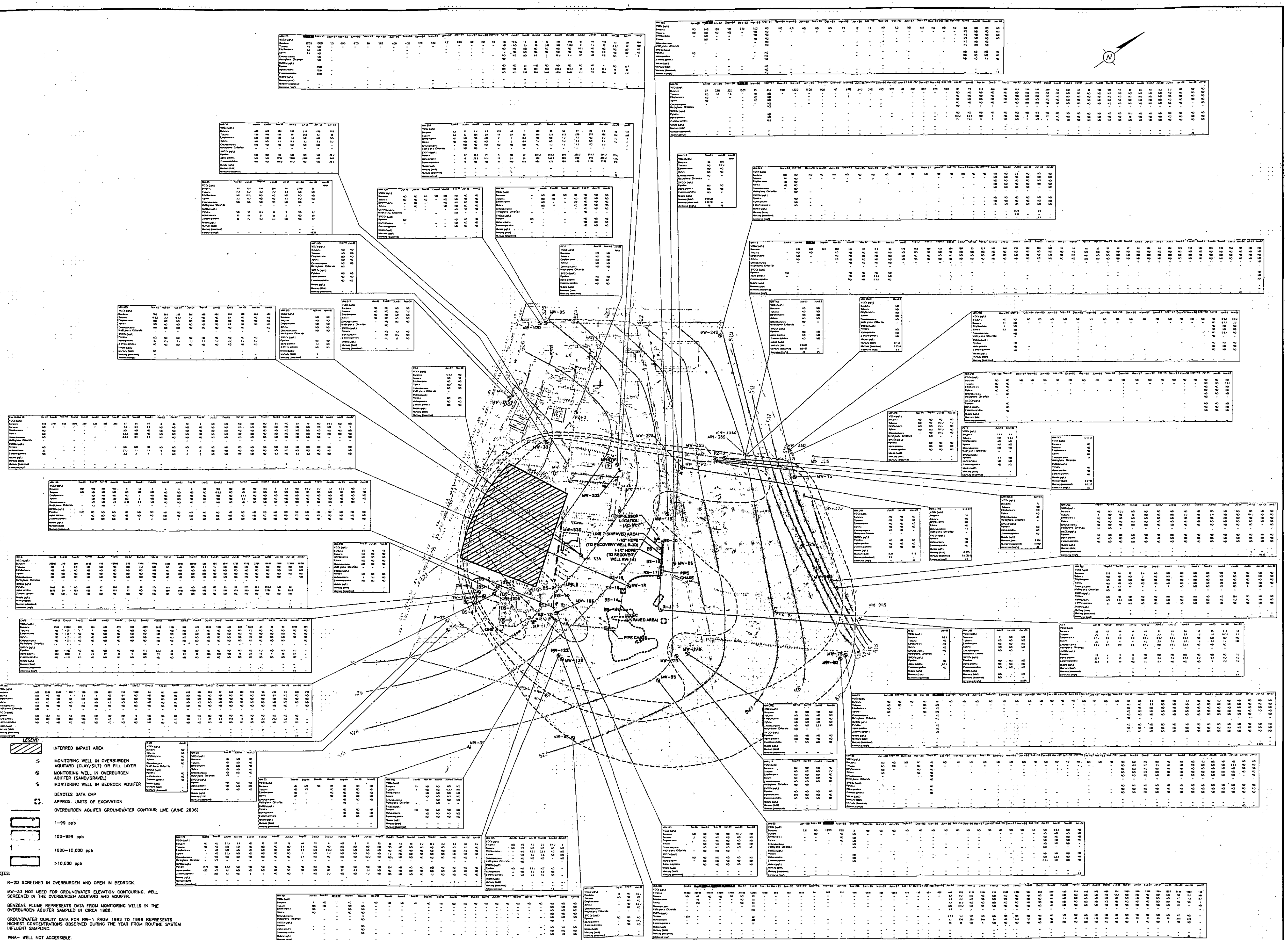
REV. ISSUED DATE DESCRIPTION

KEYPLAN | SEAL | SEAL

ARCADIS
1 International Boulevard
Suite 406
Mahwah, NJ 07495
Tel: 201-684-1410 Fax: 201-684-1420
www.arcadis-us.com

PROJECT TITLE: MAYBROOK TRUST, HARRIMAN, NEW YORK

PROJECT MANAGER	DEPARTMENT MANAGER	LEAD DESIGN PROF.	CHECKED BY
A. ROBINSON	C. MOTTA	D. HEUER	A. ROBINSON
SHEET TITLE: HISTORICAL GROUNDWATER SAMPLING RESULTS		TASK/PHASE NUMBER: 00007	DRAWN BY: A. SANTINI
		PROJECT NUMBER: NJ000389.0007	DRAWING NUMBER: 2-2



NOTES:

1. R-2D SCREENED IN OVERBURDEN AND OPEN IN BEDROCK.
2. MW-33 NOT USED FOR GROUNDWATER ELEVATION CONTOURING. WELL SCREENED IN THE OVERBURDEN AQUITARD AND AQUIFER.
3. BENZENE PLUME REPRESENTS DATA FROM MONITORING WELLS IN THE OVERBURDEN AQUIFER SAMPLED IN CIRCA 1988.
4. GROUNDWATER QUALITY DATA FOR RW-1 FROM 1992 TO 1998 REPRESENTS HIGHEST CONCENTRATIONS OBSERVED DURING THE YEAR FROM ROUTINE SYSTEM INFLUENT SAMPLING.
5. WNA- WELL NOT ACCESSIBLE.
6. GROUNDWATER CONTOURS BASED ON MEASUREMENTS FROM JUNE 2006.

REV. ISSUED DATE DESCRIPTION

KEYPLAN

SEAL

SEAL

ARCADIS

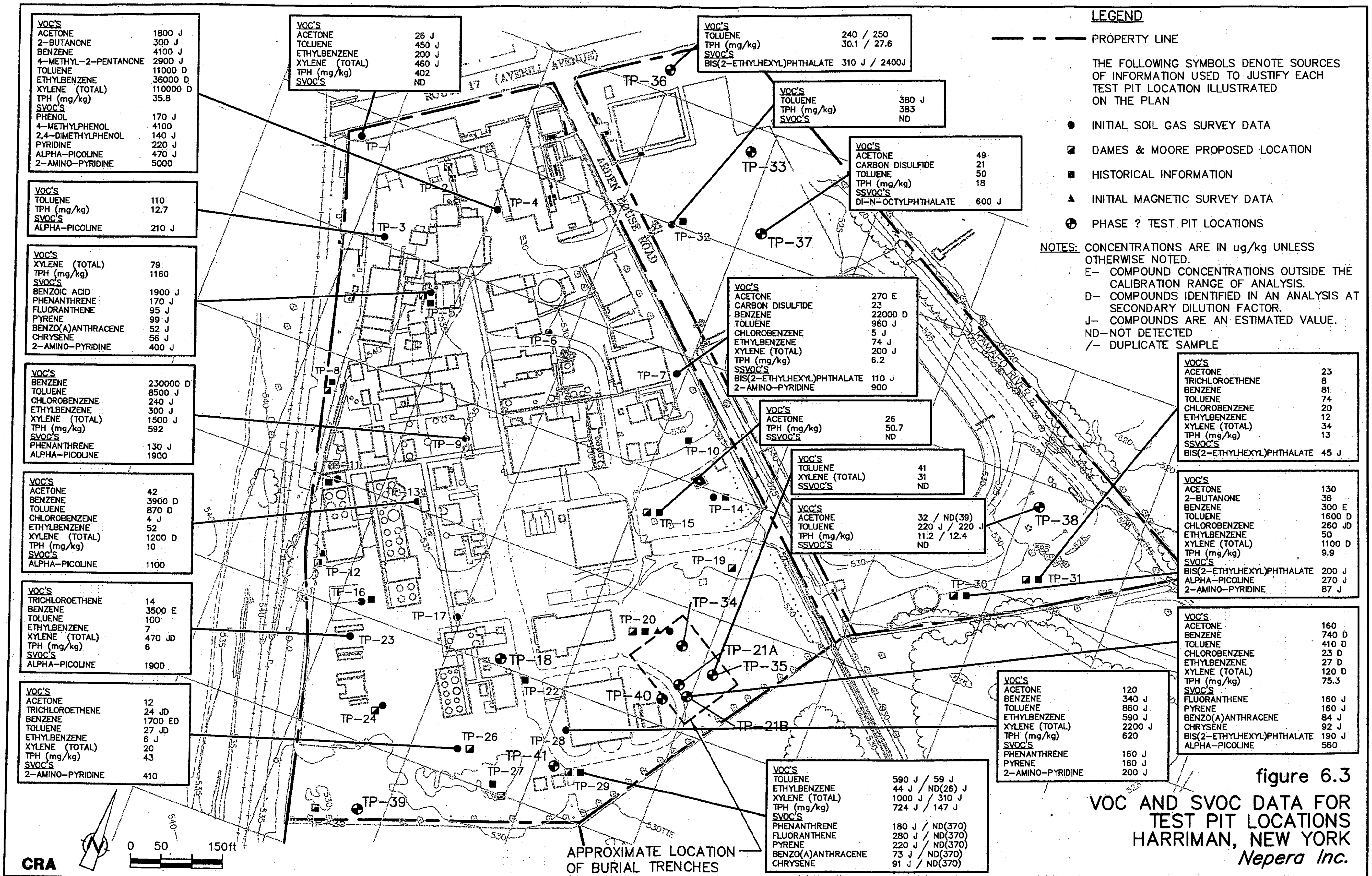
105 Fieldcrest Avenue
Suite 5E
Edison, New Jersey 08837
Tel: 732.225.5061 Fax: 732.225.5067
www.arcadis-us.com

PROJECT TITLE

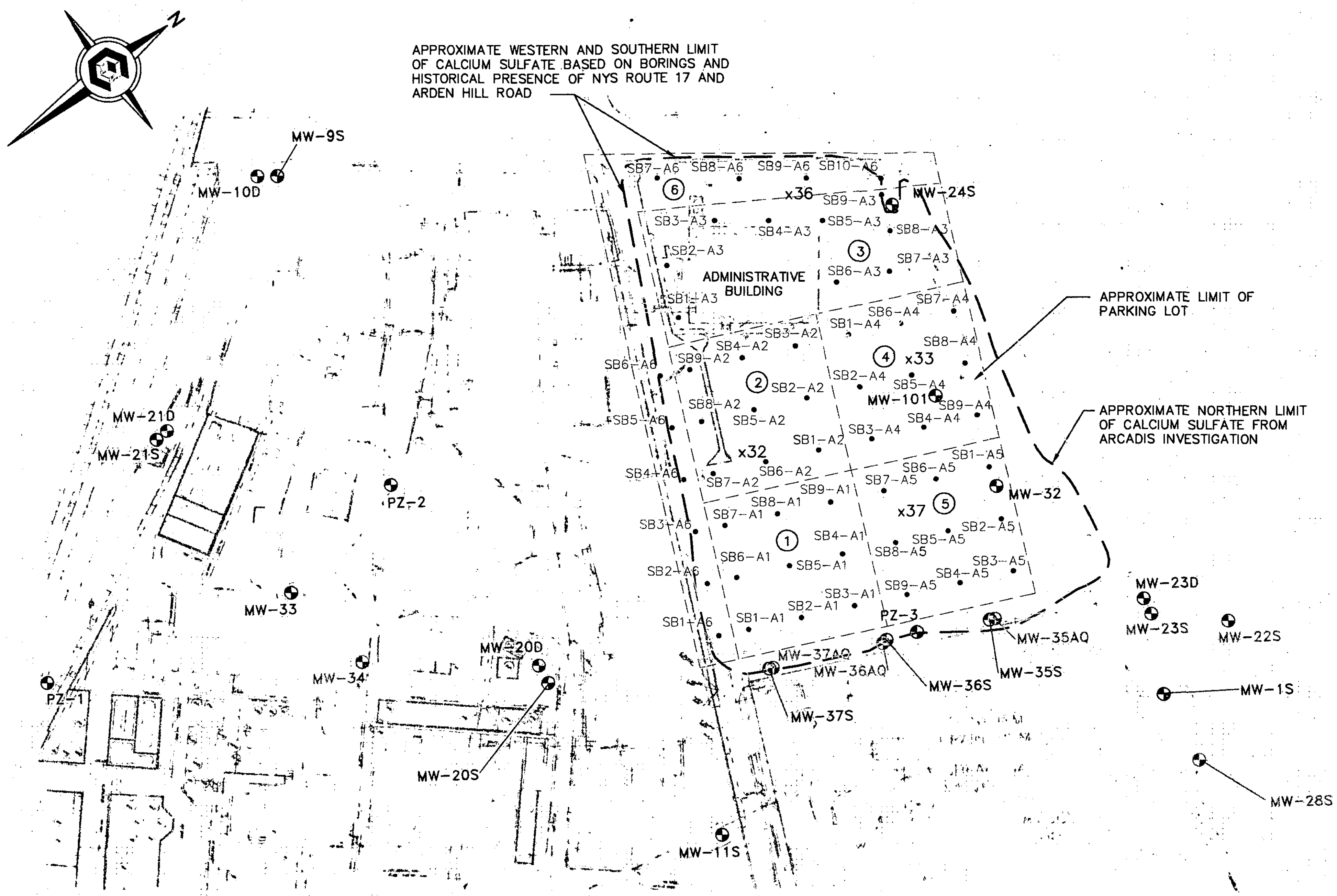
MAYBROOK TRUST
HARRIMAN, NEW YORK

PROJECT MANAGER	DEPARTMENT MANAGER	LEAD DESIGN PROF.	CHECKED BY
A. ROBINSON	C. MOTTA	D. HEUER	A. ROBINSON
SHEET TITLE: HISTORICAL GROUNDWATER SAMPLING RESULTS/ BENZENE PLUME MAP- OVERBURDEN AQUIFER CIRCA 1988		TASK/PHASE NUMBER: 00015	DRAWN BY: A. SANTINI
		PROJECT NUMBER: NJ000389.0007	DRAWING NUMBER: 2-1

Acad Version : R16.2s (LMS Tech)
User Name : asantini
Date\Time : Thu, 23 Aug 2007 - 12:16pm
Path\Name : G:\Drafting\Neperal\CADD\Supplemental Groundwater Report_2007\FIG. 2-1 CIRCA 1988 PLUME MAP OVERBURDEN AQUIFER.dwg



3697(14)–MAY 26/92–REV.0 (P-20)



LEGEND:

MW-36AQ	MONITORING WELL IN OVERBURDEN AQUITARD
MW-37S	MONITORING WELL IN OVERBURDEN AQUIFER (SAND AND GRAVEL)
MW-23D	MONITORING WELL IN BEDROCK
x32	EXISTING TEST PIT LOCATION (APPROXIMATE)
SB2-A4	GEOPROBE BORING LOCATION (SB2) AND AREA (A4). LOCATIONS APPROXIMATE (SEE NOTE).
(4)	AREA WITHIN WHICH GEOPROBE BORING SAMPLES WERE COMPOSITED FOR ANALYSIS.

NOTE:

BORING LOCATIONS BASED ON 50' GRID MEASURED IN THE FIELD AND SHIFTED AS NEEDED TO AVOID OBSTRUCTIONS.

0 100 200
SCALE IN FEET

CORNERSTONE Environmental Group, LLC

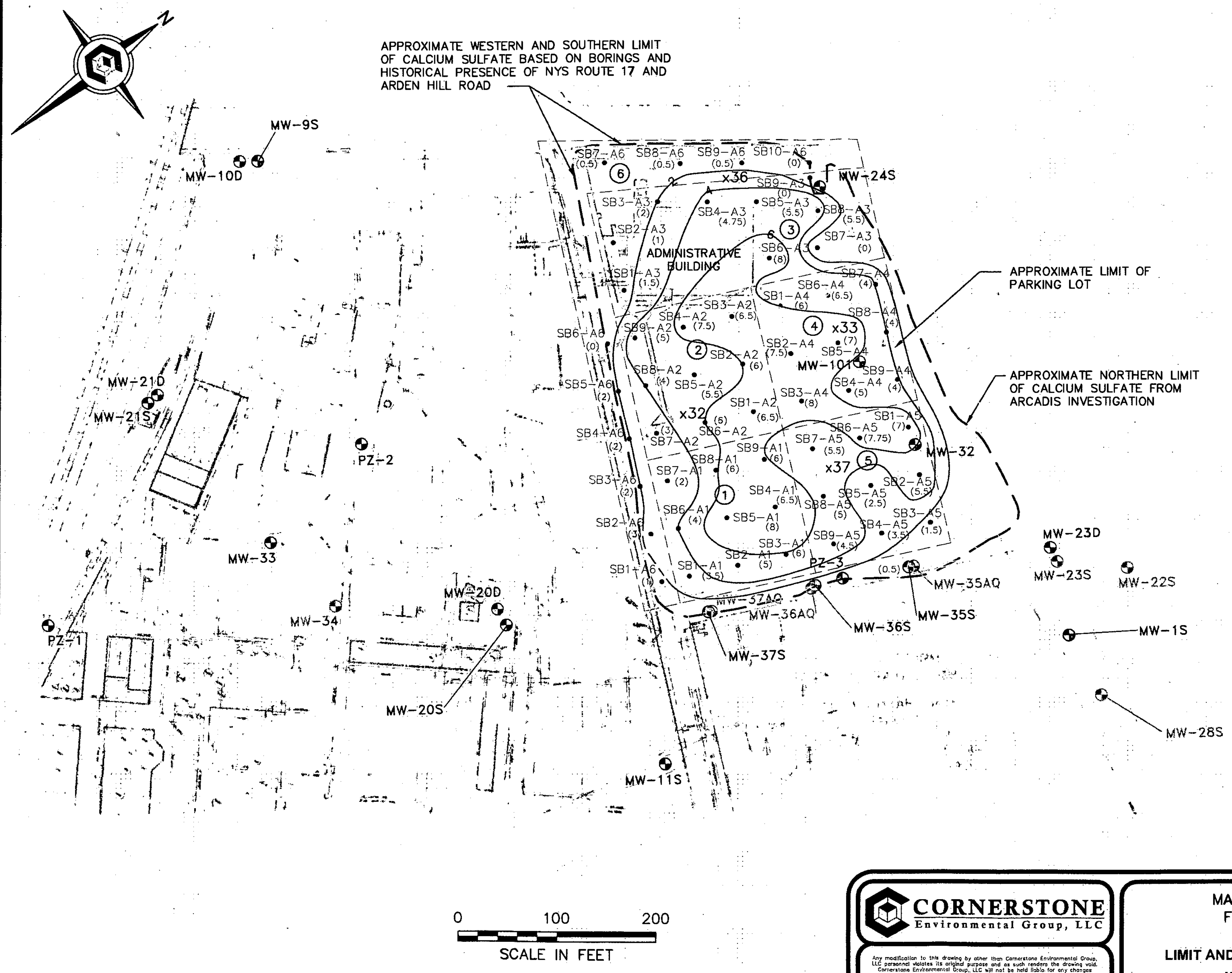
MAYBROOK HARRIMAN TRUST
FORMER NEPERA FACILITY
HARRIMAN, NEW YORK

GEOPROBE BORING AND COMPOSITING LOCATIONS WITHIN PARKING LOT AREA

FIGURE NO. 1

PROJECT NO. 090378

File: X:\PROJECTS\Maybrook_Harriman_Trust_090378\PROJECT DRAWINGS\MIMHTSSP-01.dwg Layout: Figure 1 User: SAM.WAIZENEGGER Apr 16, 2010 - 3:43pm



LEGEND:

MW-36AQ	MONITORING WELL IN OVERBURDEN AQUITARD
MW-37S	MONITORING WELL IN OVERBURDEN AQUIFER (SAND AND GRAVEL)
MW-23D	MONITORING WELL IN BEDROCK
x32	EXISTING TEST PIT LOCATION (APPROXIMATE)
SB2-A4	GEOPROBE BORING LOCATION (SB2) AND AREA (A4). LOCATIONS APPROXIMATE (SEE NOTE).
(4)	AREA WITHIN WHICH GEOPROBE BORING SAMPLES WERE COMPOSITED FOR ANALYSIS.
(6)	THICKNESS (FEET) OF CALCIUM SULFATE WHERE PRESENT
— 2 —	THICKNESS CONOUR

NOTE:

BORING LOCATIONS BASED ON 50' GRID MEASURED IN THE FIELD AND SHIFTED AS NEEDED TO AVOID OBSTRUCTIONS.

CORNERSTONE Environmental Group, LLC

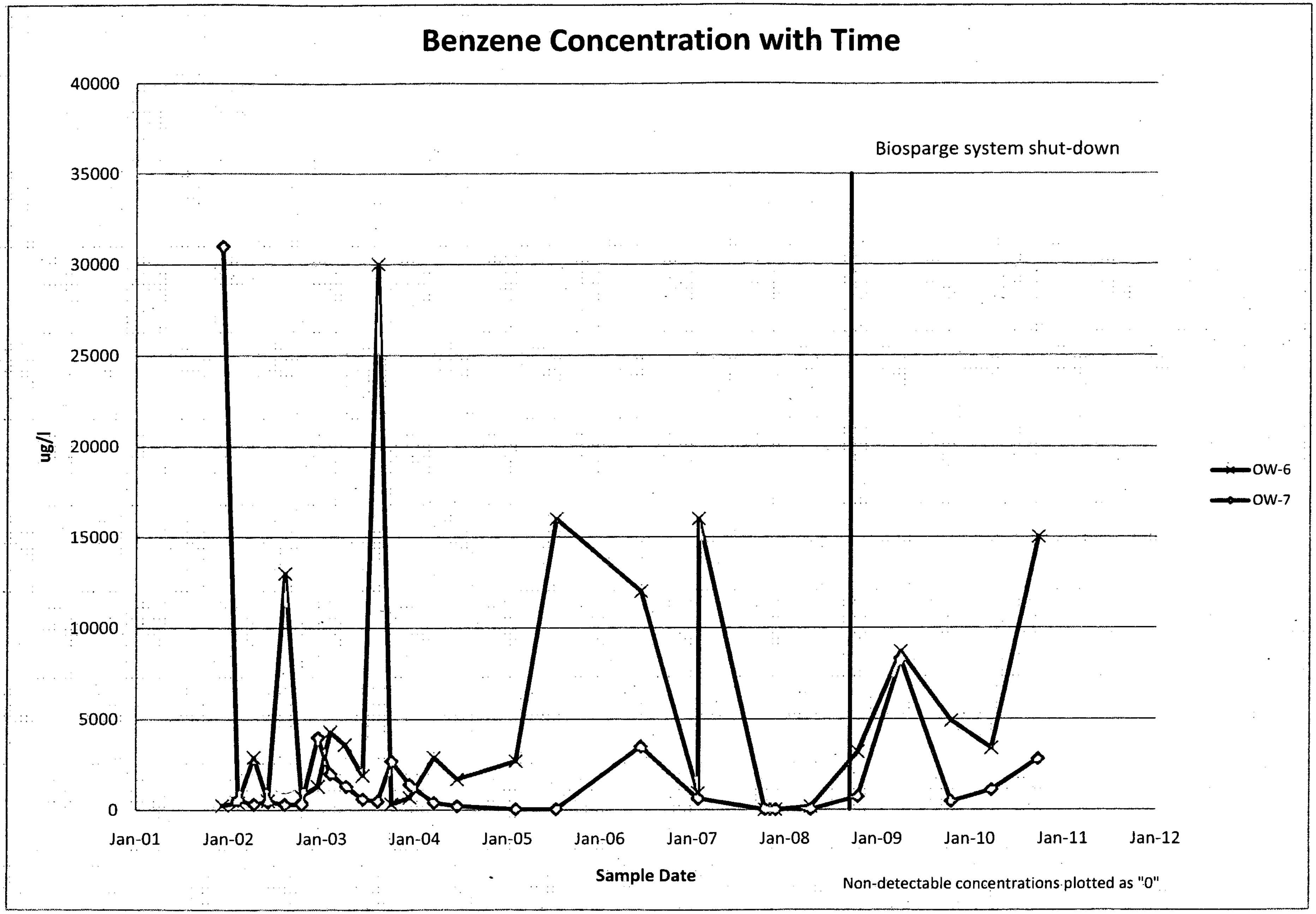
MAYBROOK HARRIMAN TRUST
FORMER NEPERA FACILITY
HARRIMAN, NEW YORK

LIMIT AND THICKNESS OF CALCIUM SULFATE WITHIN PARKING LOT AREA

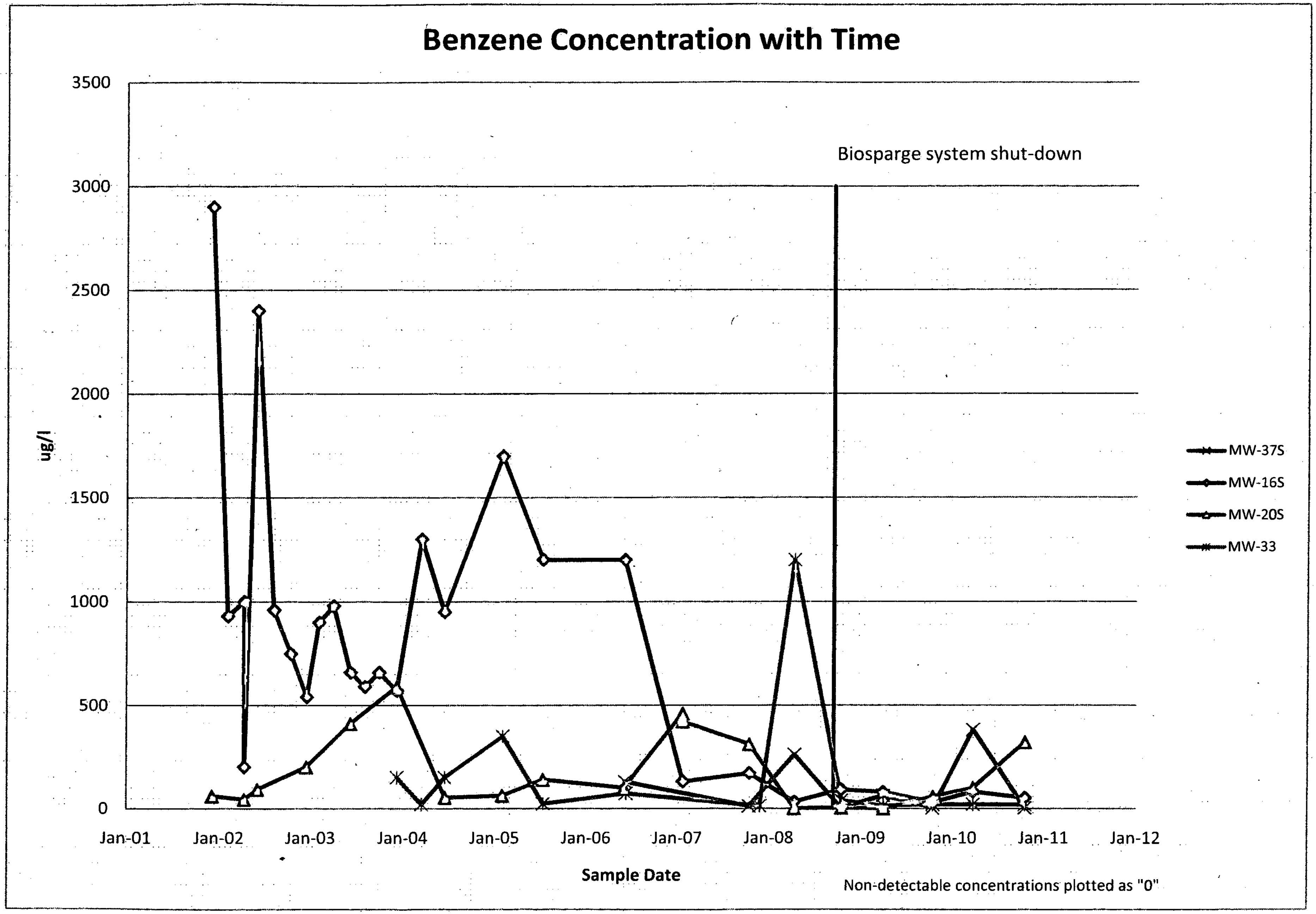
FIGURE NO. 2

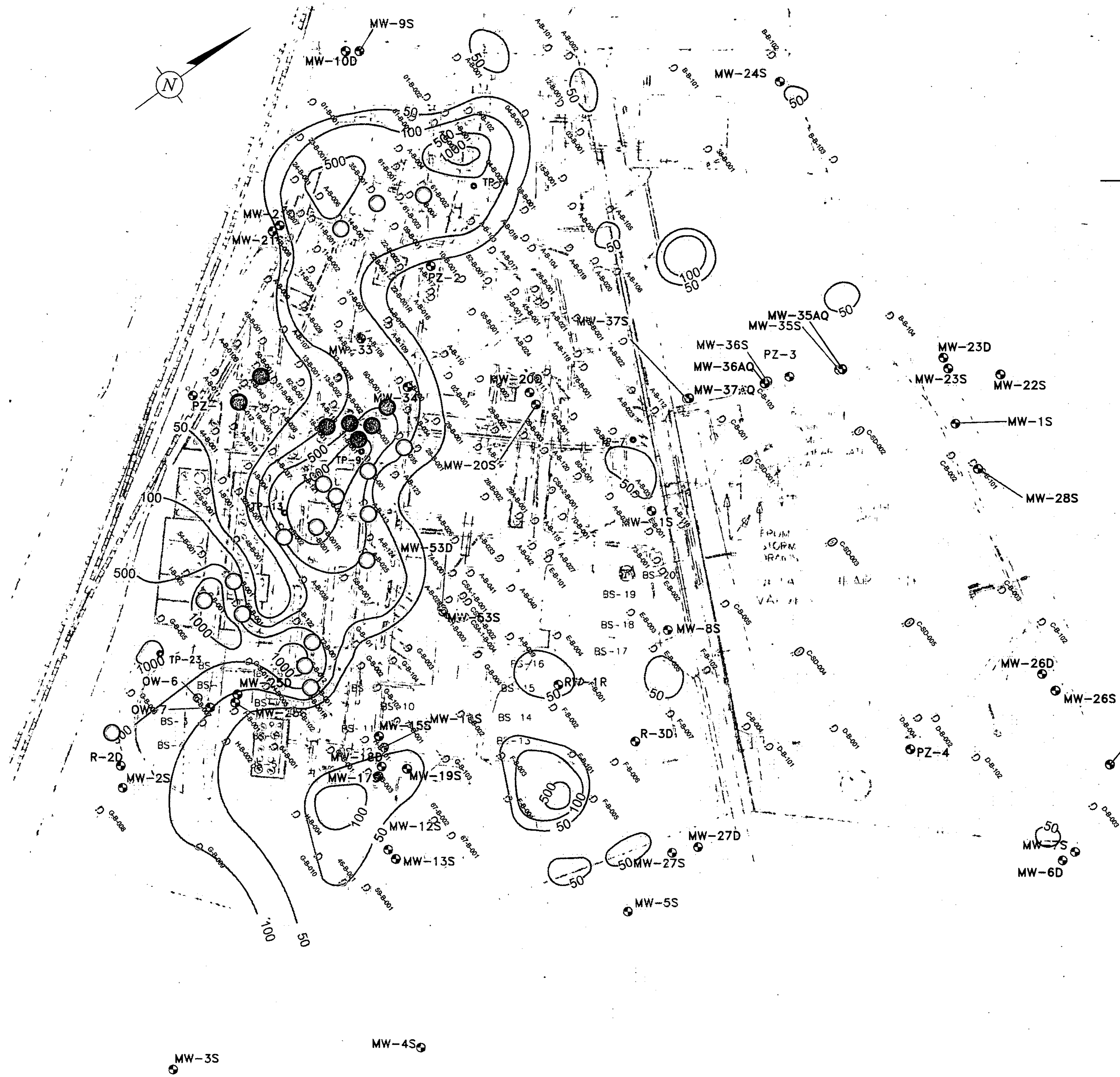
PROJECT NO. 090378

File: X:\PROJECTS\Maybrook_Harriman_Trust_090378\PROJECT DRAWINGS\MIMHTSSP-01.dwg Layout: Figure 2 User: SAM.WAIZENEGGER Apr 16, 2010 - 3:41pm



Benzene Concentration with Time
40000
35000
30000
25000
20000
15000
10000
5000
0
ug/l
Biosparge system shut-down
OW-6
OW-7
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Sample Date
Non-detectable concentrations plotted as "0"


Benzene Concentration with Time
3500
3000
2500
2000
1500
1000
500
0
ug/l
Biosparge system shut-down
MW-37S
MW-16S
MW-20S
MW-33
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Sample Date
Non-detectable concentrations plotted as "0"



— 50 — 1991 SOIL GAS CONCENTRATION CONTOUR

SAMPLES WITH HIGH (>10 mg/kg) BENZENE CONCENTRATIONS

SAMPLES WITH LOW (<10 mg/kg) BENZENE CONCENTRATIONS IN AREAS OF HIGH SOIL GAS READINGS

MW-36AQ — MONITORING WELL IN OVERBURDEN AQUITARD

MW-37S — MONITORING WELL IN OVERBURDEN AQUIFER (SAND & GRAVEL)

MW-23D — MONITORING WELL IN BEDROCK

0 100 200 300
SCALE IN FEET

Sample	Depth	Benzene (mg/kg)
14-B-001	0-1	0.413
14-B-001	4-5	0.123
18-B-001	0-1	780
18-B-002	0-1	163
18-B-002	3-4	223
18-B-003	0-1	465
31-B-001	0-1	10.8
31-B-001	5-6	73.7
33-B-001	0-1	1.17 J
34-B-001	0-1	
34-B-001	5-6	
35-B-001	0-1	
35-B-001	4-5	0.744 J
50-B-001	0-1	33.5
50-B-001	4-5	10.3
55-B-001	3-4	
56-B-001	0-1	
56-B-001	4-5	
57-B-001	0-1	0.00171 J
60-B-001	0-1	75.1
61-B-002	0-1	0.124
63-B-001	0-1	
63-B-001	5-6	
63-B-001	5-6	
63-B-001R	0-1	
72-B-001	0-1	
72-B-001	5-6	
A-B-006	0-1	9.43
A-B-006	3-4	0.057
A-B-012	5-6	38.1 J
A-B-025	0-1	
A-B-025	3-4	
A-B-035	0-1	
A-B-035	4-5	0.191
A-B-113	3-4	
A-B-121	3-4	0.274
G-B-001	0-1	
G-B-006	0-1	
G-B-006	3-4	
G-B-012	0-1	
G-B-012	6-7	0.304
I-B-002	0-1	
I-B-002	5-6	

HydroQual

1200 MacArthur Boulevard
Mahwah, New Jersey 07430
(201)529-5151 F:(201)529-5728

Figure 2-10
Benzene concentrations from RFI soils data compared to 1991 soil gas data

Former Nepera Facility
Harriman, New York

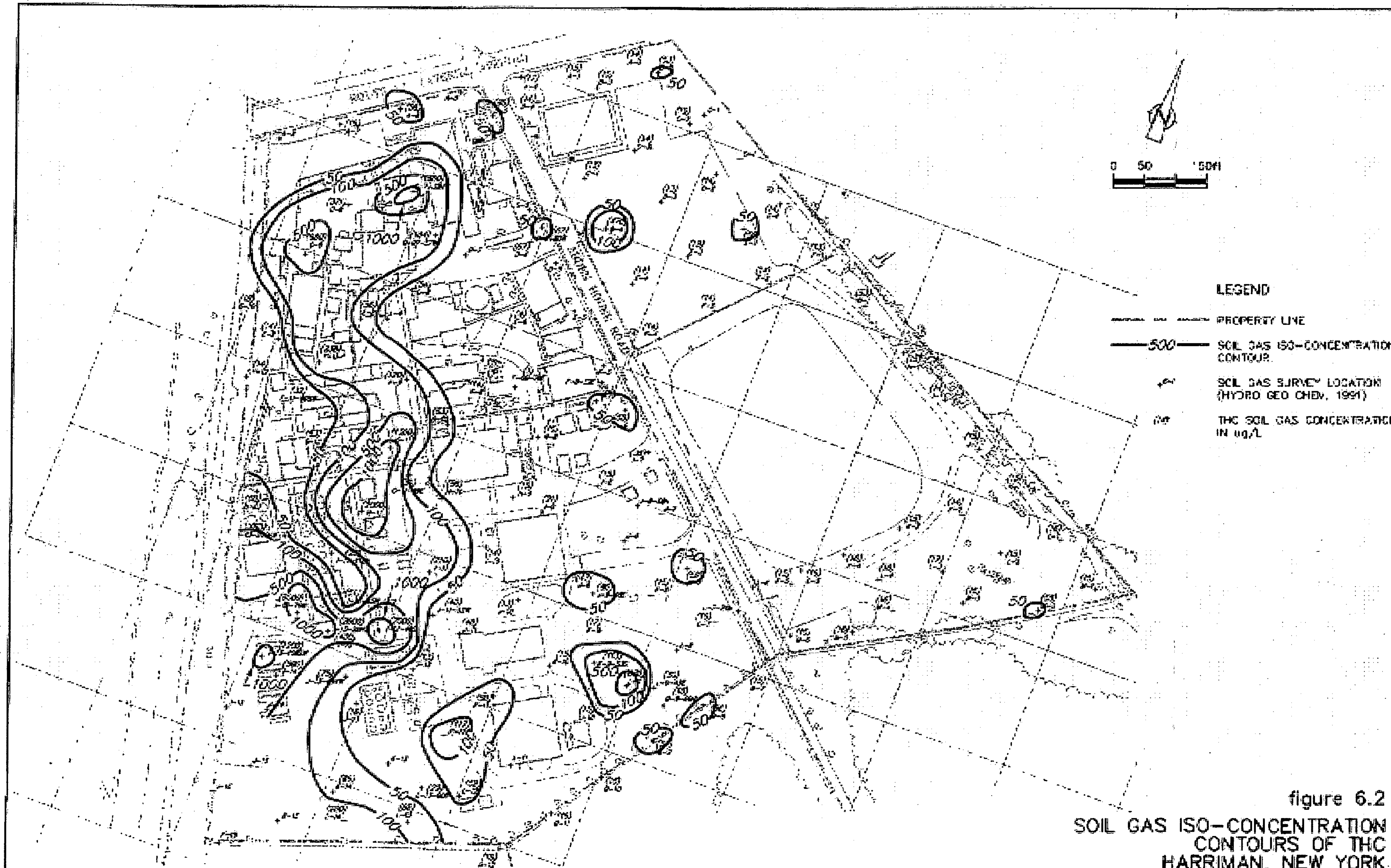
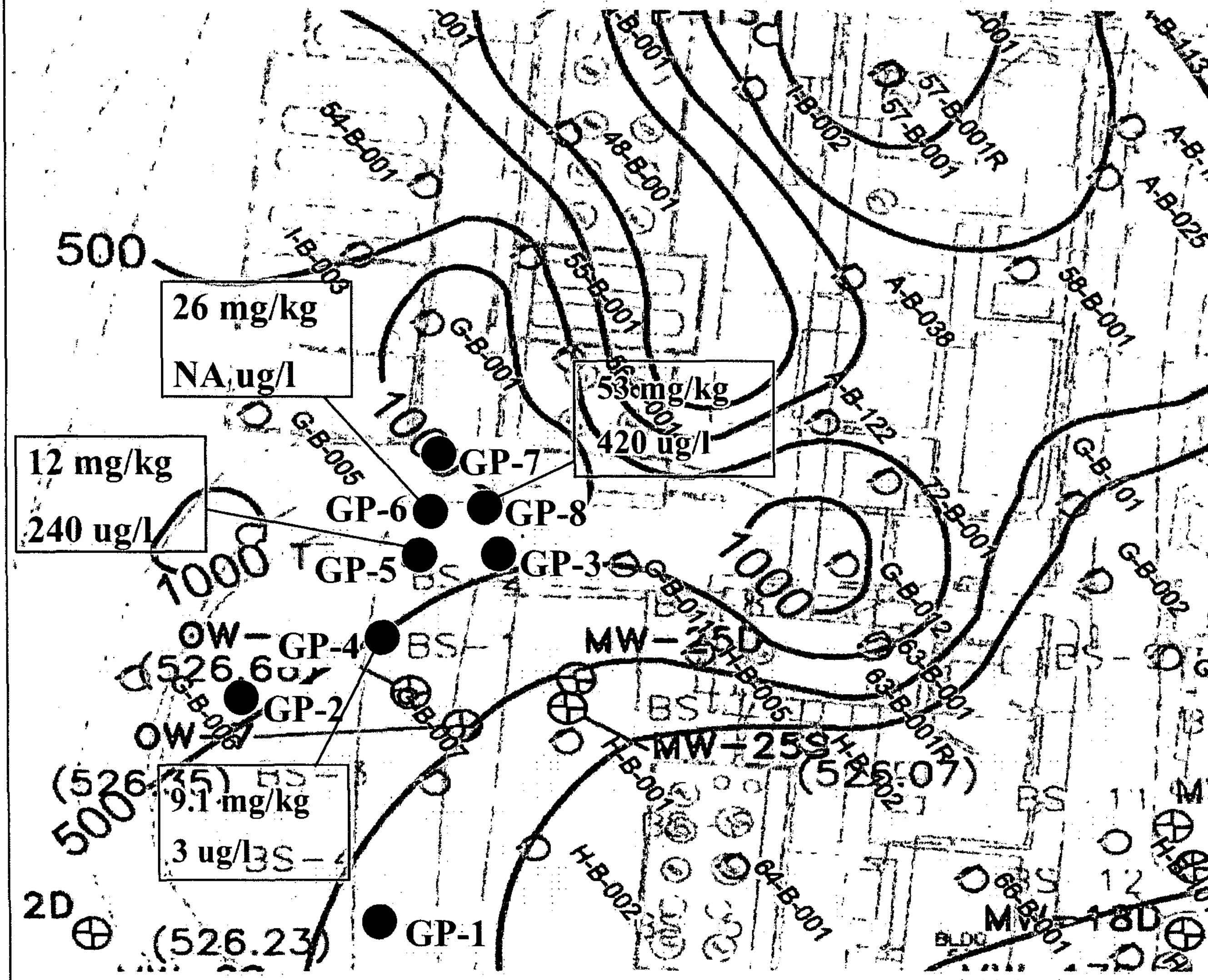


figure 6.2
SOIL GAS ISO-CONCENTRATION CONTOURS OF THC
HARRIMAN, NEW YORK
Nepera Inc.

3697(14)-MAY 26/92-REV.0 (P-16)



12 mg/kg
240 ug/l

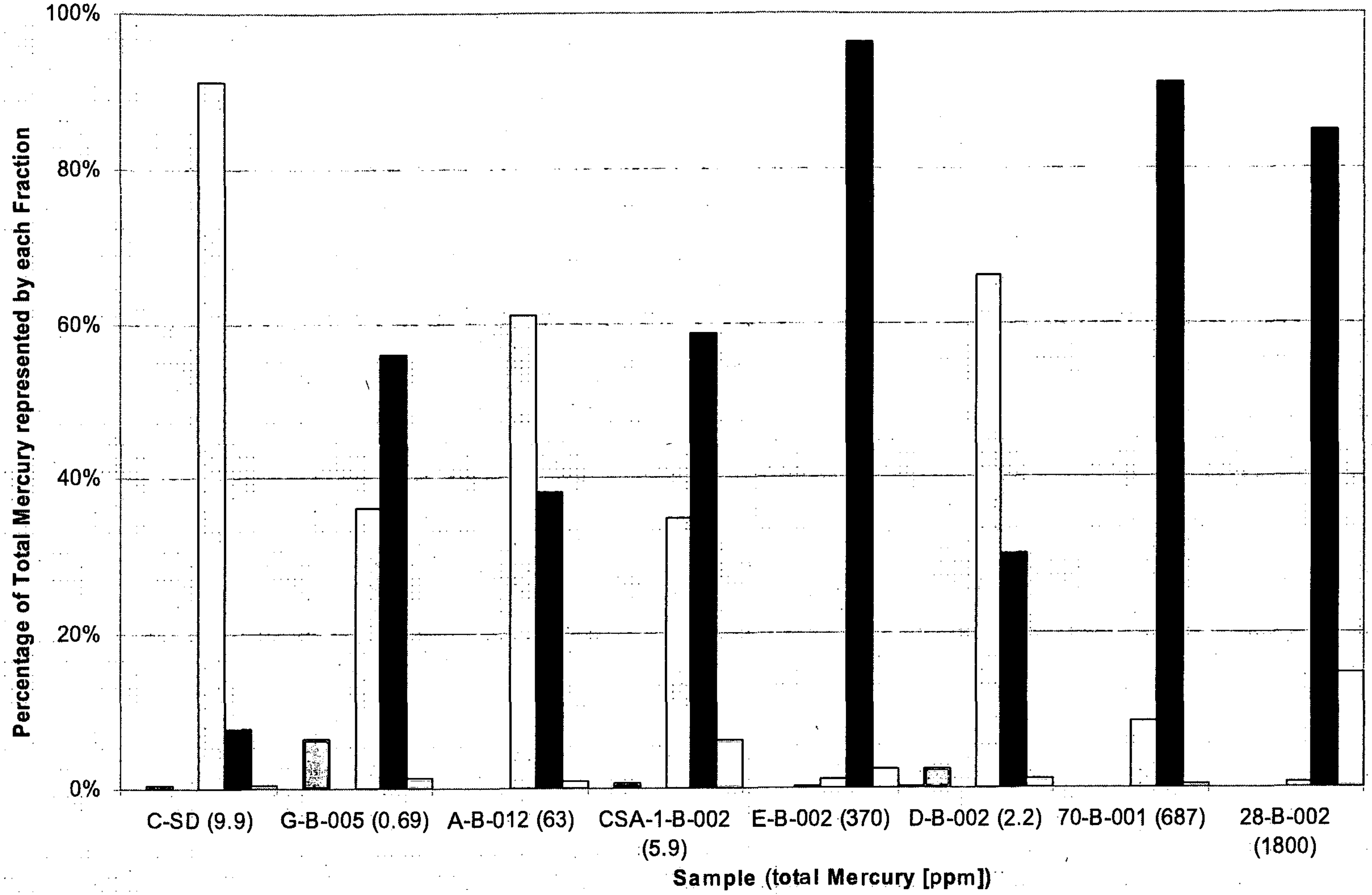
GP-5

Geoprobe boring location and Benzene concentration in soil (mg/kg) and groundwater (ug/L) sample

HydroQual
1200 MacArthur Boulevard
Mahwah, New Jersey 07430
(201)529-5151 F:(201)529-5728

Figure 2-11
October 2006 Geoprobe Investigation results compared to 1991 soil gas data

Former Nepera Facility
Harriman, New York



LEGEND

- Hg^0 (CVAF) - elemental mercury fraction
- F1 (CVAF) - water soluble fraction
- F2 (CVAF) - 'human stomach acid' soluble fraction
- F3 (CVAA) - organo-chelated fraction
- F4 (CVAA) - elemental mercury fraction
- F5 (CVAA) - mercuric sulfide fraction

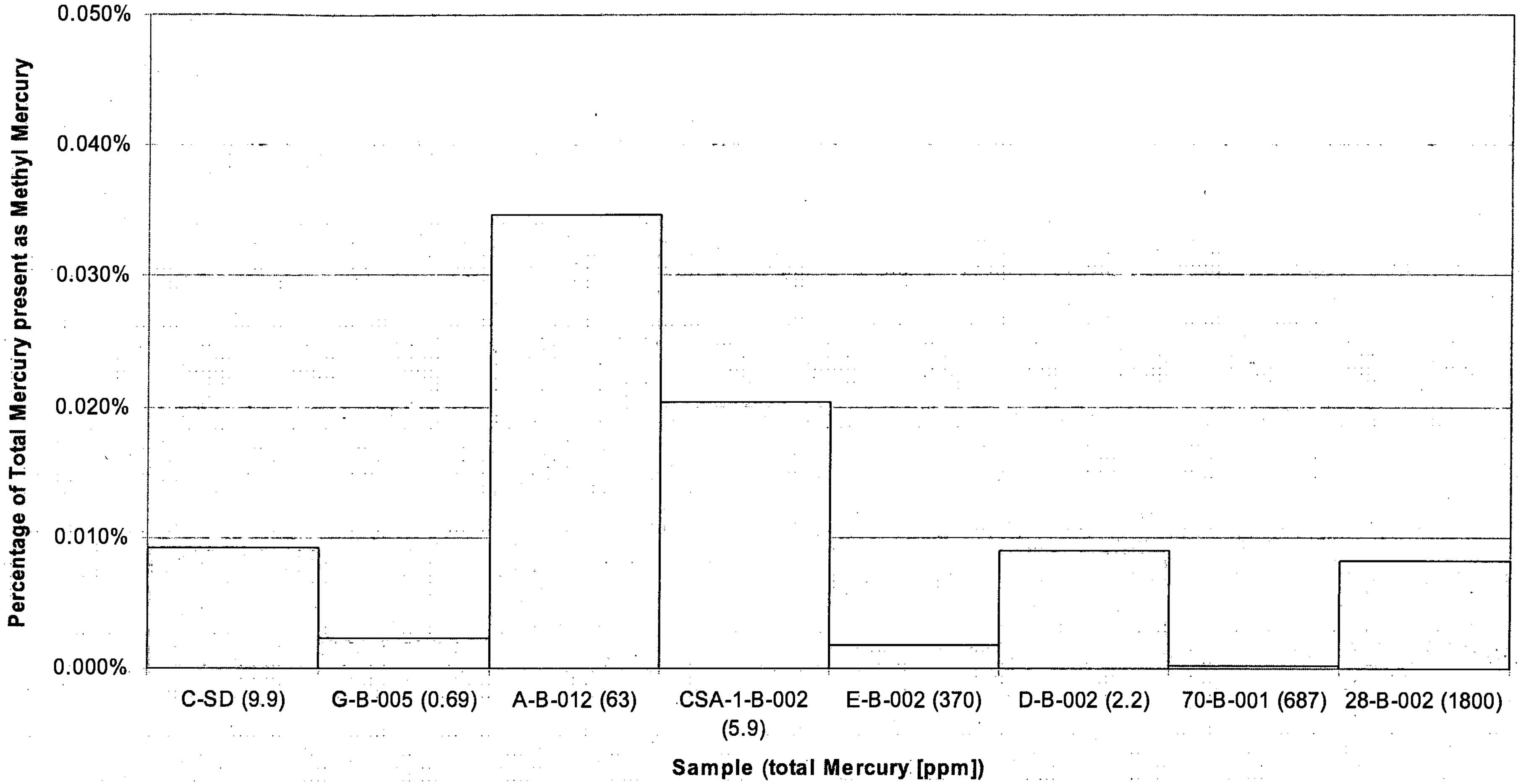
CVAF - cold vapor atomic fluorescence
CVAA - cold vapor atomic absorption
ppm – parts per million

FIGURE 4-9

SEQUENTIAL MERCURY EXTRACTION RESULTS

FORMER NEPERA PLANT SITE HARRIMAN, NEW YORK	DATE 4/16/2007	PROJECT NUMBER 131698.007
	BROWN AND CALDWELL ASSOCIATES	

P:\^Clients\Nepera\Harriman\130150(RCRA Closure)\RFI Report\Figures\Fig 4-9 4-10.ppt



Note:
ppm – parts per million

FIGURE 4-10

METHYL MERCURY RESULTS

FORMER NEPERA PLANT SITE HARRIMAN, NEW YORK	DATE 4/16/2007	PROJECT NUMBER 131698.007
	BROWN AND CALDWELL ASSOCIATES	