BD responses to EPA Request for Information

Nos. 14

GROUND WATER REMEDIATION PROJECT HISTORY

ISRA Case No. 87577
Becton Dickinson
East Rutherford, NJ

December 1998

Prepared for:

Becton Dickinson and Company
1 Becton Drive
Franklin Lakes, New Jersey

Prepared by:

ENVIRONMENTAL RESOURCES MANAGEMENT
175 Froehlich Farm Blvd.
Woodbury, NY 11797

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Becton, Dickinson and Company (BD) began terminating operations at its East Rutherford, New Jersey facility in the mid-1980's. BD had used this location since the early 1900's for a variety of manufacturing operations and administrative functions. In order to comply with NJDEP's ECRA (now ISRA) requirements, BD performed comprehensive soil and ground water investigations at the site. This lead to the development of a risk based remedial strategy to address heavy metals and petroleum hydrocarbons detected in on-site soils and chlorinated volatile organic compounds (VOCs) identified in the ground water underlying the site.

BD initiated activities to implement the remedial strategy in the late 1980's. Since that time, soils throughout the site have been remediated through excavation and off-site disposal. In 1990, BD installed and placed into operation a ground water recovery and treatment system to address the VOCs. This system has been successful in significantly reducing the areal extent and concentration of several of the VOC plumes at the site. The concentration of VOCs at these locations is now approaching the site's remedial objectives. However, the presence of DNAPL at one of the plume locations has impeded progress towards achieving the remedial objective at that point.

BD has decided to evaluate modifications to its strategy for meeting the remedial ground water objectives. These modifications were discussed in a meeting with the NJDEP on 2 June 1998. The new strategy incorporates an in-situ, reactive treatment wall to effectively isolate the DNAPL source area, while applying a natural attenuation strategy at the other plumes. Taken together, the treatment wall and natural attenuation strategy will provide an environmentally sound approach that will successfully conclude active remedial activities at the site (i.e., the pump and treat system).

This report has been prepared and organized to accomplish three inter-related objectives:

1. To provide a concise summary of significant site activities over the past 12 years with the hope that this will facilitate NJDEP's review of BD's treatment wall and natural attenuation strategy;

2. To provide answers to several questions raised by the NJDEP during the June 1998, meeting and subsequent telephone conversations with ERM; and

3. To present the plume delineation and a preliminary monitored natural attenuation monitoring plan for NJDEP's review.

1.0 *INTRODUCTION*

The Becton Dickinson and Company (BD) facility in East Rutherford, Bergen County, New Jersey was used for the production of medical products such as syringes and thermometers, beginning early this century and ending in 1988. Past manufacturing activities are considered to be the source of environmental impacts to the ground water beneath the site and several areas of impacted soil around the site. As presented below, BD conducted environmental investigations and performed remedial activities to address these environmental impacts.

BD is currently considering modifications to its existing strategy that employs ground water recovery and treatment. The newly proposed remedial strategy consists of a zero-valent iron, in-situ treatment wall, to address dense non-aqueous phase liquid (DNAPL) impacted areas with high levels of dissolved VOCs and natural attenuation to address plume areas with low levels of dissolved VOCs.

This report summarizes the site investigations and remedial activities at the site to facilitate implementation of the newly proposed ground water remedial strategy.

1.1 *REPORT PURPOSE AND BACKGROUND*

This project began in 1987 and included a comprehensive site investigation and remedial activities to address soil and ground water impacts. Over the years a multitude of reports have been written, submitted and approved by the New Jersey Department of Environmental Protection (NJDEP). This report attempts to summarize those reports and present the project's history in a single document.

BD has employed a ground water recovery and treatment strategy for the impacted ground water at the site since 1990. This remedial approach, which was approved by the Department, addresses on-site ground water impacts in the upper water table aquifer beneath the site. The decisions that led to the selection of the current ground water remedial strategy were made with NJDEP guidance and approval, and were based on the hydrogeologic setting, ground water impacts encountered in 1988 and the state of technology at the time of its implementation.

As part of its on-going ground water remediation activities at the site, BD has investigated new and innovative alternatives to enhance the ground water remediation. This past June, BD and ERM project team personnel, including Dr. Stanley Feenstra of Applied Groundwater Research, Inc., met with the Department's project team to present a proposal for a change in the aforementioned ground recovery and treatment strategy. During this meeting BD presented the proposed remedial strategy, which include both Natural Attenuation and a Treatment Wall (NA/TW). The Department was generally receptive to the NA/TW remedial strategy and requested that BD prepare this report to generally summarize past site activities and specifically address the following:

- Historic ground water monitoring data;
- Delineation of vertical ground water quality;
- Occurrence of metals in ground water at the site;
- Occurrence of light non-aqueous phase liquids (LNAPL's) at the site;
- Past suspension of sampling of Parcel 1 monitoring wells;
- Alternative treatment technologies evaluated;
- Summary report of the ground water recovery and treatment system operations;

- Proposed plume delineation to be used in the NA/TW remedial strategy; and
- Proposed plume monitoring plan to be utilized once the natural attenuation plan is implemented.

In addition to these items, this report presents other information relative to the site investigation and remedial activities conducted at the site.

1.2 *PROJECT LOCATION*

The site is located on the western fringe of the Hackensack Meadowlands as shown in Figure 1-1. Figure 1-2 shows a plan view of the site during the fullest extent of BD operations. The site incompassed approximately 30 acres and is divided by public streets. Portions of the site are surrounded by chain link or iron fencing.

Local land use within 1,000 feet of the site property boundary is urban with mixed residential and industrial/commercial development. The site is bordered on the east by New Jersey State Highway Route 17. East of Route 17 are tidal meadowlands. Developed areas along the east site of Route 17 include commercial and industrial establishments. The south and west sides of the site are bordered by residential and commercial establishments. A public high school lies to the north of the site boundaries.

1.3 *PROJECT CHRONOLOGY*

In June 1987, BD submitted the initial ECRA notice to the New Jersey Department of Environmental Protection (NJDEP). The site was divided into six separate ECRA cases, corresponding with the six tax lot and block numbers shown on Figure 1-2.

Figure 1-1

Figure 1-2

Environmental investigations of Parcel No. 1, 2 and 3 were conducted on an expedited schedule from October 1987 through December 1987. BD subsequently prepared and submitted Remedial Action Plans (RAP) for the three parcels in July 1988. The RAP for Parcels 1 and 2 included the overall ground water remediation strategy that was subsequently applied to the entire site (as appropriate). The RAPs were approved by the NJDEP in October 1988 and the soil cleanup in Parcel Nos. 1 and 2 was completed in November 1989. NJDEP issued Full Compliance Letters for the Parcel Nos. 1 and 2 ECRA Cases in May 1991 and for the Parcel No. 3 ECRA/ISRA Case in July 1993.

Environmental investigations were conducted in Parcel Nos. 4, 5 and 6 from February to May 1988. The RAPs for these Parcels were submitted to NJDEP in March 1989 and were approved in September 1989. Remediation of soil in Parcel Nos. 4 and 5 (exclusive of soils underlying site buildings) was completed in December 1991 and soil remediation of Parcel No. 6 was completed in September 1992. The Soil Remediation Reports for Parcel Nos. 4 and 5 and Parcel No. 6 were submitted to NJDEP in June 1992 and December 1992, respectively. NJDEP issued an ISRA Full Compliance Letter for the Parcel No. 6 Case in September 1993. In February 1994, the Department issued an ISRA Full Compliance Letter for the Parcel No. 4 Case and for the Parcel No. 5 Soil Remediation.

The soil investigations in Parcel Nos. 4 and 5 were limited to outdoor areas because initial redevelopment plans called for the existing buildings to remain in place. However, subsequent redevelopment plans required the demolition of all site buildings on Parcel Nos. 4 and 5 (except for the ground water treatment plant). The assessment and remediation of sub-slab soil beneath these buildings began in April 1994 and was completed in September 1996. The NJDEP issued an ISRA Full Compliance Letter for the Sub-Slab Soil Remediation in February 1998.

The portion of the site south of Stanley Street (Parcels 1 and 2) was sold in 1989 and is presently completely redeveloped, containing a large building owned and occupied by the Federal Reserve Bank of New York. Parcel 3, the smallest of the six, was sold in 1993 and is currently occupied by a small hardware store. The demolition of all other buildings north of Stanley Street was completed in 1996 and BD is in negotiations to sell this portion of the site (Parcels 4, 5, and 6). It is anticipated that the new land use of these parcels will consist of large retail sales operations. As discussed in Section 3.0, the ground water recovery and treatment system continues to operate at the site.

Table 1-1 provides a summary listing of the project documents that have been submitted to the NJDEP. A summary of all the site investigation activities is presented in section 1.5.

1.4 SITE GEOLOGY

The geologic materials underlying the BD site from top to bottom consist of:

- A layer of fill materials overlying the natural unconsolidated sediments at the surface;
- Holocene marsh and fluvial deposits;
- Pleistocene glacial deposits; and
- Bedrock (Passaic Formation of the Brunswick Group).

These units are described below. A representative geologic cross section is presented as Figure 1-3.

Table 1-1

Table 1-1

Figure 1-3

Anthropogenic Deposits

The uppermost layer of materials found underlying the site consists of fill (four to seven feet thick). The fill layer is a mixture of fine and coarse-grained sediments containing a spectrum of man-made objects. These objects include glass fragments from presumably off-specification thermometers and syringes, metal turnings, coal and ash, bricks, and wood fragments. The water table is sometimes found within this unit, therefore the fill exists both in the saturated and unsaturated zones. (Depth to water at the site generally ranges between approximately three and eight feet.) Due to the heterogeneous nature of these materials, it is assumed that its permeability will exhibit a large range of values.

Holocene Deposits

The deposition of these materials is related to the Hackensack Meadowlands, therefore they consist primarily of marsh deposits interbedded with lenticular fluvial and/or tide channel deposits. Lithologically, this unit is comprised of fine to medium sand and silt. The hydraulic conductivity of this unit is low, averaging about 2.0 feet per day and ranging between 0.2 to 5.0 feet per day. These K values were determined from slug tests and a pumping test of a pilot recovery trench.

A contiguous clay unit occurs within the silt and sand deposits along the southeastern boundary of the site (i.e., along Route 17). The clay attains a maximum thickness of 10 feet at the southern corner of Parcel 5 and generally thins towards the northeast through Parcel 6. Between one and three feet of peat mantles this clay, or is occasionally interbedded within it. The origin of this unit is from marsh deposition. The thickness of the Holocene deposits at the site ranges from 10 to 25 feet.

Shallow ground water flow within the upper saturated zone is in a generally south-southeasterly direction as shown in the water table contour map presented in Figure 1-4. This figure depicts the pre-pumping configuration of the water table.

Pleistocene Glacial Deposits

A southeastward thickening wedge of glacially derived sediments overlies bedrock at the site. The materials within this wedge can be divided from top to bottom into the following hydrogeologic zones:

- Glaciolacustrine Clay (aquitard)
- Outwash Sand and Gravel (confined aquifer)
- Till (aquitard)

The glaciolacustrine clay ranges in color from gray to reddish brown, and is interlayered with laminations of silt and fine sand. Dropstones are occasionally observed. The unit is wedge-shaped, with its zero edge occurring in the center of the site and steeply thickening toward the southeast. At the property boundary along Route 17, the unit is approximately 60 feet thick. Vertical hydraulic conductivity of this unit was measured at less than 0.003 feet per day in undisturbed Shelby tube samples.

A well-confined glaciofluvial deposit occurs beneath the glaciolacustrine clay. It consists of coarse to fine sand interbedded with silt and gravel horizons. Its permeability is fairly constant at approximately 50 to 55 feet per day based on several slug tests. The areal extent of the glaciolacustrine clay and the potentiometric surface associated with the confined aquifer is shown in Figure 1-5.

The till directly overlies bedrock throughout most of the site. The geologic description of this unit is based on a small number of samples but

Figure 1-4

Figure 1-5

can generally be described as dense and highly compacted, reddish brown unsorted sand, silt and gravel. Its hydraulic conductivity is believed to be very low.

Bedrock

Bedrock is sedimentary, chiefly siltstone and shale of the Triassic Passaic Formation. The bedrock beneath the site dips steeply to the southeast (towards Route 17). Depths range from 33 feet below grade in Parcel 4 to greater than 100 feet along Route 17. The logs for those borings at the site that extend to bedrock indicate that it consists primarily of siltstone. The Passaic Formation is a fairly prolific aquifer and it is widely used for water supply in New Jersey and specifically for industrial purposes within a five-mile radius of the site.

1.5 *SUMMARY OF SITE INVESTIGATIONS*

During the initial site activities BD completed extensive soil and ground water sampling investigations in order to assess the environmental impacts of past manufacturing activities on the site. The results of these investigations were used to complete the various environmental assessment and remedial work plan reports which were submitted and approved by the Department. The following sections present a summary of the site investigations of soil and groundwater.

1.5.1 *Soils*

BD investigated the soils at the site and collected over 1,000 soil samples. Samples were collected and analyzed for: heavy metals, volatile organic compounds (VOC's), semi-volatile organic compounds (SVOC's), total petroleum hydrocarbons (TPH's), polychlorinated bi-phenyls (PCB's), and pesticides. The results of these investigations, are as follows:

Parcel 1

- Four Areas of Concern for soil were sampled in Parcel 1. The results of the analysis for heavy metals contained maximum concentrations for lead, mercury and zinc, at 691 ppm, 3.0 ppm, and 533 ppm respectively.

- SVOC concentrations in soil samples from these areas ranged 14.5 ppm to 28.6 ppm. The primary constituents of the total SVOC concentrations were polynuclear aromatic hydrocarbons (PAH's).

- Several soil samples had TPH concentrations ranging from 130 ppm to 8,500 ppm.

- No VOC, PCB or Pesticide impacted soils were encountered.

Parcel 2

- Over 30 Areas of Concern for soil were sampled in Parcel 2. The results of soil samples analyzed for heavy metals contained maximum concentrations for cadmium, chromium, copper, lead, mercury, nickel, silver and zinc, were 6.7 ppm, 700 ppm, 928 ppm, 13,789 ppm, 7.2 ppm, 209 ppm, 373 ppm and 12,967 ppm respectively.

- SVOC concentrations in soil samples from these areas ranged 10 ppm to 46.3 ppm. The primary constituents of the total SVOC concentrations were polynuclear aromatic hydrocarbons (PAH's).

- Several soil samples had TPH concentrations ranging from 110 ppm to 48,780 ppm.

- Several soil samples were collected that had total VOC concentration ranging from 2 ppm to 5 ppm. It should be noted that only one sample had a concentration of 5 ppm and the total VOC fraction was due to the presence of total xylenes. This soil sample was collected near an auto repair shop discharge line.

- PCB concentrations in soil collected near transformer pads ranged from 1.4 ppm to 29,000 ppm. The primary PCB fraction was arochlor - 1260.

- No Pesticide impacted soils were encountered.

Parcel 3

- Only two areas were found to have impacted soil, these two areas had maximum concentrations of lead and TPH of 819 ppm and 3,450 ppm respectively.
- No VOC, SVOC, PCB or Pesticides were encountered.

Parcels 4, 5 and 6

- Five open areas and eleven areas of environmental concern were investigated in these parcels. The soil sampling program included over 350 samples and indicated areawide impacts with heavy metals. In addition soils containing TPH and SVOC's were encountered.
- No VOC, PCB or Pesticides were encountered.
- Approximately eleven percent of the samples analyzed for heavy metals displayed concentrations of cadmium and chromium ranging from 3.3 ppm to 16.4 ppm, and 109 ppm to 887 ppm, respectively; forty percent displayed concentrations of lead ranging from 266 ppm to 2,239 ppm; twenty-one percent displayed concentrations of copper and zinc ranging from 234 ppm to 837 ppm and 362 ppm to 1,196 ppm, respectively; and fifty-one percent of the samples displayed concentrations of mercury ranging from 1.1 ppm to 22.4 ppm.
- Twenty-eight percent of the samples analyzed for SVOC's displayed concentrations of total SVOC's ranging from 5.2 ppm to 197.9 ppm.
- Twenty-five percent of the samples analyzed for TPH indicated levels of TPH that ranged from 100 ppm to 17,800 ppm.

Parcel 5 Sub-Building Slab

Once the buildings on Parcel 5 were demolished a soil investigation was completed to establish any environmental impacts to soil beneath the buildings. The results of this investigation yielded the following:

- Nine areas of environmental concern were sampled and analysis indicated the presence of heavy metals including: copper, lead, mercury, and nickel. The respective maximum concentrations for

these metals were 775 ppm, 4,390 ppm, 194 ppm, and 9,280 ppm.

- No VOC's, SVOC's, PCB's or pesticides were encountered.

1.5.2 *Ground Water*

Approximately 100 ground water monitoring wells have been installed and sampled for the purpose of characterizing ground water at the BD site. These wells were sampled for a comprehensive suite of analytes including: metals; volatile organic compounds (VOCs); semi-volatile organic compounds (SVOCs); PCBs; and pesticides. The significant findings of this work may be summarized as follows:

- No SVOC, PCBs or pesticide impacts were found;
- Metals sampling results indicated some marginal exceedences of the now current New Jersey ground water standards. The only excedeence substantially above the standard was nickel in well MW-15s. This sample was collected during 1988 when no nickel standard existed. Further discussion of the metals results can be found in Section 2.5.
- Significant VOC impacts were found in several parts of the site. Much of the remainder of this report discusses the characterization and remediation of the VOC impacts in detail;
- Light, non-aqueous liquid (LNAPL) was found in two areas of the site. These areas are small in areal extent and thicknesses. Further discussion of this subject can be found in Sections 2.3 and 3.3.

1.6 *REMEDIAL OBJECTIVES*

ERM performed an environmental and health based risk assessment in order to develop remedial objectives for the site. These objectives were developed to eliminate unacceptable risks to human health or the environment. The risk assessment utilized all of the environmental data that was collected during the site investigation phases of the project. The remedial objectives were stipulated in a series of RAPs that were

submitted to and approved by the NJDEP. These NJDEP-approved plans established the basis for all subsequent remedial activities at the site.

Most significant to the current proposal are the objectives that NJDEP approved for the remediation of ground water at the site. The approved objectives directed BD to:

- Maintain hydraulic control of the site in order to prevent off-site migration of VOCs in the shallow water table aquifer.
- Include within its capture zone ground water in the shallow aquifer that contained total VOCs greater than 100 ppb and/or total petroleum hydrocarbons greater than 10 ppm.
- Address free products at locations were LNAPL was identified.

ERM did not deem it necessary nor did the NJDEP require BD to address any of the following:

- Off-site ground water contamination (none was identified during the site investigation).
- Heavy metals in the shallow water table aquifer (no metals were detected above the site specific criteria for no adverse health and environmental affects), and
- Trace concentrations of VOCs that had been detected in the confined aquifer.

1.7 REPORT ORGANIZATION

The remainder of the report is organized into the following sections:

- *Section 2.0* - Ground Water Characterization. This section summarizes the water quality data collected as part of the project.
- *Section 3.0* - Ground Water Recovery and Treatment. This section describes the pump and treat remediation system presently operating at the site.

- *Section 4.0* – Alternative Remedial Strategies. Several pilot tests of alternative remedial technologies have been conducted at the site and are described in this section.

- *Section 5.0* - Proposal for Additional Plume Delineation and Natural Attenuation Monitoring.

2.0 *GROUND WATER CHARACTERIZATION*

The BD East Rutherford project has a long history of ground water sampling, dating from 1987 to the present. Approximately 100 ground water monitoring wells have been installed and sampled during this period. Initial characterization sampling of the site ground water included analysis for metals, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), PCBs and pesticides. Significant VOC concentrations were found in several parts of the site which are described in this section. Scattered occurrences of elevated metals were also found; these results are presented in Section 2.5. No SVOC, PCBs or pesticide impacts were found, therefore these fractions are not discussed in this document.

Tabular representation of the VOC sampling results is presented in Appendices 1 and 2. Appendix 1 contains all data collected as part of the on-going semi-annual monitoring program, which samples a representative selection of 27 monitoring wells at the site, plus 11 ground water recovery trenches and wells. Appendix 2 contains the data from all other monitoring wells sampled during the project. This section presents an analysis of these data, focusing on horizontal plume delineation in the shallow aquifer, identification of DNAPL source areas, occurrence of LNAPL at the site, water quality in the deep confined aquifer, and historical water quality data for metals.

2.1 *SHALLOW VOC PLUME DELINEATION (1987-1988)*

Based on the data presented in Appendices 1 and 2, four separate dissolved plumes of volatile organic compounds (VOCs) have been identified in shallow site ground water. This includes the "S" horizon wells that are screened at the water table, and the "M" horizon wells that are screened below the water table but above the glaciolacustrine

confining unit. These plumes are characterized by elevated levels of trichloroethene (TCE) and its decay products 1,2-dichloroethene (DCE) and vinyl chloride. The areal extent of the VOC plumes was defined during the initial site characterization investigations, conducted during 1987 and 1988. Figure 2-1 presents a total VOC isocontour map using a composite database of all sampling results from this time period. For those wells with multiple sampling events, the highest detected concentration was utilized. Figure 2-1 may therefore be considered a conservative interpretation of the available VOC data.

2.2 *DNAPL SOURCE AREAS*

The ground water sampling data at the East Rutherford site suggests the presence of separate phase VOCs (i.e., dense, non-aqueous phase liquid, or DNAPL). A commonly applied rule-of-thumb states that DNAPL is likely present where dissolved ground water concentrations exceed 1% of the pure compound solubility. Since TCE was the original product that was used and subsequently released at the site, the benchmark level is 1% of TCE solubility or 11,000 µg/l.

Based on ground water sampling results of the site monitoring wells, two areas have been identified where it is highly likely that residual DNAPL is present (dissolved TCE concentrations are consistently greater than 1% of TCE solubility in these areas). These two areas are referred to as the Building E Area and the Building UW Area. No other locations at the site have shown persistent concentrations at such levels. Two wells (MW-42m and MW-36) both had one data point above the benchmark level, however these seem to be anomalous data points. For both wells, all other sampling results were significantly below the benchmark, therefore residual DNAPL is not suspected at these locations.

Figure 2-1

In an effort to delineate the areal extent of the two suspected source areas, an investigation was performed using a Geoprobe drilling apparatus to collect ground water samples throughout these two areas. The ground water samples were analyzed immediately in the field with a portable gas chromatograph to facilitate immediate planning of subsequent sampling locations.

The result of this work is presented in Figures 2-2 and 2-3. A contour line has been placed on these figures to define the areal extent of ground water containing TCE concentrations above 1% of TCE solubility. This is interpreted as the probable extent of the DNAPL source area at these two locations.

2.3 *OCCURRENCE OF LNAPL*

Free phase petroleum product (LNAPL) has been identified in two locations at the site, both within Parcel 5 north of Stanley Street. One LNAPL body is located at wells MW-2 and MW-501; the second is found in wells MW-519s and RW-2 (see Figure 2-1 for well locations). Both LNAPL bodies are small in areal extent and thickness. A summary of the available information on these LNAPL bodies is provided below:

- Based on visual observations, the MW-519s/RW-2 LNAPL body appears to be comprised of a lightweight lubricating or cutting oil. Its occurrence is associated with waste glassware used for fill material in this area. A 10,000 gallon underground tank used to store No. 2 fuel oil and/or kerosene also formerly existed in this general area. However, observations made during the removal of this tank in 1986 indicated no evidence of leakage.

- The source of the LNAPL at the MW-2/MW-501 location was fuel oil leaked from underground storage tanks. Two 20,000 gallon tanks associated with the facility boilers were formerly located in this area (removed in 1986).

Figure 2-2

Figure 2-3

As described in Section 3.2, LNAPL remediation has been conducted in these two areas concurrently with the ground water pump and treat activities. LNAPL monitoring data is also presented in Section 3.2.

2.4 *VERTICAL VOC PLUME DELINEATION (1987-1988)*

The shallow plumes at the site have been found in most locations to extend down to the top of the glaciolacustrine clay unit. Across most of the site, the clay is found 10 to 15 feet below grade (see Figure 1-3). In the southeastern part of the site near Route 17, the shallow aquifer is thicker (up to 30 feet), therefore in addition to wells screened at the water table, deeper wells (denoted by the suffix "m") were also installed to evaluate water quality in the lower portion of the shallow aquifer.

Water quality in the MW-30s/MW-30m cluster shows that the plume extends (albeit at significantly reduced concentration) down to the top of the glaciolacustrine clay. At other locations, the deeper well exhibits higher VOC concentrations (e.g., the MW-42s/MW-42m cluster). At the MW-508s/MW-508m cluster, the plume concentration is fairly consistent throughout the thickness of the shallow aquifer.

It should be noted that the ground water recovery system was designed to collect ground water from the full thickness of the shallow aquifer, therefore VOCs at the bottom of the shallow aquifer are being addressed by the present system (see Section 3.0 for further discussion of ground water remediation).

Ground water quality beneath the glaciolacustrine clay has also been evaluated. A total of six wells at the site are screened within the deep confined aquifer (see Figure 2-1 for well locations). Five of the six were sampled during the site characterization investigation in 1987 and 1988; the results are listed below:

Well	Total VOCs
MW-8d	ND
MW-14d	196 µg/l
MW-15d	164 µg/l
MW-16d	41 µg/l
MW-18d	not sampled
MW-508d	71 µg/l

The breakdown of compounds detected in these samples is generally consistent with the shallow plumes at the site (i.e., TCE, DCE and vinyl chloride). Specific sample analytical results are provided in Appendix 2. Ground water remediation was specifically not required by NJDEP for the following reasons:

- concentrations in the confined aquifer were relatively low;
- the thick sequence of overlying clay acts as a barrier between the confined aquifer and the shallow VOC plumes;
- the vertical ground water flow gradient is upward between the deep confined aquifer and the shallow unconfined aquifer; and
- no receptors were identified where water in the confined aquifer was being used.

2.5 *METALS IN GROUND WATER*

Ground water samples were also analyzed for selected metals during the site characterization investigation. The specific metals analyzed as part of the investigations conducted south of Stanley Street (Parcels 1, 2, and 3) included antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, thallium and zinc. Some wells were tested for a reduced analyte list that was limited to cadmium, chromium, copper, mercury, nickel and zinc. North of Stanley Street (Parcels 4, 5 and 6), a more extensive analyte list was utilized that included aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium,

cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, selenium, silver, sodium, thallium, vanadium and zinc.

A summary of the metals sampling results is provided in Table 2-1. It should be noted that this table lists only those parameters for which detections were found.

Subsequent to the initial site characterization investigations, additional ground water monitoring for metals in certain wells was conducted on a semi-annual basis. The purpose of this sampling was to monitor ground water quality in areas where NJDEP allowed soil containing metals above the ECRA RCL's to be left in place without remediation. The specific unremediated metals in soil included chromium, copper, lead, mercury and zinc. As per the approved site cleanup plans, the purpose of this monitoring was to evaluate possible leaching of metals to ground water. This sampling program was conducted through April 1992. At that time BD, presented the data to NJDEP and received approval to terminate this component of the semi-annual ground water monitoring program. The data are presented in Table 2-2.

The results from the Parcel 1, 2 and 3 investigation indicate several exceedences of the current New Jersey ground water standards. Exceedences were noted for nickel in well MW-15s and more marginally for arsenic in well MW-7 and lead and cadmium in well MW-35. All other exceedences detected in the initial sampling round were not confirmed in subsequent follow-up sampling.

The results from the Parcel 4, 5 and 6 investigation also indicated exceedences of the New Jersey ground water standards, however nearly all are for aluminum, iron, manganese or sodium. These are naturally occurring metals that are unrelated to historical site operations. Among

Table 2-1a

Table 2-1a

Table 2-1a

Table 2-1b

Table 2-1b

Table 2-1b

Table 2-2

Table 2-2

those substances that may be related to BD's activities, marginal exceedences are noted for arsenic and nickel in well MW-515s.

It should be noted that soil sampling for nickel was conducted at five (5) separate locations in the general area around MW-15s. The results of this work indicated the presence of nickel above the remedial action levels in only one location. This location was beneath the slab of the building directly upgradient of MW-15s. During the sub-slab soil remedial action conducted in Parcel No. 5, in the summer of 1996, approximately twelve (12) cubic yards of nickel-impacted soils were excavated and disposed of off-site in accordance with the NJDEP approved RAP. The following conclusions are reached from this work:

- a complete soil investigation for nickel was completed in the vicinity of well MW-15s;
- one nickel-impacted area was found that therefore must represent the source area of the nickel impacts in well MW-15s; and
- no further work is necessary relative to the characterization or remediation of the contamination source in this area.

2.6 *CURRENT CONFIGURATION OF SHALLOW VOC PLUME*

Subsequent to the site characterization investigations in 1987 and 1988, semi-annual ground water sampling of selected wells has been conducted for the purpose of monitoring remediation progress. These wells were selected to fulfill several purposes:

- monitor ground water quality entering the site from upgradient;
- monitor ground water quality within each plume at the site; and
- monitor ground water quality leaving the site along the downgradient property boundary.

This sampling plan was not designed to provide continuous redefinition of the plume configurations and the data from the program are

inadequate for this purpose. However, the data does allow a qualitative plume delineation to be performed. This has been done for the two most recent sampling round (November 1997 and May 1998) which is provided as Figures 2-4a and 2-4b. A number of changes in the nature of the site plumes are noted as listed below:

- The VOC plume south of Stanley Street (Plume 1) has significantly decreased in concentration (wells MW-6 and MW-42mr). Based on this change in plume character, it is also inferred that a coincident reduction in the plume area has occurred. It should be noted that the Federal Reserve Bank building overlies most of the former area of Plume 1, thus isolating potential residual contamination from possible human contact.

- The large VOC plume north of Stanley Street (Plume 2) has changed much less significantly than Plume 1. Some concentration reductions have been observed, however these reductions are considered insignificant and high levels still persist. The shape of the plume is somewhat changed - partially caused by migration from natural ground water flow, but mainly due to the pumpage of recovery trench 11 that has enhanced plume movement in the downgradient direction.

- The VOC plume located near the corner of Stanley Street and Route 17 (Plume 3) has been reduced to approximately half of its original size. Modest VOC concentration reduction has also occurred in the most contaminated part of the plume (well MW-508sr).

- The northern most VOC plume adjacent to the wetland area (Plume 5) is characterized by data collected in monitoring well MW-601m, which was later replaced by recovery well RW-3. Over time, the VOC concentration in Plume 5 has been reduced significantly. There is no data to evaluate whether the size of this small plume has changed.

2.7 *VOC CONCENTRATION TREND EVALUATION*

Contaminant concentrations trends can be qualitatively evaluated using time versus concentration graphs, therefore this has been done for Plumes 1, 3 and 5. Plume 2 was not analyzed since no change is expected due to the on-going source in the form of residual DNAPL. These graphs have been prepared for key plume characterization monitoring wells and

representative ground water recovery trenches in Plumes 1, 3 and 5 (see

Figure 2-4a

Figure 2-4b

Figures 2-5 through 2-10). All of these graphs (except Trench 7 in Plume 3) qualitatively indicate downward total VOC concentration trends.

Several statistical methods are available for quantitative trend analysis. The NJDEP Technical Requirements for Site Remediation (May 1997) prescribes the Mann-Whitney U-Test to examine concentration trends in ground water quality data. This method is specifically designed to determine if there is a statistically significant variance in datasets from two defined time periods with regular sampling intervals. The adaptation in the Technical Requirements specifies two one-year time periods with quarterly sampling data (total of eight sampling periods). The Technical Requirements also specify that this method should be applied to individual compounds. However, at a chlorinated solvent site where reductive dechlorination is occurring, upward trends would be expected in daughter products, while the actual trend in contaminant mass is downward. To avoid this possible misrepresentation of concentration trend at the BD site, all statistical trend evaluations were performed using total VOC concentrations. Individual compound trend analyses are useful as part of natural attenuation monitoring and are proposed for this purpose as described in Section 5.0.

The wells at the BD site have not been sampled on a quarterly basis therefore, eight consecutive semi-annual sampling events must be used to analyze the data utilizing the Mann-Whitney U-Test. However, when this was done, however none of the key data points represented in Figures 2-5 through 2-10 exhibited a statistically significant downward trend for the most recent eight rounds of data. This result seems at odds with the strong concentration reductions in wells MW-6, MW-42mr and MW-601m/RW-3. Closer evaluation of the time versus concentration plots show that most of the reduction occurred several years ago. The only way the Mann-Whitney U-Test could reflect this would be to bias the selection of the eight consecutive sampling rounds used in the analysis. It was

Figure 2-5

Figure 2-6

Figure 2-7 & 2-8

Figure 2-9 & 2-10

therefore concluded that this is not an adequate test to evaluate the data at the BD site.

A more appropriate statistical analysis for these data sets is the Mann-Kendall Test. This test does not require the data to conform to a particular temporal distribution and is not limited to analyzing a prescribed number of data points. A description of this test taken from "Statistical Methods for Environmental Pollution Monitoring" (Gilbert, 1987) is provided as Appendix 3.

The Mann-Kendall Test has been performed on the key data points represented in Figures 2-5 through 2-10. Documentation of these analyses is given in Tables 2-3 through 2-8 and the results discussed below:

- In Plume 1, the results show a statistically significant downward trend in excess of the 95% confidence level in wells MW-42mr and MW-6. The downward trend in the Trench 1 data does not reach the 90% confidence level.
- In Plume 3, neither MW-508sr nor Trench 7 exhibits a statistically significant trend.
- The Plume 5 monitoring point (well MW-601m/RW-3) exhibits a statistically significant downward trend in excess of the 95% confidence level.

2.7 *PARCEL 1 GROUND WATER SAMPLING*

In the meeting held at the NJDEP offices on 2 June 1998, the Department inquired about the monitoring status in former BD Parcel 1. In ERM's letter dated 12 February 1993, BD requested that all ground water monitoring (three wells) on Parcel 1 be terminated. The Department's response letter dated 7 June 1993 asked that one well (MW-101) continue to be monitored for VOCs.

Table 2-3]

Table 2-4

Table 2-5

Table 2-6

Table 2-7

Table 2-8

Since that time, BD has continued to conduct ground water sampling on Parcel 1; the results are provided in Appendix 1. To summarize these data, 20 ground water samples have been collected from Parcel 1 wells since June 1993. No detections were found in excess of the New Jersey Water Quality Standards.

3.0 *GROUND WATER RECOVERY AND TREATMENT*

The ground water remedial strategy specified in the approved ground water RAP was ground water recovery and treatment. Construction of the system began in the fall of 1989 and was completed in the spring of 1990. Operation of the recovery system and treatment plant at partial flow was begun in May of 1990. Full flow from the system began in August 1, 1990, when the final Bergen County Utilities Authority (BCUA) Significant Industrial User (SIU) permit took effect.

3.1 *SYSTEM DESCRIPTION/OPERATIONAL DATA*

The recovery system consists of eight recovery trenches of a total length of 825 feet, and three recovery wells. The trenches and wells were installed to various depths ranging from 8 to 30 feet, each extending down to the top of the glaciolacustrine clay. Each recovery trench contains a horizontal drainage pipe along the base, which is connected to a vertical well on one end of the trench. At the opposite end of the trench, the drainage pipe intersects the ground surface at a cleanout. The recovered ground water is transferred from the trenches and wells via a force main to an on-site treatment system located in Building T on Parcel No. 5. The location of all recovery points is shown in Figure 3-1 along with the water table contours under remedial pumping conditions.

In February 1993, BD submitted a letter to NJDEP that provided a status report on the ground water remediation and included proposed modifications for the project. The recommendations included terminating the operation of Recovery Well No. 2 on Parcel No. 5 because the LNAPL plume in this area had been largely remediated. This modification was subsequently approved by NJDEP.

The treatment process originally consisted of metals (primarily iron) precipitation prior to UV-advanced oxidation process for complete destruction of VOCs. The treatment units employed included flow equalization, pH adjustment, chemical coagulation, flocculation, clarification, filtration, sludge thickening, sludge dewatering, and UV-Peroxidation. The water quality produced by the plant has consistently been excellent; the analytical result of discharge samples has been routinely demonstrated non-detectable concentrations of VOCs.

The recovery system and treatment plant have operated continuously since the startup, with only occasional temporary shutdowns for maintenance and process modifications. Minor process modifications were made to the treatment system as operational experience identified operational improvements and/or cost reduction opportunities.

The only major process change was performed in June of 1997, when metals precipitation unit processes of the original treatment system were taken off-line, and an automatic bag filter, pH adjustment systems and a new, more efficient UV-oxidation unit was installed. This process change occurred concurrently with a change in ground water recovery operating scenario as discussed in Section 3.2 below. The operation of the recovery pumps was changed from maximum pumpage possible from each recovery trench to target flow rates from selected recovery trenches. The modified treatment process includes flow equalization, filtration via bag filters, pH adjustment down to a pH of 3, UV-Peroxidation, and pH adjustment to 6.0, prior to discharge.

As of the end of July, 1998, a total of 86.35 million gallons of ground water was recovered, treated and discharged to the BCUA as recorded by the treatment plant's influent flow meter and recorder. The total volume of water discharged to the BCUA through July was 103.3 million gallons. The difference in meter readings is potable water use. The current

treatment system does not consume potable water, but the original treatment system used about 2 gallons per minute of potable water on a continuous basis.

Initially, the treatment system was issued a NJPDES/SIU permit in addition to the BCUA pretreatment permit. When BCUA received final authorization for it's Pretreatment Monitoring Program, the NJPDES/SIU permit was terminated by the NJDEP. Since that time, the BCUA has monitored the discharge from the facility. The facility's BCUA permit no. is 97-0438.

3.2 *CAPTURE ZONE ANALYSIS*

Since the pump and treat system has been running at the site, it has been operated in a number of pumping configurations. These changes in the system operation were instituted to reduce O&M costs at the treatment plant. In making these changes, it was recognized that one of the primary objectives of the remedial strategy is to provide hydraulic control and prevent contaminant migration. These operational changes therefore fully considered the effect of the changes on ground water flow with the objective to preserve the maintenance of hydraulic control and prevent contaminant migration.

Figure 3-1 shows the configuration of the water table with the entire pump and treat system in normal operation. It can readily be seen from this figure that the system capture zone is profound and covers most of the site. Furthermore, it was observed that it is also very likely that hydraulic control of the plume areas could be maintained with less pumpage. An evaluation was therefore performed to determine if pumpage could be reduced while retaining hydraulic control. The following three pumping scenarios were evaluated:

- Figure 3-1

- Scenario 1 - Normal operation: trenches 1, 2, 11, 7 and 9; well 3
  Inactive: trenches 4, 5, and 6; well 1 (See Figure 3-2).

- Scenario 2 - Normal operation: trenches 1, 2, 7, 9; well 3
  Inactive: trenches 4, 5, 6 and 11; well 1
  (See Figure 3-3).

- Scenario 3 - Normal operation: trenches 1, 2, 7, 11; well 3
  Inactive: trenches 4, 5, 6 and 9; well 1 (See Figure 3-4).

The conclusion of this analysis was that each of these reduced pumping scenarios provides capture zones that are easily large enough to encompass all plume areas at the site. Scenario 3 had the lowest system flow and thus has been used as basis of operations since July, 1996.

3.3 *LNAPL REMEDIATION*

As discussed in Section 2.3 free phase petroleum product (LNAPL) has been encountered in two locations at the site, in nearby wells MW-2 and MW-501; and in adjacent wells MW-519s and RW-2 (see Figure 2-1 for well locations). The ground water treatment plant operators have been monitoring and removing product from these since 1992. Table 3-1 presents this data.

Since 1992, approximately 7.0 gallons of product were recovered from MW-519s and approximately 8.0 gallons from RW-2. The LNAPL found in wells MW-519s and RW-2 has been largely remediated and only a trace of product has been encountered since the end of 1996. No monitoring was conducted in 1993, the year that RW-2 was taken off-line as approved by the department. The treatment plant operators are currently monitoring these wells on a bi-weekly basis. As of this writing, only a transient sheer has been encountered in MW-519S and no product has been observed in RW-2 over the past 3 months.

Table 3-1

Table 3-1

Table 3-1

Table 3-1

Table 3-1

Table 3-1

Table 3-1

Table 3-1

Figure 3-2

Figure 3-3

Figure 3-4

The LNAPL encountered in MW-501 and MW-2 was of a heavier type and still persists in MW-2. As shown in Table 3-1, the product in MW-501 had been remediated down to approximately 1/10th of a foot by early 1996. At this time, the well head was accidentally destroyed during the building demolition activities conducted on-site. From 1993 until early 1996, approximately 3.0 gallons were recovered from MW-501. Due to the damage to the well head, a request to permanently abandon MW-501 has been filed with the Department.

As of this writing only a sheen of product is present in MW-2 and this product is being recovered with an absorbent sock. Since 1992 approximately 21.2 gallons has been recovered from MW-2. It appears that this heavier product is still persistent in this area and continued monitoring and recovery via passive product recovery devices is the selected remedial action.

4.0 *ALTERNATIVE REMEDIAL STRATEGIES*

In an effort to improve the current remedial system, BD evaluated several technology enhancements including dewatering/soil vapor extraction and in-situ chemical oxidation. The following is a summary of the pilot tests conducted to evaluate those technologies. In addition BD evaluated the use of combining a zero-valent iron, in-situ treatment wall, to address areas impacted by DNAPL's and natural attenuation to address dissolved ground water impacts. A summary of that evaluation is provided in Section 4.3.

4.1 *DEWATERING/SOIL VAPOR EXTRACTION PILOT TEST*

The purpose of this pilot test was to determine if it was feasible to dewater down to the top of the glaciolacustrine confining unit and exposing the impacted soils to remediation vial soil vapor extraction (SVE). The pilot test was conducted in the Building UW area. Figure 4-1 depicts the location of the dewatering, monitoring and SVE wells.

Ground water was pumped from three wells (DW-1, 2, and 3) in an approximately 1500 square feet area for dewatering purposes. Recovery Trench No. 6 was also pumping in this area. The depth to water in these three wells was lowered from, approximately 7.3 feet below grade on average, to approximately 12.5 feet below grade (below the top of the glaciolacustrine confining unit). Average ground water flow from these wells was about 0.25 gpm each. After pumping for approximately one month it was found that water level in the shallow aquifer was reduced an average of two to three feet, as observed in the temporary monitoring wells, TMP-1, 2, and 3. The dewatering efforts did not effect full dewatering of the area; approximately two to three feet of saturated material remained above the glaciolacustrine clay unit.

Figure 4-1

As shown in Figure 4-1, MW-520 was used as a soil vapor extraction well. The SVE radius of influence was found to be 25 feet at 64 inches of water applied vacuum, as observed from vacuum measurements recorded in TMP-1, 2, and 3. However, SVE contaminant removal in the partially dewatered test area was disappointing. The concentration of total volatile organic compounds in the extracted soil vapor ranged between 7.3 and 11.2 ppmv. These poor results were largely attributed to insufficient dewatering in the test area.

This technology was not considered acceptable due to the fact that the tight soils formations at this site limit the effectiveness of dewatering and also greatly reduce the amount of soil pore spaces available to the influence of air flow.

4.2 *IN-SITU CHEMICAL OXIDATION PILOT TEST*

A second pilot test was conducted in the Building UW area utilizing a proprietary in-situ chemical oxidation technology. The basis of this technology is Fenton's Reaction where hydrogen peroxide reacts with ferrous iron in an acidified aqueous medium to produce hydroxyl radicals. The hydroxyl radicals then react with the contaminant to form carbon dioxide and water.

The test was conducted by CleanOx Environmental Services (the patent holder) and observed by ERM personnel. Initially acetic acid and ferrous sulfate were injected into TMP-1 and DW-3, as shown in Figure 4-1, in the test area. After this step was completed, hydrogen peroxide was injected into these wells which produced immediate visible evidence of reaction. Vigorous foaming was observed at each wellhead that diminished in intensity as the injection proceeded.

The effectiveness of this technology was evaluated by collecting ground water samples both before and after the test. The samples were collected from the two injection wells, TMP-1 and DW-3, as well as from the other wells in close proximity to the injection point (MW-520, TMP-2, TMP-3, DW-1, DW-2, and Trench-6). No significant reductions in dissolved ground water concentrations were observed in any well within the test area.

The inability of this technology to reduce dissolved ground water concentrations is most likely due to: (1) extreme heterogeneity and tight soil formation at the site limit the contact of the hydroxyl radicals with the constituents of concern; and (2) competition for hydroxyl radicals by naturally occurring organic carbon.

4.3 *TREATMENT WALL AND NATURAL ATTENUATION*

This evaluation was undertaken to determine whether an in-situ treatment wall was suitable to be linked with a natural attenuation remediation strategy to provide a technically feasible and cost-effective method of addressing the remaining ground water impacts beneath the BD site. The application of the treatment wall to contain and control the DNAPL source areas within Plume No. 2 would be coupled with the use of a natural attenuation remediation strategy to address dissolved Plume Nos. 1, 3 and 5 as shown in Figure 4-2.

As part of this evaluation, a thorough review of the existing literature was completed as well as an interview process which included a survey of federal and state official, familiar with this technology, and owners of sites using zero-valent iron fillings to remediate similar ground water plumes. Once this preliminary evaluation was completed a concept design of the treatment wall system was developed and modeled. Through this evaluation BD determined that:

Figure 4-2

- an in-situ reactive treatment wall using granular, zero-valent iron is capable of degrading the chlorinated volatile organic compounds found in Plume 2;

- The underlying clay layer and the current lack of structures at the site will facilitate the design and construction of such a system;

- The actual removal efficiency of the wall depends upon the width of the iron wall. This width can be determined by: 1) performing column tests on the ground water to determine decay rates; 2) applying a model to utilize the decay rates to calculate removal efficiency versus time; and 3) using a site specific ground water hydrogeological model to determine the ground water velocity through the treatment wall;

- The construction process typically involves the use of sealable-joint steel sheet pilings for the impermeable portions of the wall;

- The treatment cells are typically constructed in place using standard box trenching and sheet piles;

- Typical monitoring parameters include VOCs, bacterial plate counts, pH, alkalinity, chlorides, and other inorganics, and

- This process has been accepted as a viable remediation technology by the NJDEP and currently, an aboveground reactor is used as an IRM to treat chlorinated VOCs in ground water in Wayne, New Jersey.

These findings indicate that the treatment wall technology would be a technically feasible remediation technology at the East Rutherford site. Once this preliminary evaluation was completed, the proposed configuration for an in-situ treatment wall, as shown in Figure 4-1, was developed using ground water modeling.

Dr. Stanley Feenstra, of Applied Groundwater Research, Inc. reviewed the final conceptual design, and results of the site characterization. Dr. Feenstra is a well-known leader in the development and implementation of the treatment wall technology at similarly impacted sites. Dr. Feenstra is also considered an expert in the area of DNAPL phenomena and its occurrence in the environment. Dr. Feenstra concluded that the BD site

was an excellent candidate for the application of the treatment wall technology and natural attenuation approach.

5.0 *NATURAL ATTENUATION MONITORING PROPOSAL*

As discussed in the project meeting held on 2 June 1998 at the NJDEP offices in Trenton, BD is proposing to alter the existing ground water remedial strategy. In lieu of the current pump and treat remediation, a combination of an in-situ treatment wall and monitored natural attenuation is proposed. The proposed treatment wall will utilize the zero valent iron technology and will address the DNAPL source areas and high VOC concentrations in Plume 2. The details of how this technology will be implemented at the BD site shall be presented to the NJDEP at a later date. This section describes BD's proposal for monitoring the natural attenuation of Plumes 1, 3 and 5.

5.1 *PLUME DELINEATION*

Monitored natural attenuation requires a complete understanding of contaminant distribution as a starting point. As previously presented in Section 2.0, a large body of VOC delineation data exists for the BD site. These data can be summarized by initially looking at the horizontal delineation of the four VOC plumes:

- *Plume 1:* The limits of this plume were fixed during the site characterization investigation of 1987 and 1988. The downgradient extent was well defined by monitoring wells 11, 17, 18s and 19. The current data indicates that the plume has not migrated to any significant extent since 1988 and the aforementioned wells are still clean. The current status of the dilute upgradient portion of the plume cannot be determined due to the presence of the Federal Reserve Bank building. At this time, no further work is necessary regarding the delineation of Plume 1.

- *Plume 2:* Natural attenuation is not being proposed for Plume 2 (it is being addressed by the treatment wall). This plume was fully delineated as part of the 1987/1988 characterization investigation described in Section 2.0. Since that time the plume has been under the hydraulic control of the recovery system and therefore has not moved

to any significant degree. No further delineation work is proposed for this plume.

- *Plume 3:* Lateral delineation of this plume along Route 17 is very good with clean data points on both sides of the plume. The separation with Plume 2 was demonstrated during the 1987/1988 characterization investigation by several clean wells (MW's 518, 9, 507r, the 515 cluster and the 519 cluster). However, delineation southeast (downgradient) of well MW-508s is incomplete.

- *Plume 5:* Three clean wells surround this plume (MW's 511, 10, the 602 cluster), therefore its extent is substantiated. However, this plume is located within a designated wetland and adjacent to standing surface water. Since these features represent the nearest potential receptor for Plume 5, no further delineation work is necessary.

Vertical delineation was previously discussed in Section 2.4. In most instances, the thickness of contaminated ground water extends down to the top of the glaciolacustrine clay. As previously noted, the vertical hydraulic conductivity of this unit was measured at less than 0.003 feet per day in undisturbed Shelby tube samples. Migration potential through this unit is therefore extremely limited. However, low levels of contamination were detected in the underlying confined aquifer. The source of this contamination is believed to be from the dilute portion of Plume 2 upgradient of the zero edge of the clay unit (see Figure 1-5). No further vertical delineation is proposed.

In summary, the only identified plume delineation data gap is the horizontal downgradient extent of Plume 3. It is therefore proposed that a cluster of two new wells be installed on the southeast shoulder of Rt. 17. These wells will be located downgradient of well MW-508sr and will be designed to screen the full thickness of the shallow aquifer down to the top of the glaciolacustrine clay.

5.2 *NATURAL ATTENUATION MONITORING*

A formal natural attenuation work plan will be presented to NJDEP at a later date. At this time, natural attenuation appears to be a reasonable alternative strategy for Plumes 1, 3 and 5, since decay is definitely occurring at the site based on the occurrence of TCE daughter compounds. The work plan to accomplish this will be based on the technical requirements set forth in NJDEP N.J.A.C. 7:26E and EPA guidance document (EPA/600/R-98/128) "Technical Protocols for Evaluating Natural Attenuation of Chlorinated Solvents in Ground Water" (Weidemeyer, et. al., 1998). A description of the proposed monitoring strategy is presented here to illicit the Department's comments prior to the submittal of a formal natural attenuation work plan.

In general, the requirements specified in NJAC 7:26E-6.3(d)&(e) will be observed and the program will include the following components:

- the use of modeling to document plume fate and demonstrate compliance at receptors;
- management of residual DNAPL in Plume 2 through the use of an in-situ treatment wall;
- assumption that contaminated soil above the water table has already been adequately addressed as described in Section 1.3;
- assumption that delineation of all ground water VOC plumes has been adequately addressed as described in Section 5.1;
- evaluation of potential impacts to receptors via the vapor migration pathway;
- evaluation of current and future ground water uses based on a 25-year planning horizon;
- establishment of a Classification Exception Area;
- implementation of quarterly monitoring program that will include the following elements:

- at least one well in each plume proposed for natural attenuation within the most concentrated area of the plume;

- at least one sentinel well downgradient of each plume proposed for natural attenuation. The technical requirements state that this well should be located more than three years travel time from the nearest receptor and less than five years travel time from the downgradient extent of the plume;

The technical requirements also state that at least two other wells are required within each plume. However, given the very small size of the plumes proposed for natural attenuation at the BD site, this is not practical and has not been included as part of the proposed program.

Ground water velocity at the site is estimated through the use of Darcy's Law: $v = Ki/n$, where:

v = ground water flow velocity (feet/day)
K = hydraulic conductivity (feet/day)
i = hydraulic gradient (dimensionless)
n = porosity (dimensionless)

Hydraulic conductivity of the shallow aquifer has been evaluated at the site through a program of slug testing. As previously indicated in Section 1.4, the results of this program indicated an average hydraulic conductivity in the shallow aquifer of 2.0 feet per day. The hydraulic gradient under natural flow conditions is specifically measured for Plumes 1, 3, and 5 using the water table contour map presented in Figure 1-4. Porosity is assumed to be 35%. Based on these parameters, the following ground water travel times are estimated for the vicinity of each plume proposed for natural attenuation:

PLUME	GW FLOW VELOCITY	3-YEAR TRAVEL DISTANCE	5-YEAR TRAVEL DISTANCE
1	0.04 feet/day	44 feet	73 feet
3	0.12 feet/day	131 feet	219 feet
5	Not applicable - plume has already reached nearest receptor		

Based on these travel time estimates, the table below indicates how BD proposes to comply with the above monitoring requirements.

PLUME	NEAREST RECEPTOR	PLUME MONITOR WELL	SENTINEL MONITOR WELL
1	Wetland adjacent to SE shoulder of Rt. 17	MW-42mr, MW-6	MW-17
3	Wetland adjacent to SE shoulder of Rt. 17	MW-508sr	New Well Cluster
5	BD Parcel 6 Wetland	RW-3	NA - plume has reached receptor

The plume monitoring wells are all located within the most concentrated portion of their respective plumes and therefore satisfy the plume monitoring criteria. The rationale for the sentinel wells are summarized as follows:

- *Plume 1:* MW-17 is located less than five years travel time from the plume and greater than three years travel time from the nearest receptor. This satisfies the sentinel well criteria.

- *Plume 3:* Due to the proximity of the nearest receptor, a useful sentinel well cannot be located at the required distance, therefore this part of the criteria is not applicable. The sentinel wells will therefore consist of the new 2-well cluster proposed to be installed on the southeast shoulder of Route 17. This cluster is located downgradient of well MW-508sr and within five years travel time from the plume. A previously described, this cluster will also satisfy the additional delineation requirements necessary for this plume.

- *Plume 5:* No sentinel well will be installed for this plume. As previously stated, the plume is located within the BD Parcel 6 wetland, therefore it may be concluded that the plume has already reached the nearest receptor.

Table 5-1 provides a list of the wells proposed for inclusion in the quarterly monitoring program. This program will include the wells

Table 5-1

discussed above, plus a number of additional wells to monitor Plume 2, the upgradient property boundary and the downgradient property boundary.

The proposed laboratory analytical parameters include VOCs (including methane, ethane and ethene), nitrate (NO_3), iron, sulfate (SO_4), alkalinity, and chloride. Proposed field analyses include pH, temperature, conductivity, dissolved oxygen (DO), and oxidation/reduction potential (ORP).

TABLE 1-1
SUMMARY OF PROJECT DOCUMENTS
Previously Submitted to NJDEP

Report Title	Report Summary	Submission Date
ECRA - Sampling and Analysis Plan, Volume I Parcel Nos. 1, 2, 3, 4, 5, and 6	Presents site information for the initial ECRA notice and the Sampling and Analysis Plan common to each of the 6 parcels	June 1987
ECRA - Sampling and Analysis Plan, Volume II Parcel Nos. 1, 2, 3, 4, 5, and 6	Presents parcel specific information for the Sampling and Analysis Plan including results of the Phase 1a Preliminary Environmental Investigation. Includes the GIS and SES ECRA forms for each parcel and supporting information.	June 1987
ECRA - Supplementary Information, Volume III Parcel Nos. 5 and 6	Presents the results of the Phase 1b and 1c Preliminary Environmental Investigations conducted in Parcel Nos. 5 and 6 and amends the June 1987 Sampling and Analysis Plans.	December 1987
ECRA - Environmental Assessment Program Parcels 1, 2, and 3	Presents results of the comprehensive environmental program conducted in Parcel Nos. 1, 2, and along with the results of the Phase 1b and 1c preliminary environmental investigations.	February 1988
Soil and Ground Water Remedial Action Plan Parcels #1 and 2	Presents results of environmental investigations and procedures to remediate soil and ground water contamination in Parcels 1 and 2.	July 1988
Soil and Ground Water Remedial Action Plan(s) Parcel No. 3	Presents additional results of environmental investigations and procedures to remediate soil and ground water contamination in Parcel No. 3.	July 1988
ECRA Environmental Assessment Program Parcel Nos. 4, 5 and 6	Presents results of the comprehensive environmental program conducted in Parcel Nos. 4, 5 and 6.	August 1988

TABLE 1-1
SUMMARY OF PROJECT DOCUMENTS
Previously Submitted to NJDEP
(continued)

Report Title	Report Summary	Submission Date
Soil and Ground Water Remedial Action Plan(s) Parcel No. 4	Presents procedures to remediate soil and ground water contamination in Parcel No. 4.	March 1989
Soil and Ground Water Remedial Action Plan(s) Parcel No. 5	Presents additional results of environmental investigations and procedures to remediate soil and ground water contamination in Parcel No. 5.	March 1989
Soil and Ground Water Remedial Action Plan(s) Parcel No. 6	Presents additional results of environmental investigations and procedures to remediate soil and ground water contamination in Parcel No. 6.	March 1989
Verification Report for ECRA Site Remediation Parcel Nos. 1 and 2	Documents the implementation of the Soil Remedial Action in Parcel Nos. 1 and 2.	November 1989
Verification Report for ECRA Soil Remediation Parcel Nos. 4 and 5	Documents the implementation of the Soil Remedial Action in Parcel Nos. 4 and 5.	June 1992
Verification Report for ECRA Soil Remediation Parcel No. 6	Documents the implementation of the Soil Remedial Action in Parcel No. 6.	December 1992
ISRA Site Investigation Report, Sub-Building Soil Investigation, Parcel No. 5	Presents the results of the investigation of sub-building soil in Parcel No. 5	October 1994
ISRA Site Investigation Report Addendum Sub-Building Soil Investigation Parcel No. 5	Presents the results of the investigation of sub-building soils in Parcel No. 5.	March 1995
Verification Report for ISRA Soil Remediation Parcel No. 5 Sub-building Soil, ISRA Case No. 87577	Documents the implementation of the Soil Remedial Action for Sub-Building Soils in Parcel No. 5	December 1996

TABLE 5-1
WELLS PROPOSED FOR QUARTERLY MONITORING
BD East Rutherford Site

WELL	*PURPOSE*
1	Upgradient monitoring
206	Upgradient monitoring
202	Plume 1 monitoring
6	***Plume 1 monitoring***
42M	***Plume 1 monitoring***
17	***Plume 1 sentinel well***
508SR	***Plume 3 monitoring***
New Well	***Plume 3 sentinel well***
16S	Plume 2 monitoring
39	Plume 2 monitoring
36	Plume 2 monitoring
520	Plume 2 monitoring
4	Plume 2 monitoring
15S	Plume 2 monitoring
101	Downgradient property boundary monitoring
18S	Downgradient property boundary monitoring
11	Downgradient property boundary monitoring
19	Downgradient property boundary monitoring
21R	Downgradient property boundary monitoring
50	Downgradient property boundary monitoring
510	Downgradient property boundary monitoring
522	Downgradient property boundary monitoring

18 December 1998

Mr. Murdo Morrison
Case Manager
NJ Dept. of Environmental Conservation Div. of Responsible Party Site Remediation
Bureau of Environmental Evaluation and Cleanup Responsibility Assessment
401 East State Street
Trenton, NJ 08625

Re: Request to Abandon Ground Water Monitoring Wells
Becton Dickinson & Company (BD)
East Rutherford, Bergen County, NJ
ISRA Case No. 87577
NJPDES/DGW Permit No. NJ0078981

Dear Mr. Morrison:

On behalf of Becton Dickinson & Company (BD), Environmental Resources Management (ERM) is pleased to present the department with the accompanying report, "Ground Water Remediation Project History" for your review. This report was prepared as requested by the department in our 2 June 1998 meeting at your offices. Please distribute the three (3) copies of this report to the following department personnel John Graham, Rob Lux and Joel Fradel.

The purpose of this report is three-fold: (1) it attempts to provide a concise summary of site activities relative to ground water remediation; (2) it answers specific questions by department personnel during the meeting of 2 June 1998; and (3) it presents a preliminary outline of a monitored natural attenuation plan to address on-going remediation at the site. The complete monitored natural attenuation plan will be submitted to the department at a later date.

Should you have questions, comments or require any clarification, please contact the undersigned at (516) 921-4300 or via facsimile at (516) 921-5637. In addition we will be contacting you in the near future as a follow-up to this correspondence.

Very truly yours,

Michael B. Teetsel, C.P.G.
Senior Associate

Jim Rocco
Project Manager

cc: Karen Lowe DeMarinis, BD
Matthew Bigley, BD

18615708.191/ls

BD responses to EPA Request for Information

Nos. 14

REPORT OF FINDINGS ON ADDITIONAL INVESTIGATIVE ACTIVITIES

ISRA Case No. 87577
Becton Dickinson
East Rutherford, NJ

April 2001

Prepared for:

Becton Dickinson and Company
1 Becton Drive
Franklin Lakes, New Jersey

Prepared by:

ENVIRONMENTAL RESOURCES MANAGEMENT
175 Froehlich Farm Blvd.
Woodbury, NY 11797

REPORT OF FINDINGS ON ADDITIONAL INVESTIGATIVE ACTIVITIES

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APPENDIX A

Laboratory Data Reports (Form 1's) – Charaterization of Metals in Shallow Ground Water

APPENDIX B

Geologic Boring Logs

APPENDIX C

Laboratory Data Reports (Form 1's) - DNAPL Delineation

APPENDIX D

Laboratory Data Reports (Form 1's) – VOCs and Metals in the Deep Confined Aquifer

APPENDIX E

Laboratory Data Reports (Form 1's) – VOCs Source Delineation near MW-508sr

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EXECUTIVE SUMMARY

Becton, Dickinson and Company (BD) began terminating operations at its East Rutherford, New Jersey facility in the mid-1980's. BD had used this location since the early 1900's for a variety of manufacturing operations and administrative functions. In order to comply with NJDEP's ECRA (now ISRA) requirements, BD performed comprehensive soil and ground water investigations at the site. This lead to the development of a risk based remedial strategy to address heavy metals and petroleum hydrocarbons detected in on-site soils and chlorinated volatile organic compounds (VOCs) identified in the ground water underlying the site.

BD initiated activities to implement the remedial strategy in the late 1980's. Since that time, soils throughout the site have been remediated through excavation and off-site disposal. In 1990, BD installed and placed into operation a ground water recovery and treatment system to address the VOCs. This system has been successful in significantly reducing the areal extent and concentration of several of the VOC plumes at the site. The concentration of VOCs at these locations is now approaching the site's remedial objectives. However, the presence of two, dense, non-aqueous phase liquid (DNAPL) source areas in one of the plumes, Plume No. 2, has impeded progress towards achieving the remedial objective at that location.

BD proposed to modify its current pump and treat remedial strategy and the proposed new strategy incorporated an in-situ, reactive treatment wall to effectively isolate and treat the DNAPL source area, while applying a monitored natural attenuation (MNA) approach at the other plumes, Plume Nos. 1, 3 and 5.

A RAWP Addendum that addressed the MNA component of the strategy was approved for implementation for Plume Nos. 1 and 5 by the

Department in July 2000. Subsequent project team discussions identified several areas requiring additional investigation. Two proposals for further investigation, dated 14 March 2000 and 24 July 2000, were submitted and approved by the Department and the tasks included in these proposals were as follows:

- Additional characterization of metals in ground water;
- Additional investigation of the thickness and areal extent of the Glaciolacustrine clay layer;
- Further delineation of the known DNAPL source areas (Plume 2);
- Monitoring of VOCs and metals in the deep confined aquifer; and
- Delineation of suspected VOC source material near MW-508sr (Plume 3).

This report presents the findings of the investigation and presents several modified recomendations. The most significant modification is to continue ground water pump and treat as the remedial strategy to address the DNAPL source areas instead of the previously proposed in-situ iron filling wall. This change in remedial strategy is necessary based on the presence of VOCs in ground water beneath Stanley Street that are potentially indicative of DNAPL and the infeasibility of installing treatment wall components in this area.

The remaining recommendations include applying an MNA remedial strategy to address two discreet nickel plumes in the shallow aquifer; installing additional deep aquifer monitoring wells to facilitate applying MNA as a remedial strategy; and to excavate a small amount of potential source material in the area immediately surrounding MW-508sr. Once this excavation is complete it has been agreed that the previously submitted MNA strategy for Plume No. 3 will be approved.

1.0 INTRODUCTION

The Becton Dickinson and Company (BD) facility in East Rutherford, Bergen County, New Jersey was used for the production of various medical apparatus such as syringes and thermometers, beginning early this century and ending in 1988. Past manufacturing activities are considered to be the source of environmental impacts to the ground water beneath the site and several discreet areas of impacted soil around the site. Beginning in 1987, BD has conducted environmental investigations and performed remedial activities to address these environmental conditions. A summary of project reports previously submitted to the NJDEP that document this work is provided in Table 1-1.

The site is located on the western fringe of the Hackensack Meadowlands as shown in Figure 1-1. Figure 1-2 shows a plan view of the site during the fullest extent of BD operations. The site incompassed approximately 30 acres and is divided by public streets. Portions of the site are surrounded by chain link or iron fencing.

In July 1999, BD submitted a Ground Water Remedial Action Work Plan (RAWP) Addendum to modify the existing ground water recovery and treatment remedial strategy (pump and treat). The new ground water remedial strategy proposed to apply monitored natural attenuation (MNA) to three of the four ground water plumes (designated as Plumes 1, 3 and 5) that are impacted with dissolved chlorinated organics. An MNA program for these plumes was fully developed and presented in that document. The remaining plume (Plume 2) is also impacted by dissolved chlorinated organic compounds, and in addition contains two areas of dense, non-aqueous phase liquids (DNAPL). As part of the revised ground water remediation strategy, it was proposed that Plume 2 would be addressed by the installation of a zero-valent iron treatment wall. However, the details of the Plume 2 treatment wall proposal were not

presented in this document and were envisioned to be submitted later in a second RAWP Addendum document.

In February 2000 BD, ERM and NJDEP project team members met in the Trenton, NJ office to discuss the proposed implementation of the revised remedial strategy. During the meeting the Department indicated that there were several areas of concern warranting additional investigation. BD subsequently submitted proposals dated 14 March 2000 and 24 July 2000 for further site investigation that were approved by NJDEP. The tasks included in these proposals were as follows:

- Additional characterization of metals in ground water;
- Additional investigation of the thickness and areal extent of the glaciolacustrine clay layer;
- Delineation of the known DNAPL source areas (Plume 2);
- Monitoring of Volatile Organic Compounds (VOCs) and metals in the deep confined aquifer; and
- Delineation of suspected VOC source material near MW-508sr (Plume 3).

The following section provides a discussion of each task and the proposed scope of work.

2.0 *SCOPE OF WORK*

2.1 *CHARACTERIZATION OF METALS IN SHALLOW GROUND WATER*

It is believed that historic metals analyses were obtained from filtered ground water samples and it was acknowledged that some of the detected concentrations exceeded current ground water standards. The Department does not consider filtered results to be reflective of actual ground water quality and indicated that additional work needed to be done to close the metals issue at the site. It was agreed that one or two rounds of sampling would be sufficient.

ERM provided the Department with a proposal dated 14 March 2000 to characterize metals in ground water. During the May and November 2000 semi-annual sampling events, ground water samples were collected from 31 site wells and trenches (MWs-001, 004, 006, 011, 015s, 016s, 017, 018s, 019r, 021r, 024, 036, 039, 042mr, 050, 101, 202, 206, 507r, 508sr, 510, 520, 522, 523s, 523m, 524, 525, 526, RW-01, and TRs 07 and 11), consistent with the approved proposal. The locations of these sampling points are shown in Figure 2-1. Each well was analyzed for Ag, Cd, Cr, Cu, Hg, Ni, Pb, and Zn. These metals were selected since they were the parameters of concern during the soil remediation activities conducted at the site. The ground water samples were collected in accordance with NJDEP low-flow sampling requirements and the results of the sampling is presented in Section 3.1.

2.2 *ADDITIONAL DELINEATION OF THE CLAY LAYER*

The Department reviewed the existing clay layer delineation data and indicated that additional information was necessary, specifically in the area of the known DNAPL source areas. The scope of work for additional delineation of the clay layer consisted of the following steps:

- Geoprobe borings with soil sampling and geologic logging were utilized as the basic investigation approach.
- The data for this exercise was collected from twelve (12) geologic characterization borings utilized for DNAPL delineation, and an additional five (5) borings for clay delineation only. These seventeen (17) boring locations, are shown on Figure 2-2. Four transects across the inferred location of the zero edge of the clay were performed.
- Soil sampling consisted of continuous four-foot "Macrocore" samples to a depth of twenty-four (24) feet, a total six (6) cores per boring.

The results of the clay layer delineation are presented in Section 3.2.

2.3 *DELINEATION OF THE KNOWN DNAPL SOURCE AREAS IN PLUME 2*

The July 1999 RAWP Addendum presented historic DNAPL delineation data that was used to develop the concept design of the proposed in-situ iron filing treatment wall. The Department subsequently indicated that additional delineation of the two DNAPL source areas would be needed to enable their approval of the treatment wall alternative. The purpose of this task was to better define the extent of the two DNAPL source areas located near monitoring wells MW-015s and MW-520. These two locations are considered to be the source areas for dissolved VOCs in Plume No. 2 at the site. The approach used involved collection of three types of data:

- Soil samples were screened for gross contamination potentially indicative of DNAPL using a portable photo-ionization detector (PID).
- Soil samples were further evaluated in the field for the potential presence of DNAPL using a Tooke Model 1200 Mineral Flouroscope. (This unit functions on the principle that the DNAPL will flouresce in the presence of UV light).
- Ground water samples were collected using a Geoprobe and analyzed for VOCs using Method 601 to identify areas where TCE concentrations exceed 1% solubility (11,000 μg-TCE/L).

In the MW-015s area, five boring locations were selected along the south edge of Stanley Street (see Figure 2-3). In the MW-520 area, seven boring locations were selected beneath and adjacent to the footprint of former Building UW (see Figure 2-4). The Geoprobe drilling method was used and at each location, two borings were installed, the first for geologic characterization, the second for ground water sampling. Each geologic characterization boring was 24 feet in depth. The depth of the ground water sampling borings were variable, depending on the findings of the associated geologic boring.

For geologic characterization, continuous soil samples were collected in four-foot lengths (Macrocore sampler). An aliqout from each foot of sample was evaluated for the possible presence of DNAPL by flouroscope and PID screening. Based on the findings of the geologic boring, two four-foot intervals were selected for ground water sampling in the subsequent boring. The sampling intervals were selected based on the depth to ground water, depth to the glaciolacustrine clay layer and the results of the fluoroscope and PID screening. A shallow ground water sample was collected below the water table and above the clay. The deeper sample was generally collected from within the clay layer, and the deeper sample was collected using the screening results, biased toward horizons with more abundant sandy lenses. The results of the DNAPL delineation sampling are provided in Section 3.2.

2.4 *MONITORING OF VOC AND METALS IN THE DEEP CONFINED AQUIFER*

The purpose of this task was to update the characterization of the deep aquifer (glacial outwash unit). Low levels of VOCs were detected in ground water samples collected in 1988 from this aquifer, however no samples have been collected since. The Department and BD have agreed that a MNA remedial strategy seems to be appropriate for the deep aquifer but current water quality data is needed to implement a MNA remedy. The scope of work implemented to update the characterization of the deep aquifer is indicated below:

A site reconnaissance was initially performed wherein it was determined that three deep aquifer monitoring wells remain at the site (MW-018d, MW-015d and MW-508d). Each of these wells were test pumped and/or redeveloped to verify that they are usable for monitoring purposes. The locations of these monitoring wells is shown in Figure 2-1.

Ground water samples were collected using a two-phase sampling procedure. An initial sample was collected using low-flow sampling methodology for metals analysis as outlined in the 14 March 2000 letter to the department. After the metals sample was collected, a second sample was obtained for VOC analysis using the standard purge and bail method. The laboratory analytical parameters consisted of:

- VOCs by Method 624;
- the site specific list of metals developed for characterization of the shallow aquifer (cadmium, chromium, copper, lead, nickel, silver and zinc) by Method 6010;
- mercury by Method 7470; and
- the monitored natural attenuation parameters (pH, temperature, dissolved oxygen, specific conductance, redox potential, total iron, total manganese, nitrate-nitrogen, total organic carbon, total alkalinity, chloride, sulfate, carbon dioxide, methane, ethane, and ethene).

The results of the deep aquifer monitoring are presented in Section 3.4.

2.5 *DELINEATION OF SUSPECTED VOC SOURCE NEAR MW-508SR IN PLUME 3*

The Department's 21 March 2000 letter stated that "the NJDEP cannot approve MNA for Plume 3 since the ground water quality data from MW-508sr indicate a lingering source. This is based upon persistent elevated concentrations of Total 1,2 DCE". A scope of work was therefore developed to delineate potential source material in the vicinity of MW-508sr as described below.

Ground water samples were collected by Geoprobe from the area surrounding MW-508sr. Based on the screened interval of this well (2 to 12 feet below grade) and the presence of a shallow clay horizon in this area from 8 to 16 feet below grade, a sampling interval was selected from 4 to 8 feet below grade. Four (4) sample locations were selected as shown in Figure 2-5. One ground water sample per boring was collected and analyzed for VOCs using Method 601.

3.0 *INVESTIGATION RESULTS*

The following sections outline the findings of the investigations completed during May through November 2000. The work was conducted in accordance with the approved investigation proposals of 14 March and 24 July 2000.

3.1 *CHARACTERIZATION OF METALS IN SHALLOW GROUND WATER*

Ground water samples were collected from 31 site wells and trenches (MWs-001, 004, 006, 011, 015s, 016s, 017, 018s, 019r, 021r, 024, 036, 039, 042mr, 050, 101, 202, 206, 507r, 508sr, 510, 520, 522, 523s, 523m, 524, 525, 526, RW-01, and TRs 07 and 11). Each sample was analyzed for Ag, Cd, Cr, Cu, Hg, Ni, Pb, and Zn. The results of the sampling are summarized in Table 3-1 and the locations of the monitoring points sampled are shown in Figure 2-1. The reduced deliverable, laboratory analytical data reports are being submitted under separate cover; the data reports (Form 1's) can be found in Appendix A.

The May 2000 sampling results presented in Table 3-1 indicate the following exceedences of the New Jersey Ground Water Quality Standards (NJGWQS):

- In well MW-015s, nickel was detected at 1300 µg/l (NJGWQS = 100 µg/l);
- In trench TR-11, nickel was detected at 721 µg/l;
- In well MW-016s mercury was detected at 2.5 µg/l (NJGWQS = 2.0 µg/l); and
- In well MW-042mr, cadmium was detected at 6.0 µg/l (NJGWQS = 4.0 µg/l).

Based on these findings ERM installed three new additional monitoring wells (MW-524, MW-525 and MW-526) and conducted an additional

round of sampling in November 2000 to delineate the nickel plume(s) and confirm the mercury and cadmium results in MW-016s and MW-042mr. These results are also provided in Table 3-1.

The extent of nickel in ground water above the NJGWQS is shown in Figure 3-1. This figure shows that there are two small, well-defined nickel plumes present at the site. The results of the re-sampling of wells MW-016s and MW-042mr are summarized below:

- In well MW-016s mercury was detected at 11.2 µg/l; and
- In well MW-042mr, cadmium was detected at 11.5 µg/l.

The re-sampling of MW-016s confirmed the presence of mercury at levels above the NJGWQS. However, to place this finding in context, it must be noted that well MW-016s is located within Plume No. 2, therefore ground water at this location is more seriously impacted by VOCs. Furthermore, nearby sampling points MW-520 and TR-11 did not exceed the NJGWQS for mercury, in fact, none of the other 30 sampled wells contained mercury above the NJGWQS. Based on the foregoing, and the small margin of the NJGWQS exceedence, the presence of mercury in well MW-016s is interpreted to be a *deminimus* outlier and no further investigation is warranted.

The re-sampling of MW-042mr confirmed the presence of cadmium at levels above the NJGWQS. However, the data also indicates that adjacent well MW-006 did not exceed the NJGWQS for cadmium, nor did any of the other 30 wells sampled at the site. Considering the small margin of the NJGWQS exceedence in this well, the same logic applied above for well MW-016s applies here as well (i.e., the presence of cadmium in well MW-042mr is interpreted to be a *deminimus* outlier and no further investigation is warranted).

3.2 *ADDITIONAL DELINEATION OF THE CLAY LAYER*

The clay layer delineation work described in Section 2.2 was performed in August 2000. The geologic boring logs that formed the basis of this evaluation are presented in Appendix B. The logs show that the clay is well laminated and contains lenses of silt and fine sand. The logs were used to develop a contour map of the glaciolacustrine clay upper surface, which is presented in Figure 3-2. This figure shows that, where found, the clay unit is continuous and represents a significant barrier to downward migration of DNAPL. Figure 3-2 also shows that the zero edge of the clay is well defined, especially in relation to the location of the DNAPL source areas (see Section 3.3 for delineation of these areas). Furthermore, it is noted that the clay completely underlies both DNAPL source areas.

The geologic logs from the suspected DNAPL source area near well MW-015s (see Appendix B) indicate the clay is four to nine feet thick in this area, as indicated below:

- In MW-015s, the clay layer was detected between +6.5 and –2.5 feet MSL (from 7 to 16 feet below grade);
- In 15DB-3, the clay layer was detected between 0.0 and –9.0 feet MSL (from 11 to 20 feet below grade);
- In 15DB-4, the clay layer was detected between +1.0 and –7.0 feet MSL (from 12 to 20 feet below grade); and
- In 15DB-5, the clay layer was detected between 0.0 and –4.0 feet MSL (from 14 to 18 feet below grade).

The clay has a high point near MW-015s and slopes to the south (toward Stanley Street). Further to the south across Stanley Street, the clay rises in elevation. The clay rise appears to provide a natural barrier to ~~any~~ DNAPL migration in this direction. The low point seems to lie along the south shoulder of Stanley Street, therefore it can be interpreted that the

DNAPL delineation borings in this area represent the worst-case location for DNAPL accumulation.

The geologic logs from the suspected DNAPL source area near well MW-520, (see Appendix B) indicate the clay is uniformly greater than eleven feet thick and is generally fourteen to eighteen feet thick in the area as indicated below.

- In 520DB-2, the clay layer was detected between +2.5 and the bottom of the boring at -14 feet MSL (from 7 to >24 feet below grade);
- In 520DB-3, the clay layer was detected between +3.0 and the bottom of the boring at -15 feet MSL (from 6 to >24 feet below grade);
- In 520DB-4, the clay layer was detected between -2.0 and the bottom of the boring at -13 feet MSL (from 13 to >24 feet below grade);
- In 520DB-5, the clay layer was detected between -1.0 and the bottom of the boring at -14 feet MSL (from 11 to >24 feet below grade); and
- In 520DB-7, the clay layer was detected between -1.0 and the bottom of the boring at -15 feet MSL (from 10 to >24 feet below grade).

The dominant slope of the clay in the MW-520 area appears to be toward the south.

3.3 *DELINEATION OF THE KNOWN DNAPL SOURCE AREAS IN PLUME 2*

As presented in Section 2.3, Geoprobe borings were advanced beneath the surface at the two known DNAPL locations, near wells MW-015s and MW-520. Soil samples were evaluated for the potential presence of DNAPL using the flouroscope. However, no samples exhibited the flourescence that indicates the presence of DNAPL, therefore the PID screening and ground water sampling results represented the only available data to define the DNAPL source areas. These results are discussed below.

3.3.1 *DNAPL Delineation in MW-015s Area*

In the area of MW-015s, ground water samples were collected from borings 15DB-1, 2, 3, 4 and 5. The analytical data are summarized in Table 3-2 and the location of the borings and TCE concentrations encountered are shown in Figure 3-3. The PID screening results are provided on the boring logs in Appendix B. The reduced deliverable, laboratory analytical data reports are being submitted under separate cover; the data reports (Form 1's) can be found in Appendix C.

The VOC levels detected on the PID in the MW-015s area were generally low, ranging to a maximum of 124 ppmv, which is much lower than expected in the presence of DNAPL. All detections above 100 ppmv were found in boring 15DB-3 at 4-7 feet below grade. No DNAPL was encountered during flouroscope screening activities. The PID and flouroscope screening results do not indicate the presence of gross DNAPL contamination in this area. This is interpreted to indicate that if DNAPL is present, it is in the residual, non-mobile form. There is no evidence to suggest that pooled DNAPL may exist in this area.

The ground water sampling data showed that levels greater than 1% of the TCE solubility (<11,000 ug/L) were encountered in borings 15DB-4 and 5. These levels are indicative of the potential presence of residual DNAPL. These levels penetrate into the clay layer, and additional data suggests that they do not persist below the clay, based on the current sampling results from well MW-015d (TCE = 276 µg/L), which is screened in the underlying deep confined aquifer (see Section 3.4).

Figure 3-3 provides an interpretation of the DNAPL source in this area, utilizing the new ground water sampling data in combination with the prior Geoprobe sample results from 1994. Figures 3-2 and 3-3 show that the DNAPL source area exists very close to the zero edge of the clay layer,

but the clay appears to underlie the entire source area. The high levels of TCE in 15DB-4 and 15DB-5 may indicate historical DNAPL migration, from the assumed release point on the BD site near well MW-015s, south across Stanley Street (following the slope of the clay). (It should be noted that the assumption of a release point near MW-015s cannot be verified from knowledge of specific activitities in this area.) The interpretation of the source area provided in Figure 3-3 is believed to represent an adequate delineation based on the following evidence:

- The configuration of the underlying clay (see Section 3.2,) indicates that the clay surface rises south of Stanley Street. In a past period when the DNAPL may have been mobile, this rise in the clay would have represented a barrier to further DNAPL migration;
- The location of the suspected DNAPL source and slope of the clay surface in this area do not suggest that the source area extends further to the west than shown in Figure 3-3. The data indicate that if any DNAPL migration occurred, the dominant direction should have been toward the south; and
- Shallow ground water sampling south of the suspected source area shown in Figure 3-3 do not indicate the possible presence of DNAPL outside this area. For instance, MW-31 contained TCE at a maximum of 18 µg/l prior to being abandoned in approximately 1990. More recent data from this vicinity is available from recovery well RW-1. This well has been regularly sampled over the period from 1991 to the present. Over this time, the TCE concentration in this well has ranged without apparent trend from a low of non-detect to a high of 2740 µg/L. The median concentration in this dataset was 205 µg/L. These levels are also not indicative of the presence of DNAPL.

3.3.2 *DNAPL Delineation in MW-520 Area*

In the area of MW-520, ground water samples were collected from borings 520DB-1, 2, 3, 4, 5, 6, and 7. The analytical data are summarized in Table 3-2 and the location of the borings and TCE concentrations encountered are shown in Figure 3-4. The PID screening results are provided on the boring logs in Appendix B. The reduced deliverable, laboratory analytical data reports are being submitted under separate cover; the data reports (Form 1's) can be found in Appendix C.

Elevated VOC levels greater than 100 ppmv were detected on the PID in borings 520DB-5, 520DB-6 and 520DB-7. Further details are provided as follows:

- In boring 520DB-5, PID readings ranged from 117 and 350 ppmv between 21 and 23 feet below grade. As further discussed below, this location is believed to be potentially DNAPL-impacted.
- In boring 520DB-6, a reading of 808 ppmv was obtained at 2-3 feet below grade. This horizon is within the vadose zone and is therefore unrelated to the DNAPL issues being addressed by this investigation.
- In boring 520DB-7, two horizons had elevated PID detections. At 2-3 feet below grade the PID registered 148 ppmv. At 23-24 feet below grade, 142 ppmv was found. These modest VOC levels, while elevated, still do not indicate the gross contamination expected from DNAPL impacts.

Figure 3-4 provides an interpretation of the DNAPL source in this area, utilizing the new ground water sampling data in combination with the prior Geoprobe sample results from 1994. Figures 3-2 and 3-4 show that the DNAPL source area exists very close to the zero edge of the clay layer, but the clay appears to underlie the entire source area. The areal extent of ground water containing TCE at levels greater than 1% of it's solubility were encountered in boring 520DB-5 as well as several other previous sampling points. These levels penetrate into the clay layer but there is no

evidence that they exist below the clay due to its greater thickness in this area (uniformly greater than 11 feet) as described in Section 3.2. In addition, deep well MW-016d formerly existed in this vicinity and historical sampling data from this well (circa 1988) found TCE at a maximum level of 41 μg/L.

The delineation of the area greater than 1% of TCE solubility is well defined with the exception of the result in boring 520DB-5. However, a previous boring adjacent to this location (DB-13) contained much lower TCE levels. It is interpreted that this indicates the potential DNAPL source boundary should be located in this vicinity as shown in Figure 3-4.

The data indicates that TCE may have been released in the vicinity of the former Building UW courtyard (i.e., near recovery trench TR-6 and monitoring well MW-520). However, it should be stated that this is an assumption and cannot be verified from knowledge of specific activitities in this area. The high levels of TCE in 520DB-5 may indicate historical DNAPL migration south beneath former Building UW (following the slope of the clay). However, the PID and flouroscope screening results do not indicate the presence of gross DNAPL contamination in this area. This is interpreted to indicate that if DNAPL is present, it is in the residual, non-mobile form. There is no evidence to suggest that pooled DNAPL may exist in this area.

3.4 *VOC AND METALS MONITORING OF DEEP CONFINED AQUIFER*

Ground water samples were collected from the three existing lower aquifer monitoring wells, MW-015d, MW-018d and MW-508d. These wells were sampled for VOCs and metals (Ag, Cd, Cr, Cu, Hg, Ni, Pb, and Zn) in September 2000, two weeks after they were redeveloped.

The sampling data are summarized in Table 3-3 and the monitoring well locations are shown in Figure 2-1. The reduced deliverable, laboratory analytical data reports are being submitted under separate cover; the data reports (Form 1's) can be found in Appendix D. No metals were detected above NJGWQS in any of the wells sampled. A summary of the VOC results are provided below (in μg/L):

Analyte: (μg/L)	MW-015d	MW-018d	MW-508d
Tetrachloroethene	16.0	3.2	51.2
Trichlorethene	276	ND	24.2
cis-1,2-dichloroethene	1.5	0.74	49.5
Vinyl Chloride	ND	ND	ND
Other VOCs	0.40	0.55	2.55
Total VOCs	293.90	4.49	127.45
Note: ND=Not Detected			

Well MW-015d is located adjacent to well MW-015s and within the DNAPL source area, but is screened below the DNAPL horizon. The data shows that the highest levels of TCE and its decay products in the deep aquifer are found in well MW-015d. However, the concentrations are still relatively low and do not indicate the presence of DNAPL in the deep aquifer.

Previous work has shown that ground water flow in the deep aquifer is toward the southeast, however this could not be verified during the current investigation. As a result, the position of wells MW-508d and MW-018d relative to the two DNAPL source areas could not be determined. The water quality in MW-508d shows low level impacts, with tetrachloroethene (PCE), TCE and cis-1,2-dichloroethene (DCE) all exceeding their respective standards. Well MW-018d only contained tetrachloroethene at a level slightly above its standard.

It is also noted that the presence of PCE in all three deep aquifer wells is somewhat of an anomaly. The extensive database of ground water quality

in the shallow aquifer shows that PCE was rarely detected, and when it was found, its concentration was generally far lower than TCE and/or any of the TCE decay products. (PCE is not a decay product of TCE.) The data therefore shows the following:

- The frequency of PCE occurrence in the deep aquifer is much greater than in the shallow aquifer; and
- For instances where PCE was detected in the shallow aquifer, the ratio of PCE:TCE is much lower than in the deep aquifer.

The results of the natural attenuation parameter sampling are also presented in Table 3-3. These results show that the TCE decay pathway may not be complete. Competing electron acceptors nitrate and sulfate are present at levels that may inhibit reductive dechlorination. The lack of measureable total organic carbon is also not conducive to reductive dechlorination.

Temporal trends have been evaluated by comparing these results to the previous data collected in the 1987-1988 timeframe. The table below gives the maximum levels detected during this period (in µg/L):

Analyte: (µg/L)	MW-015d	MW-018d	MW-508d
Tetrachloroethene	ND	No Data	27
Trichlorethene	72	No Data	44
cis-1,2-dichloroethene	ND	No Data	ND
Vinyl Chloride	ND	No Data	ND
Other VOCs	92	No Data	ND
Total VOCs	164	No Data	71
Note: ND=Not Detected			

A comparison of the September 2000 and historic data shows that the current total VOCs found in MW-015d have not significantly changed since 1987-1988, and there has been a slight increase in TCE concentrations in MW-015d. The total VOC and TCE levels found in MW-508d have not

significantly changed since the initial deep aquifer characterization in 1987-1988.

3.5 *DELINEATION OF VOC SOURCE MATERIAL NEAR MW-508SR IN PLUME 3*

Geoprobe ground water samples for VOCs were collected from four borings surrounding well MW-508sr (508DB-1, 2, 3 and 4) as shown in Figure 2-5. The reduced deliverable, laboratory analytical data reports are being submitted under separate cover; the data reports (Form 1's) can be found in Appendix E. The results are summarized below (in µg/L):

Analyte	508DB-1	508DB-2	508DB-3	508DB-4
Tetrachloroethene	ND	ND	ND	ND
Trichlorethene	ND	ND	ND	0.72
Cis-1,2-dichloroethene	ND	ND	ND	2.1
Vinyl Chloride	ND	ND	ND	ND
Other VOCs	1.2	1.4	1.5	ND

No VOCs were encountered above the NJGWQS and the only measurable levels of TCE and DCE were encountered in 508DB-4 at concentrations of 0.72 ug/L and 2.1 ug/L, respectively. As a result of this work, it is concluded that the potential source area around MW-508sr is located in close proximity to this well.

4.0 *DATA EVALUATION AND RECOMMENDATIONS*

The data collected during the field investigations presented within this report have been evaluated and recommendations for further investigation and remediation are discussed below. The proposed recommendations are being presented in order to obtain conceptual agreement from the NJDEP Project Team prior to submitting formal proposals in a Remedial Action Work Plan Addendum to carry out the recommended activities.

4.1 *METALS IN SHALLOW GROUND WATER*

As discussed in Sections 2.1 and 3.1, ground water samples were collected from 31 monitoring wells and trenches in order to characterize metals in ground water within the shallow aquifer across the site. This work was completed to determine the current inorganic water quality in the shallow aquifer, since historic data indicated metal levels above the NJGWQS. The sampling data indicates that there are two discrete nickel plumes as shown in Figure 3.1. Cadmium and mercury levels slightly above the NJGWQS were also observed in MW-042mr and MW-016s, respectively.

Delineation of metals in ground water is deemed complete and a monitored natural attenuation (MNA) remedial strategy for the nickel plumes will be provided to the Department. Further, the existing CEA will be modified to include nickel at these locations. The occurrence of elevated levels of cadmium and mercury in MW-042mr and MW-016s, respectively, are interpreted to be *deminimus* outliers and no further action is recommended. It should be noted that MW-016s is located within the capture zone of the on-going ground water recovery and treatment system, therefore off-site migration of mercury is not possible.

4.2 *DNAPL SOURCE AREAS IN PLUME 2*

The delineation of the two DNAPL source areas within Plume No. 2 was requested in order to enable the Department to approve the proposed in-situ, iron-filling treatment wall. The treatment wall was proposed in order to contain and control the two DNAPL source areas and provide in-situ treatment of the residual dissolved portion of Plume No. 2.

As originally proposed in the "Ground Water Remediation Project History" report (ERM, December 1998), the treatment wall system contained a section of impermeable sheet piling that was to be installed along the northern edge of Stanley Street. This impermeable section of wall was to provide containment and control of the DNAPL source area near MW-015s. As discussed in Section 3.3.1, the DNAPL delineation indicates that the DNAPL source area extends away from MW-015s under Stanley Street to the south. The presence of DNAPL under Stanley Street renders the proposed treatment wall ineffective at providing containment and control of the DNAPL source area at MW-015s. Installation of impermeable sheet piles beneath Stanley Street is not feasible given the presence of multiple subsurface utilities, i.e., gas, telephone, electric, storm and sanitary sewers.

As discussed in Section 3.2, the clay delineation data indicates that the slope of the clay layer to the south of Stanley Street has prevented further migration of the DNAPL and the clay layer completely underlies both DNAPL source areas providing a barrier to downward DNAPL migration. Based on these findings and supporting ground water quality data presented in Sections 3.3 and 3.4, the horizontal DNAPL delineation is considered complete. Further vertical delineation work is recommended in conjunction with additional deep aquifer investigation discussed below.

Continued operation of the existing ground water recovery and treatment system is recommended in order to contain and control the DNAPL source areas as well as capture the dissolved portion of Plume No. 2. The operation of the pump and treat system also provides additional control of downward migration of impacted ground water to the deep confined aquifer.

4.3 *VOC AND METALS CONCENTRATIONS IN THE DEEP CONFINED AQUIFER*

As discussed in Sections 2.4 and 3.4 the ground water quality in the deep confined aquifer was monitored for metals and VOCs. This work was completed in order to determine the current ground water quality in the deep confined aquifer since historic data indicated VOC levels above the NJGWQS, and in order to establish a CEA for this water bearing unit.

The laboratory analyses for metals indicate that no exceedences of the NJGWQS were encountered and no further action is recommended. However, VOC levels above the NJGWQS were encountered in the three monitoring wells sampled, MW-015d, MW-018d and MW-508d. It is recommended that further investigation be performed to better understand the distribution of VOCs in the deep aquifer, to confirm the ground water flow direction in this unit, and to assess VOC contributions from the overlying VOC sources (i.e., the DNAPL areas). Two new monitoring wells are proposed in the general downgradient direction from the two DNAPL source areas. Additional information regarding these two proposed wells is given below:

Proposed Well ID	Location	Purpose
MW-518d	Approximately 150 feet southeast of MW-520	Evaluation of MW-520 source area's potential contribution to deep aquifer impacts
MW-019d	Approximately 500 feet southeast of MW-015d	Evaluation of potential deep aquifer impacts down gradient of MW-015d

The addition of these two wells will form a deep aquifer monitoring well network that provides much better site coverage, with wells near the two source areas and wells downgradient of these areas. A total of five wells will be present in the deep aquifer, which will permit re-evaluation of the potentiometric surface in this unit. Once the new wells are installed, a complete synoptic round of sampling will be performed. This data will form the basis for a more complete analysis of the impacts to the deep aquifer.

It should be noted that the Department has previously provided BD with a No Further Action ruling on the deep aquifer in its letter dated 13 September 1989. Item No. 4 in this letter states "... no action is required on the deeper confined aquifer that occurs under the entire site". The purpose of the proposed work is to confirm that conditions in the deep aquifer have not materially changed since this time. The data collected to date suggests that this is the case. If the additional data confirms this condition, BD will expect that the Department will honor its prior ruling in this matter.

Furthermore, continued operation of the pump and treat system is recommended in order to limit any possible further degradation of the water quality within this aquifer. A proposal for the installation of the new monitoring wells and implementation of another round of sampling will be prepared and submitted to the Department. This data will be collected in advance of the RAWP Addendum and will be utilized in the

preparation of a remedy for this aquifer. At this time, based on the similarity between the historic and recent ground water quality in this aquifer (but pending confirmation through the collection of the recommended additional data), it is still contemplated that this remedy will consist of MNA with a CEA.

4.4 *POTENTIAL PLUME 3 SOURCE AREA*

The delineation of potential VOC source material in Plume No. 3 near MW-508sr was conducted in order to determine if any source material is present. Further, the Department has indicated that if any source material is identified and after source remediation/removal the Department would approve the previously submitted proposal for MNA at this location. The proposal for MNA at this location was presented in the "Ground Water Remedial Action Work Plan" report (ERM, July 1999).

As discussed in Section 3.5, the delineation sampling data did not reveal any VOC impacted material in this area. It is acknowledged that persistent levels of VOCs in MW-508sr are indicative of lingering source material, however based on the results of this investigation it is believed that any impacted material must be in the area immediately surrounding the well.

A limited excavation of the area immediately surrounding MW-508sr is recommended and abandonment and replacement of this well may be required in order to complete this remedial activity. A proposal outlining the scope of work will be submitted to the Department as part of the RAWP Addendum. It is anticipated that the MNA strategy for this location will be approved upon completion of this remedial action.

TABLE 1-1:
SUMMARY OF PROJECT DOCUMENTS
PREVIOUSLY SUBMITTED TO THE NJDEP

Report Title	Report Summary	Submission Date
ECRA - Sampling and Analysis Plan, Volume I Parcel Nos. 1, 2, 3, 4, 5, and 6	Presents site information for the initial ECRA notice and the Sampling and Analysis Plan common to each of the 6 parcels	June 1987
ECRA - Sampling and Analysis Plan, Volume II Parcel Nos. 1, 2, 3, 4, 5, and 6	Presents parcel specific information for the Sampling and Analysis Plan including results of the Phase 1a Preliminary Environmental Investigation. Includes the GIS and SES ECRA forms for each parcel and supporting information.	June 1987
ECRA - Supplementary Information, Volume III Parcel Nos. 5 and 6	Presents the results of the Phase 1b and 1c Preliminary Environmental Investigations conducted in Parcel Nos. 5 and 6 and amends the June 1987 Sampling and Analysis Plans.	December 1987
ECRA - Environmental Assessment Program Parcels 1, 2, and 3	Presents results of the comprehensive environmental program conducted in Parcel Nos. 1, 2, and along with the results of the Phase 1b and 1c preliminary environmental investigations.	February 1988
Soil and Ground Water Remedial Action Plan Parcels #1 and 2	Presents results of environmental investigations and procedures to remediate soil and ground water contamination in Parcels 1 and 2.	July 1988

TABLE 1-1:
SUMMARY OF PROJECT DOCUMENTS
PREVIOUSLY SUBMITTED TO THE NJDEP
(continued)

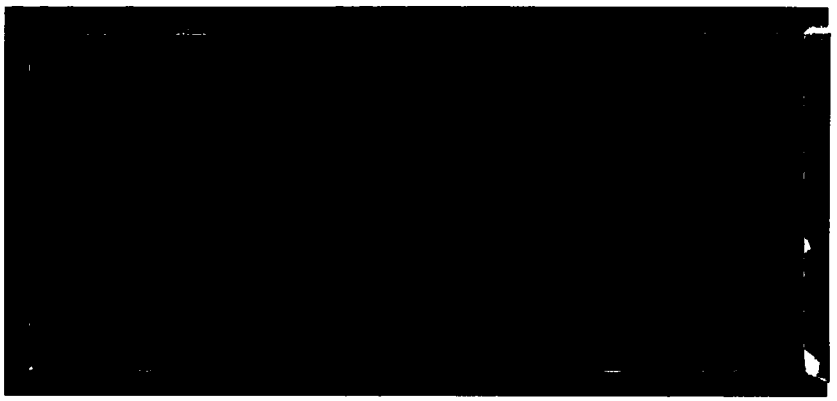
Report Title	Report Summary	Submission Date
Soil and Ground Water Remedial Action Plan(s) Parcel No. 3	Presents additional results of environmental investigations and procedures to remediate soil and ground water contamination in Parcel No. 3.	July 1988
ECRA Environmental Assessment Program Parcel Nos. 4, 5 and 6	Presents results of the comprehensive environmental program conducted in Parcel Nos. 4, 5 and 6.	August 1988
Soil and Ground Water Remedial Action Plan(s) Parcel No. 4	Presents procedures to remediate soil and ground water contamination in Parcel No. 4.	March 1989
Soil and Ground Water Remedial Action Plan(s) Parcel No. 5	Presents additional results of environmental investigations and procedures to remediate soil and ground water contamination in Parcel No. 5.	March 1989
Soil and Ground Water Remedial Action Plan(s) Parcel No. 6	Presents additional results of environmental investigations and procedures to remediate soil and ground water contamination in Parcel No. 6.	March 1989
Verification Report for ECRA Site Remediation Parcel Nos. 1 and 2	Documents the implementation of the Soil Remedial Action in Parcel Nos. 1 and 2.	November 1989
Verification Report for ECRA Soil Remediation Parcel Nos. 4 and 5	Documents the implementation of the Soil Remedial Action in Parcel Nos. 4 and 5.	June 1992

TABLE 1-1:
SUMMARY OF PROJECT DOCUMENTS
PREVIOUSLY SUBMITTED TO THE NJDEP
(continued)

Report Title	Report Summary	Submission Date
Verification Report for ECRA Soil Remediation Parcel No. 6	Documents the implementation of the Soil Remedial Action in Parcel No. 6.	December 1992
ISRA Site Investigation Report, Sub-Building Soil Investigation, Parcel No. 5	Presents the results of the investigation of sub-building soil in Parcel No. 5	October 1994
ISRA Site Investigation Report Addendum Sub-Building Soil Investigation Parcel No. 5	Presents the results of the investigation of sub-building soils in Parcel No. 5.	March 1995
Verification Report for ISRA Soil Remediation Parcel No. 5 Sub-building Soil, ISRA Case No. 87577	Documents the implementationof the Soil Remedial Action for Sub-Building Soils in Parcel No. 5	December 1996
Ground Water Remediation Project History	Documents past project remediation, presents the proposed modification to the ground water remedial strategy and provides specific responses to departmental inquiries.	December 1998
Ground Water Remedial Action Workplan Addendum	Presents proposed MNA Remedial Strategy for Plumes 1, 3 and 5	July 1999

BD responses to EPA Request for Information

Nos. 14



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SOIL AND GROUND WATER REMEDIAL ACTION PLAN
BECTON DICKINSON AND COMPANY
EAST RUTHERFORD, NEW JERSEY

Part No. 3

AUGUST, 1988

PREPARED FOR:

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EXECUTIVE SUMMARY

This Remedial Action Plan has been developed to address environmental concerns identified in Parcel 3 at Becton, Dickinson and Company's (B-D) East Rutherford, New Jersey site. B-D plans to cease operations at the site in the fall of 1989 and is submitting this plan to obtain the necessary ECRA clearance for future site redevelopment.

Environmental concerns in Parcel 3 have been delineated through a series of comprehensive site investigations. These investigations have determined that soil in discrete locations of Parcel 3 contains elevated levels of heavy metals and petroleum hydrocarbons. The water table aquifer in Parcel 3 does not contain contaminants at levels exceeding ECRA's Recommended Cleanup Levels (RCLs).

The remedial plan was developed using soil remediation criteria established in the Soil and Ground Water Remedial Action Plan, Parcels 1 and 2 (July, 1988). Excavation and off-site disposal will be the method used to achieve the soil remediation.

1.0 INTRODUCTION

Becton, Dickinson and Company (B-D) owns and operates a medical apparatus manufacturing facility in the Borough of East Rutherford, Bergen County, New Jersey. The location of the facility is shown on the general vicinity map provided as Figure 1-1. Due to the planned cessations of operations at the site, B-D prepared and submitted an initial Environmental Cleanup Responsibility Act (ECRA) notice to the New Jersey Department of Environmental Protection (NJDEP) in June 1987. The site was divided into six parcels (Parcel No. 1 through 6) each having separate tax lot and block numbers. Six separate ECRA submissions were therefore made. Each submission was subsequently assigned an individual ECRA case number by the NJDEP. B-D has since conducted a series of comprehensive environmental investigations and made various additional ECRA submissions.

The previous environmental investigations conducted in Parcel 3 at the East Rutherford site have revealed that contaminants are present in soil (total petroleum hydrocarbons, lead and zinc) above the NJDEP-ECRA RCLs. The environmental investigations have not revealed contaminants present in ground water above the RCLs in Parcel 3. This Remedial Action Plan has

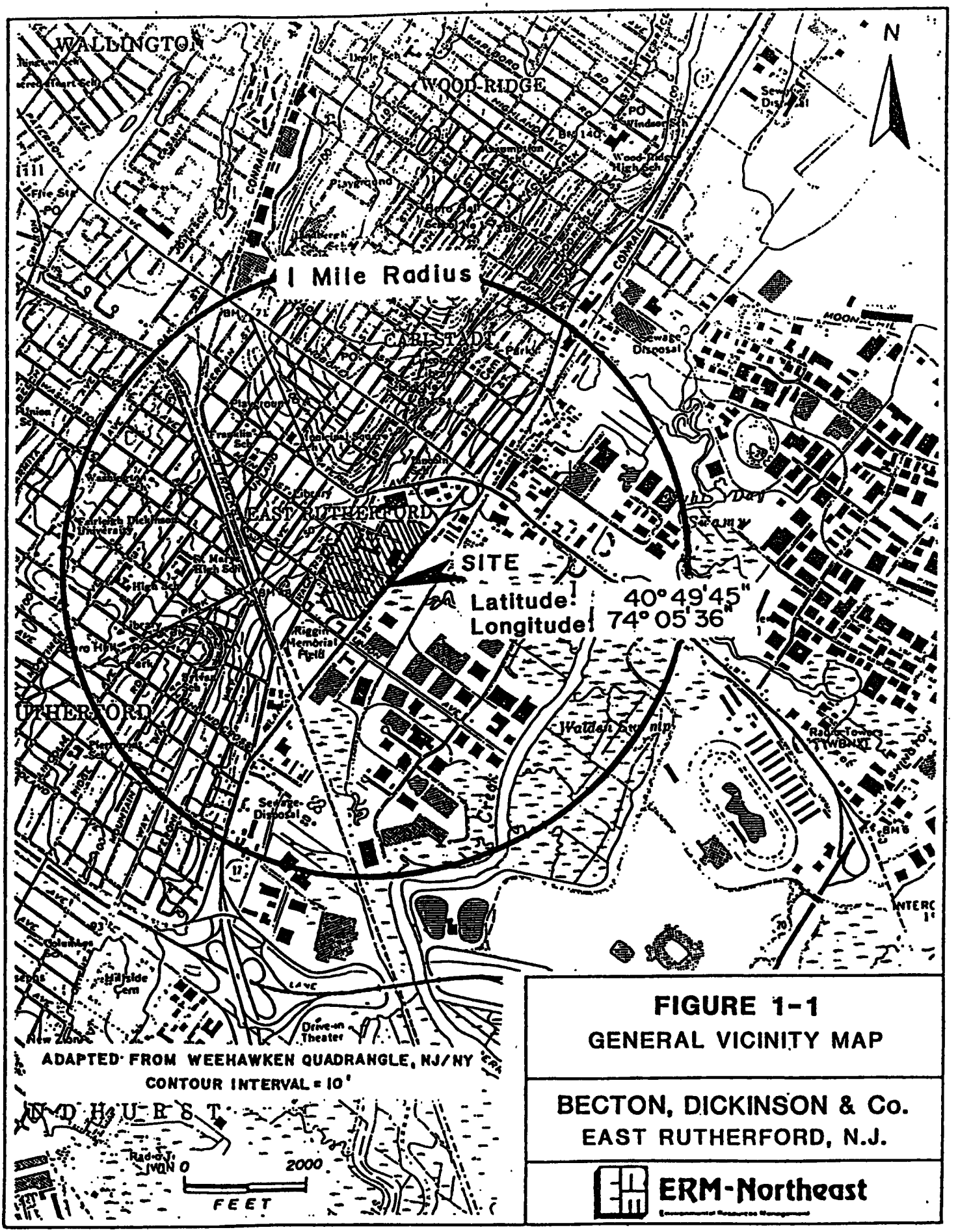

FIGURE 1-1
GENERAL VICINITY MAP

BECTON, DICKINSON & Co.
EAST RUTHERFORD, N.J.

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been developed to address areas of environmental concern in Parcel 3 and to provide procedures for the remediation of this parcel. A separate decontamination plan has been prepared to address remediation of the site buildings and structures.

1.1 Remedial Action Performance Standard

This Remedial Action Plan is designed to remedy site environmental conditions on the basis of environmental and health based risk levels developed for the site.

1.2 Overview of Report

The remainder of the report is organized into the following sections:

2.0 Environmental Conditions - This section presents environmental conditions at the site.

3.0 Soil Remediation Program - This section presents the procedures proposed to remediate soil at the site. These include excavation and off-site disposal. Access control, procedural logistics, health and safety issues and post-

excavation verification sampling and analysis procedures are also addressed.

4.0 Schedule and Estimated Cost of Remedial Activities - A schedule and cost estimate for implementation of remedial activities and procedures is presented in this section.

2.0 ENVIRONMENTAL CONDITIONS

This section establishes overall environmental conditions in Parcel 3.

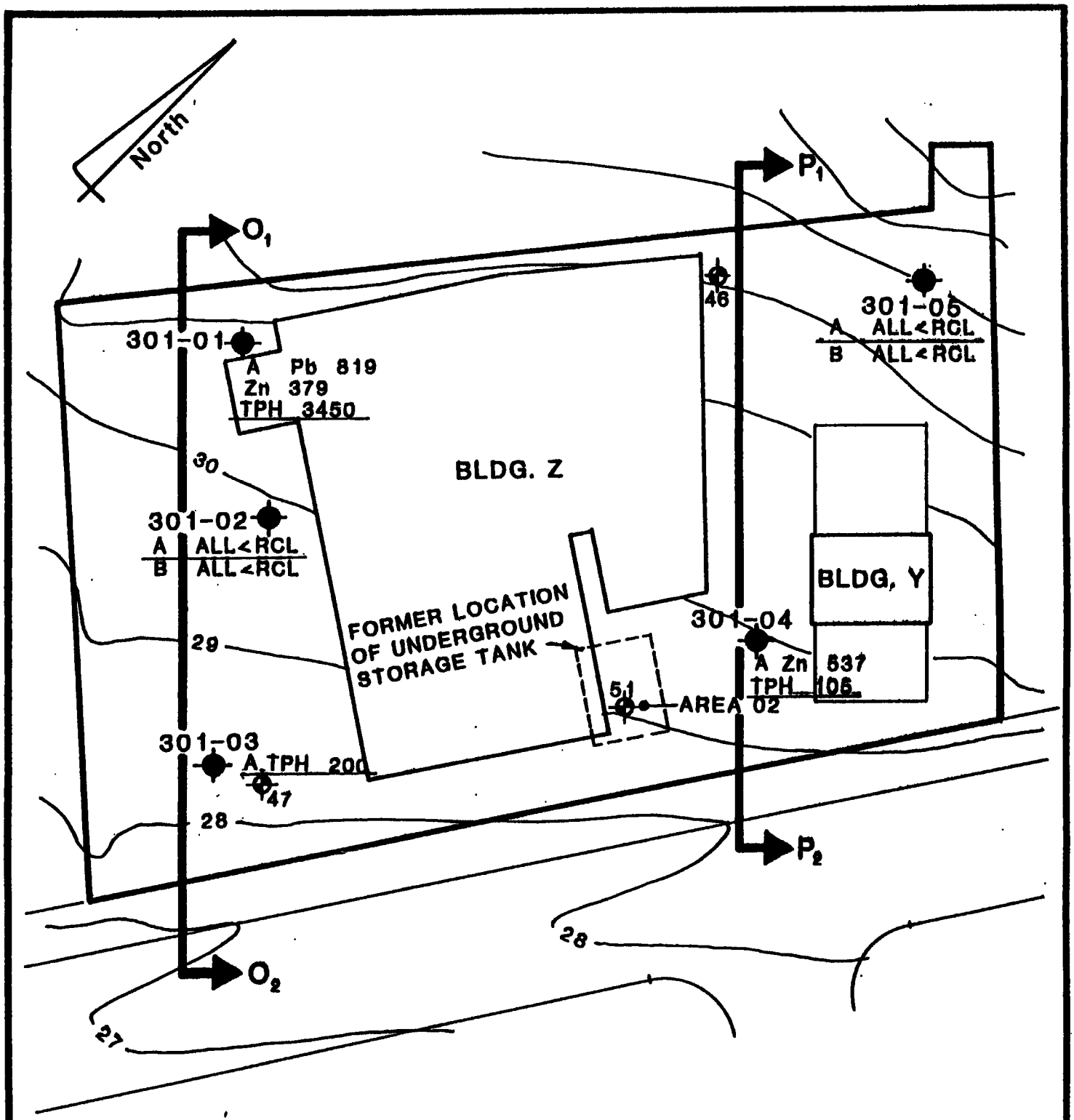
2.1 Soil Quality Conditions

2.1.1 Areal and Vertical Extent of Contamination - Open Area Away From Production Activities

Figure 2-1 provides a plan view of Parcel 3 indicating the location of soil samples used to characterize the open area away from production activities.

Two soil cross-sections were drawn through Parcel 3. Included in each cross-section is the ground surface, approximate ground water table surface, soil sample locations and the concentrations of contaminants identified at levels exceeding the ECRA RCLs. The locations of the cross-sections are provided on Figure 2-1. Figures 2-2 and 2-3 provide the cross-sections.

Heavy metals (lead and zinc) were detected at levels exceeding the RCLs in two locations in the open area away



LEGEND

= SOIL SAMPLE LOCATION

= MONITORING WELL LOCATION

TITLE

SITE PLAN

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Environmental Resources Management

SCALE 1"=30'

DATE

FIGURE 2-1

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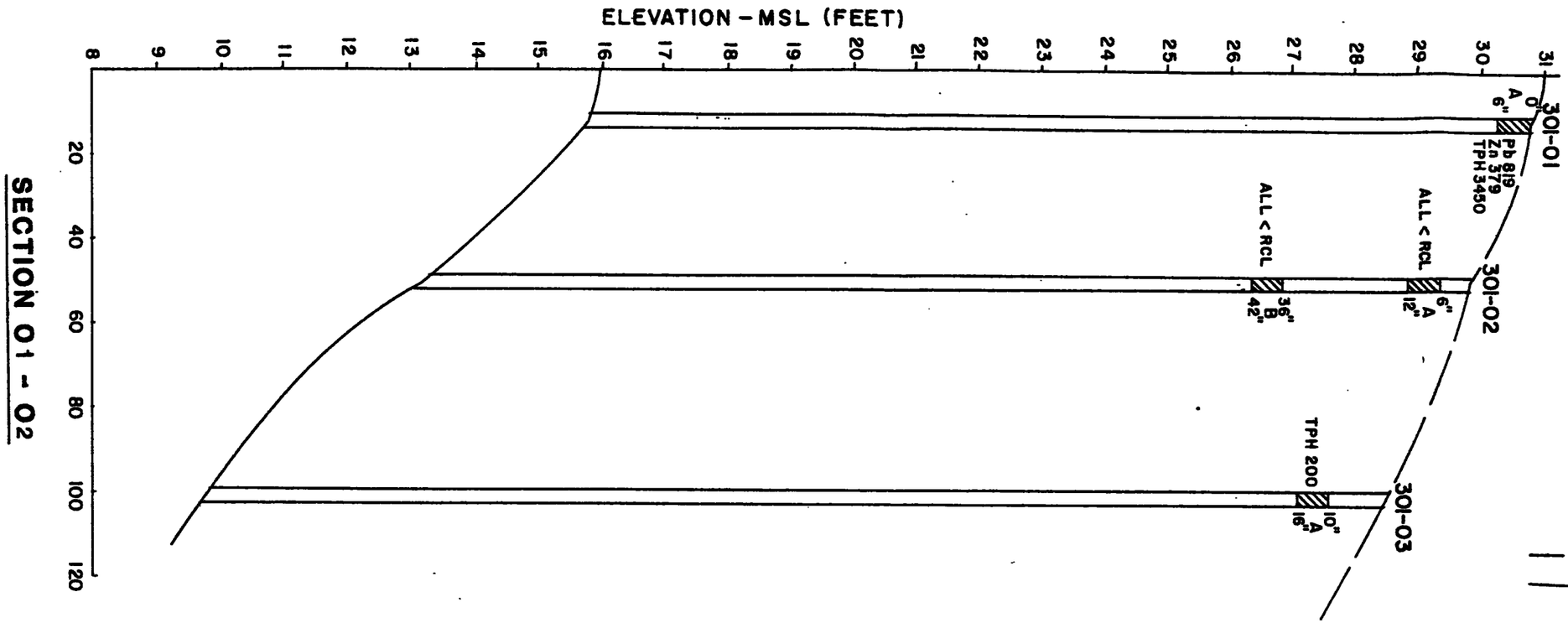

LEGEND

GRADE

POTENTIOMETRIC SURFACE

CONCENTRATIONS IN PPM's SHOWN EQUAL OR EXCEED NJDEP LIMITS

SCALE:

HORIZ. 1" = 30'

VERT. 1" = 2'.

TITLE

SOIL CROSS SECTION
O1 - O2
PARCEL No. 3

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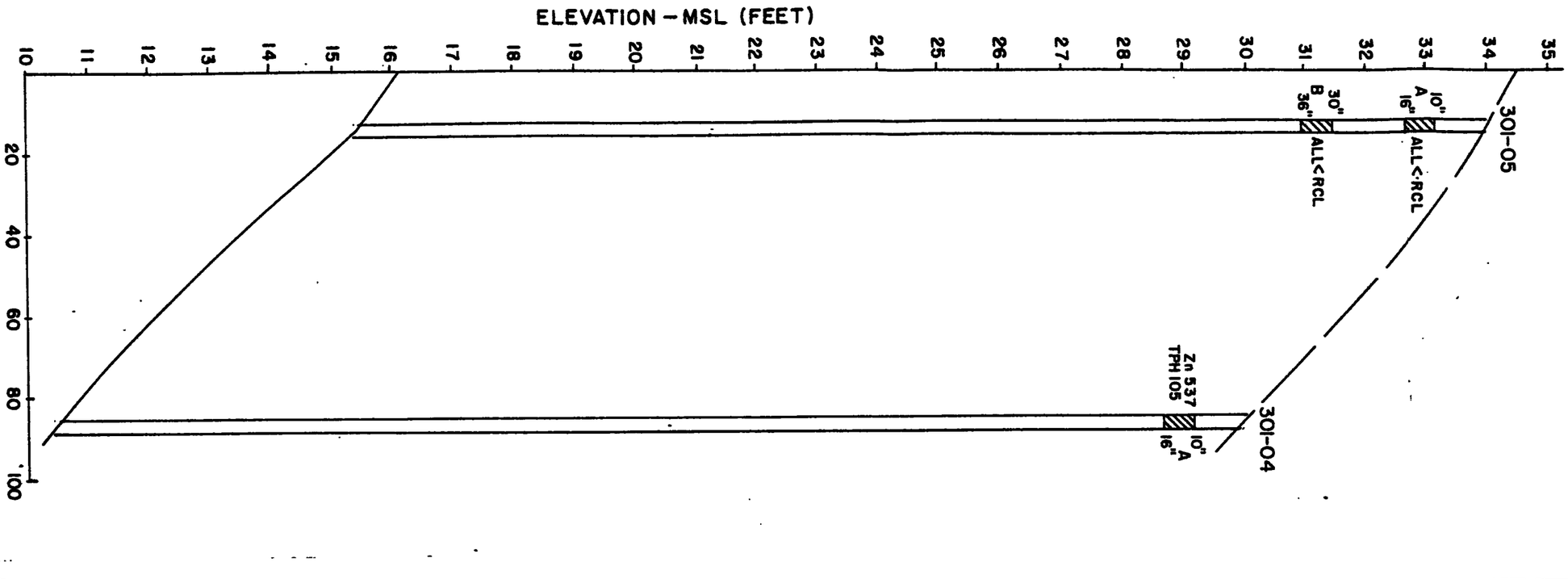
Environmental Resource Management

SCALE AS SHOWN

DATE 5/24/85

FIGURE 2-2



SECTION P1 - P2

LEGEND

— — — — GRADE

———— POTENTIOMETRIC SURFACE

CONCENTRATIONS IN PPM's SHOWN EQUAL OR EXCEED NJDEP LIMITS

SCALE:

HORIZ. 1" = 30'

VERT. 1" = 2'

TITLE

SOIL CROSS SECTION
P1 – P2
PARCEL No. 3

PREPARED FOR
BECTON, DICKINSON & Co.
EAST RUTHERFORD, N.J.

ERM-Northeast
Environmental Resource Management

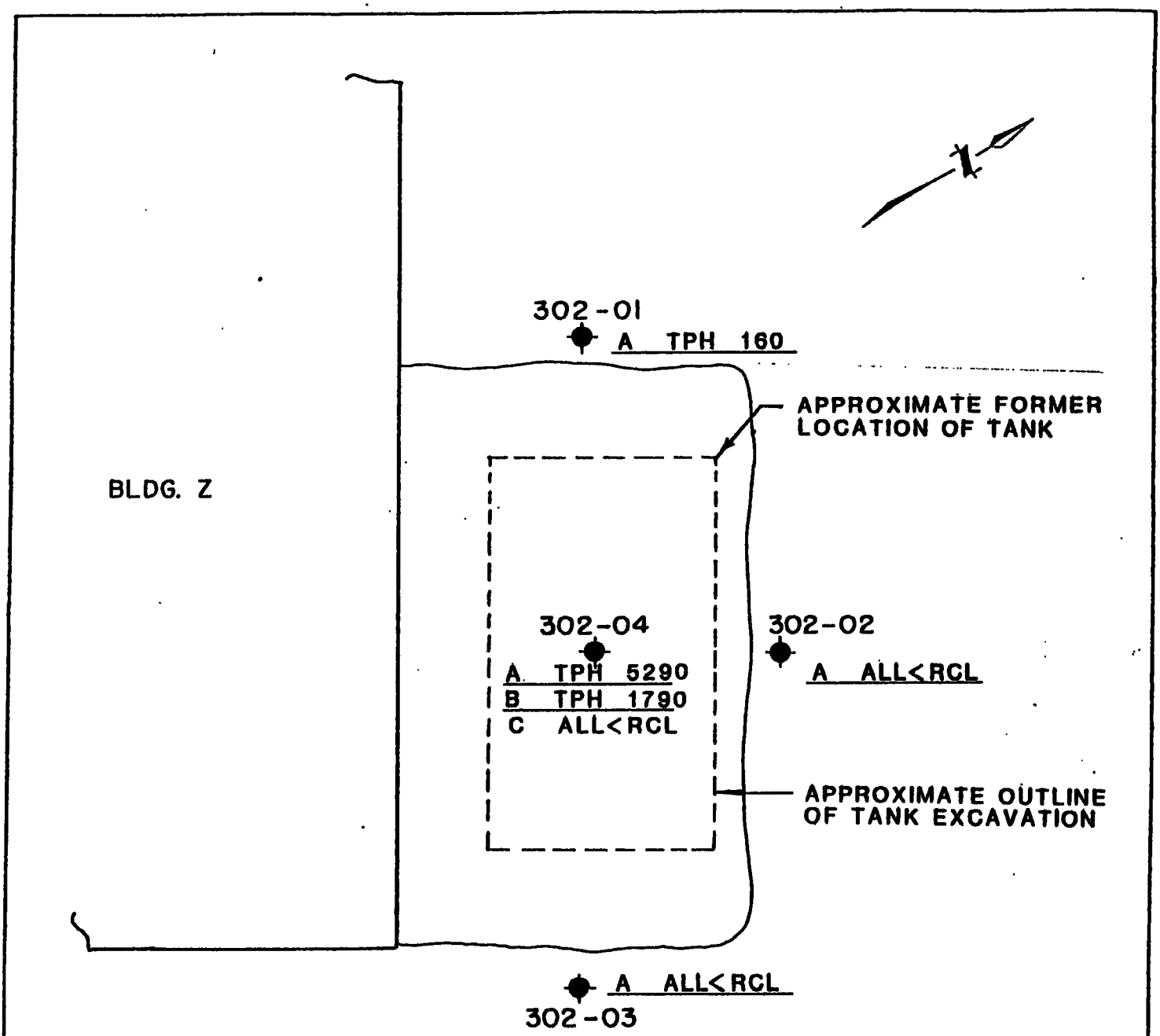
SCALE AS SHOWN
DATE 3/24/88
FIGURE 2-3

from production activities. These metals may be a result of metal turnings from the machinery of brass parts being present in the fill materials formerly deposited in the open area. The limited metal contamination may also be due to background concentrations of metals in disturbed urban soils or residual concentrations in coal ash. The total petroleum hydrocarbon contamination identified occurred near the soil surface in areas covered by asphaltic pavement and/or was associated with fill soils that contained coal, coal ash or possibly cutting oil used in the machining processes conducted at the site.

2.1.2 Areal and Vertical Extent of Contamination-Identified Area of Environmental Concern (Area 02)

The identified area of environmental concern - the former location of an underground fuel oil storage tank is shown on the site plan presented as Figure 2-1.

Figure 2-4 provides a plan view of this area and includes the horizontal location of sampling points and contaminant concentrations that exceed the ECRA RCLs. Figure 2-5 provides a cross-section of the area that shows the ground surface, estimated former location of the



SCALE: .25" (1/4") = 1'-0"

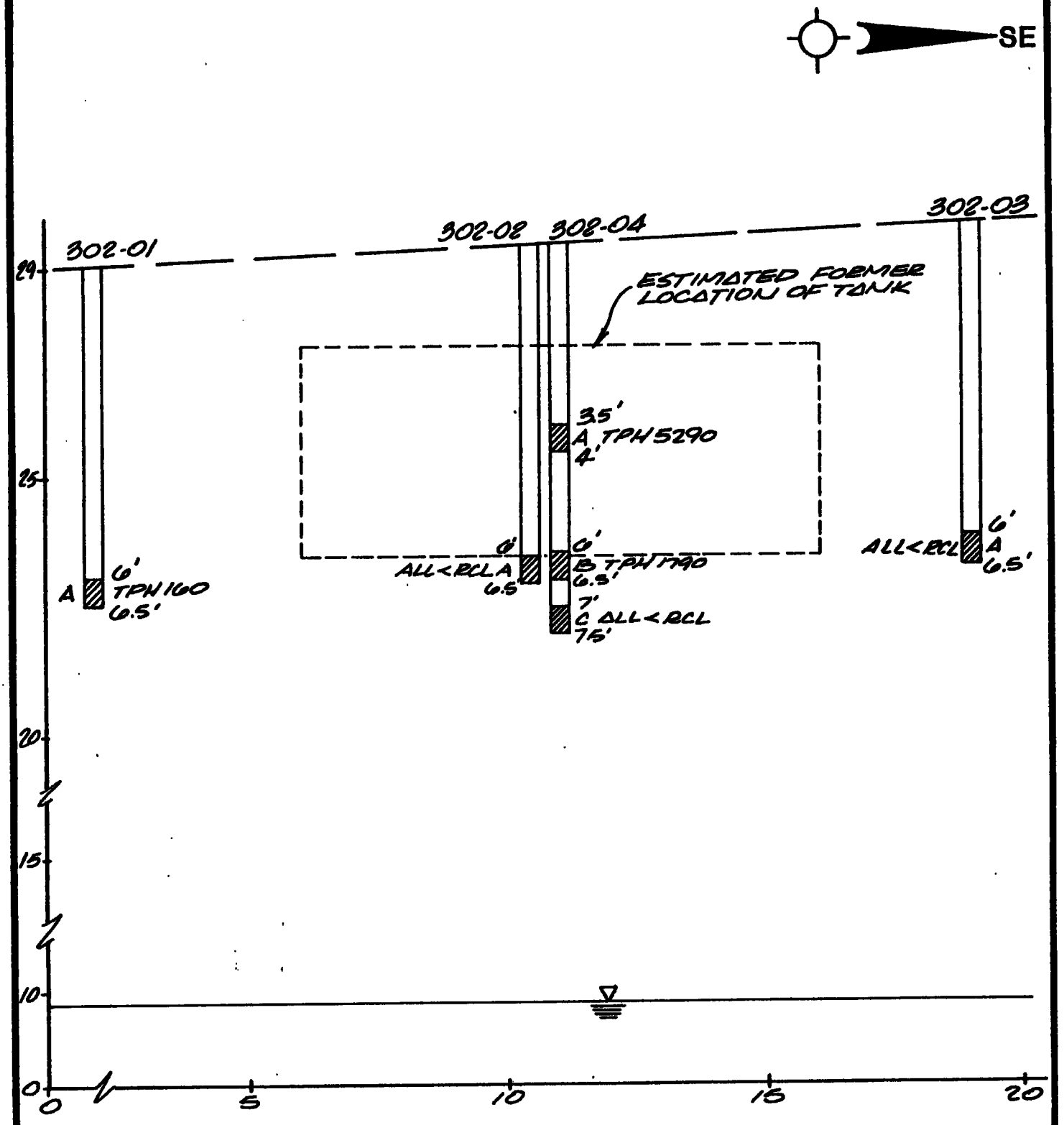
LEGEND

SOIL SAMPLE LOCATION

FIGURE 2-4
ASSESSMENT OF FORMER UNDERGROUND TANK LOCATION

BECTON, DICKINSON & Co.
EAST RUTHERFORD, N.J.

ERM-Northeast



TITLE

CROSS-SECTION FORMER LOCATION OF UNDERGROUND STORAGE TANK

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SCALE 3/8"=1'

DATE

FIGURE 2-5

139839

underground storage tank, ground water table surface, horizontal alignment and vertical location of sampling points and contaminant concentrations exceeding the ECRA RCLs.

Total petroleum hydrocarbon contamination is present within the backfilled area of the former location of an underground storage tank. The contamination may be a result of leaving contaminated soils in place during the tank removal or from backfilling the tank excavation cavity with contaminated soil.

2.2 Ground Water Quality

Contaminants were not detected above the ECRA RCLs in ground water monitoring well 46 (MW-46), MW-47 and MW-51 (see Figure 2-1).

3.0 SOIL REMEDIATION PROGRAM

This section describes the program to be followed to remediate soil contamination in Parcel 3.

3.1 Remedial Classification of Soils

Soil quality remediation criteria presented in Section 4.3 of the Soil and Ground Water Remedial Action Plan, Parcels 1 and 2 (July, 1988) have been used to identify soil as requiring remedial action (RA), or no action (NA). It was conservatively assumed that all soil will be maintained beneath permeable cover after site redevelopment.

Table 3-1 identifies the remedial classification of soil in Parcel 3. Soil location is specified by parcel number, area number and soil sample location number. Figure 3-1 shows the locations of the RA areas. There are no areas that require further investigation. For the two locations requiring remedial action, the parameters of concern are total petroleum hydrocarbons and lead.

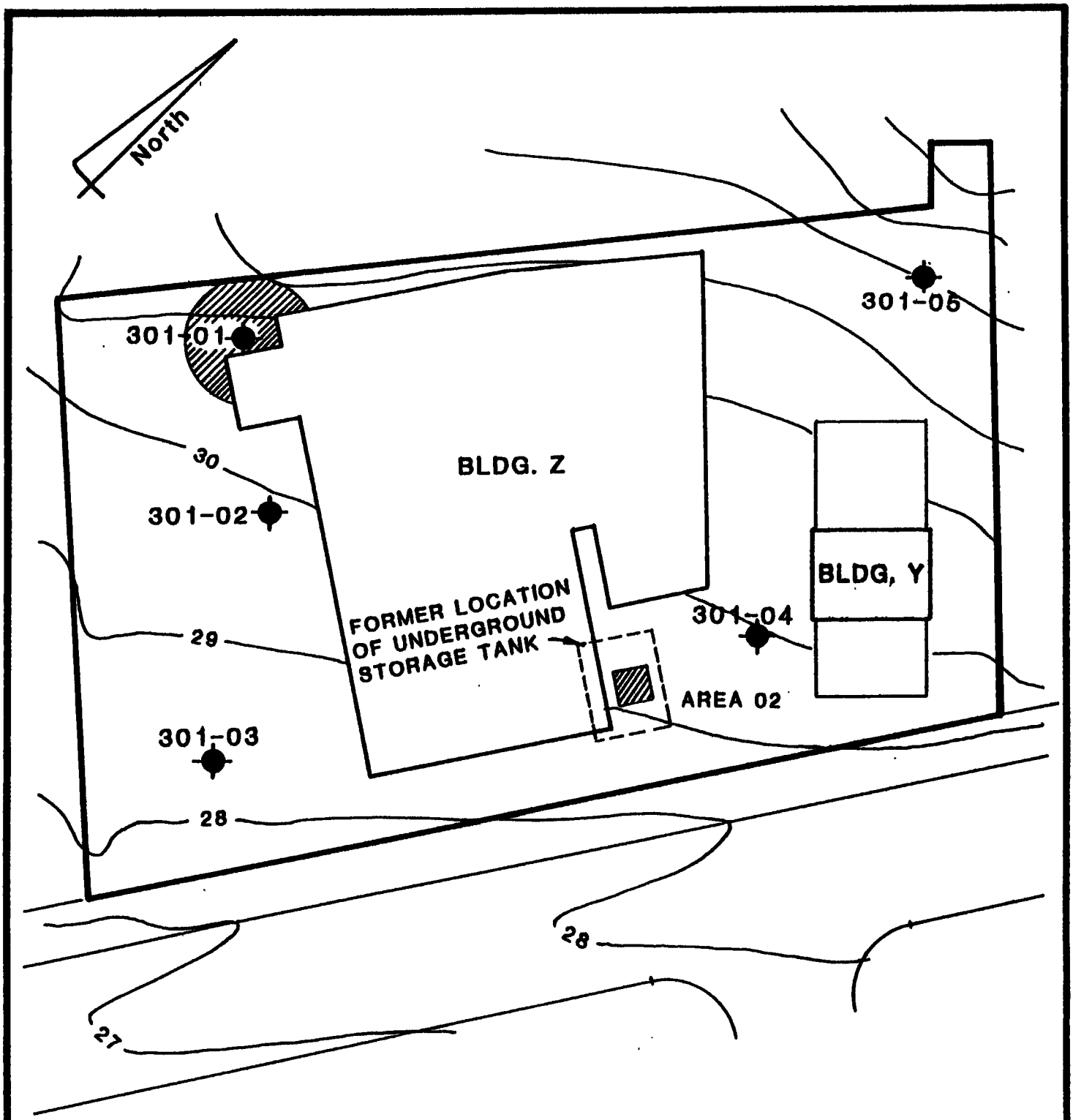
Section 5.0 of the Soil and Ground Water Remedial Action Plan, Parcels 1 and 2 (July, 1988), presents an evaluation of

TABLE 3-1

REMEDIAL CLASSIFICATION OF SOILS

Area	Location	Remedial Designation	Parameters of Concern
Open Area			
Parcel No. 3			
Cross-Section O_1 - O_2			
	301-01	RA	TPH, Pb
	301-02	NA	
	301-03	NA	
Cross-Section P_1 - P_2			
	301-04	NA	
	301-05	NA	
Identified Area of Environmental Concern			
Parcel No. 3			
Former Location of An Underground Fuel Oil Storage Tank (Area 02)			
	302-01	NA	
	302-02	NA	
	302-03	NA	
	302-04	RA	TPH

NA = No Action Required
RA = Remedial Action Required



LEGEND

= SOIL SAMPLE LOCATION

= AREA REQUIRING REMEDIAL ACTION

TITLE

SOIL REMEDIATION AREAS

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EAST RUTHERFORD, N.J.

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Environmental Resources Management

SCALE 1"=30'

DATE

FIGURE 3-1

39639

soil remediation alternatives. Excavation and off-site disposal was selected as the most appropriate method for remediating soil conditions.

3.2 Environmental Coordinator

An Environmental Coordinator (EC) will be appointed to implement the soil quality remediation program. The role of the EC is outlined in Section 6.2 of the Soil and Ground Water Remedial Action Plan, Parcels 1 and 2 (July, 1988).

3.3 Excavation Plan

Plans to control access to the site and establish work zones, to excavate and dispose of contaminated soil, to perform post-excavation sampling and analysis, backfilling of excavated areas and equipment decontamination are presented in Sections 6.3.1, 6.3.2 and 6.4 of the Soil and Ground Water Remedial Action Plan, Parcels 1 and 2 (July, 1988). The total volume of soil to be removed in Parcel 3 is estimated to be 30 cubic yards.

3.4 Health and Safety Plan

A. Level D protection will be used, at a minimum, by all personnel implementing soil remediation procedures. Higher levels of protection, (levels A through C), may be prescribed according to the requirements of the specific work and the hazards of the substances to be removed. Appendix A presents a description of each level of personal protection.

B. Notifications by letter shall be made to all applicable federal, state and local agencies before any work is initiated.

C. A Hazard Evaluation Summary (HES) will be prepared covering the substance involved, concentrations (if known) and primary hazards such as reactivity, toxicity, ignitability, corrosivity, etc.

D. Personnel decontamination procedures will follow standard decontamination procedures common to specific types of work. Methods will include change of clothing procedures, personal hygiene, storage of boots/safety helmets, clothing, etc.).

E. Communication procedures and equipment shall be established and work crews will be trained in their use before work begins.

F. An environmental monitoring plan and equipment used for monitoring will be established and described. A monitoring log will be maintained.

G. Emergency procedures in the event of accidents, spill, fire/explosion, equipment failure of personal protective gear or other equipment will be established and described. Personnel will be trained to be familiar with these procedures.

H. Personal protective equipment will be selected prior to commencement of the work based upon the hazards of the substances to be removed.

4.0 SCHEDULE AND ESTIMATED COST OF REMEDIAL ACTIVITIES

4.1 Schedule of Site Remediation Activities

The schedule of site restoration activities for Parcel 3 will generally follow the schedule of remediation activities for Parcels 1 and 2. The schedule of remedial activities for Parcels 1 and 2 is presented in Section 9.0 of the Soil and Ground Water Remedial Action Plan, Parcels 1 and 2 (July, 1988).

4.2 Cost Estimate for Site Remediation

The total cost for the completion of site remediation as presented in this remedial action plan is estimated to be $50,000. This cost consists entirely of the cost for soil remediation since ground water remediation is not required in Parcel 3. Table 4-1 provides a breakdown of the estimated cost organized by major project component.

TABLE 4-1

COST ESTIMATE FOR
SOIL REMEDIATION PROGRAM
PARCEL 3

1.	Project Planning, Bid Preparation and Contract Award	$ 2,000
2.	Mobilization	$ 1,000
3.	Excavation	$ 8,000
4.	Equipment Decontamination	$ 2,000
5.	Waste Transportation	$ 8,000
6.	Waste Disposal	$ 8,000
7.	Post Excavation Sampling	$ 3,000
8.	Backfill	$ 2,000
9.	Contract Management, Coordination with NJDEP, RCRA Closure	$ 4,000
	SUBTOTAL	$ 38,000
10.	Overall Project Contingency @ 25 percent	$ 9,500
	TOTAL COST	$ 47,500
	SAY	$ 50,000

APPENDIX A

LEVEL OF PERSONAL PROTECTION

LEVEL A PROTECTION

Existing conditions and analytical data precludes level A personnel protection. However, if conditions warrant level A, the recommended equipment list will include:

- Pressure-demand, full-facepiece SCBA or pressure-demand supplied-air respirator with escape SCBA
- Fully-encapsulating, chemical-resistant suit
- Inner chemical-resistant gloves
- Chemical-resistant safety boots/shoes
- Two-way radio communications

Equipment list optional:

- Cooling unit
- Coveralls
- Long cotton underwear
- Hard hat
- Disposable gloves and boot covers

LEVEL D PROTECTION

Equipment list recommended:

- Coveralls
- Safety boots/shoes
- Safety glasses or chemical splash goggles

Equipment list optional:

- Gloves
- Escape mask
- Face shield

LEVEL C PROTECTION

Equipment list recommended:

- Full-facepiece, air purifying canister-equipped respirator (NIOSH approved)
- Chemical-resistant clothing (overalls and longsleeved jacket; hooded, one- or two piece chemical splash suit; disposable chemical-resistant one-pieced suit)
- Inner and outer chemical-resistant gloves
- Chemical-resistant safety boots/shoes
- Hard hats
- Two-way radio communications (work under outside protective clothing)

Equipment list optional:

- Coveralls
- Disposable boot covers
- Face shield
- Escape mask
- Long cotton underwear

DJS

ERM-Northeast

BD responses to EPA Request for Information

Nos. 14

SOIL AND GROUND WATER REMEDIAL ACTION PLAN
PARCEL NO. 4
BECTON, DICKINSON AND COMPANY
EAST RUTHERFORD, NEW JERSEY

MARCH, 1989

PREPARED FOR:

BECTON, DICKINSON AND COMPANY
ONE BECTON DRIVE
FRANKLIN LAKES, NEW JERSEY 07417-1880

PREPARED BY:

ERM-NORTHEAST
88 SUNNYSIDE BOULEVARD
PLAINVIEW, NEW YORK 11803

LEVEL B PROTECTION

Equipment list recommended:

- Pressure-demand, full-facepiece SCBA or pressure-demand supplied-air respirator with escape SCBA
- Chemical-resistant clothing (overall and longsleeved jacket; hooded, one-or two piece chemical splash suit; disposable chemical-resistant one-piece suit)
- Inner and outer chemical-resistant gloves
- Chemical-resistant safety boots/shoes
- Hard hats
- Two-way radio communication

Equipment list optional:

- Coveralls
- Disposable boot covers
- Face shield
- Long cotton underwear

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EXECUTIVE SUMMARY

This Remedial Action Plan has been developed to address environmental concerns in Parcel No. 4 at Becton, Dickinson and Company's (B-D) East Rutherford, New Jersey facility. B-D plans to cease operations in Parcel No. 4 (along with Parcel Nos. 5 and 6) and transfer ownership of the property in the fall of 1991.

Environmental conditions in Parcel No. 4 have been delineated through a series of comprehensive site investigations. These investigations have determined that soil at one location in the Parcel is contaminated with petroleum hydrocarbons. Ground water quality is not an environmental concern in Parcel 4.

An environmental and health based risk assessment was used to establish remedial action criteria for soil quality. These criteria fully consider site conditions as well as the safety of individuals that will occupy the site following property transfer.

Several soil remediation technologies were evaluated for meeting the established remedial action criteria. Excavation and off-site disposal was selected as the most appropriate method of achieving the soil criteria.

1.0 INTRODUCTION

Becton, Dickinson and Company (B-D) owns and operates a medical apparatus manufacturing facility in the borough of East Rutherford, Bergen County, New Jersey. The location of the facility is shown on the general vicinity map provided as Figure 1-1. Due to the planned cessations of operations at the site, B-D prepared and submitted an initial Environmental Cleanup Responsibility Act (ECRA) notice to the New Jersey Department of Environmental Protection (NJDEP) in June, 1987. The site was divided into six parcels (Parcel Nos. 1 through 6) each having separate tax lot and block numbers. Figure 1-2 provides a plan view of the site divided into six parcels. Six separate ECRA submissions were therefore made. Each submission was subsequently assigned an individual ECRA case number by the NJDEP. B-D has since conducted a series of comprehensive environmental investigations and made various additional ECRA submissions.

Environmental investigations of Parcel Nos. 1, 2 and 3 were conducted on an expedited schedule from October, 1987 through December, 1987. B-D subsequently prepared and submitted Remedial Action Plans for these three parcels in July, 1988. The Remedial Action Plans were approved by the NJDEP in October, 1988. Parcel

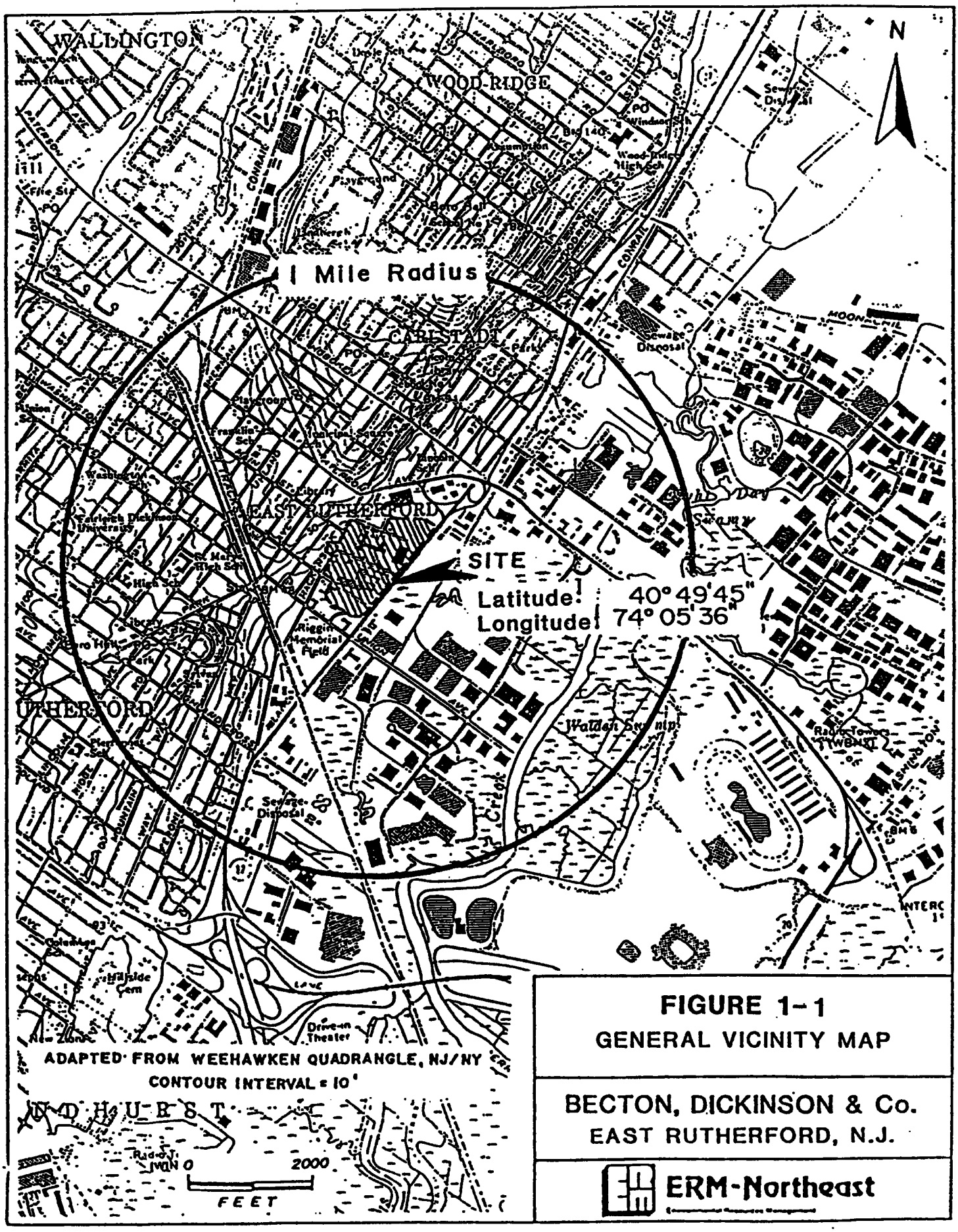
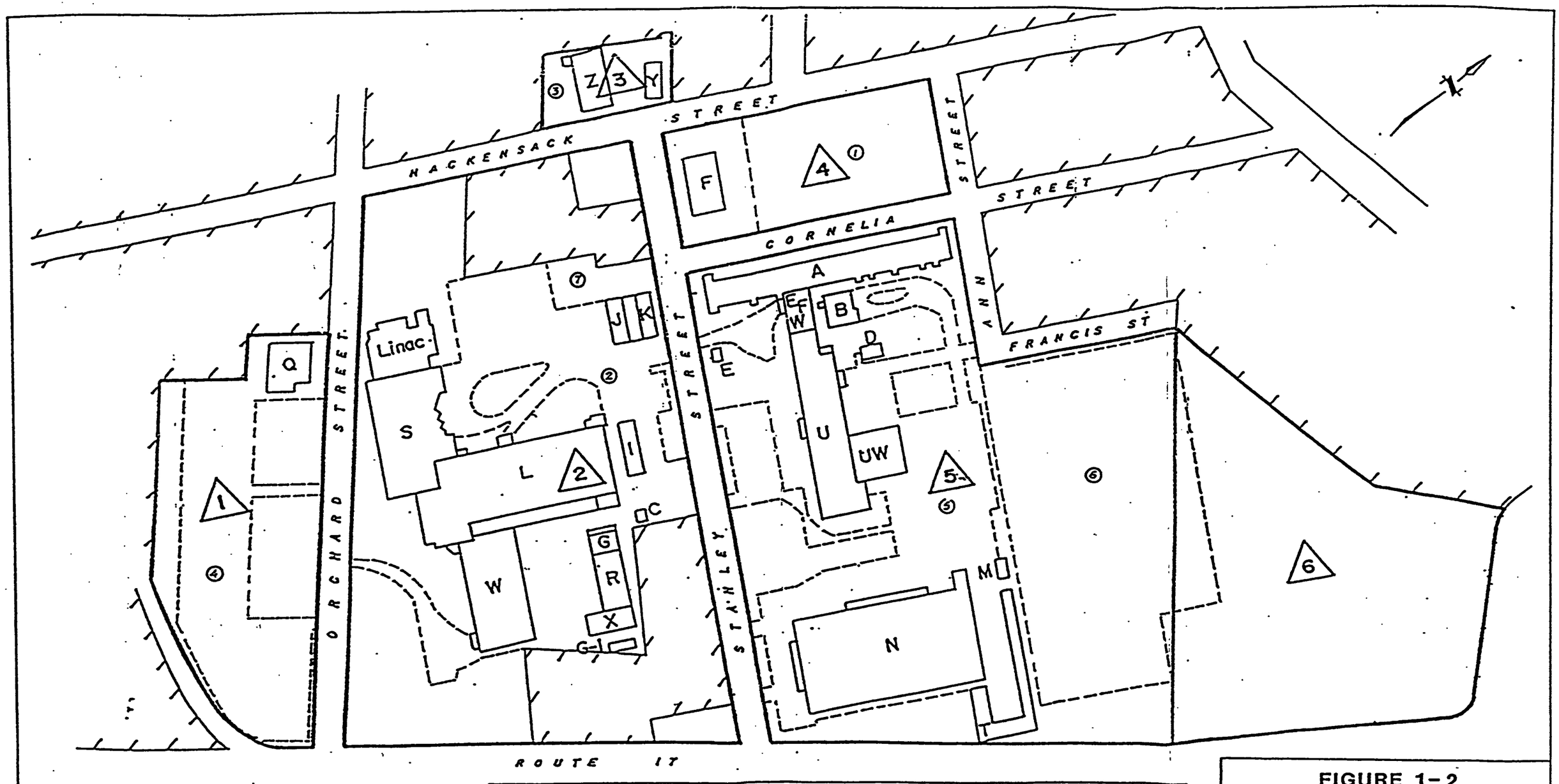


FIGURE 1-1
GENERAL VICINITY MAP

BECTON, DICKINSON & Co.
EAST RUTHERFORD, N.J.

ERM-Northeast



SCALE: 1"=165'±

LEGEND

D BUILDING

① PARKING LOT NUMBERS

PROPERTY NOT OWNED BY B-D

FIGURE 1-2
SITE PLAN
PARCEL DESIGNATIONS

BECTON, DICKINSON & Co.
EAST RUTHERFORD, N.J.

ERM-Northeast

Nos. 1, 2 and 3 are currently in the remediation phase and are being handled by the NJDEP ECRA Cleanup Oversight section.

Similar environmental investigations were conducted in Parcel Nos. 4, 5 and 6 from February, 1988 through May, 1988. The environmental investigation of Parcel No. 4 at the East Rutherford site has revealed that contaminants are present in soil and ground water at concentrations above the NJDEP-ECRA recommended cleanup levels (RCLs). This Remedial Action Plan has been developed to address soil quality concerns in Parcel No. 4. Ground water quality concerns are being addressed in the site wide ground water remediation program presented in the Parcel 5 Remedial Action Plan. A separate decontamination plan has been prepared to address remediation of the site buildings and structures.

1.1 Previous ECRA Submissions

Table 1-1 provides a summary listing of the documents previously submitted to the NJDEP. These documents are referenced in this report to avoid redundancy and improve the efficiency of the remedial procedures presentation.

TABLE 1-1

SUMMARY OF ECRA SUBMISSIONS

Report Title	Report Summary	Submission Date
ECRA - Sampling and Analysis Plan, Volume I Parcel Nos. 1, 2, 3, 4, 5, and 6	Presents site information for the initial ECRA notice and the Sampling and Analysis Plan common to each of the 6 parcels	June 1987
ECRA - Sampling and Analysis Plan, Volume II Parcel Nos. 1, 2, 3, 4, 5, and 6	Presents parcel specific information for the Sampling and Analysis Plan including results of the Phase 1a Preliminary Environmental Investigation. Includes the GIS and SES ECRA forms for each parcel and supporting information.	June 1987
ECRA - Supplementary Information, Volume III Parcel Nos. 5 and 6	Presents the results of the 1b and Phase 1c Preliminary Environmental Investigations conducted in Parcel Nos. 5 and 6 and amends the June 1987 Sampling and Analysis Plans.	Dec. 1987
ECRA - Environmental Assessment Program Parcel Nos. 1, 2, and 3	Presents results of the comprehensive environmental program conducted in Parcel Nos. 1, 2, and 3 along with the results of the Phase 1b and 1c preliminary environmental investigations.	Feb. 1988
Soil and Ground Water Remedial Action Plan(s) Parcel Nos. 1 and 2, Parcel No. 3	Presents additional results of environmental investigations and procedures to remediate soil and ground water contamination in Parcel Nos. 1, 2 and 3.	July 1988
ECRA Environmental Assessment Program Parcel Nos. 4, 5 and 6	Presents results of the comprehensive environmental program conducted in Parcel Nos. 4, 5 and 6	Aug. 1988

1.2 Remedial Action Performance Standard

This Remedial Action Plan is designed to accomplish two objectives:

- To remedy site environmental conditions on the basis of environmental and health based risk levels developed for the site.

- To address environmental quality issues to be consistent with future site development plans.

1.3 Overview of Report

The remainder of the report is organized into the following sections:

2.0 ENVIRONMENTAL CONDITIONS - This section presents a summary of soil and ground water quality at the site.

3.0 SITE DEVELOPMENT PLAN - The future site development plan is summarized in this section.

4.0 DEVELOPMENT OF REMEDIAL ACTION CRITERIA - This section establishes remedial action criteria for soil.

5.0 SOIL REMEDIATION PROGRAM - This section presents procedures for soil remediation.

6.0 SCHEDULE AND ESTIMATED COST OF REMEDIAL ACTIVITIES - A schedule and cost estimate for the implementation of remedial activities are presented in this section.

2.0 ENVIRONMENTAL CONDITIONS

This section establishes overall environmental conditions in Parcel No. 4.

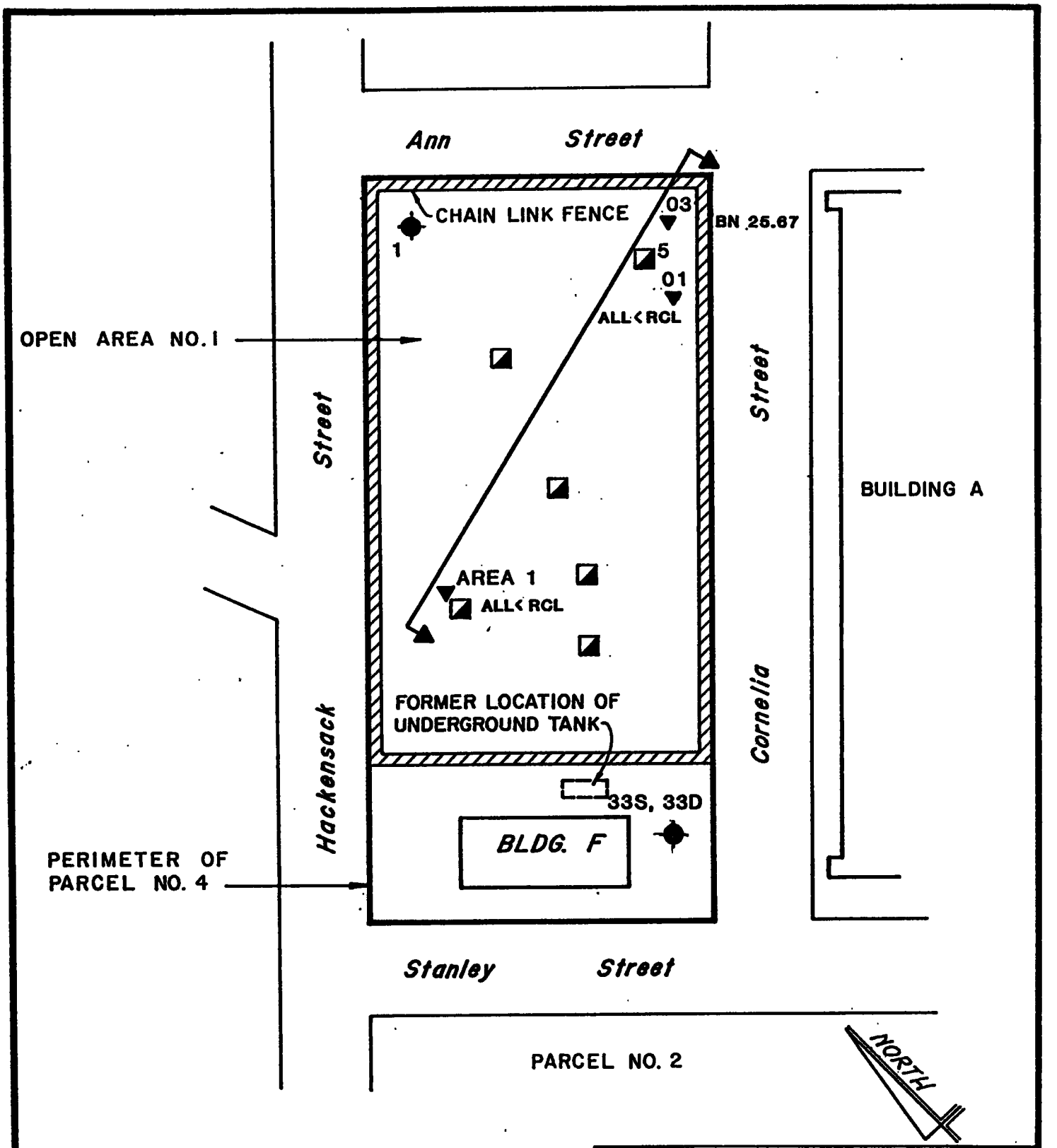
2.1 Soil Quality Conditions

2.1.1 Areal and Vertical Extent of Contamination - Open Area Away From Production Activities

Figure 2-1 provides a plan view of Parcel No. 4 indicating the location of soil samples and borings used to characterize the open area away from production activities.

One soil cross-section was drawn through Parcel No. 4. Included in the cross-section is the ground surface, approximate ground water table surface, soil sample locations and the concentrations of contaminants identified at levels exceeding the ECRA RCLs. The location of the cross-section is provided on Figure 2-1. Figure 2-2 provides the cross-section.

Base neutral organic compound contamination was detected in one location in the open area away from production



LEGEND

- TEST BORINGS
- SAMPLE POINT, CONCENTRATIONS IN PPM
- MONITORING WELL

TITLE

PARCEL 4
OPEN AREA SAMPLING LOCATIONS
(AREA 4-01)

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Environmental Resources Management

SCALE 1"=80'

DATE

FIGURE 2-1

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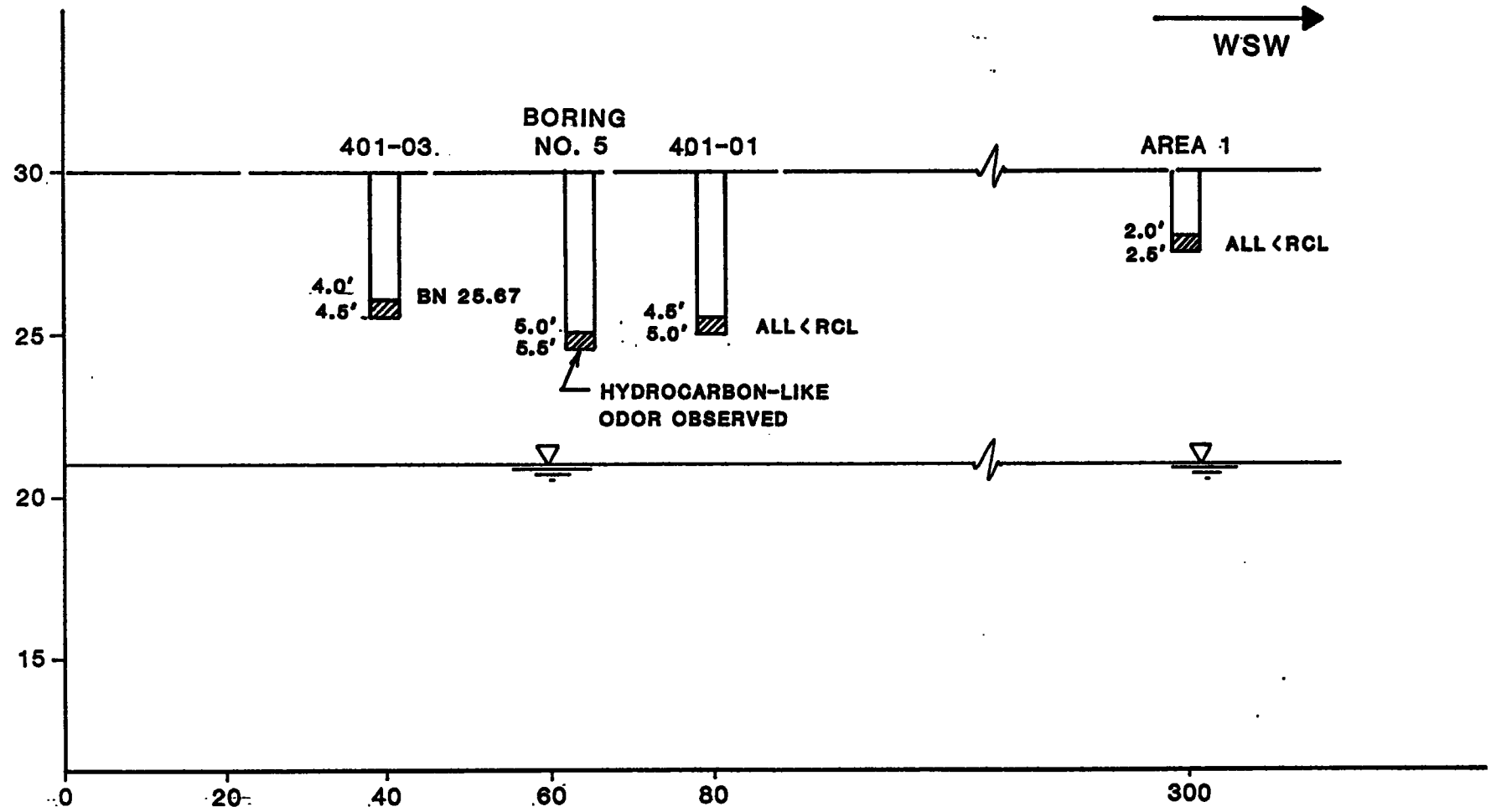

SCALE: HORIZ. 1"=20'
VERT. 1"=5'

TITLE

CROSS SECTION
(AREA 4-01)

PREPARED FOR
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EAST RUTHERFORD, N.J.

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Environmental Resources Management

SCALE NOTED
DATE

FIGURE 2-2

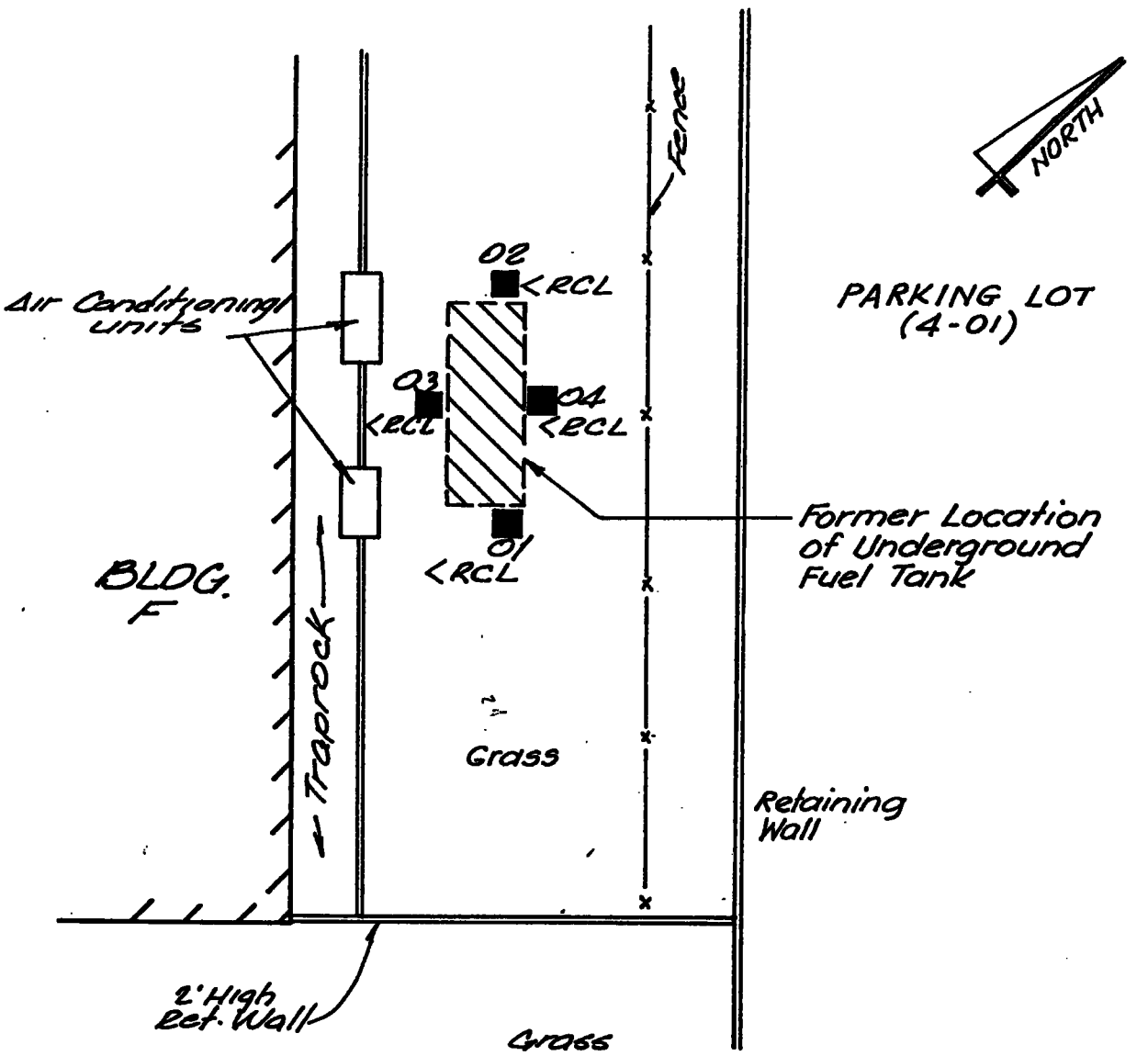
activities. The base neutral compounds were detected at a concentration of 25.67 parts per million (ppm) at location 401-03. Prior to the 1950s, a residential structure occupied this area.

During preliminary environmental investigations conducted in 1987, a hydrocarbon-like odor was observed at the location of Boring 5 at a depth of 5.0 to 5.5 feet below the pavement surface. Additional sampling is required at this location.

2.1.2 Areal and Vertical Extent of Contamination - Identified Area of Environmental Concern (Area 4-02)

The identified area of environmental concern - the former location of an underground fuel oil storage tank is shown on the site plan presented as Figure 2-1.

Figure 2-3 provides a plan view of this area and includes the horizontal location of sampling points and contaminant concentrations that exceed the ECRA RCLs. Figure 2-4 provides a cross-section of the area that shows the ground surface, estimated former location of the underground storage tank, ground water table surface, horizontal alignment and vertical

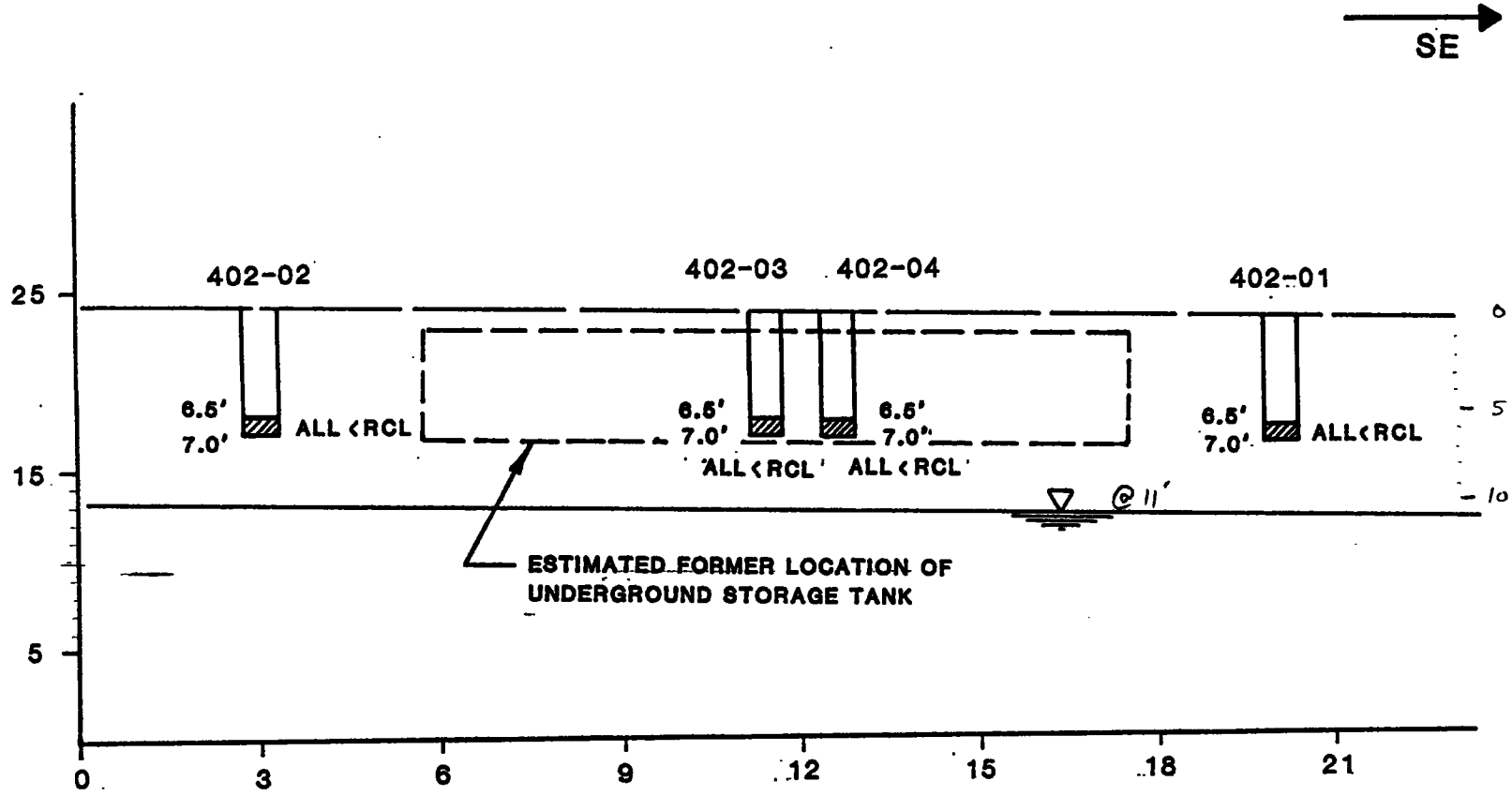


LEGEND

01 = Soil Boring and Sample Locations

TITLE	SAMPLING LOCATIONS PARCEL 4 FORMER UNDERGROUND FUEL TANK (AREA 4-02)
PREPARED FOR	Becton Dickinson &Co.
ERM-Northeast Environmental Resources Management	SCALE NOTED; DATE; FIGURE 2-3

139838



SCALE: HORIZ. 1"=3'
VERT. 1"=10'

TITLE

CROSS SECTION (AREA 4-02)

PREPARED FOR
BECTON, DICKINSON & CO.
EAST RUTHERFORD, N.J.

ERM-Northeast
Environmental Resources Management

SCALE NOTED
DATE

FIGURE 2-4

location of sampling points and contaminant concentrations exceeding the ECRA RCLs.

The four samples collected were analyzed for total petroleum hydrocarbons. Sample 4-02-04 was also analyzed for base neutrals. All concentrations were below the ECRA RCLs.

2.2 Hydrogeologic Conditions

The B-D site and the local vicinity are underlain by unconsolidated glacial sediments of Pleistocene age. The glacial materials consist of a complex interbedding of sand, silt, clay and gravel that are underlain by bedrock of the Brunswick Formation (Triassic age). The unconsolidated deposits form a southeastward thickening wedge of sediment that may be subdivided into seven generalized hydrogeologic units. These units exist from top to bottom, in the order listed below:

1. Unsaturated Zone
2. Shallow Unconfined Aquifer
3. Shallow Clay Unit
4. Semi-Confined Aquifer
5. Glacio-lacustrine Clay
6. Deep Confined Aquifer

7. Glacial Till

The Brunswick Formation lies beneath the glacial sediments and consists predominantly of shale and siltstone. The bedrock surface is irregular and dips steeply eastward.

2.2.1 Water Bearing Geologic Units

There are three principal water bearing (aquifer) units underlying the B-D site: the shallow unconfined aquifer, the intermediate semi-confined aquifer and the deep confined aquifer. Within Parcel No. 4, only the shallow unconfined aquifer is found. This unit consists primarily of moderate-to-well sorted, fine-to-medium grained glacial outwash deposits. Some undifferentiated till sediments (unsorted material deposited beneath the glacial ice) may also be included at the base of the unit. The unit is characterized by large areal variation in composition and a corresponding range of hydraulic conductivity values. The base of the unit in Parcel No. 4 is marked by the contact with the underlying Brunswick Shale.

2.2.2 Direction of Ground Water Flow

Ground water flow within Parcel No. 4 at the site is generally in a south-southeastward direction. This is consistent with the flow direction across the entire site. The rate of flow is dependent on the hydraulic gradient and hydraulic conductivity, both of which vary considerably across the site.

2.3 Ground Water Quality

Contaminants were not detected above the ECRA RCLs in ground water monitoring well 1 (MW-1) and MW-33S (see Figure 2-1). Volatile organic compounds have been detected in MW-33D at concentrations of 52.2 ppb and 66.4 ppb. MW-33D is a deep well tapping the underlying bedrock and is located upgradient of manufacturing operations in Parcel Nos. 2 and 5. A report addressing ground water quality in the confined aquifer (including ground water monitored by MW-33D) will be submitted under a separate cover.

A site wide ground water remediation plan (addressing the unconfined ground water table aquifer) is presented in the Soil and Ground Water Remedial Action Plan, Parcel No. 5. Ground water issues will not be discussed further in this report.

3.0 SITE DEVELOPMENT PLAN

B-D and National Community Bank (NCB) are currently negotiating the terms of a contract for the sale of the buildings and property contained in Parcel Nos. 4, 5 and 6.

NCB has indicated that the buildings of Parcel Nos. 4, 5 and 6 will be used primarily as office and warehouse space and that the characteristics of the land will remain essentially unchanged. No major construction projects are anticipated by NCB. The single building (Building F) and parking area (Parking lot No. 1) will be used in their present condition.

NCB is fully aware of environmental conditions at the East Rutherford site. B-D will work closely with NCB to ensure that future site development activities will not interfere with the intent or operation of the environmental cleanup program presented in this report.

4.0 DEVELOPMENT OF REMEDIAL ACTION CRITERIA

Remedial action criteria were established for all chemicals reported in soil at concentrations in excess of the ECRA RCLs using the same methodology as presented in Section 4.0 of the Soil and Ground Water Remedial Action Plan, Parcel No. 5.

4.1 Soil Remedial Action Criteria

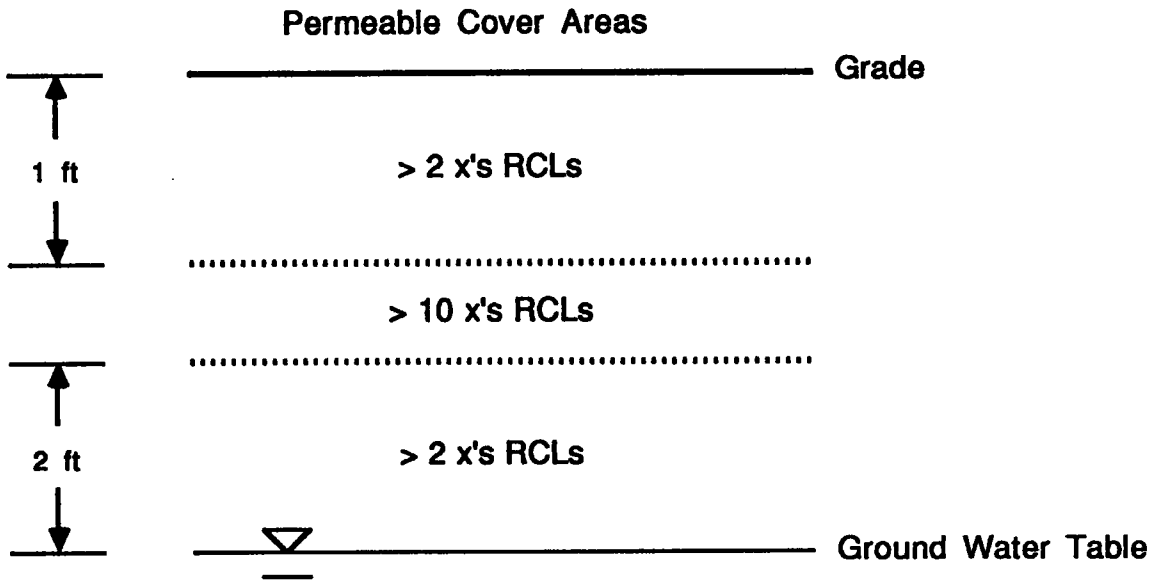
The only chemical or group of chemicals detected in soils in excess of ECRA RCLs was base/neutral extractable organics (one sample). The majority of the contamination (99%) was due to PAHs. Therefore, a criterion was established for PAHs. The only non-PAH base/neutral extractable organic reported in that sample was dibenzofuran at a concentration of 0.3 ppm. Because of the low concentration (<5 ppm) and the fact that the area will be remediated due to the presence of PAHs, no criterion was developed for dibenzofuran. Although the RCL for TPH was not exceeded, a soil criterion was established because further sampling for TPH is recommended. The criteria for TPH and PAHs are the same as presented in the Parcel No. 5 Remedial Action Plan. Figure 4-1 presents the soil remedial action criteria.

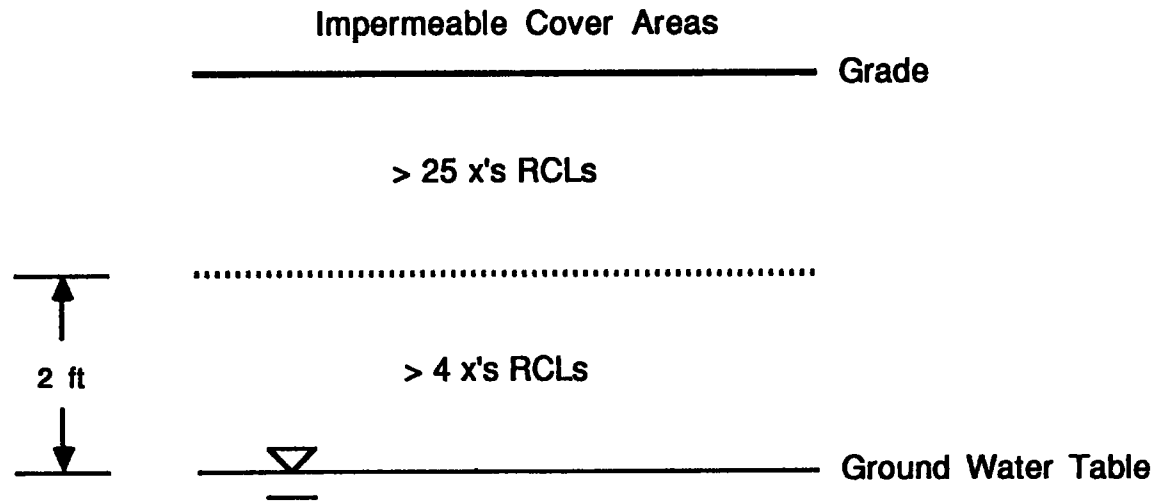
FIGURE 4-1

REMEDIAL ACTION CRITERIA

Soil Remedial Action Criteria

* General Criteria for Permeable and Impermeable Cover Areas





* Soil Contaminant Specific Criteria

Polynuclear Aromatic Hydrocarbons (PAH) - 20 ppm

4.2 Risk Assessment of the Proposed Criteria

The remedial action criteria for TPH and PAHs were evaluated using the same assumptions as presented in the Parcel No. 5 report. It was further assumed that the parking lot area will remain as a paved surface. Appendix C of the Parcel No. 5 report includes toxicity and environmental profiles for the contaminants of concern at Parcel No. 4.

4.2.1 Potential Exposure Routes

The exposure routes through which humans or the environment could potentially be exposed to site contaminants are the same as presented in the Parcel No. 5 report. These potential exposure routes include:

- volatilization of contaminants from soil;
- fugitive dust emissions from contaminated soil;
- direct contact with and ingestion of contaminated soils;
- surface water runoff discharging to Berry's Creek; and
- leaching of contaminants in soil to ground water.

Exposure to contaminated ground water (ground water contamination independent of contributions from soil contamination) does not represent a potential exposure route for Parcel No. 4 because of the lack of contamination in the surficial aquifer. Each of the remaining routes is discussed below.

1. Volatilization of Contaminants from Soil

Following remediation, volatilization of contaminants from soil is not expected to be a significant exposure route. Because the site history showed no indication of the use of volatile organics in Parcel No. 4, no such analyses were made. Even if volatiles had been used, contamination of soils would have occurred more than 30 years ago and it is expected that any highly volatile compounds would have already volatilized in that time period. The only chemical or group of chemicals reported in excess of the ECRA RCLs was base/neutral extractable compounds, consisting primarily of PAHs, from samples from under the parking lot. The impermeable surface would effectively limit any volatilization. Furthermore, PAHs are not highly volatile. Therefore, volatilization from soils is highly unlikely to represent a significant route of exposure.

2. Fugitive Dust Emissions from Contaminated Soil

As is the case for Parcel No. 5, fugitive dust emissions following remediation are not expected to be significant because all ground surfaces will be covered by either impermeable surfaces or vegetation.

3. Direct Contact with and Ingestion of Contaminated Soils

As is the case with Parcel No. 5, direct contact with contaminated soil by the public is not expected. Approximately 90% of the site is either paved or covered with buildings and this ratio is expected to remain the same. The remaining area will be fenced during remediation and construction to limit access to workers only. Direct contact with contaminated soils could theoretically occur following remediation by landscaping workers. This potential exposure route is addressed in Section 4.2.2.

4. Surface Water Runoff from the Site Discharging to Berry's Creek

Following remediation, transport of contaminated surface water runoff off-site from Parcel No. 4 will not be

significant. Parcel No. 4 has no stormwater collection and drainage system. Flow is overland to public streets which discharge to public sewers and ultimately to surface water bodies, primarily Berry's Creek. However, as described above, Parcel No. 4 will have very little exposed soil, and thus a low potential for contaminated surface runoff. Furthermore, no contaminants were detected above ECRA RCLs in the unpaved portion of Parcel No. 4. Therefore, contaminated surface runoff is not expected to be significant.

5. Leaching of Contaminants in Soil to Ground Water

As is the case with Parcel No. 5, leaching of contaminants in soils at the site to the surficial water-bearing zone underlying the site with subsequent discharge to the wetlands surrounding Berry's Creek represents a potential exposure route for humans and aquatic life. This route is addressed in Section 4.2.2.

Summary of Potential Exposure Routes

In summary, potential exposure to humans and the environment following remediation could occur through only two routes. First, contamination in site soils could leach to

ground water and migrate off-site to Berry's Creek. Second, landscapers could potentially be exposed to soil contaminants through direct contact with site soils. These exposure routes are addressed in Section 4.2.2.

It should be noted that significant human exposure to Berry's Creek is highly unlikely. As described in the Parcel No. 5 report, Berry's Creek is classified as suitable for fishing and noncontact recreation only. It is not classified as suitable for drinking water.

Because total petroleum hydrocarbons (TPH) are a group of chemicals with significantly varying fate and transport and toxicity characteristics, appropriate health-based standards with which to compare estimated exposures in a risk assessment are not available. The highest remedial action criterion for TPH in soils is 2500 ppm (i.e., 25 times the RCL of 100). This criterion has been determined to be protective of human health and the environment for the following reasons. First, TPH contamination in Parcel No. 4 soils is commonly due to solids such as coal and ash, which are not very mobile or likely to leach to ground water. Therefore, migration of TPH contamination to Berry's Creek in significant concentrations is not likely. Furthermore, TPH has not been detected in the

closest downgradient wells which have been sampled for TPH (MW-513 and MW-512). Therefore, no significant risk to human health or the environment is expected from these criteria.

4.2.2 Estimation of Exposure Point Concentrations and Comparison with Relevant Standards

Leaching of PAHs to Ground Water and Movement Off-Site to Berry's Creek

Leaching of PAHs to ground water following soil remediation with a remedial action criterion of 20 ppm was evaluated in the Parcel No. 5 report. As described in that report, projected concentrations of PAHs using conservative assumptions are essentially the same as the U.S. EPA Ambient Water Quality Criterion for protection of human health due to ingestion of drinking water. Therefore, no significant impacts to human health or the environment are expected to result from this discharge.

Direct Contact with Site Soils

The potential risk to site landscapers resulting from direct contact with site soils containing PAHs at 20 ppm or

less was evaluated in the Parcel No. 5 report. As indicated in that report, predicted intake via inhalation is nearly three orders of magnitude below the acceptable intake. Predicted oral plus dermal intake is essentially equal to the applicable health-based criterion. Because of the conservative assumptions made in the model, these predicted intakes present no unacceptable risks.

4.2.3 Summary and Conclusions

On the basis of the risk assessment, no unacceptable risks to human health or the environment are expected following remediation of the site using the proposed remedial action criteria. Projected concentrations of PAHs from site soils at Berry's Creek, using very conservative models, are essentially equal to the relevant criteria. Projected exposures to site landscapers due to contact with site soils, again using conservative assumptions, also essentially meet or are below the relevant acceptable intakes.

5.0 SOIL REMEDIATION PROGRAM

This section describes the program to be followed to remediate soil contamination in Parcel No. 4.

5.1 Remedial Classification of Soils

Soil quality remediation criteria discussed in Section 4.0 of this report have been used to identify soil as requiring remedial action (RA), further investigation (FI) or no action (NA).

Table 5-1 identifies the remedial classification of soil in Parcel No. 4. Soil location is specified by parcel number, area number and soil sample or boring location number. There is one area in Parcel No. 4 that requires remedial action, and one area that requires further investigation. In the case where remedial or investigative action is indicated, the parameters of concern for that location are also listed in the table. The one location identified as requiring further investigation is deficient in the data needed for the RA or NA classification. Procedures to evaluate the FI area are presented in the following section.

TABLE 5-1

REMEDIAL CLASSIFICATION OF SOILS

Area	Location	Remedial Designation	Parameters of Concern
Open Area			
Parcel No. 4			
Open Area No. 1 (Area 4-01)	Area 1	NA	
	401-01	NA	
	Boring 5	FI	PAH, TPH
	401-03	RA	BN
Identified Area of Environmental Concern			
Parcel No. 4			
Former Location of an Underground Fuel Tank (Area 4-02)	402-01	NA	
	402-02	NA	
	402-03	NA	
	402-04	NA	

5.1.1 Sampling and Analysis Plan for Areas Requiring Further Investigation

The location with a remedial designation of FI requires further investigation to determine if remedial action is necessary. Additional sampling will be performed at this location. A soil boring will be advanced adjacent to the location of investigation Boring No. 5 (see Figure 2-1) and a 6-inch column sample will be collected from a depth of 5.0 to 5.5 feet below the pavement surface. Hydrocarbon-like odors were detected in Boring No. 5 at this depth during the preliminary site investigation. The sample will be analyzed for the parameters of concern identified in Table 5-1.

Sample collection, maintenance and analysis procedures will be performed in accordance with those procedures presented in Section 2.0 of ECRA Environmental Assessment Program, Parcel No. 2 of January, 1988. Analytical data will be evaluated and compared to the criteria discussed in Section 4.0 of this report in order to determine if remedial action is required. If analytical results of additional sampling indicate concentrations of contaminants above acceptable levels, B-D may choose to conduct further investigation before removing the contaminated soil.

5.2 Soil Remediation Procedures

Section 5.0 of the Soil and Ground Water Remedial Action Plan, Parcel No. 5 presents an evaluation of soil remediation alternatives. Excavation and off-site disposal was selected as the most appropriate method for remediating soil conditions in Parcel Nos. 4, 5 and 6.

Section 6.0 of the Soil and Ground Water Remedial Action Plan, Parcel No. 5 presents procedures for soil remediation. These same procedures will be used to accomplish soil remediation in Parcel No. 4 and are included in this report by reference.

The total initial volume of soil to be removed in Parcel No. 4 is estimated to be 20 cubic yards. Additional soil excavation may be required depending upon the results of the investigative program described in Section 5.1.1.

6.0 SCHEDULE AND ESTIMATED COST OF REMEDIAL ACTIVITIES

6.1 Schedule of Site Remediation Activities

The schedule of site remediation activities for Parcel No. 4 will follow the schedule of remedial activities for Parcel No. 5 presented in Section 10.0 of the Soil and Ground Water Remedial Action Plan, Parcel No. 5

6.2 Cost Estimate for Site Remediation

The total cost for the completion of site remediation as presented in this remedial action plan is estimated to be $26,000. Table 6-1 provides a breakdown of the estimated cost organized by major project component.

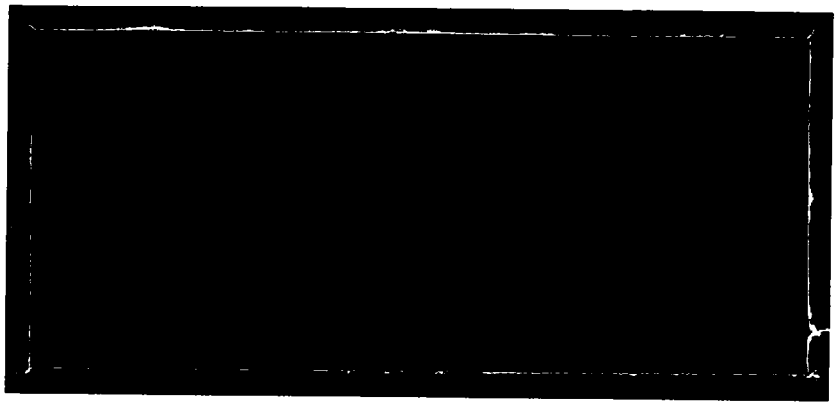
TABLE 6-1

COST ESTIMATE FOR
SOIL REMEDIATION PROGRAM
PARCEL 4

1.	Project Planning, Bid Preparation and Contract Award	$ 2,000
2.	Mobilization	$ 1,000
3.	Excavation	$ 5,000
4.	Equipment Decontamination	$ 1,000
5.	Waste Transportation	$ 5,000
6.	Waste Disposal	$ 4,000
7.	Post Excavation Sampling	$ 2,000
8.	Backfill	$ 1,000
	SUBTOTAL	$ 21,000
10.	Overall Project Contingency @ 20 percent	$ 4,200
	TOTAL COST	$ 25,200
	SAY	$ 26,000

BD responses to EPA Request for Information

Nos. 14



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SOIL AND GROUND WATER REMEDIAL ACTION PLAN
PARCEL NO. 5
BECTON, DICKINSON AND COMPANY
EAST RUTHERFORD, NEW JERSEY

MARCH, 1989

PREPARED FOR:

BECTON, DICKINSON AND COMPANY
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FRANKLIN LAKES, NEW JERSEY 07417-1880

PREPARED BY:

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EXECUTIVE SUMMARY

This Remedial Action Plan has been developed to address environmental concerns identified in Parcel No. 5 at Becton, Dickinson and Company's (B-D) East Rutherford, New Jersey site. B-D plans to cease operations in Parcel No. 5 (along with Parcel Nos. 4 and 6) and transfer ownership of the property in the fall of 1991.

Environmental concerns in Parcel 5 have been delineated through a series of comprehensive site investigations. These investigations have determined that the soils at the site are contaminated with a number of heavy metals and petroleum hydrocarbons. PCBs were also detected in soil at discrete locations. Trichloroethylene and its breakdown products were determined to be the major constituents of ground water contamination detected at several locations on-site. Petroleum hydrocarbons were also detected in ground water at discrete locations.

An environmental and health based risk assessment was used to evaluate the level of cleanup required. A series of soil and ground water remedial action criteria were developed to protect ground and surface water. These criteria also fully considered the

safety of individuals that will be working at the site following property transfer.

The remedial action plan was developed after a comprehensive evaluation of soil and ground water remediation alternatives. Excavation and off-site disposal was selected as the most appropriate method of achieving the soil criteria. To achieve ground water remediation, a series of recovery trenches will be placed at strategic locations on the site. The recovered ground water will be conveyed to an on-site system for treatment. The treated effluent will be discharged to the local sewerage system.

1.0 INTRODUCTION

Becton, Dickinson and Company (B-D) owns and operates a medical apparatus manufacturing facility in the Borough of East Rutherford, Bergen County, New Jersey. The location of the facility is shown on the general vicinity map provided as Figure 1-1. Due to the planned cessation of operations at the site, B-D prepared and submitted an initial Environmental Cleanup Responsibility Act (ECRA) notice to the New Jersey Department of Environmental Protection (NJDEP) in June, 1987. The site was divided into six parcels (Parcel Nos. 1 through 6) each having separate tax lot and block numbers. Figure 1-2 provides a plan view of the site divided into the six parcels. Six separate ECRA submissions were therefore made. Each submission was subsequently assigned an individual ECRA case number by the NJDEP. B-D has since conducted a series of comprehensive environmental investigations and made various additional ECRA submissions.

Environmental investigations of Parcel Nos. 1, 2 and 3 were conducted on an expedited schedule from October, 1987 through December, 1987. B-D subsequently prepared and submitted Remedial Action Plans for these three parcels in July, 1988. The Remedial Action Plans were approved by the NJDEP in October, 1988. Parcel

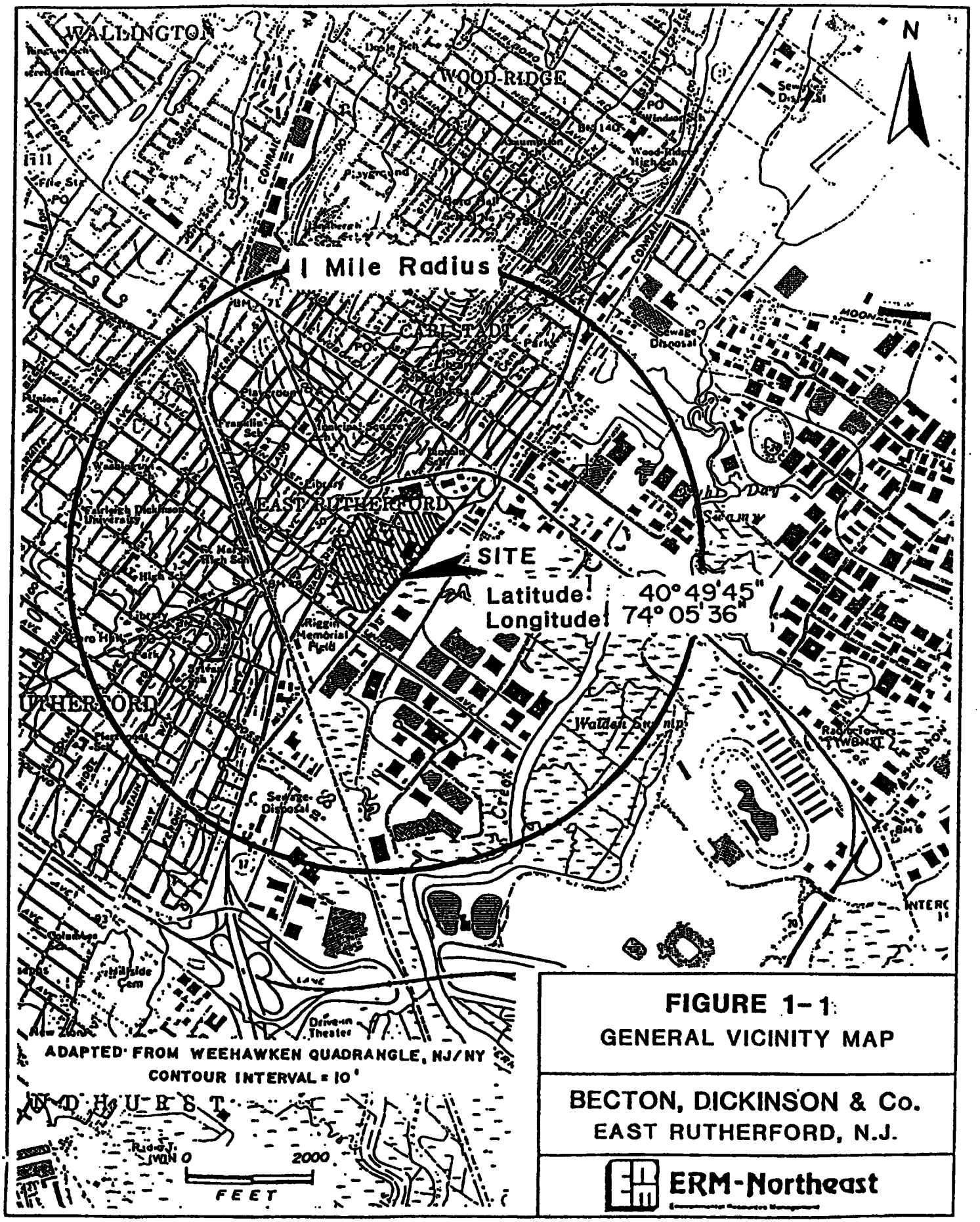
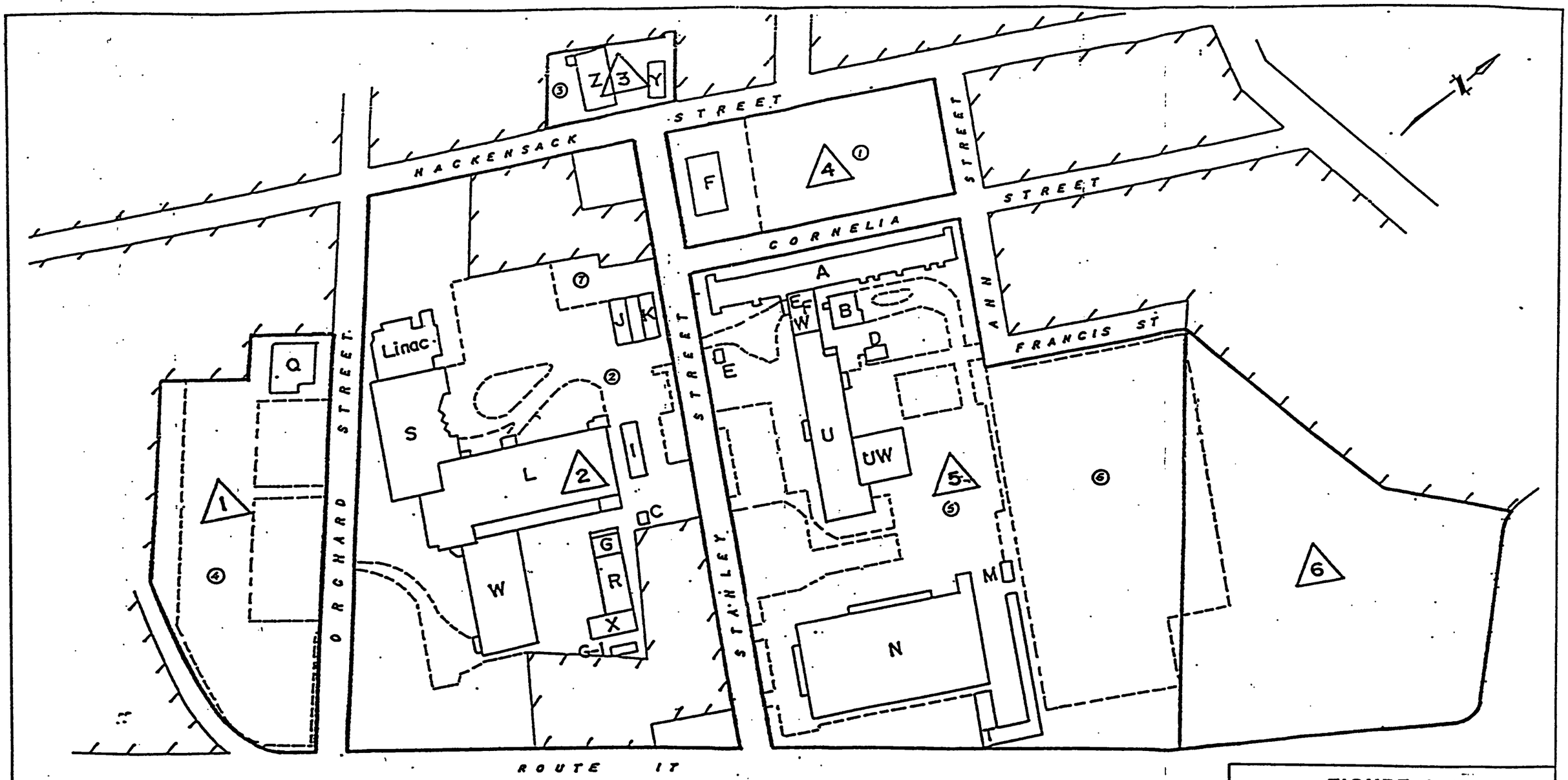


FIGURE 1-1
GENERAL VICINITY MAP

BECTON, DICKINSON & Co.
EAST RUTHERFORD, N.J.

ERM-Northeast



SCALE: 1"=165'±

LEGEND

D BUILDING

① PARKING LOT NUMBERS

PROPERTY NOT OWNED BY B-D

FIGURE 1-2
SITE PLAN
PARCEL DESIGNATIONS

BECTON, DICKINSON & Co.
EAST RUTHERFORD, N.J.

ERM-Northeast

Nos. 1, 2 and 3 are currently in the remediation phase and are being handled by the NJDEP ECRA Cleanup Oversight section.

Similar environmental investigations were conducted in Parcel Nos. 4, 5 and 6 from February, 1988 through May, 1988. The investigation conducted in Parcel No. 5 has revealed that contaminants are present in both soil (primarily heavy metals and total petroleum hydrocarbons) and ground water (primarily volatile organic compounds) above the NJDEP-ECRA recommended cleanup levels (RCLs). This Remedial Action Plan has been developed to address areas of environmental concern in Parcel No. 5 and to provide procedures for the remediation of this parcel. A separate decontamination plan has been prepared to address remediation of the site buildings and structures.

1.1 Previous ECRA Submissions

Table 1-1 provides a summary listing of the documents previously submitted to the NJDEP. These documents are referenced in this report to avoid redundancy and improve the efficiency of the remedial procedures presentation.

TABLE 1-1

SUMMARY OF ECRA SUBMISSIONS

Report Title	Report Summary	Submission Date
ECRA - Sampling and Analysis Plan, Volume I Parcels 1, 2, 3, 4, 5, and 6	Presents site information for the initial ECRA notice and the Sampling and Analysis Plan common to each of the 6 parcels	June 1987
ECRA - Sampling and Analysis Plan, Volume II Parcels 1, 2, 3, 4, 5, and 6	Presents parcel specific information for the Sampling and Analysis Plan including results of the Phase 1a Preliminary Environmental Investigation. Includes the GIS and SES ECRA forms for each parcel and supporting information.	June 1987
ECRA - Supplementary Information, Volume III Parcels 5 and 6	Presents the results of the 1b and Phase 1c Preliminary Environmental Investigations conducted in Parcels 5 and 6 and amends the June 1987 Sampling and Analysis Plans.	Dec. 1987
ECRA - Environmental Assessment Program Parcels 1, 2, and 3	Presents results of the comprehensive environmental program conducted in Parcels 1, 2, and 3 along with the results of the Phase 1b and 1c preliminary environmental investigations.	Feb. 1988
Soil and Ground Water Remedial Action Plan(s) Parcel 1 and 2, Parcel 3	Presents additional results of environmental investigations and procedures to remediate soil and ground water contamination in Parcels 1, 2 and 3.	July 1988
ECRA Environmental Assessment Program Parcels 4, 5 and 6	Presents results of the comprehensive environmental program conducted in Parcels 4, 5 and 6	Aug. 1988

1.2 Remedial Action Performance Standard

This Remedial Action Plan is designed to accomplish two objectives:

- To remedy site environmental conditions on the basis of environmental and health based risk levels developed for the site.

- To address environmental quality issues to be consistent with future site development plans.

1.3 Overview of Report

The remainder of the report is organized into the following sections:

2.0 ENVIRONMENTAL CONDITIONS - This section presents environmental conditions at the site and includes the presentation of results from previous investigations along with additional data not yet presented.

3.0 FUTURE SITE DEVELOPMENT PLAN - The future site development plan is summarized in this section.

4.0 DEVELOPMENT OF REMEDIAL ACTION CRITERIA - This section presents site cleanup levels developed for both soil and ground water.

5.0 SELECTION OF REMEDIAL ALTERNATIVES - Remedial alternatives for both soil and ground water are discussed and presented in this section.

6.0 SOIL REMEDIATION PROGRAM - This section presents the procedures proposed to restore soil quality at the site.

7.0 GROUND WATER REMEDIATION PROGRAM - The conceptual design of the ground water retrieval, treatment and discharge systems are presented in this section.

8.0 ON-GOING MONITORING PROGRAM - This section presents a program for on-going monitoring of ground water and the effluent from the treatment system.

9.0 SCHEDULE OF REMEDIAL ACTIVITIES - A schedule for implementation of remedial activities and procedures is presented in this section.

10.0 COST ESTIMATES FOR SITE REMEDIATION - This section presents the estimated cost for the remediation program for Parcel No. 5.

2.0 ENVIRONMENTAL CONDITIONS

This section establishes overall environmental conditions in Parcel No. 5. Environmental data obtained after August, 1988 (and therefore not included in previous submissions) is presented in detail along with a summary of previously submitted data. Data obtained prior to August, 1988 is detailed in the previously submitted ECRA Environmental Assessment Program for Parcel Nos. 4, 5 and 6.

2.1 Soil Quality Conditions

2.1.1 New Soil Quality Data

EP Toxicity Analysis

Two samples previously collected were analyzed for heavy metals using the extraction procedure. The choice of samples for reanalysis was based upon the original heavy metal analytical results. Both samples had significant total metal concentrations. Table 2-1 presents a comparison of the samples' total metals concentrations versus the extraction procedure metals concentrations. Laboratory data reporting sheets are presented in Appendix A.

TABLE 2-1

COMPARISON OF TOTAL HEAVY METALS WITH EXTRACTION PROCEDURE
(LEACHABLE HEAVY METALS)

Sample No.	Parameter	Total Concentration	Leachable Concentration	RCRA standard
5-04-13	Barium	496 ppm	0.14 ppm	
	Lead	1941 ppm	16 ppm	5 ppm
5-13-01	Cadmium	16.4 ppm	<0.01 ppm	
	Chromium	161 ppm	<0.01 ppm	
	Mercury	3.37 ppm	<0.4 ppb	
	Lead	358 ppm	0.105 ppm	

Archived Soil Sample Analysis

Three archived soil samples were analyzed for zinc, lead and zinc, and total petroleum hydrocarbons (TPH), respectively. The choice of samples for reanalysis was made based upon the location of the sample. Each of the archived samples is located directly below a sample that has been previously analyzed and found to have elevated concentrations of the parameters listed. Table 2-2 presents the sample number and the depth of the previous sample, the depth of the archived sample, the parameter, the previous sample's concentration and the concentration of the archived sample. Samples 5-04-10 and MW-516 were received by the laboratory within the maximum holding time. Although Sample 5-07-04 was not received within the maximum holding time for TPH, the results of the analysis are valid for our purposes. Laboratory data reporting sheets are presented in Appendix A.

2.1.2 Areal and Vertical Extent of Contamination - Open Areas Away from Production Activities

Figure 2-1 (back pocket) provides a plan view of Parcel No. 5 indicating the location of soil samples used to characterize open areas away from production activities (as

TABLE 2-2

ARCHIVED SAMPLE RESULTS

Sample Number	Depth of Original Sample (ft.)	Depth of Archived Sample (ft.)	Parameter	Concentration of Original Sample (ppm)	Concentration of Archived Sample (ppm)
5-04-10	1.5-2.0	3.5-4.0	Zn	365	76
5-07-04	1.0-1.5	3.0-3.8	TPH	120	56
MW-516 (soil)	1.5-2.0	3.0-3.5	Pb	326	28
			Zn	362	22

defined in the ECRA Sampling and Analysis Plan, Vol. II). All environmental data obtained to date are shown on the figure.

Twelve soil cross-sections were drawn through Parcel No. 5. Included in each cross section is the ground surface, approximate ground water table surface, soil sample locations and the concentrations of priority pollutant organic compounds, heavy metals and other contaminants identified at levels exceeding the ECRA RCLs. The locations of these cross sections are provided on Figure 2-2 presented in a back pocket of this report. Figures 2-3 through 2-14, in Appendix B, provide the cross-sections. All environmental quality data obtained to date are shown on the cross sections.

2.1.3 Areal Extent of Contamination-Identified Areas of Environmental Concern

Plan view drawings of each area of environmental concern (as defined in the Sampling and Analysis Plan, Vol. II) are presented in Figures 2-15 through 2-29. The plan view drawings show the horizontal location of sampling points and contaminant concentrations that exceed the ECRA RCLs. The data shown on these figures includes all environmental quality

data collected to date. These figures are provided in Appendix B.

2.1.4 Summary of Soil Quality Conditions

In general, areas of particular concern in Parcel No. 5 identified during the soil quality investigation include:

- Heavy metal contamination, particularly mercury, at the southern end of Building A.

- Base-neutral organic compounds and total petroleum hydrocarbon contamination adjacent to Building B.

- Former underground storage tank locations adjacent to Building D and north of Building N.

More specifically, soil quality conditions in Parcel No. 5 can be summarized as follows:

- Heavy metal contamination, predominantly mercury, chromium, copper, lead and zinc is primarily found at shallow depths in each of the open areas away from production activities. Table 2-3 provides

TABLE 2-3

SOIL CONTAMINANT DETECTION AND CONCENTRATION

Parameter	RCL (ppm)	No. of Samples Analyzed for Parameter	No. of Samples with Concentration of Parameter Above RCL	Range of Concentrations (ppm)	Average Concentration (ppm)
Cr	100	62	2	197-425	310
Cu	170	62	9	197-2310	562
Pb	250	62	12	266-1941	562
Hg	1.0	62	21	1.05-38	7.4
Zn	350	62	8	3626-1196	713
TPH	100	66	16	110-17,800	4,663

concentration ranges for the five metals. These metals may be a result of metal turnings from the machining of brass (a leaded alloy) parts and off-spec products being present in fill materials formerly deposited in the open areas. The machining of brass syringe fittings is a process that has been conducted at B-D's East Rutherford site for over 50 years.

- Total petroleum hydrocarbon contamination occurred near the soil surface and was associated with fill soils that contained coal and/or coal ash and other miscellaneous debris. Elevated TPH concentrations are also found in the former underground storage tank locations. TPH concentration ranges are provided on Table 2-3.

- Base-neutral organic compounds were found in discrete surface locations adjacent to former underground storage tanks' locations.

- Volatile organic compound contamination is of limited concern in soil.

- The results of the analysis of samples collected in areas identified as having a potential environmental concern have shown that some of these areas exhibit contaminant levels (generally heavy metals and TPH) greater than the ECRA RCLs. In most cases, the source of the contamination is probably the plant activities that have taken place in the area, i.e., storage of fuel oil in an underground storage tank. Soil contamination may also be caused, to some extent, by the fill material underlying the areas.

- In general, soils in Parcel No. 5 consist of both man-made fill materials and variably sorted glacial meltwater sands and silts with occasional traces of clay. The fill layer is a mixture of the aforementioned fine and coarse grained sediments containing materials such as glass fragments, metal turnings, coal and ash, bricks and wood fragments.

- Although it is difficult to establish what background conditions are for these types of soils, the NJDEP Office of Science and Research has established typical ambient concentrations of select heavy metals in disturbed urban parkland soils in

Northern New Jersey. Table 2-4 provides a listing of these typical concentrations. Analytical results of soil samples collected from Independence Park in Essex Co. (nearest to B-D's East Rutherford facility) are also provided.

2.2 Summary of Hydrogeologic Conditions

The B-D site and the local vicinity are underlain by unconsolidated glacial sediments of Pleistocene age. The glacial materials consist of a complex interbedding of sand, silt, clay and gravel and are underlain by bedrock of the Brunswick Formation (Triassic age). The unconsolidated deposits form a southeastward thickening wedge of sediment that may be subdivided into seven generalized hydrogeologic units. These units exist from top to bottom, in the order listed below:

1. Unsaturated Zone
2. Shallow Unconfined Aquifer
3. Shallow Clay Unit
4. Semi-Confined Aquifer
5. Glacio-lacustrine Clay
6. Deep Confined Aquifer
7. Glacial Till

TABLE 2-4

HEAVY METALS IN URBAN "BACKGROUND" SOILS

Heavy Metal	Range of "Background" Concentrations (ppm)	Median Concentrations (ppm)	Concentrations In Independence Park, Essex Co. (ppm)
Arsenic	0.34 - 48.9	5.65	48.9
Cadmium	0.16 - 2.36	.47	2.36
Copper	8.8 - 143	31.5	143
Lead	25.8 - 617	97.8	617
Manganese	30 - 952	333	240
Nickel	5.5 - 53.8	13.3	53.8
Zinc	40.4 - 789	88.9	210

Fields, T. Personal communication from T. Fields, Office of Science and Research, New Jersey Department of Environmental Protection, to J. Hochreiter, ERM Inc., December, 1987.

The Brunswick Formation lies beneath the glacial sediments and consists predominantly of shale and siltstone. The bedrock surface is irregular and dips steeply eastward.

2.2.1 Water Bearing Geologic Units

There are three principal water bearing (aquifer) units underlying the B-D site, the shallow unconfined aquifer, the intermediate semi-confined aquifer and the deep confined aquifer. Each of these units are found within Parcel No. 5. The shallow unconfined unit consists primarily of moderate-to-well sorted, fine-to-medium grained glacial outwash deposits. In the eastern portion of the site along Route 17, this unit overlies the shallow clay unit and the intermediate semi-confined aquifer. The semi-confined aquifer is similar in composition to the upper unconfined aquifer. Both aquifers are characterized by large areal variation in composition and a corresponding range of hydraulic conductivity values.

Below the semi-confined aquifer is the lacustrine clay unit and the underlying deep confined aquifer. In the western portion of Parcel No. 5, the upper unconfined aquifer lies directly atop the lacustrine clay. The deep confined aquifer consists of coarse-to-fine stratified sands with interbedded

lenses of silt and gravel. The base of this unit is marked by a contact with the underlying glacial till or the Brunswick Shale.

2.2.2 Direction of Ground Water Flow

Ground water flow within Parcel No. 5 is generally in a south-southeastward direction. This is consistent for each of the three aquifer units. The rate of flow in the upper unconfined aquifer and the intermediate semi-confined aquifer is dependent on the hydraulic gradient and hydraulic conductivity, the latter of which varies considerably across the site. Flow rate in the deep confined aquifer is relatively slow due to small hydraulic gradient present.

2.3 Ground Water Quality Conditions

2.3.1 Supplementary Ground Water Sample Analysis

Monitoring well Nos. 2, 3 and 4 (MW-2, MW-3, MW-4) in Parcel No. 5 were sampled in August, 1988, and MW-2 and MW-3 were sampled in November, 1988. Their samples were analyzed as required by B-D's New Jersey Pollutant Discharge Elimination System Permit. Samples from MW-2 and MW-3 were

analyzed for total petroleum hydrocarbons in both August and November. The sample from MW-4 was analyzed for metals, total petroleum hydrocarbons and volatile organic compounds. The sample analysis results along with a summary of all ground water quality data obtained to date for Parcel No. 5 are presented in Table 2-5 through 2-12. Laboratory data reporting sheets are presented in Appendix A.

2.3.2 Identification of Ground Water Contamination

Figure 2-30, presented in a back pocket of this report, presents a plan view of Parcel No. 5 showing detected ground water contamination at levels exceeding the RCLs. The highest level of contamination observed in any one well over the RCLs is presented on the figure. As can be seen from the figure, the primary ground water contaminants detected in Parcel No. 5 are volatile organic compounds.

2.3.3 Summary of Ground Water Quality Conditions

Ground water quality conditions in Parcel No. 5 can be summarized as follows:

- Volatile organic compounds (VOCs) are the primary ground water contaminant detected in Parcel No. 5.

TABLE 2-5 SUMMARY OF INORGANIC ANALYSES
UNCONFINED AQUIFER
BECTON DICKINSON, 1988-1988
EAST RUTHERFORD

			PARCEL 5																
SAMPLE ID NUMBER	RCL	DL	4	4	4	9	9	12	15	15	16	32	501	502	503	507	508	509	510
LABORATORY ID NUMBER			54824-D	57486-004	67696-002	54824-I	57486-009	57486-012	57486-015	58601-007	57486-016	69793-001	63674-006	63580-009	63580-015	63580-005	63580-014	63580-003	63580-008
Date Collected			6/9/87	9/2/87	8/19/88	6/9/87	9/2/87	9/2/87	9/2/87	10/8/87	9/2/87	10/25/88	4/6/88	4/6/88	4/5/88	4/6/88	4/6/88	4/5/88	4/5/88
Aluminum (Al)		200	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	U	U	879	478	U	U	U
Arsenic (As)	50	5	12	NA	NA	15	NA	NA	NA	NA	NA	NA	U	U	U	U	U	U	U
Barium (Ba)	1,000	200	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	U	U	U	200	U	662	399
Calcium (Ca)			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	79,200	106,000	50,400	43,000	16,800		64,400
Chromium (Cr+6)	50	0.01	NA	<10	<10	NA	NA	NA	40	26	NA	NA	U	NA	NA	NA	NA	NA	NA
Cobalt (Co)		30	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	U	U	U	U	U	U	U
Copper (Cu)	1,000	25	110	40	<50	500*	<40	30	90	109	60	NA	U	U	U	32	U	U	U
Iron (Fe)		100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	174	U	1,260	J	383	34,400	4,570
Lead (Pb)	50	10	32	U	<50	400*	U	U	U	U	U	NA	U	U	U	U	U	U	10
Magnesium (Mg)			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	15,700	14,300	10,200	28,800	6,300	22,900	22,200
Manganese (Mn)		10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8,054	21	532	1,230	931	1,841	873
Mercury (Hg)	2	0.4	0.9	NA	NA	140*	1	0.5	NA	U	U	NA	U	U	U	J	U	0.5	U
Nickel (Ni)		40	U	40	<50	370*	390	40	3,100	4,200	210	1,700	U	U	U	U	U	54	U
Sodium (Na)	50,000 (1)		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	51,600	33,500	30,600	147,000	61,000	72,500	303,000
Zinc	5,000	20	180	130	<50	1,230*	520	110	NA	890	700	NA	U	U	120	39	34	232	24
Total Cyanide		10	<5	NA	NA	<5	NA	NA	NA	NA	NA	NA	10	U	U	J	U	U	U

U - Parameter not detected
NA - Not Analyzed For
RCL - ECRA *Action level
DL - Detection Limit
(1) - NJDEP Drinking Water Level

Units in ppb
*Sample was not filtered prior to analysis

TABLE 2-5 SUMMARY OF INORGANIC ANALYSES
UNCONFINED AQUIFER
BECTON DICKINSON, 1988-1988
EAST RUTHERFORD

	PARCEL 5								
SAMPLE ID NUMBER	512	512	513	513	515(S)	516	517	518	519(S)
LABORATORY ID NUMBER	63580-012	69793-002	63680-011	69793-003	63680-007	63674-004	63674-005	63674-001	63674-008
Date Collected	4/6/88	10/25/88	4/6/88	10/25/88	4/5/88	4/7/88	4/7/88	4/7/88	4/7/88
Aluminum (Al)	1,270	NA	U	NA	U	U	U	1,820	U
Arsenic (As)	U	NA	U	NA	18	U	U	U	U
Barium (Ba)	U	NA	U	NA	627	U	U	U	414
Calcium (Ca)	69,500	NA	80,900	NA	55,800	80,400	74,500	106,000	101,000
Chromium (Cr+6)	NA	NA	NA	NA	U	NA	NA	NA	NA
Cobalt (Co)	U	NA		NA	U	U	U	47	U
Copper (Cu)	U	NA	29	NA	U	U	U	29	U
Iron (Fe)	U	NA	U	NA	16,200	U	U	2,710	5,710
Lead (Pb)	U	NA	U	NA	U	U	10	U	U
Magnesium (Mg)	13,400	NA	13,700	NA	13,800	9,420	8,480	23,800	14,800
Manganese (Mn)	569	NA	47	NA	750	35	90	13,820	1,920
Mercury (Hg)	U	NA	U	NA	U	U	U	U	U
Nickel (Ni)	U	40	U	U	203	U	U	U	U
Sodium (Na)	34,000	NA	41,800	NA	54,800	13,000	22,400	18,100	54,200
Zinc	50	NA	U	NA	837	48	37	U	U
Total Cyanide	U	NA	U	NA	U	U	U	U	U

U - Parameter not detected
NA - Not Analyzed For
RCL - ECRA "Action level
DL - Detection Limit
(1) - NJDEP Drinking Water Level

Units in ppb
*Sample was not filtered prior to analysis

TABLE 2-6
SUMMARY OF ORGANIC ANALYSES IN THE
UNCONFINED AQUIFER
BECTON DICKINSON
EAST RUTHERFORD
1987-1989

SAMPLE ID NUMBER	2	2	2	3	3	3	4	4	4	4	9	9	9	12	12
LABORATORY ID NUMBER	62804-004	67696-005	70197-002	54824-03	67696-006	70197-003	54824-04	57486-004	62803-003	67696-002	54824-09	57486-009	62803-008	57486-012	62803-004
Date Collected	3/11/88	8/19/88	11/9/88	6/9/87	8/19/88	11/9/88	6/9/87	9/2/87	3/11/88	8/19/88	6/9/87	9/2/87	3/11/88	9/2/87	3/11/88
ORGANIC COMPOUNDS (PPB)															
Total Base Neutral Organics	NA	NA	NA	U	NA	NA	U	NA	NA	NA	U	NA	NA	NA	NA
Total Pesticides	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total PCBs	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Phenols	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Petroleum Hydrocarbons (PPM)	NA	54	190	2.5	<0.5	<0.5	<0.7	NA	NA	4.9	0.73	NA	NA	NA	NA
Date Collected	3/11/88	8/19/88	11/9/88	6/9/87	8/19/88	11/9/88	6/9/87	9/2/87	3/11/88	8/19/88	6/9/87	9/2/87	3/11/88	9/2/87	3/11/88
Laboratory ID Number	62804-004						54824-04	57486-004	62803-003	67696-002	54824-09	57486-009	62803-008	57486-012	62803-004
Total Volatile Organics	U	NA	NA	NA	NA	NA	832	196	199	243	56	U	47	U	356
Tentatively Identified Compounds (PPB)															
Volatile Organics	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Base Neutrals	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

U - No Constituents were detected
NA - Not analyzed for

TABLE 2-5
SUMMARY OF ORGANIC ANALYSES IN THE
UNCONFINED AQUIFER
BECTON DICKINSON
EAST RUTHERFORD
1987-1988

	PARCEL 5														
SAMPLE ID NUMBER	501	502	503	507	508(S)	509(S)	510	512	513	515(S)	516	517	518	519(S)	2'
LABORATORY ID NUMBER	63674-006	63580-009	63580-015	63580-005	63580-014	63580-003	63580-008	63580-012	63580-011	63580-007	63674-04	63674-005	63674-001	63674-008	54824-02
Date Collected	4/6/88	4/6/88	4/5/88	4/6/88	4/6/88	4/5/88	4/5/88	4/6/88	4/6/88	4/5/88	4/7/88	4/7/88	4/7/88	4/7/88	6/9/87
ORGANIC COMPOUNDS (PPB)															
Total Base Neutral Organics	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Total Pesticides	U	U	U	U	U	U	U	U	U	U	U	U	U	U	NA
Total PCBs	U	U	U	U	U	U	U	U	U	U	U	U	U	U	NA
Total Phenols	20	U	U	U	U	U	U	U	U	U	U	U	U	U	NA
Total Petroleum Hydrocarbons (PPM)	6.3	U	U	U	U	U	U	U	U	0.6	U	U	U	58	U
Date Collected	3/8/88	3/8/88	3/8/88	3/8/88	3/8/88	4/5/88	4/5/88	3/8/88	3/11/88	3/11/88	4/7/88	4/7/88	3/11/88	3/11/88	6/9/87
Laboratory ID Number	62718-007	62718-008	62719-002	62718-009	62718-010	63580-003	63580-008	62718-011	62803-009	62803-007	63674-004	63674-005	62803-005	62803-002	
Total Volatile Organics	160	U	1010	U	7,490	U	195	70	8.3	U	7	U	21	U	NA
Tentatively Identified Compounds (PPB)															
Volatile Organics	U	U	U	U	U	U	U	U	U	U	U	U	U	U	NA
Base Neutrals	344	U	U	U	U	U	U	U	U	U	U	U	U	376	NA

U - No Constituents were detected
NA - Not analyzed for

TABLE 2-6
SUMMARY OF ORGANIC ANALYSES IN THE
UNCONFINED AQUIFER
BECTON DICKINSON
EAST RUTHERFORD
1987-1988

SAMPLE ID NUMBER	15	15	15	16	16	24	24	24	32	32	36	36	36	37	37
LABORATORY ID NUMBER	57486-015	58601-007	62718-001	57486-016	62803-001	58970-013	59014-027	62718-002	59088-002	62718-003	59193-016	62719-001	65022-009	59262-001	62718-004
Date Collected	9/2/87	10/8/87	3/8/88	9/2/87	3/11/88	10/22/87	10/24/87	3/8/88	10/28/87	3/8/88	10/30/87	3/8/88	5/27/88	10/31/87	3/8/88
ORGANIC COMPOUNDS (PPB)															
Total Base Neutral Organics	NA	27.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Pesticides	NA	U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total PCBs	NA	U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Phenols	NA	U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Petroleum Hydrocarbons (PPM)	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Date Collected	9/2/87	10/8/87	3/8/88	9/2/87	3/11/88	10/22/87	10/24/87	3/8/88	10/28/87	3/8/88	10/30/87	3/8/88	5/27/88	10/31/87	3/8/88
Laboratory ID Number	57486-015	58601-007	62718-001	57486-016	62803-001	58970-013	59014-027	62718-002	59088-002	62718-003	59193-016	62719-001	65022-009	59262-001	62718-004
Total Volatile Organics	56,586	62,590	42,900	U	160	5749	10,489	2,700	3,460	10,130	7,023	19,200	19,987	125	260
Tentatively Identified Compounds (PPB)															
Volatile Organics	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Base Neutrals	NA	U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

U - No Constituents were detected
NA - Not analyzed for

TABLE 2-6
SUMMARY OF ORGANIC ANALYSES IN THE
UNCONFINED AQUIFER
BECTON DICKINSON
EAST RUTHERFORD
1987-1988

SAMPLE ID NUMBER	39	39	45	45
LABORATORY ID NUMBER	59545-031	62718-005	59583-005	62718-006
Date Collected	11/12/87	3/8/88	11/13/87	3/8/88
ORGANIC COMPOUNDS (PPB)				
Total Base Neutral Organics	NA	NA	NA	NA
Total Pesticides	NA	NA	NA	NA
Total PCBs	NA	NA	NA	NA
Total Phenols	NA	NA	NA	NA
Total Petroleum Hydrocarbons (PPM)	NA	NA	NA	NA
Date Collected	11/28/87	3/8/88	11/13/87	3/8/88
Laboratory ID Number	59545-031	62718-005	59583-005	62718-006
Total Volatile Organics	1,928	190	4,345	11,000
Tentatively Identified Compounds (PPB)				
Volatile Organics	NA	NA	NA	NA
Base Neutrals	NA	NA	NA	NA

U - No Constituents were detected
NA - Not analyzed for

TABLE 2-7
SUMMARY OF VOLATILE ORGANICS IN THE UNCONFINED AQUIFER
BECTON-DICKINSON & CO.
1987-1988

SAMPLE NUMBER	PARCEL 5 501	502	503	507	508	509	510	512	513	515	516	517	518	519S
LABORATORY ID NUMBER	63674-006	62718-008	63580-015	62718-009	62718-010	63580-003	63580-008	62718-011	62803-009	62803-007	63674-004	63674-005	662803-005	662803-002
Date Collected	4/6/88	3/10/88	4/5/88	3/10/88	3/10/88	4/6/88	4/6/88	3/10/88	3/11/88	3/11/88	4/6/88	4/7/88	3/11/88	3/11/88
UNITS (PPB)														
Acetone	U	U	U	U	U	U	U	U	U	BMDL	U	U	U	U
Benzene	U	U	U	U	U	U	5	U	U	U	U	U	U	U
Bromomethane	U	U	U	U	U	U	U	U	U	U	U	BMDL	U	U
Chloroform	U	BMDL	U	U	U	U	BMDL	U	U	U	U	U	U	U
Chloromethane	U	U	U	U	U	U	U	U	U	U	U	BMDL	U	U
Methylene Chloride	U	U	9.6B	U	U	U	U	U	BMDL	BMDL	U	BMDL	21	U
Tetrachloroethene	U	U	4.6J	U	U	U	U	U	BMDL	U	7	U	BMDL	U
Trans-1,2 Dichloroethene	160	U	110	BMDL	6800	U	110	BMDL	U	BMDL	U	U	U	U
Trichloroethene	BMDL	BMDL	900B	BMDL	610	U	U	70	8.3	BMDL	U	U	BMDL	U
Vinyl Chloride	U	U	1J	U	80	U	80	U	U	BMDL	U	BMDL	U	U
1,1,1 Trichloroethane	U	U	1J	U	U	U	U	U	BMDL	U	U	U	U	U
1,1 - Dichloroethane	U	U	U	U	BMDL	U	U	U	U	U	U	U	J	U
TOTAL VOLATILES	160	0	1010 (B)	0	7,490	0	195	70	8.3	0	7	0	21	0

B - Also detected in blank
J - Quantitative estimate
U - None Detected
( ) - One or more constituents is qualified by associated code
BMDL - Below method detection limit

TABLE 2-7
SUMMARY OF VOLATILE ORGANICS IN THE UNCONFINED AQUIFER
BECTON-DICKINSON & CO.
1987-1988

SAMPLE NUMBER	2	(DUPL. OF 2) 705	3	4	4	4	4	9	9	9	12	12	15	15	15
												PARCEL			
LABORATORY ID NUMBER	62804-004	62804-001	63803-010	54824-04	57486-004	62803-003	67696-002	54824-09	57846-009	62803-008	57846-012	62803-004	57486-015	58601-007	62718-001
Date Collected	3/11/88	3/11/88	3/11/88	6/9/87	9/2/87	3/11/87	8/19/88	6/9/87	9/2/87	3/11/88	9/2/87	3/11/88	9/2/87	10/8/87	3/8/88
UNITS (PPB)															
Acetone	U	U	U	U	73	U	110	U	U	U	65	U	U	U	U
Benzene	U	U	U	U	U	U	U	U	U	U	U	BMDL	11	U	U
Chloroform	U	U	U	U	2.1J	BMDL	BMDL	U	U	U	U	U	U	U	U
Methylene Chloride	2.5BJ	2.9BJ	BMDL	U	U	U	U	U	U	BMDL	U	BMDL			U
Tetrachloroethene	1.8J	1.8J	U	U	U	BMDL	BMDL	U	U	U	U	U	120	U	U
Trans-1,2 Dichloroethene	1.3J	U	U	72	13	8.5	13	36	U	30	16	140	3,100	10,100	2,900
Trichloroethene	1.1BJ	2.0BJ	BMDL	760	110	190	120	U	U	BMDL	U	BMDL	31,000	52,300	40,000
Vinyl Chloride	U	U	U	1.5J	U	U	ND	22	U	17	530	210	U	U	U
1,1,1 Trichloroethane	1.1J	1.0J	U	U	U	BMDL	U	U	U	U	U	U	U	U	U
1,1 Dichloroethane	U	U	U	2.6J	U	BMDL	U	U	U	U	U	5.6	U	U	U
1,1 Dichloroethene	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
TOTAL VOLATILES	0	0	0	832	196	199	243	58	0	47	611	356	56,586	62,590	42,900

B - Also detected in blank
J - Quantitative estimate
U - None Detected
( ) - One or more constituents is qualified by associated code
BMDL - Below method detection limit

TABLE 2-7
SUMMARY OF VOLATILE ORGANICS IN THE UNCONFINED AQUIFER
BECTON-DICKINSON & CO.
1987-1988

SAMPLE NUMBER	16	16	24	24	24	32	32	36	36	36	37	37	39	39	45
LABORATORY ID NUMBER	57846-016	62803-001	58970-013	59014-027	62718-002	59088-002	62718-003	59193-016	62719-001	65022-009	59262-001	62718-004	55545-031	62718-005	59583-005
Date Collected	9/2/87	3/11/88	10/22/87	10/24/87	3/8/88	10/28/87	3/8/88	10/30/87	3/8/88	5/27/88	10/31/87	3/8/88	11/12/87	3/8/88	11/13/87
UNITS (PPB)															
Acetone	U	U	U	U	BMDL (2500)	U	U	U	740	U	U	U	U	U	U
Benzene	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Chloroform	U	U	7.6	U	U	U	U	U	U	U	U	U	U	U	U
Methylene Chloride	U	BMDL	U	U	U	U	U	U	1,100B	U	U	U	U	U	U
Tetrachloroethene	U	BMDL	21	8.5	U	U	U	23	U	27	U	U	44	U	280
Trans-1,2 Dichloroethene	U	140	320	480	U	260	530	700	1,100	960	U	U	450	U	1,100
Trichloroethene	U	14	5,400	10,000	2,700	3200	9,600	6,300	17,000B	19,000	125	260	1400	190	2,900
Vinyl Chloride	U	5.6	U	U	U	U	U	U	U	U	U	U	34	U	U
1,1,1 Trichloroethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1 Dichloroethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1 Dichloroethene	U	BMDL	U	U	U	U	U	U	U	U	U	U	U	U	U
TOTAL VOLATILES	0	160	5,749	10,489	2,700	3,460	10,130	7,023	19,200 (B)	19,987	125	260	1928	190	4,345

B - Also detected in blank
J - Quantitative estimate
U - None Detected
( ) - One or more constituents is qualified by associated code
BMDL - Below method detection limit

TABLE 2-8
SUMMARY OF VOLATILE ORGANICS THE SEMI-CONFINED AQUIFER
BECTON-DICKINSON & CO., EAST RUTHERFORD
MARCH - MAY 1988

	PARCEL 5						
SAMPLE NUMBER	508M	509M	510	511	12	515M	519M
LABORATORY ID NUMBER	63580-009	63580-010	63580-008	63577-001	62803-004	63580-006	62804-002
Date Collected	4/5/88	4/5/88	4/6/88	4/6/88	3/11/88	4/6/88	3/11/88
UNITS (PPB)							
Acetone	U	U	U	U	U	U	U
Benzene	U	U	5	U	BMDL	U	U
Bromomethane	U	BMDL	U	U	U	U	U
2 - Butanone	U	U	U	50J	U	U	U
Chloroform	U	BMDL	BMDL	21	U	BMDL	1J
Chloromethane	U	BMDL	U	U	U	U	U
Methylene Chloride	U	U	U	U	BMDL	U	2.7BJ
1,1 - Dichloroethane	U	U	U	U	U	U	U
Trans-1,2 Dichloroethene	50	55	110	U	140	U	U
Trichloroethene	U	BMDL	U	U	BMDL	U	U
Vinyl Chloride	25	25	80	3.4J	210	BMDL	U
Trichloroflouromethane	U	U	U	U	U	U	U
1,1,1, - Trichloroethane	U	U	U	U	5.6	U	U
TOTAL VOLATILES	75	80	195	21	356	0	0

B - Also detected in blank
BMDL - Below method detection level
J - Quantitative estimate
U - Constituent not detected

TABLE 2-9
SUMMARY OF INORGANIC ANALYSES IN THE
SEMI-CONFINED AQUIFER
BECTON DICKINSON
EAST RUTHERFORD
MARCH - APRIL 1988

	PARCEL 5					
SAMPLE ID NUMBER	508M	509M	510	511	515M	519M
LABORATORY ID NUMBER	63589-004	63580-010	63580-008	63577-001	63580-006	63580-016
Date Collected	4/5	4/5	4/5	4/6	4/5	4/7
Total Phenols	U	U	U	U	U	U
Total Petroleum Hydrocarbons	U	U	U	U	U	U
Total Volatile Organics	75	80	195	U	U	U
Total Base Neutral Organics	U	U	U	NA	U	U
Total Pesticides	U	U	U	NA	U	U
Total PCBs	U	U	U	NA	U	U
TENTATIVELY IDENTIFIED COMPOUNDS						
Volatile Organics	U	U	U	U	U	U
Base Neutrals	U	U	U	U	U	U

NA - Parameter Not Analyzed
U - Parameter was analyzed for but not detected
Units in PPB

TABLE 2-10
SUMMARY OF INORGANIC ANALYSES IN THE
SEMI-CONFINED AQUIFER
BECTON DICKINSON
EAST RUTHERFORD
MARCH - APRIL 1988

	PARCEL 5					
SAMPLE ID NUMBER	508M	509M	510	511	515M	519M
LABORATORY ID NUMBER	63580-004	63580-010	63580-008	63577-001	63580-006	63580-016
Date Collected	4/6/88	4/6/88	4/6/88	4/6/88	4/6/88	4/6/88
INORGANIC & MISCELLANEOUS (PPB)						
Aluminum (Al)	U	U	U	U	U	U
Arsenic (As)	U	U	U	U	6.7	U
Barium (Ba)	287	662	399	301	229	224
Calcium (Ca)	82,700	93,300	64,400	95,400	119,000	121,000
Chromium (Cr)	U	U	U	U	U	U
Copper (Cu)	U	63	U	U	U	U
Iron (Fe)	16,400	34,400	4,570	3,610	7,520	125,000
Lead (Pb)	U	U	10	U	U	10
Magnesium (Mg)	47,500	22,900	22,200	24,900	29,500	30,400
Manganese (Mn)	1,734	1,841	873	195	1,470	494
Mercury (Hg)	U	0.5	U	U	U	U
Nickel (Ni)	U	54	U	U	U	U
Potassium (K)	U	U	U	18,000	U	U
Sodium (Na)	55,100	72,500	303,000	261,000	90,300	39,900
Zinc	37	232	24	54	20	31

U - UNDETECTED

TABLE 2-11
SUMMARY OF VOLATILE ORGANICS IN THE CONFINED AQUIFER
BECTON-DICKINSON & CO.
EAST RUTHERFORD
MARCH - MAY 1988

	PARCEL 5					
SAMPLE NUMBER	15D	15D	16D	16D	50BD	50BD
LABORATORY ID NUMBER	64702-001	65022-003	63674-007	65022-022	63674-002	65022-001
Date Collected	5/17/88	5/27/88	4/7/88	5/27/88	4/7/88	5/27/88
UNITS (PPB)						
Acetone	U	92	U	U	U	U
Chloroform	U	U	U	U	U	U
Methylene Chloride	U	U	U	U	U	U
Tetrachloroethene	U	U	U	U	27	34
Trans-1,2 Dichloroethene	U	U	U	U	U	U
Trichloroethene	65	72	41	37	44	6.5
Vinyl Chloride	U	U	U	U	U	U
1,1,1 Trichloroethane	U	U	U	U	BMDL	U
TOTAL VOLATILE ORGANICS	65	‡72	41	37	71	40.5

B - Also detected in blank
J - Quantitative estimate
U - Constituent not detected
‡ - Total does not include suspect acetone value

TABLE 2-12
SUMMARY OF GROUND WATER ANALYSIS IN
CONFINED AQUIFER
BECTON D DICKINSON
EAST RUTHERFORD
MARCH - MAY 1988

	PARCEL 5					
SAMPLE ID NUMBER	15D	15D	16D	16D	508D	508D
LABORATORY ID NUMBER	64702-001	65002-003	63674-007	65022-022	63674-002	65022-001
Date Collected	5/17/88	5/27/88	4/7/88	5/27/88	4/7/88	5/27/88
INORGANIC & MISCELLANEOUS (PPB)						
Barium (Ba)	871	NA	U	NA	U	NA
Chromium (Cr)	U	NA	U	NA	U	NA
Copper (Cu)	51	NA	U	NA	U	NA
Magnesium (Mg)	17,500	NA	13,600	NA	16,800	NA
Iron (Fe)	16,700	NA	U	NA	U	NA
Lead (Pb)	U	NA	20	NA	U	NA
Manganese (Mn)	1,990	NA	16	NA	18	NA
Mercury (Hg)	1.1	NA	U	NA	U	NA
Nickel (Ni)	U	NA	U	NA	U	NA
Zinc	U	NA	U	NA	47	NA
Organics (ppb)						
Total Phenols	U	NA	U	NA	U	NA
Total Petroleum Hydrocarbons	U	NA	U	NA	U	NA
Total Volatile Organics	65	#72	41	37	71	40.5
Total Base Neutral Organics	U	NA	U	NA	U	NA
Total Pesticides	U	NA	U	NA	U	NA
Total PCBs	U	NA	U	NA	U	NA
TENTATIVELY IDENTIFIED COMPOUNDS						
Volatile Organics	46	NA	U	NA	U	NA
Base Neutrals	43	NA	U	NA	U	NA

NA - Parameter not analyzed
U - Parameter was analyzed for but not detected
- Value does not include suspect acetone value

Trichloroethylene (TCE) is the most prevalent volatile detected. The anaerobic biological breakdown products of TCE, trans-1,2-dichloroethylene and vinyl chloride were also detected. Tetrachloroethylene, 1,1,1-trichloroethane, chloroform, and benzene were detected at much lower concentrations in discrete locations.

- Analytical results from the monitoring wells in Parcel No. 5 show that the water-table (unconfined) aquifer has discrete areas of VOC contamination. VOC contamination was generally found in three areas: 1) south of Building A and southeast of Building U; 2) southeast of three former underground storage tanks near Building D; and 3) south of Building N along Route 17.

- Volatile organic compounds (listed previously) are present on-site in total concentrations as high as 62,600 ppb (in the southwestern corner of Parcel No. 5). This contamination appears to have migrated across Stanley Street into Parcel No. 2.

- Volatile organic compound concentrations in the areally limited semi-confined sand unit underlying Building N are

two to three orders of magnitude lower than in the unconfined water-table aquifer.

- Volatile organic compound concentrations in the deeper confined sand unit underlying the low-permeability glacio-lacustrine clay range from 37 ppb to 72 ppb both up and downgradient of Parcel No. 5.

- Elevated levels of petroleum hydrocarbon contamination were detected in two areas within Parcel No. 5: 1) in the vicinity of the two former underground fuel oil storage tank locations adjacent to Building B; and 2) in Open Area No. 3 north of Building N. In the first area (Building B), total petroleum hydrocarbons (TPH) was detected at 190 ppm in MW-2. A product layer of approximately 0.03 feet thick (MW-501) was also detected in this area. In the second area (north of Building N), TPH was detected at 58 ppm in MW-519S. Further, a product thickness of approximately 0.04 feet was measured in MW-519S.

- Heavy metals are generally not a concern in ground water. Although heavy metal contamination (mercury, chromium, copper, lead and zinc) is evident in soil, it appears

that these metals are not leaching into and affecting ground water on-site. However, elevated concentrations of nickel have been identified in MW-32 (1700 ppb) and MW-15 (4200 ppb).

- Pesticides and PCBs are not a concern in ground water.

3.0 SITE DEVELOPMENT PLAN

B-D and National Community Bank (NCB) are currently negotiating the terms of a contract for the sale of the buildings and property contained in Parcel Nos. 4, 5 and 6.

NCB has indicated that the buildings of Parcel Nos. 4, 5 and 6 will be used primarily as office and warehouse space and that the characteristics of the land will remain essentially unchanged. No major construction projects are anticipated by NCB. According to the NCB preliminary site development plan, all buildings will be used in their present condition except for Buildings D and T which will be demolished to grade.

NCB is fully aware of environmental conditions at the East Rutherford site. B-D will work closely with NCB to ensure that future site development activities will not interfere with the intent or operation of the environmental cleanup program presented in this report.

4.0 DEVELOPMENT OF REMEDIAL ACTION CRITERIA

NJDEP has developed a series of recommended cleanup levels (RCLs) for soils and ground water that serve as general guidance in remedial projects conducted under the ECRA program. As general guidance, the RCLs do not take into account site specific conditions that could affect the mobility of the constituent or the site's unique environmental setting.

Soil and ground water remedial action criteria have been developed for B-D's East Rutherford property based upon the ECRA recommended cleanup levels. The criteria considered the existing site conditions (Section 2.0), the environmental setting, environmental and health based risk assessments, the toxicity and mobility of certain contaminants, surface water discharge limitations to Berry's Creek, and the permeability of soil cover anticipated after site development. Starting with NJDEP's RCLs, a series of alternative concentration limits (generally expressed as multiples of the RCLs) were considered. These criteria were then evaluated through a quantitative risk assessment to determine the health and environmental effects resulting from implementation of these alternate criteria. A final set of criteria were selected at a level that presented no adverse health or environmental affects. Section 4.1 presents the selected remedial action

criteria for soil and ground water developed for the East Rutherford site. Section 4.2 presents the risk assessment of the site following cleanup under these proposed criteria.

It should be noted that the selected soil and ground water remedial action criteria and the methodology used to evaluate them are the same as presented in the Soil and Ground Water Remedial Action Plan for Parcel Nos. 1 and 2 of the East Rutherford site (ERM, 1988a).

4.1 Soil and Ground Water Remedial Action Criteria

4.1.1 Soil Remedial Action Criteria

Remedial action criteria were developed to identify soil requiring remediation in Parcel No. 5. Criteria were developed for all contaminants reported in Parcel No. 5 soils in excess of the ECRA RCLs, except for volatile organics and non-PAH base/neutral organics.

Total volatile organics were detected in soil above the RCL of 1 ppm at only one location (MW-508) at two depths. At a depth of 1.5-2.0 feet, total volatile organics, consisting entirely of acetone, were detected at 1.7 ppm. The duplicate

sample reported acetone at a concentration of only 0.35 ppm. Furthermore, the QA review of the duplicate sample indicated that the result was qualitatively suspect and may have been introduced after sampling. Because of the only marginal exceedance of the RCL as well as the suspect nature of the analysis, no criterion was established for acetone. Total volatile organics were also detected at a concentration of 39.975 ppm at MW-508 at a depth of 16.5-17.0 feet. Because the water table is approximately two feet below land surface in this area, cleanup of these volatile organics will be addressed via ground water cleanup.

At locations where the RCL for base/neutral extractable compounds was exceeded, PAHs were in most cases the chemicals reported. Therefore, a criterion was established for PAHs. The only non-PAH compounds detected in these samples were dibenzofuran (3 detects, maximum concentration of 1.61 ppm) and butylbenzyl phthalate (1 detect, 3.22 ppm). Because of the low concentrations reported (<5 ppm) and because these areas will be remediated due to high levels of PAH or TPH, no criteria for these two compounds were derived.

The chemicals for which criteria were developed are listed in Table 4-1. The soil remedial action criteria are

TABLE 4-1

CHEMICALS FOR WHICH SOIL REMEDIAL ACTION CRITERIA ARE DEVELOPED

Metals

Cadmium
Chromium
Copper
Lead
Mercury
Nickel
Zinc

Organics

Polynuclear Aromatic Hydrocarbons (PAHs)
Total Petroleum Hydrocarbons (TPH)

presented on Figure 4-1. These criteria, described in detail below, are dependent upon the location of the contaminated soil with respect to the ground surface and the top of the water table. The criteria with respect to the ground surface are intended to protect site employees after site redevelopment. The criteria with respect to the top of the water table are intended to protect ground water quality.

Specific criteria were developed for areas that will be paved (i.e., impermeable surfaces) and those locations that will be left open (i.e., permeable) after site development. In addition, special consideration was given to certain materials of particular concern, i.e., mercury and polynuclear aromatic compounds.

Soil Remedial Action Criteria For Areas With Impermeable Cover

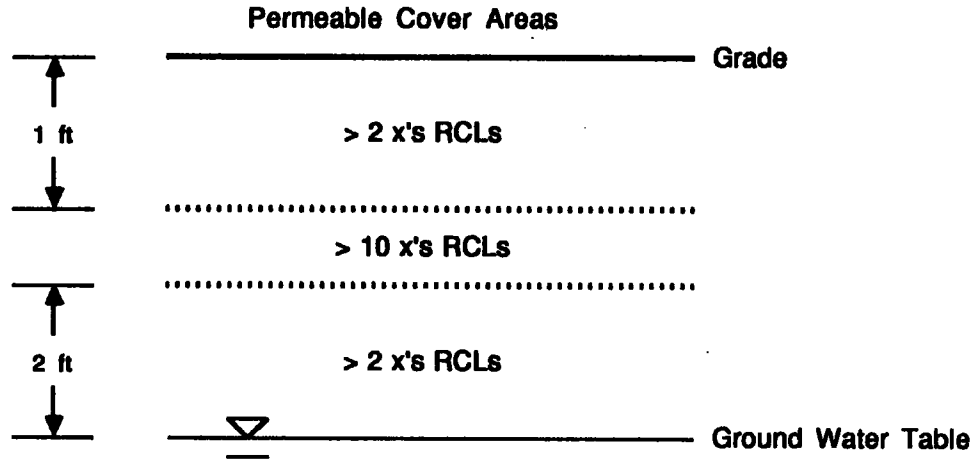
Soil that will be maintained, after site redevelopment, beneath impermeable soil cover, such as buildings and paved areas, will have the following remedial action criteria applied.

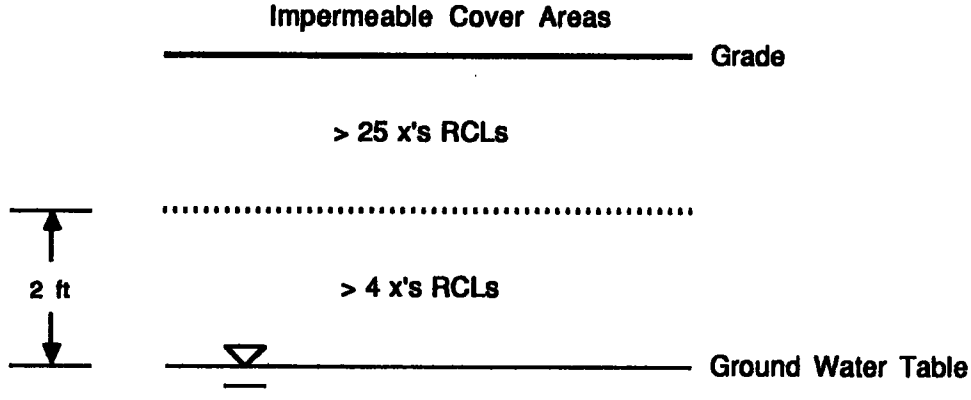
- Soil located in the zone between the surface and two (2) feet above the water table will require

FIGURE 4-1
REMEDIAL ACTION CRITERIA

Soil Remedial Action Criteria

* General Criteria for Permeable and Impermeable Cover Areas





* Soil Contaminant Specific Criteria

Mercury	-	2 ppm
Polynuclear Aromatic Hydrocarbons (PAH)	-	20 ppm

Ground Water Remedial Action Criteria

* Ground Water Contaminant Specific Criteria

Volatile Organic Compounds (VOC)	-	10 ppb
Total Petroleum Hydrocarbons (TPH)	-	10 ppm

remediation if the contaminant concentrations are greater than twenty-five (25) times the ECRA RCLs.

- Soil that is within two (2) feet of the ground water table will require remediation if the contaminant concentrations are greater than four (4) times the ECRA RCLs.

- Soils having contaminant concentrations less than these criteria require no action.

Soil Remedial Action Criteria For Areas With Permeable Cover

Soil that will be maintained, after site redevelopment, beneath permeable soil cover, such as grass covered areas, will have the following remedial action criteria applied.

- Soil within one (1) foot of the ground surface will require remediation if the contaminant concentrations are greater than two (2) times the ECRA RCLs.

- Soil located in the zone between one (1) foot below grade and two (2) feet above the water table will require remediation if the contaminant

concentrations are greater than ten (10) times the ECRA RCLs.

- Soil within two (2) feet of the water table will require remediation if contaminant concentrations are greater than two (2) times the ECRA RCLs.

- Soils having contaminant concentrations less than these criteria require no action.

Soil Contaminated with Mercury

All soil having mercury concentrations greater than two (2) ppm will require remediation.

Soil Contaminated with Priority Pollutant Polynuclear Aromatic Hydrocarbons

All soil having priority pollutant polynuclear aromatic hydrocarbons (PAHs) at concentrations greater than 20 ppm will require remediation.

4.1.2 Ground Water Remedial Action Criteria

Ground water remedial action criteria have been developed for Parcel No. 5 to identify ground water requiring remediation (withdrawal, treatment and discharge). Ground water quality criteria were developed for all contaminants reported in ground water at the site in excess of the ECRA RCLs. Table 4-2 lists these chemicals. Only volatile organics and TPH were detected in excess of the applicable RCLs. Figure 4-1 presents the ground water remedial action criteria.

Volatile Organic Compounds

The ground water remedial action criterion for total priority pollutant volatile organic compounds is 100 ppb.

Total Petroleum Hydrocarbons

The ground water quality remedial action criterion for total petroleum hydrocarbons is 10 ppm.

TABLE 4-2

CHEMICALS FOR WHICH GROUND WATER REMEDIAL ACTION CRITERIA ARE DEVELOPED

Volatiles

- Benzene
- Chloroform
- 1,2-Dichloroethylene
- Methylene Chloride
- Tetrachloroethylene
- 1,1,1-Trichloroethane
- Trichloroethylene
- Vinyl Chloride

Other

- Total Petroleum Hydrocarbons (TPH)

4.2 Risk Assessment of Proposed Criteria

4.2.1 Introduction

The criteria developed in Section 4.1 were subjected to a quantitative risk assessment to ensure that no adverse impacts to human health or the environment would result from implementation of a cleanup plan on that basis. The results of the risk assessment are presented in this section.

The risk assessment was performed in accordance with the U.S. EPA Superfund Public Health Evaluation Manual (U.S. EPA, 1986) and the Draft NJDEP Risk Assessment Guidelines (1986). The steps followed in performing the risk assessment are:

- preparation of toxicity and environmental profiles (Appendix C);
- identification of potential exposure routes and receptors;
- estimation of exposure point concentrations of the chemicals of concern;

- comparison of exposure point concentrations to relevant and applicable standards; and

- risk characterization.

In performing the risk assessment, several assumptions were made regarding the future use of the site. These assumptions are provided below:

- Areas of the site to be excavated will be fenced during remediation and construction activities to allow only workers access to the site.

- Following excavation, all disturbed areas of the site will be occupied by buildings, pavement or will be revegetated. Existing vegetation will be maintained in undisturbed areas. The entire site will remain fenced to limit access.

- Two inactive water supply wells (Parcel Nos. 2 and 5) will not be reopened for use and no new water supply wells will be developed.

- Ground water in the upper water-bearing zone will not be used for drinking or any other uses.

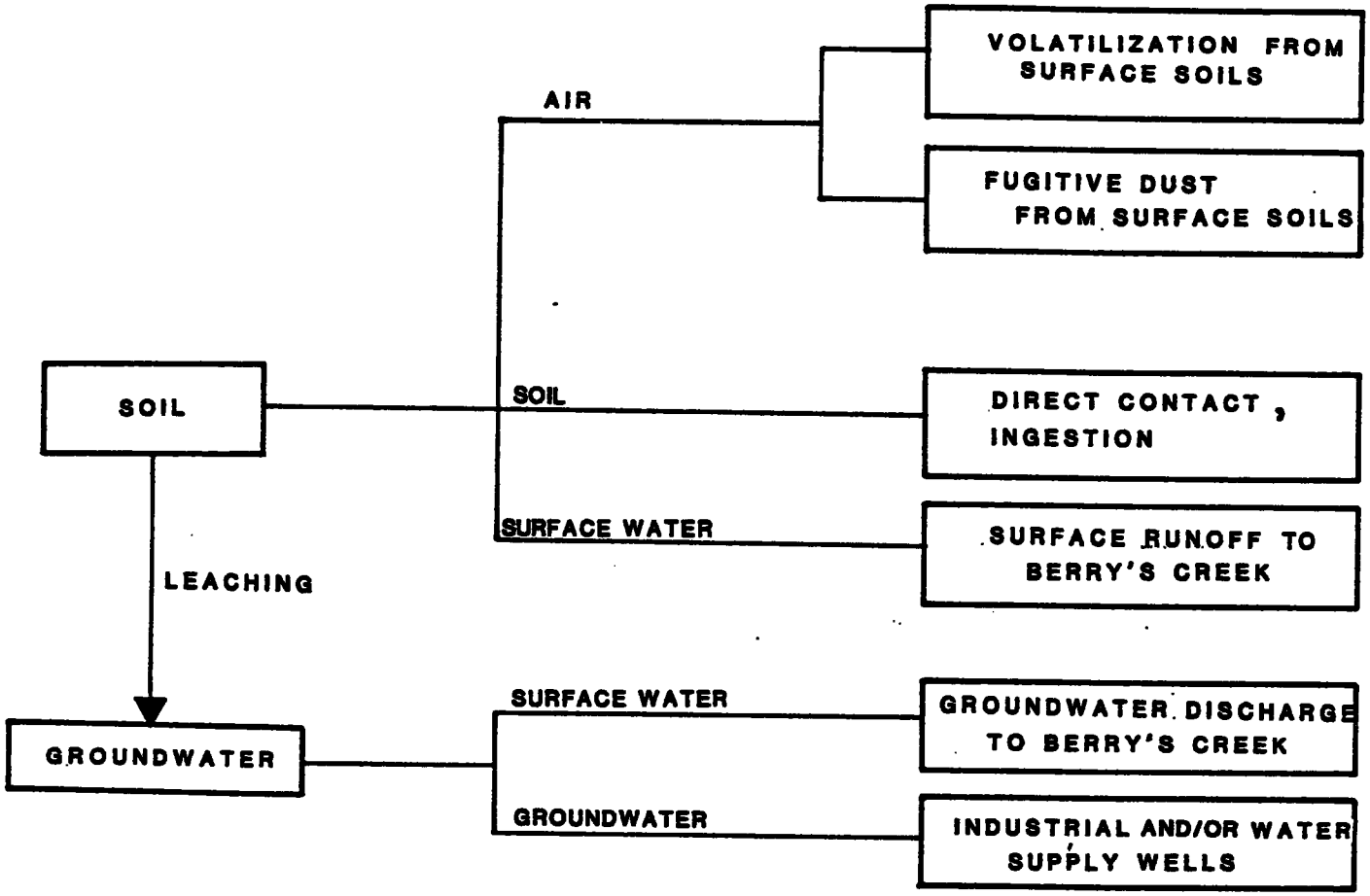
4.2.2 Identification of Potential Exposure Routes

In order to evaluate risk, the routes through which receptors could potentially be exposed to contamination from the site following remediation must be identified. Potential receptors can include the general public (nearest residences, industrial and commercial establishments, etc.) and landscaper and other employees at the site. Figure 4-2 presents an overview of all potential exposure routes. Each of these routes is described below and a determination made if the route is complete (i.e., contamination could be transported from the site to a receptor).

Potential Exposure Routes

1. Volatilization of Contaminants from Soil

Following remediation, volatilization of contaminants from soil is not expected to be a significant exposure route because of the age and nature of the contamination. Contamination of soils occurred more than 30 years ago. Any



TITLE

POTENTIAL CONTAMINANT EXPOSURE PATHWAYS

PREPARED FOR

BECTON DICKINSON

ERM-Northeast
Environmental Resources Management

SCALE

DATE

FIGURE 4-2

highly volatile compounds would have already volatilized in that time period. In addition, most of the contaminants of concern in soils at Parcel No. 5 have low volatilities. Appendix C presents additional information on the volatility of the selected chemicals.

2. Fugitive Dust Emissions from Contaminated Soil

In general, emissions of contaminated fugitive dusts (airborne wastes or contaminated soil particles) can result from wind erosion and vehicular traffic over exposed soils. Following remediation, all ground surfaces will be covered by either impermeable surfaces (buildings, pavement, etc.) or vegetation. Because no exposed soils will be present, no significant fugitive dust emissions are expected. During soil remediation activities, dust control will be implemented as required (see Section 6).

3. Direct Contact with and Ingestion of Contaminated Soils

Direct contact with contaminated soils can result in dermal exposure. Small amounts of dirt on the hands can also be ingested in small quantities through activities such as smoking and eating where the hands are in close proximity to

the mouth. Direct contact with contaminated soil by the public is not expected. Both during and following remediation, the site will be fenced and guarded to limit access to workers only. Direct contact with contaminated soils could occur following remediation by landscaping workers. This potential exposure route is evaluated in Section 4.2.3.

4. Surface Water Runoff from the Site Discharging to Berry's Creek

Surface water runoff from the site resulting from precipitation could dissolve contaminants in surficial soils or resuspend contaminated soil particles and transport them off-site. Following remediation, transport of contaminated surface water runoff to Berry's Creek will not be significant. Contaminated surface runoff from Parcel No. 5 under current conditions appears to be very low. Parcel No. 5 has a stormwater collection and drainage system which discharges to Berry's Creek. As part of the permit requirements, B-D monitors stormwater and other flow which discharges to Berry's Creek at Union Boulevard. Three of the metals of concern in soil at the site are monitored: chromium, copper and zinc. Due to lack of discharge, the outfall was only sampled once

in the past year of monitoring (8/87-8/88). Concentrations of these three metals did not exceed the national primary and secondary drinking water standards. Therefore, contaminated surface runoff following the completion of soil remediation activities is expected to be even lower. In addition, special criteria have been developed for soil in the top one foot below grade.

5. Leaching of Contaminants in Soil to Ground Water

Contaminants in soils at the site could potentially migrate to the surficial water-bearing zone underlying the site. This water-bearing zone lies between 1.0 and 15.0 feet below land surface throughout most of the site and discharges immediately to the southeast of the site in the wetlands surrounding Berry's Creek. The area between the site and the discharge area is primarily industrial and commercial. This area is serviced by a public water supply. Therefore, it is assumed that ground water in this zone is not and will not be withdrawn via wells for use. The results of the well survey shown in Figure 2-3 of the Parcel No. 2 ECRA Environmental Assessment Program (ERM, 1988b) support this conclusion. No wells are shown within a five-mile radius of the site in the downgradient direction (southeast). Therefore, the only human

exposure to contaminants in the surficial water-bearing zone would occur in Berry's Creek.

Berry's Creek is designated as FW2-NT/SE2 by the New Jersey DEP (NJDEP, 1985a). This designation indicates a waterway in which there may be a saltwater/freshwater interface. The exact point of demarcation between the fresh and saline water is determined by salinity measurement and is that point where the salinity reaches 3.5 parts per thousand (ppt) at mean high tide. The stream is classified as FW2-NT in the fresh portions (salinity less than or equal to 3.5 ppt at mean high tide) and SE2 in the saline portions (NJDEP, 1985b). Recent salinity data (HMDC, 1988a) suggest that the portion of the creek to which ground water from the site discharges is most appropriately classified as SE2. In support of this, the Hackensack River, to which Berry's Creek discharges, is classified as SE2 both upstream and downstream of its confluence with Berry's Creek. Furthermore, the hydrology of Berry's Creek has been described as semi-diurnal tidal flow with little or no fresh water intrusions other than pumped storm water and discharged sewage (Galluzzi, 1982).

The designated uses of SE2 waters include maintenance, migration and propagation of the natural and established

biota, migration of diadramous fish, maintenance of wildlife, secondary contact recreation, and any other reasonable uses (NJDEP, 1985c). Secondary contact recreation refers to recreational activities where the probability of water ingestion is minimal and includes, but is not limited to, boating and fishing. Therefore, from the perspective of a human health exposure evaluation, secondary contact recreation represents a potential exposure route. This route, including the potential for aquatic impacts, is evaluated in Section 4.2.3.

6. Exposure to Contaminated Ground Water

Ground water contamination exists at the site independent of contributions from soil contamination. As indicated in Table 4-2, ground water contamination consists primarily of volatile organics. Three water-bearing zones underlie the site, as discussed in the ECRA Environmental Assessment Program report for Parcel Nos. 4, 5 and 6 (ERM, 1988c): a shallow unconfined water-bearing zone; an areally-limited semiconfined water-bearing zone; and a deeper confined water-bearing zone. Ground water in the unconfined and semi-confined water-bearing zones flows to the south-southeast

discharging to Berry's Creek. This exposure route is evaluated in Section 4.2.3.

Contamination in the deeper confined water-bearing zone is limited. As indicated above, the well survey showed no wells within five miles in the downgradient direction from the site. Because land in the downgradient area is generally unsuited for development due to its proximity to the Hackensack Meadowlands and any development (current or future) can be supplied with public water, it is unlikely that water withdrawal wells will be developed in the area in the future. A separate report is currently being prepared which will address ground water quality in the lower, confined water bearing zone.

Summary of Potential Exposure Routes

In summary, potential exposure to humans and the environment following remediation could occur through only three routes. First, contamination in ground water underlying the site could migrate off-site to Berry's Creek. Second, contamination in site soils could leach to ground water and migrate off-site to Berry's Creek. Third, landscapers could potentially be exposed to soil contaminants through direct

contact with site soils. These exposure routes are evaluated in Section 4.2.3.

It should be noted that significant human exposure to Berry's Creek is highly unlikely. As described above, Berry's Creek is classified as suitable for fishing and non-contact recreation only. It is not classified as suitable for drinking water.

Evaluation of risk associated with all the chemicals of concern at the site except total petroleum hydrocarbons (TPH) is presented. Because total petroleum hydrocarbons are a group of chemicals with significantly varying fate and transport and toxicity characteristics, appropriate health-based standards with which to compare estimated exposures in a risk assessment are not available.

Typical NJDEP limits for permitted discharges to Berry's Creek for TPH are approximately 15 ppm (Russo, 1988). Therefore, a criterion of 10 ppm, which would result in ground water discharge to Berry's Creek of less than 10 ppm, was chosen as an acceptable remedial action criterion.

The highest remedial action criterion for TPH in soils is 2500 ppm (i.e., 25 times the RCL of 100 ppm). This criterion appears to be protective of human health and the environment for two reasons. First, TPH contamination at the site consists of only low to below detection limit concentrations of priority pollutant base/neutral and volatile organics. The only priority pollutant base/neutral compounds reported in significant concentrations are PAHs, for which a separate remedial action criterion was developed. Therefore, TPH at the site is not expected to be comprised of relatively high toxicity chemicals (excluding PAHs) as identified by the U.S. EPA in their priority pollutant list.

Second, leaching of TPH in soil to ground water with subsequent discharge to Berry's Creek does not appear to be significant. The ground water samples at the downgradient site border (along Route 17) suggest that TPH present in soil is not highly mobile in ground water. Of the five shallow wells closest to Route 17 sampled for TPH (MW-508, 509, 515S, 510, and 511), TPH was detected in only one sample (MW-515S). The concentration of TPH in MW-515S was 0.6 ppm, below the ECRA RCL of 1 ppm. TPH was not detected in any of the samples from the semi-confined and confined water-bearing zones. Furthermore, ground water downgradient of the three areas with

TPH contamination considerably in excess of 2500 ppm (5-02A, 5-03 and 5-11) will be treated as part of the ground water remediation plan. Therefore, no significant risk to human health or the environment is expected from these criteria.

4.2.3 Estimation of Exposure Point Concentrations and Comparison with Relevant Standards

Movement of Contaminated Ground Water to Berry's Creek

Ground water at the site flows toward and discharges to Berry's Creek. In modelling movement of contaminants in the ground water to Berry's Creek, a number of very conservative assumptions were made in order to provide worst-case estimates. It was assumed that contamination in ground water flows with the ground water undiminished to Berry's Creek. That is, no reduction in concentration resulting from retardation, degradation, dispersion or advection was taken into account. Further, losses due to volatilization following discharge to Berry's Creek were not accounted for. Volatilization is the major transport process affecting the aquatic fate of five of the chemicals of concern in ground water at the site (benzene, chloroform, 1,2-dichloroethylene, trichloroethylene, and tetrachloroethylene) (U.S. EPA, 1979).

It was assumed that the only reduction in concentration of ground water contamination results from dilution following discharge to Berry's Creek.

Dilution at Berry's Creek is estimated by the ratio of flow of ground water leaving the site to flow of Berry's Creek. Ground water flow leaving the East Rutherford site is estimated to be 209 gpm or 0.47 cfs. Flow in Berry's Creek is estimated to be 1000 cfs (BCA, 1978) flowing upstream during flood tide and downstream during ebb-tide. This is consistent with a recent study showing tidal flows ranging from 0 to 1400 cfs during low tide and 400 to 1750 cfs during high tide (HMDC, 1988b). Therefore, dilution from Berry's Creek is estimated as 0.47 cfs/1000 cfs or 0.047 percent.

Three chemicals in ground water (trichloroethylene, 1,2-dichloroethylene, and vinyl chloride) are expected to make up over 90% of any contaminant discharge. Therefore, in order to evaluate the proposed ground water remedial action criterion for total volatile organics (100 ppb), three hypothetical situations were considered: (1) all contamination (100 ppb) is due to trichloroethylene; (2) all contamination is due to 1,2-dichloroethylene; and (3) all contamination is due to vinyl chloride.

Table 4-3 presents the projected contaminant concentrations in Berry's Creek using the conservative modelling assumptions outlined above and a dilution of 0.047%. This table also compares these concentrations to the National Primary Drinking Water Standards or other applicable health-based drinking water standards. As indicated in this table, projected concentrations in Berry's Creek are less than the applicable standards by approximately two orders of magnitude. As indicated above, use of drinking water standards to evaluate the impact of contamination on Berry's Creek represents a very conservative approach since Berry's Creek is not used as a drinking water supply and it is unlikely that any significant exposure to its waters by humans occurs. Therefore, no unacceptable risks to human health are expected to result from ground water following remediation.

No NJDEP surface water quality standards for SE2 waters exist for the contaminants of concern in ground water at the site. Therefore, in order to evaluate impacts to fish and wildlife, the projected concentrations were compared to the generally more stringent FW2 standards. As indicated in Table 4-3, the predicted concentrations are well below the FW2 surface water quality standards. Therefore, no adverse impacts to fish and wildlife are expected.

TABLE 4-3

COMPARISON OF PROJECTED GROUND WATER CONTAMINANT CONCENTRATIONS IN BERRY'S CREEK TO RELEVANT STANDARDS

Volatiles	Remedial Action Criteria (ppb)	Projected Concentration In Berry's Creek (ppb)	National Primary Drinking Water Standard (ppb)	NJDEP Surface Water Quality Standard (FW2) (ppb)
1,2-Dichloro-ethylene	100	0.047	350[1]	350[2]
Trichloroethylene	100	0.047	5	5[2]
Vinyl Chloride	100	0.047	2	2[2]

(1) U.S. EPA Drinking Water Health Advisories criterion. No national primary drinking water standard or ambient water quality criterion established.

(2) Standard for toxic substances (general) is "none which would cause standards for drinking water to be exceeded after appropriate treatment." Therefore, the drinking water standard or criterion is cited.

Leaching of Soil Contaminants to Ground Water and Movement Off-site to Berry's Creek

As described in Section 4.1, several remedial action criteria are proposed for most of the chemicals of concern in soil at the site depending on the depth of the sample and the presence of a permeable cover. In order to provide the most conservative evaluation, the highest criterion for each chemical (e.g., 25 times the RCL for metals) was used in the model.

Modelling movement of contaminants in soil at the site can be divided into two steps: 1) leaching of contaminants from soil into ground water; and 2) movement of contaminants in ground water to Berry's Creek. Different models were used to estimate leaching of metals and organics, as described below.

Metals. As indicated in Table 4-1, contaminants of concern in soils include seven metals. In order to estimate leaching of metals to ground water, the results of the EP Toxicity test were used to provide site-specific numbers. The EP Toxicity test is intended to identify those wastes which pose a hazard because of their potential to leach

significant concentrations of specific toxic constituents. The procedure is used to predict the leaching potential of hazardous wastes subjected to a worst-case scenario.

A comparison of total heavy metals with leachable metals concentrations using the EP Toxicity test for soils from Parcel No. 5 is presented in Table 2-1. These data were used along with EP Toxicity test results from Parcel Nos. 1 and 2 (ERM, 1988b) and Parcel No. 6 (Table 2-1, Parcel No. 6 report) to calculate the ratio between concentrations in the leachate (ground water) and concentrations in the soil. In order to be conservative, the highest ratio obtained in any sample in any parcel for a particular metal was used. The results are presented in Table 4-4.

Movement of metals in the ground water was conservatively estimated using the same assumptions presented above for movement of contaminants in ground water. No reduction in concentration due to retardation, degradation, dispersion or advection was taken into account. It was assumed that the only reduction in concentration of ground water contamination results from dilution following discharge to Berry's Creek (0.047%). The resulting projected concentrations of metals in Berry's Creek are presented in Table 4-5.

TABLE 4-4

HIGHEST RATIOS OF CONCENTRATIONS OF
METALS IN LEACHATE TO CONCENTRATIONS IN SOIL

Metal	Ratio
Cadmium	0.00806
Chromium	0.0017
Copper	0.0053
Lead	0.0082
Mercury	0.00053
Nickel	0.0094
Zinc	0.038

TABLE 4-5

COMPARISON OF PROJECTED SOIL CONTAMINANT CONCENTRATIONS
IN BERRY'S CREEK TO RELEVANT STANDARDS

Chemical	Restoration Criteria in Soil - 25 X RCL (ppm)	Projected Concentration in Berry's Creek (ppb)	National Primary Drinking Water Standard (ppb)	NJDEP Surface Water Quality Standard For FW2 Waters (ppb)
Metals				
Cadmium	75	0.29	10	10
Chromium	2500	2.00	50	50
Copper	4250	10.6	1000(2)	1000(3)
Lead	6250	24.1	50	50
Mercury	2(1)	0.00050	2	2
Nickel	2500	11.0	15.4(2)	15.4(3)
Zinc	8750	156	5000(2)	5000(3)
Organics				
PAHs	20(1)	0.0032	0.0031(2)	0.0031(3)

(1) Restoration criterion is not twenty-five times the RCL
(2) Ambient water quality criterion for ingestion of drinking water
(3) Standard for toxic substances (general) is "none which would cause standards for drinking water to be exceeded after appropriate treatment". Therefore, the drinking water standard or criterion is cited.

Organic Compounds. One group of organic contaminants, PAHs, was included in the chemicals of concern in soil at the site. In order to estimate leaching of these compounds from soils to ground water, the Organic Leachate Model (OLM) was used. The OLM is a model used by the U.S. EPA to predict leachate concentrations of organics from landfilled organic wastes. The model, as presented in the Federal Register (50 FR 37062), is used to evaluate delisting petitions for wastes that contain organic contaminants. The equation is:

$$C_l = 0.00211\ C_w^{(0.678)}\ S^{(0.373)}$$

Where:

C_l = constituent concentration in leachate (ppm)
C_w = constituent concentration in waste (soil) (ppm)
S = constituent solubility (ppm)

PAHs are a group of compounds with varying solubilities. In order to provide a representative solubility, the solubilities of the most frequently occurring PAH compounds which also appear on the U.S. EPA's list of priority pollutants were considered (U.S. EPA, 1984). The solubility of these PAHs ranges from 0.0007 ppm for benzo[g,h,i]perylene

to 31.7 ppm for naphthalene. A representative solubility of 0.1 ppm was used in the calculation. The resulting PAH concentration is shown in Table 4-5.

Table 4-5 compares projected concentrations of soil contaminants in Berry's Creek to the National Primary Drinking Water Standards or other health-based drinking water criteria. As indicated in this table, all projected concentrations are essentially at or below their respective drinking water standards or criteria. Therefore, no significant impact to human health is expected to result from discharge of ground water to Berry's Creek.

To evaluate potential impacts to fish and wildlife, the projected concentrations are most appropriately compared to the NJDEP Surface Water Quality Standards for SE2 waters. The designated uses of SE2 waters include maintenance, migration, and propagation of the natural and established biota, migration of diadramous fish, and maintenance of wildlife. Because no SE2 standards exist for the chemicals of concern, the projected concentrations were compared to FW2 standards. As shown in Table 4-5, the predicted concentrations are below the generally more stringent FW2 surface water quality

standards. Therefore, no significant impacts to fish and wildlife are expected to result from this discharge.

Direct Contact with Site Soils

Impacts related to the direct contact with soil by site employees were evaluated. Site landscapers were evaluated because they are the individuals most likely to be potentially impacted. Direct contact with site soils by landscapers would be expected to occur only for surficial soils which are not covered by an impermeable surface such as buildings or pavement. Therefore, for metals the remedial action criterion of two times the RCLs in surficial soils with permeable cover is evaluated. The proposed criteria for surficial soils are presented in Table 4-6. It is important to note that most of the contaminants of concern occur naturally in soils. In order to place the remedial action criteria in perspective, Table 4-6 also includes the ranges of background concentrations of these metals found in urban soils. As indicated in Table 4-6, three of the eight proposed criteria are within the ranges for background concentrations given.

In order to evaluate exposure to landscapers, Hawley's (1985) model for assessment of health risk from exposure to

TABLE 4-6

COMPARISON OF PROPOSED RESTORATION CRITERIA FOR SURFICIAL SOILS TO TYPICAL BACKGROUND CONCENTRATIONS

Chemical	Restoration Criteria (ppm)	Range of Typical Background Concentrations (ppm)
Metals		
Cadmium	6	0.16 - 2.36[1]
Chromium	200	1 - 100[2]
Copper	340	8.8 - 143[1]
Lead	500	25.8 - 617[1]
Mercury	2	0.01 - 3.4[2]
Nickel	200	5.5 - 53.8[1]
Zinc	700	40.4 - 789[1]
Organics		
PAHs	20	4 - 13[3,4]

(1) Source: Fields, T. 1987
(2) Source: Connor, J.J., et al. 1975
(3) Typical concentrations for surface soils near heavily used highways
(4) Source: Butler, 1984

contaminated soil was used with modifications for occupational exposure. For landscapers working with soil, exposure to contaminants can occur in three ways: 1) dermal exposure, in which soil contaminants in contact with the skin can be absorbed into the body; 2) incidental oral ingestion, in which soil particles in contact with the hands may be incidentally ingested by transfer from the hands to food, candy, or cigarettes; and 3) inhalation, in which contaminated dusts generated by landscaping activities are inhaled.

The estimated dose via any of the three routes to a potential receptor can be estimated from the following equation:

$$\text{Dose (mg/Kg/day)} = E \times A \times W \times Y \times 1/wt \times Cs \times a$$

Where:

E = Exposure to soil (mg soil/day)

A = Absorption fraction (dimensionless)

W = Percentage of the week workers are exposed (dimensionless)

Y = Percentage of the year workers are exposed (dimensionless)

Wt = Weight of an average adult (Kg body weight)

Cs = Concentration of contaminant in soil (mg chemical/Kg soil)

a = Conversion factor = 10^{-6} (1 Kg soil/10^{6} mg soil)

Table 4-7 lists the values used for each of these factors for each of the three soil exposure routes. The predicted intakes for each of the three soil exposure routes based on this equation are given in Table 4-8.

In order to evaluate the predicted intakes, data on acceptable intakes for each of the chemicals was compiled from the Superfund Public Health Evaluation Manual. For noncarcinogens, subchronic acceptable intake (AIS) values were used. These values are short-term acceptable intake levels for noncarcinogenic effects. Where only a chronic acceptable intake (AIC) was given, an AIS was derived by multiplying the AIC by 10.

For carcinogens, an acceptable daily intake was derived from the carcinogenic potency factor (CPF), which is an upper 5% confidence limit on the slope of the dose response curve. A 10^{-6} risk was assumed acceptable, therefore the acceptable chronic intake is given by: Acceptable chronic intake (mg/Kg/day) = acceptable risk (1 X 10^{-6})/CPF (mg/Kg/day^{-1}).

TABLE 4-7

ASSUMPTIONS FOR MODEL OF DIRECT CONTACT WITH SOIL

	Inhalation	Dermal	Oral
Soil Exposure (E) (mg/day)	0.27[1]	6400[2]	100[3]
Absorption Fraction (A)	0.75[4]	0.006[5]	1
% of Week Worked (W)	5 days/ 7 days	5 days/ 7 days	5 days/ 7 days
% of Year Worked (Y)	3 mos./ 12 mos.	3 mos./ 12 mos.	3 mos./ 12 mos.
Average Adult Weight (WT)	70 Kg	70 Kg	70 Kg

(1) Assuming the level of suspended particulate matter in outside air is 70 ug/m^3, 50% of which is resuspended local soil. Average adult respiratory rate is 7.5 l/min. at rest, 20 l/min. during light activity.

(2) Assuming a 50 um thick coating of dirt on both hands and forearms (0.17 m^2) and soil density of 1.5 g/cm^3.

(3) Incidental ingestion by children based on available literature.

(4) Assuming 75% of the inhaled particulate mass is retained, 100% of the contaminants on soil retained by the respiratory system is absorbed.

(5) Assuming skin remains in contact with the dirt (is not washed) for eight hours.

TABLE 4-8

PROJECTED INTAKES DUE TO EXPOSURE
TO CONTAMINATED SOIL BY LANDSCAPERS

Chemical	Restoration Criteria (ppm)	Incidental Oral Ingestion (mg/Kg/day)	Dermal Absorption (mg/Kg/day)	Inhalation (mg/Kg/day)
Metals				
Cadmium	6	1.53×10^{-6}	5.76×10^{-7}	3.06×10^{-9}
Chromium	200	5.10×10^{-5}	1.92×10^{-5}	1.02×10^{-7}
Copper	340	8.67×10^{-5}	3.26×10^{-5}	1.73×10^{-7}
Lead	500	1.28×10^{-4}	4.80×10^{-5}	2.55×10^{-7}
Mercury	2	5.10×10^{-7}	1.92×10^{-7}	1.02×10^{-9}
Nickel	200	5.10×10^{-5}	1.92×10^{-5}	1.02×10^{-7}
Zinc	700	1.79×10^{-4}	6.72×10^{-5}	3.57×10^{-7}
Organics				
PAHs	20	5.10×10^{-6}	1.92×10^{-6}	1.02×10^{-8}

Because the acceptable chronic intake calculated from a CPF assumes that exposure occurs over an entire lifetime (70 years average), the acceptable chronic intakes were multiplied by 70 to reflect the fact that exposure to landscapers is expected to occur for only one year per individual.

Acceptable intakes are given in the Superfund Public Health Evaluation Manual only for the oral and inhalation routes. Therefore, exposure via oral ingestion and dermal absorption are summed and compared to the acceptable oral intakes.

Table 4-9 lists the projected intakes and the relevant standards. As indicated in this table, predicted intakes via inhalation are all well below the acceptable intakes. Predicted oral plus dermal intakes are essentially at or below the relevant criteria. For metals, the predicted intakes are at least approximately two orders of magnitude below the acceptable intakes.

The projected PAH oral intake is essentially equal to the acceptable intake. Because of the conservative assumptions made in the model, this predicted intake presents no unacceptable risk. The model assumes all soils are uniformly

TABLE 4-9

COMPARISON OF PROJECTED INTAKES
TO ACCEPTABLE INTAKES - SOIL EXPOSURE

Chemical	Oral + Dermal Intake (mg/Kg/day)	Subchronic Acceptable Intake[1] (Oral) (mg/Kg/day)	Inhalation Intake (mg/Kg/day)	Subchronic Acceptable Intake[1] (Inhalation) (mg/Kg/day)
Metals				
Cadmium	2.11×10^{-6}	1.30×10^{-1}	3.06×10^{-9}	1.15×10^{-5}[2]
Chromium	7.02×10^{-5}	2.50×10^{-2}	1.02×10^{-7}	1.71×10^{-6}[2]
Copper	1.19×10^{-4}	3.70×10^{-2}	1.73×10^{-7}	1.00×10^{-1}
Lead	1.76×10^{-4}	1.40×10^{-2}	2.55×10^{-7}	4.30×10^{-3}[3]
Mercury	7.02×10^{-7}	1.40×10^{-3}	1.02×10^{-9}	5.10×10^{-4}[3]
Nickel	7.02×10^{-5}	1.40×10^{-2}	1.02×10^{-7}	8.33×10^{-5}[2,4]
Zinc	2.46×10^{-4}	2.10×10^{-1}	3.57×10^{-7}	1.00×10^{-1}[3]
Organics				
PAHs	7.02×10^{-6}	6.09×10^{-6}[2,3]	1.02×10^{-8}	1.15×10^{-5}[2,3]

(1) Source is SPHEM, 1986 with October 1987 revisions, except as noted.
(2) Acceptable intake based on CPF.
(3) Values shown are from SPHEM, 1986. October 1987 revisions indicate that these values are being reanalyzed.
(4) Based on CPF for nickel refinery wastes.

contaminated with PAHs at the remedial action criterion, which overestimates the extent of contamination. Also, the model is based on an incidental soil ingestion rate of 100 mg/day, which represents the level of soil consumed by children. Since adults would be expected to wear gloves while working and employ better personal hygiene techniques, the adult intake is expected to be even lower. In summary, no unacceptable risks are expected to occur following remediation due to direct contact with contaminated soils.

4.2.4 Summary and Conclusions

On the basis of the risk assessment, no unacceptable risks to human health or the environment are expected following remediation of the site using the proposed remedial action criteria. Projected concentrations of site soil and ground water contaminants at Berry's Creek, using very conservative models, are essentially at or below the National Primary Drinking Water Standards or other health-based drinking water standards. The projected concentrations also meet the NJDEP Surface Water Quality Standards for SE2 waters, and FW2 waters for chemicals for which no SE2 standard exists. Projected exposures to site landscapers due to contact with site soils, again using conservative assumptions, also essentially meet or are below the relevant acceptable intakes.

5.0 SELECTION OF REMEDIAL TECHNOLOGIES

Site conditions in Parcel No. 5, (and Parcel No. 6) including the nature and extent of soil and ground water contamination, are very similar to the conditions found in Parcel No. 2. Therefore, remedial technologies evaluated and selected for use in Parcel No. 2 will be used for site remediation in Parcel No. 5 (and Parcel No. 6). A comprehensive evaluation of these remedial technologies is presented in the Soil and Ground Water Remedial Action Plan for Parcel Nos. 1 and 2 (July, 1988). The following sections present a description of the methods selected to remediate contaminated soil and ground water that exceeds the environmental/health based remedial action criteria presented in Section 4.0 of this report.

5.1 Remedial Approach to Address Soil Contamination

Excavation and off-site disposal of contaminated soil will be used to meet the remedial action criteria. Soil excavation will effectively remove contaminants from areas determined to be potential sources of ground water contamination and/or exposure hazards. This remedial approach will minimize B-D's liabilities for future ground water cleanup. Section 6.0 of this report describes the proposed soil remediation program.

5.2 Ground Water Recovery System

Ground water recovery will be accomplished using a series of interconnected interceptor trenches. Recovered ground water will be pumped from the trenches to an on-site treatment plant. The interceptor trench system will accomplish three major objectives. First, it will prevent the off-site migration of contaminants. Second, it will collect ground water at site locations where the highest concentrations of contaminants have been found. Third, sufficiently large quantities of water will be recovered to minimize the length of time for cleanup.

The trench system proposed for Parcel No. 5 (and Parcel No. 6) will provide an additional 450 linear feet (estimated) of trenches at three locations in Parcel No. 5 (and one location in Parcel 6) to the currently approved recovery trench system. Section 7.1 describes the system in detail, including the conceptual construction details of each trench, locations of individual trenches and anticipated rates of ground water withdrawal.

5.3 Ground Water Treatment

The treatment of VOCs in ground water will be accomplished by chemical oxidation in an on-site treatment plant. Ultra-violet light and hydrogen peroxide (UV-peroxidation) will be used as the VOC destruction technology.

The UV-peroxidation process chemically oxidizes dissolved contaminants in ground water. Ultraviolet (UV) light catalyzes this destruction process in two ways. First, UV light interacts with intramolecular chemical bonding making the contaminants more susceptible to oxidation by hydrogen peroxide (H_2O_2). Second, UV light reacts with H_2O_2 molecules to form hydroxyl radicals (a strong chemical oxidant) that oxidize the organic contaminants. When carried to completion, the reaction products of hydrocarbon oxidation include carbon dioxide, water and residual chloride. This process works well on unsaturated organic compounds such as the chlorinated ethylenes found at the East Rutherford site. Acetone is also effectively treated by this process.

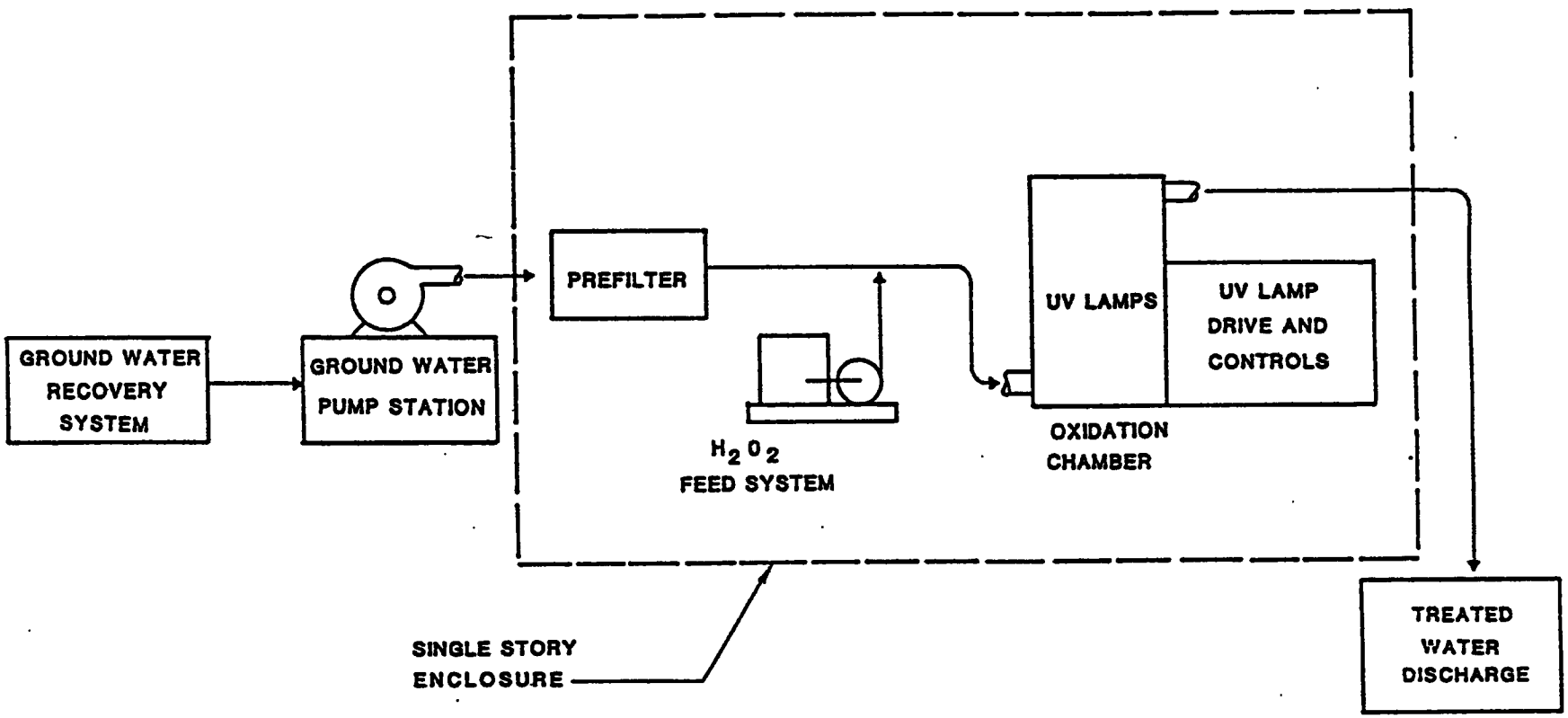
The physical process involves mixing H_2O_2 with ground water prior to entering the oxidation chamber. The water/H_2O_2 mixture flows turbulently through the reaction chamber over horizontally

mounted quartz UV-lamp enclosures. Figure 5-1 provides a schematic diagram of the UV-Peroxidation process.

Electrical power demand to drive the high intensity UV-lamps and H_2O_2 usage is the primary operating cost. Other operating costs include repair and replacement of parts (mostly UV-lamps) and routine preventative maintenance (cleaning of lamp enclosures). Fouling of the UV-lamp enclosures by scaling is the primary mode of failure for the units. This can be remedied by a combination of water pretreatment and periodic monthly maintenance.

A pilot plant study was conducted by B-D to evaluate the UV-peroxidation treatment process. During the operation of the pilot plant it became evident that dissolved iron in ground water was being oxidized by the hydrogen peroxide. Iron floc particles caused a large amount of turbidity which impeded the effectiveness of the UV-lamps' ability to destroy VOCs.

To remedy the problem during the study, the turbid water was clarified in a large storage tank prior to pumping it through the VOC treatment system. This treatment step vastly improved the efficiency of the UV-peroxide system. It also made clear the fact that the final treatment process had to be expanded to include iron removal and sludge dewatering treatment steps. The proposed



TITLE

UV-PEROXIDATION - SCHEMATIC FLOW DIAGRAM

PREPARED FOR

BECTON DICKINSON AND CO.

ERM-Northeast
Environmental Resources Management

SCALE

DATE

FIGURE 5-1

treatment system is described in more detail in Section 7.2 of this report.

A full account of the pilot ground water treatability study is being submitted under a separate report. The treatment information obtained during the operation of the pilot study will be used as a guideline during the execution of the preliminary and final design phases of the project.

5.4 Discharge of Treated Ground Water

The Bergen County Utilities Authority (BCUA) has conceptually approved the discharge of treated ground water to their POTW. Exhibit 5-1 provides a copy of the conceptual approval letter along with preliminary discharge limitations. When the final engineering design of the ground water treatment system nears completion, application will be made to both the BCUA and NJDEP (NJPDES) for permits to discharge. B-D will also proceed with obtaining an NJDEP sewer extension permit and Treatment Works approval.

Office: (201) 641-2552
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JAN 30 1989

BERGEN COUNTY UTILITIES AUTHORITY
Box 122, Foot of Mehrhof Road, Little Ferry, New Jersey 07643

LARRY J. McCLURE
Executive Director

THOMAS J. TOSCANO, Chairman
MICHAEL P. RINKO, Vice Chairman
EUGENE J. BROPHY
VERNON R. COX
MARTIN J. HAYES
SHERWIN D. LESTER
FRANK C. LONGO
MICHAEL B. SCADUTO
ROSE TEAGUE

January 26, 1989

Mr. Randy White
ERM - Northeast
88 Sunnyside Boulevard
Plainview, New York 11803

RE: Industrial Pretreatment Program
Proposed Discharge

Dear Mr. White:

We have completed our review of your Industrial Wastewater Discharge Permit Application and supporting documentation for the discharge of ground water from the Becton Dickinson property located at Stanley Street, East Rutherford, New Jersey.

Based on our review, your discharge can be accepted by the Authority. Please be advised that draft Industrial Wastewater Discharge Permits are issued during the months of February, May, July, September and November.

The Authority is in a position to issue you a permit upon your notification. Please find enclosed the discharge limitations that you will be expected to meet.

It is recommended at this time that you proceed to obtain any and all necessary permits from the Borough of East Rutherford. If there are any questions, please do not hesitate to contact Mr. John Dinice of my staff.

Very truly yours,

BERGEN COUNTY UTILITIES AUTHORITY

BY: Steven M. Mizerek
STEVEN M. MIZEREK
Principal Engineer

SMM/JD:rd
Encl.

Table - 1 Discharge Limitations

Parameter	Limitation
Biochemical Oxygen Demand, BOD	BCUA must be notified if over 350 mg/1
Suspended Solids, S.S.	BCUA must be notified if over 350 mg/1
pH	5.5 - 9.5 Daily Range
Total Kjeldahl Nitrogen	200 mg/1 Single Sample
Ammonia Nitrogen	100 mg/1 Single Sample
Cyanide (T)	0.50 mg/1 Single Sample
Oil or Grease	
Non-petroleum origin	200 mg/1 Daily Maximum
Petroleum origin	100 mg/1 Monthly Average
	150 mg/1 Single Sample
Explosivity	5% LEL any 2 successive Readings
	10% LEL any 1 reading

Note:
(T) = Total

6.0 SOIL REMEDIATION PROGRAM

This section describes the program to be followed to remediate soils in Parcel No. 5. Soils are identified as requiring remedial action, further investigation, or no action. This identification is performed using the criteria established in Section 4.0 of this report. A plan to sample and evaluate areas requiring further investigation and a plan to subsequently excavate, characterize, prepare, transport and dispose of soils requiring remedial action are presented in this section. Finally a post-excavation sampling and analysis plan and a strategy to evaluate the need for further remedial efforts is presented.

The initial volume of soil to be removed in Parcel No. 5 is estimated to be 150 cubic yards. Additional excavation is expected depending upon the results of the FI investigative program and verification sampling program described in the following sections.

6.1 Remedial Classification of Soils

The criteria presented in Section 4.0 of this report have been used to identify soil as requiring remedial action (RA), further investigation (FI) or no action (NA). Table 6-1 identifies the remedial classification of soil in Parcel No. 5. Soil location is

TABLE 6-1

REMEDIAL CLASSIFICATION OF SOILS
PARCEL NO. 5

Area	Location	Remedial Designation	Parameters of Concern
Open Areas Away from Production Activities			
Cross-Section A_1-A_2	MW-15D	NA	
	MW-512	NA	
	5-05-09	RA ✓	Hg
	5-05-10	NA	
Cross-Section B_1-B_2	5-05-06	RA ✓	Hg
	Area 2A	NA	
	5-05-02	RA ✓	BN
Cross-Section C_1-C_2	5-05-12	RA ✓	Hg
	5-05-11	NA	
Cross-Section D_1-D_2	5-07-21	NA	
	5-07-22	RA ✓	Hg
	SP7	RA ✓	Hg
	SP9	RA ✓	Cu, Hg
Cross-Section E_1-E_2	MW-507	RA ✓	VOC, BN
	MW-508	RA ✓	BN
Cross-Section F_1-F_2	MW-509	NA	
	MW-510	NA	
	5-04-17	RA ✓	TPH
Cross-Section G_1-G_2	SP8, SP18	RA ✓	Hg
	5-06-09	RA ✓	Cu, Hg
Cross-Section H_1-H_2	5-06-14	NA	
	5-07-04	NA	
Cross-Section I_1-I_2	PIC-S8	NA	
	5-07-34	NA	
	5-07-11	NA	
	5-04-13	FI	Pb, Zn
	5-04-15	RA ✓	TPH

TABLE 6-1 (CONTINUED)

REMEDIAL CLASSIFICATION OF SOILS
PARCEL NO. 5

Area	Location		Remedial Designation	Parameters of Concern
Cross-Section J_1-J_2	5-04-09		NA	
	PIC-S6		NA	
	5-04-11		NA	
Cross-Section K_1-K_2	PIC-S7		NA	
	5-04-14	Paved	NA ?	
	5-04-16		NA	
Cross-Section L_1-L_2	MW-516		NA	
	PIC-S5		NA	
	5-04-10	PAVED	NA ?	
	5-04-12		NA	
Identified Areas of Environmental Concern				
Building A (Area 5-01)	5-01-01		NA	
	5-01-02		NA	
	5-01-03		NA	
	5-01-04		RA ✓	Hg
	5-01-05		NA	
	5-01-06		NA	
	5-01-07		RA ✓	Cr, Hg, Pb, Zn
	5-01-08		NA	
	5-01-09		RA ✓	Hg
Building B (Area 5-02)	5-02-01		RA ✓	Cu, Hg, BN
	5-02-02		NA	
	5-02-03		NA	
	5-02-04		NA	
Boiler Blowdown Pit (Area 5-02A)	5-02A-01		RA ✓	Hg, TPH, BN
	5-02A-02		RA ✓	Hg, TPH
Building D - Former Underground Storage Tanks (Area 5-03)	5-03-01		NA	
	5-03-02		NA	
	5-03-03		RA ✓	TPH
	5-03-03A		NA	
	5-03-03B		FI RA	TPH

TABLE 6-1 (CONTINUED)

REMEDIAL CLASSIFICATION OF SOILS
PARCEL NO. 5

Area	Location	Remedial Designation	Parameters of Concern
	5-03-05	NA	
	5-03-06	FI	TPH
	5-03-07	NA	
	5-03-08	NA	
Building N - South Loading Dock (Area 5-08A)	5-08A-02	NA	
Building N - Diesel Tank (Area 5-08B)	5-08B-01	NA	
Building N - Former Wastewater Treatment Tank (Area 5-08C)	5-08C-01	NA	
	5-08C-02	NA	
	5-08C-03	NA	
Building N - Former Sump (Area 5-08D)	5-08D-01	NA	
Building N - Former Aboveground TCE Tanks (Area 5-08E)	5-08E-03	NA	
Building N - Western Loading Dock (Area 5-08F)	5-08F-03	RA	Hg
Building T - Hazardous Substance Storage Area (Area 5-09)	5-09-01	NA	
	5-09-02	NA	
	5-09-03	NA	
	5-09-04	NA	
	5-09-05	NA	
	5-09-06	NA	
Transformer Areas Nos. 1 and 2 (Area 5-10)	5-10-1A	NA	
	5-10-1B	NA	
	5-10-2C	NA	

TABLE 6-1 (CONTINUED)

REMEDIAL CLASSIFICATION OF SOILS
PARCEL NO. 5

Area	Location	Remedial Designation	Parameters of Concern
Transformer Area No. 3 (Area 5-10)	5-10-3A	NA	
	5-10-3B	NA	
	5-10-3C	NA	
	5-10-3D	NA	
Transformer Area No. 4 (Area 5-10)	5-10-4A	NA	
	5-10-4B	NA	
	5-10-4C	NA	
	5-10-4D	NA	
Transformer Area No. 5 (Area 5-10)	5-10-05	RA	TPH
Building M - Former Fuel Tank (Area 5-11)	5-11-01	RA	TPH
	5-11-02	RA	TPH
	5-11-03	NA	
	5-11-04	RA	TPH
Storm Water Drain* System Sediment	5-13-01	RA	

*See Building Decontamination Plan provided under separate cover

specified by parcel number, area number and soil sample location number as presented in the ECRA Environmental Assessment Program Parcel Nos. 4, 5 and 6 (August, 1988). Figure 6-1 (back pocket) shows the locations of the FI and RA areas. In the cases where remedial (RA) or further investigative action (FI) is indicated, the parameters of concern for that location are also listed in the table. Soils identified as requiring further investigation are deficient in the data needed for the RA or NA classification. Three areas with insufficient data have been identified in Parcel No. 5. Procedures to evaluate the FI areas are presented in Section 6.1.1.

6.1.1 Sampling and Analysis Plan for Areas Requiring Further Investigation

The locations with remedial designations of FI require further investigation to determine if remedial action is necessary. Additional sampling will be performed at these locations. A 6-inch column sample will be collected within one foot of the water table at these locations. The samples will be analyzed for the parameters of concern identified in Table 6-1. Sample collection, maintenance and analysis procedures will be performed in accordance with those procedures presented in Section 2.0 of ECRA Environmental

Assessment Program, Parcel No. 2 of January, 1988. Analytical data will be evaluated and compared to the criteria presented in Section 4.0 of this report in order to determine if remedial action is required.

6.2 Environmental Coordinator

An Environmental Coordinator (EC) will be appointed to implement the soil remediation program. The role of the EC will include the following:

- Oversight of soil remediation activities to ensure that soil remediation procedures and health and safety requirements are carried out in accordance with this plan;

- Act as primary regulatory contact on-site and coordinate and respond to regulatory issues as required;

- Sign hazardous waste manifests on behalf of Becton, Dickinson and Company and maintain such records;

- Maintain a daily activity log; and

- o Maintain records of waste shipments and samples collected.

6.3 Excavation Plan

This section describes soil excavation and related remediation procedures to be followed to address soils requiring remedial action. Plans to control access to the site and establish work zones, and to excavate and dispose of contaminated soil are presented below. Plans for post-excavation activities which include post-excavation sampling and analysis, backfilling of excavated areas and equipment decontamination are presented in Section 6.4.

6.3.1 Access Control

The majority of Parcel No. 5 is surrounded by security fencing. Areas of the parcel that are not fenced (and require remedial action) will be provided with fencing for access control. In order to control access within the fenced portions of the parcels during remedial activities and to ensure that contaminated soils are contained and not spread on site, it is necessary to establish the following work zones:

- o Support zone (clean zone);
- o Contamination Reduction Zone; and,
- o Exclusion Zone.

The site environmental coordinator (see Section 6.2) will establish the limits of the work zones according to specific work activities. These zones will be maintained until remediation in each area is complete. A description of each zone of work follows:

Exclusion Zone

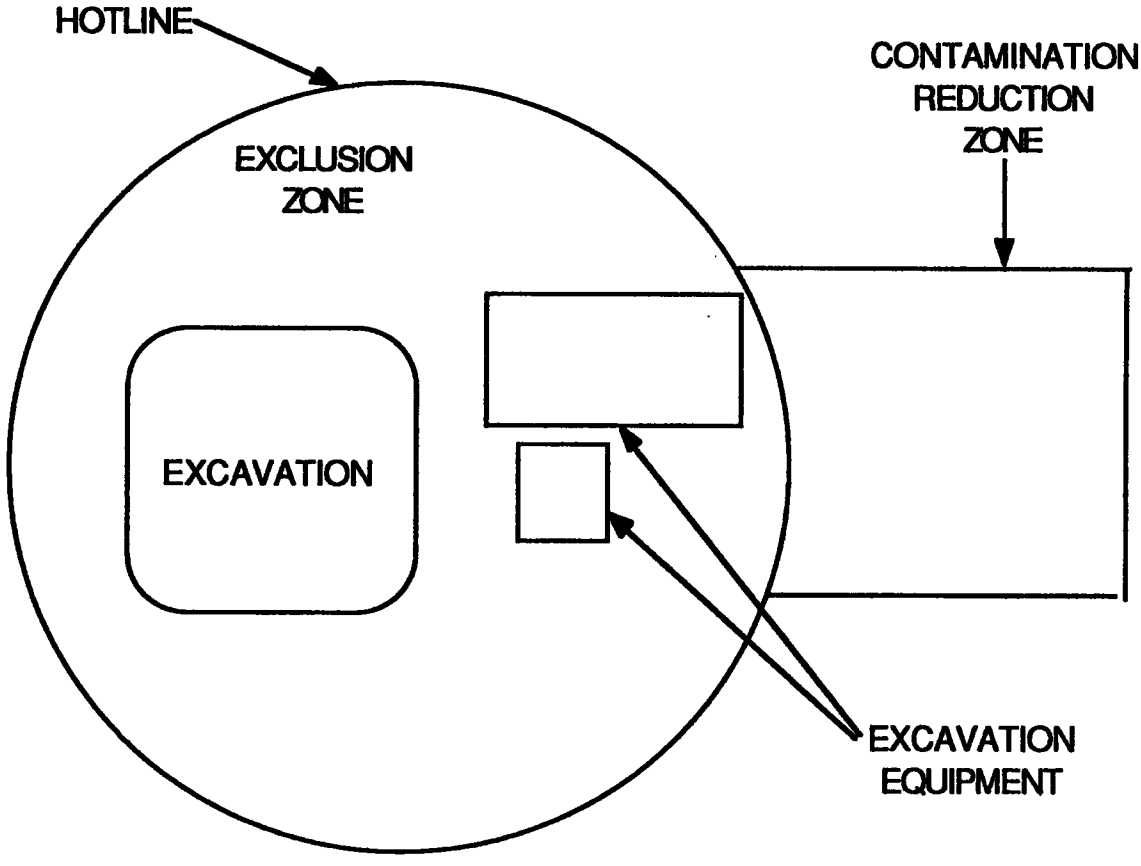
An exclusion zone will be established at each location requiring remediation when remedial activities (excavation) are initiated. The EZ will be delineated by the limits of the excavation, equipment used to excavate contaminated soils and the spatial requirements of excavation machinery and personnel. The perimeter of the EZ (the Hotline), will be established using yellow caution tape or equivalent. All persons within the EZ shall wear the required level of personal protection. An excavated area shall remain an exclusion zone until the excavation is restored with clean fill.

Contamination Reduction Zone

The contamination reduction zone (CRZ) is the transition area between the exclusion zone area and the support zone (clean area). Equipment and personnel decontamination will take place in the CRZ. Two types of CRZs will be used during the soil remediation of Parcel No. 5. An interim CRZ (ICRZ) will be established at each exclusion zone and at least one long term CRZ will be established in Parcel No. 5 for the decontamination of equipment and personnel leaving the parcel.

An ICRZ will be established at each excavation site adjoining the EZ. Figure 6-2 presents a typical layout of an EZ and adjoining CRZ for a typical area requiring excavation. Before any equipment leaves the EZ, it shall be decontaminated in the ICRZ. The ICRZ shall be an area covered with heavy-duty polyethylene or woven geotextile fabric. The equipment, which includes trucks and excavators, shall be moved onto the polyethylene or geotextile where it will be thoroughly brushed free of residual soils. Personnel shall remove protective clothing in the ICRZ for disposal or brush free residual soils prior to leaving the ICRZ.

FIGURE 6-2
TYPICAL EXCLUSION ZONE AND CONTAMINATION REDUCTION ZONE



A minimum of one long-term CRZ will be established in Parcel No. 5, located adjacent to an opening in the security fencing used for ingress to and egress from the parcel. All personnel and equipment that have contacted contaminated soil shall be decontaminated prior to leaving the site. Equipment decontamination within the long term CRZ will be accomplished either by using a powered steam system (steam jenny), or by using a dry decontamination system.

The powered steam system will be used on days when muddy conditions exist on-site, such as the day of a precipitation event. Detergent solutions will be used as necessary to properly clean contaminated equipment. All wash and rinse water will be collected within the decontamination area. These liquids will then be pumped into drums and disposed of at an authorized off-site disposal facility.

The dry decontamination system will be used when dry conditions exist on-site. Dry decontamination will be accomplished in two steps: 1) removing residual soils by brushing and scraping and 2) cleaning the equipment by wiping with rags and detergent solution. Rags contaminated during this process will be disposed of properly.

Support Zone

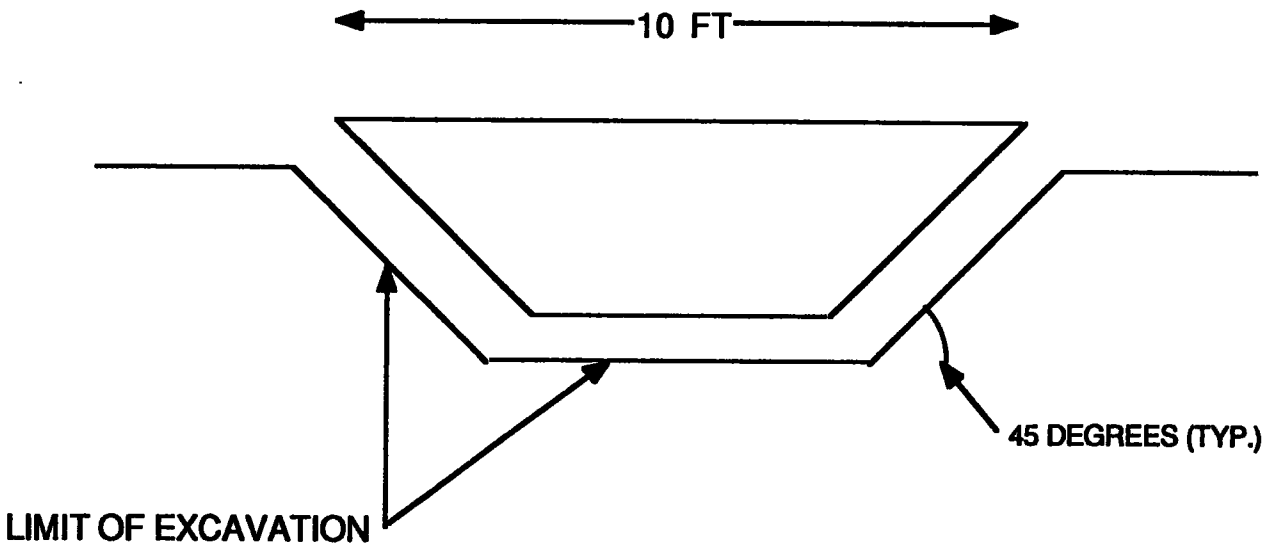
The Support Zone (SZ) is considered to be uncontaminated. Protective clothing and equipment are not required but should be available for use in emergencies. Clean equipment and materials are stored and maintained in the SZ. Protective clothing is donned in the SZ prior to entering the CRZs. Therefore, the SZ will be located adjacent to the interim CRZ, the long term CRZs and the points of ingress and egress for the parcels. Put simply, the support zone covers all areas within each parcel which are not designated as EZs or CRZs.

6.3.2 Excavation Procedures

Soil excavation will be accomplished using power equipment such as a hydraulic excavator or a backhoe. The on-site environmental coordinator or designate will oversee each excavation. Figure 6-3 presents a typical cross section indicating the anticipated extent of excavation in each area. An excavation of contaminated soil in open areas away from production activities will cover an area of approximately 100 square feet (10 foot square). The size of excavations in identified areas of environmental concern will vary depending upon the physical constraint such as building foundations,

FIGURE 6-3

TYPICAL CROSS-SECTION
OF SOIL EXCAVATION

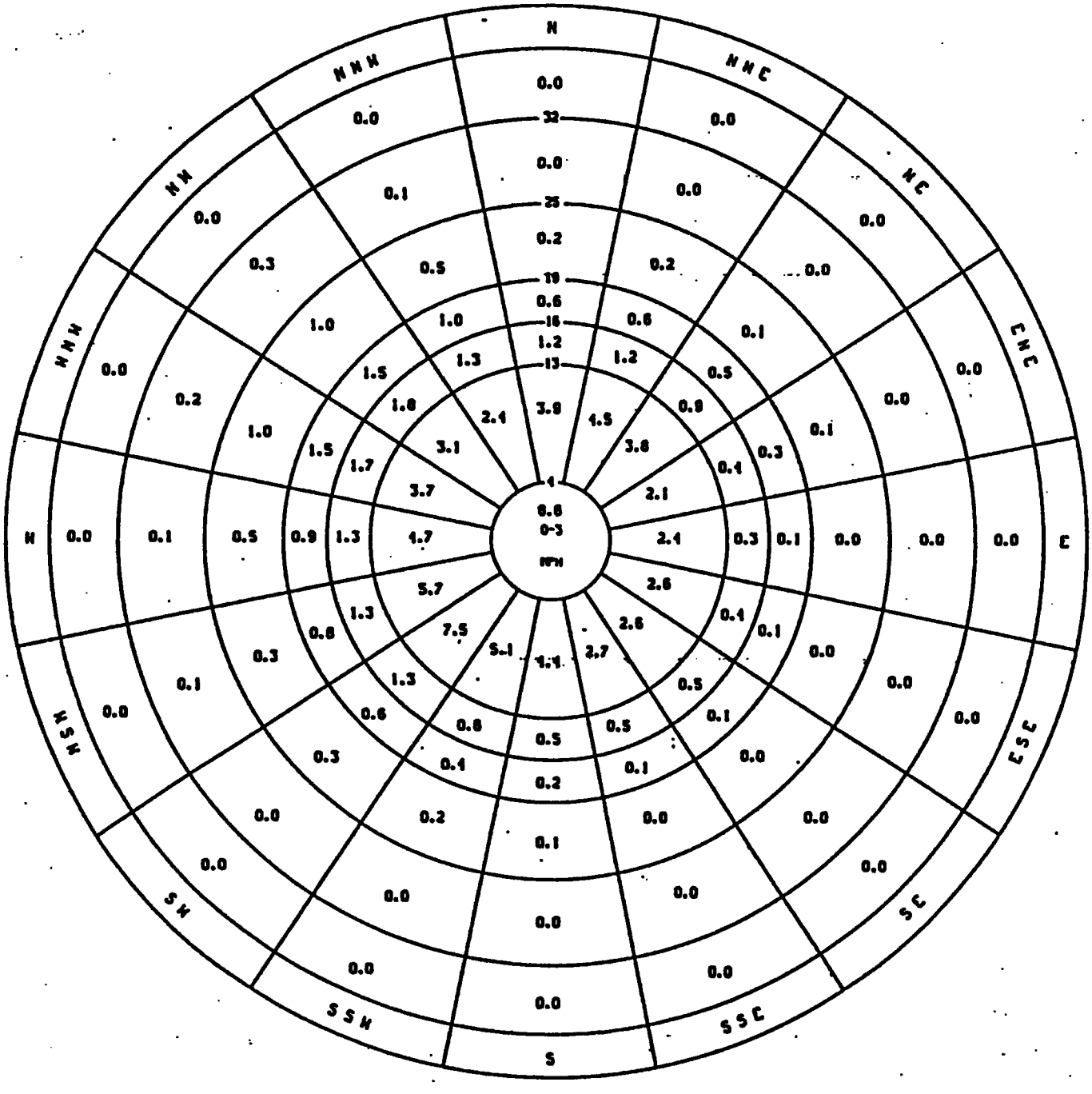


etc. Each excavation will extend either to a depth of 1 foot below the depth of the sample that indicated the need for remedial action or to the depth of the ground water surface, whichever is less. Surveying equipment will be used to maintain vertical control of the excavations when required. An excavation may be enlarged if sensory observations (soil staining, odors, etc.) indicate the need. A maximum slope of 45 degrees (1:1) will be maintained to prevent collapse. Clean fill overlying zones of contamination will be stockpiled on-site for reuse as backfill material.

Figure 6-4 presents a wind rose for Newark International Airport. Winds in the East Rutherford, New Jersey area are most often from the southwest. Therefore, in order to minimize the amount of dust resulting from remediation activities, work shall begin at the northeast portion of the site and proceed in a southwesterly direction as much as practicable. Further, the ICRZ will be established on the southwestern side of the EZ where possible. In the event of an anticipated prolonged change in wind direction, the direction of work will be varied. Dust control will be provided by water spray as required.

FIGURE 6-4

NEWARK INTERNATIONAL AIRPORT
WIND GRAPH



Excavated soil will either be loaded directly into trucks or stockpiled on-site prior to truck loading. At locations where the contaminated soil has been sufficiently characterized for disposal purposes (by previous sampling and analysis), the excavated material will be loaded directly into trucks. Plastic sheeting or woven geotextile fabric will be placed around the truck being loaded to prevent the spread of contaminated soil.

At locations where soils have not been sufficiently characterized for disposal purposes, excavated materials will be stockpiled. The location of stockpiled soils will be selected so that they not do conflict with other soil and ground water remedial activities. The soil stockpiles will be placed upon a plastic liner and covered with plastic. The plastic cover will be secured with weights.

Soil stockpiles will be designated as EZs and access will be limited accordingly. All equipment and personnel leaving the stockpile EZ will be required to pass through an ICRZ which will also be established at stockpile locations.

Soil will remain stockpiled until sufficient sample analysis data is collected to obtain disposal acceptance at

an off-site location. Soil will then be loaded into trucks within the stockpile exclusion zone. Plastic sheeting or woven geotextile fabric will be placed around each truck being loaded to prevent the spread of contaminated soil. After the soil is removed from the stockpiles, the plastic cover, bottom liner and other plastic sheeting and woven geotextile will be collected and disposed of according to the requirement for the previously stockpiled soil.

Each truck load of contaminated soil leaving the site must pass through the long term contamination reduction zone for cleaning. In addition, all loaded trucks must be covered prior to leaving the site.

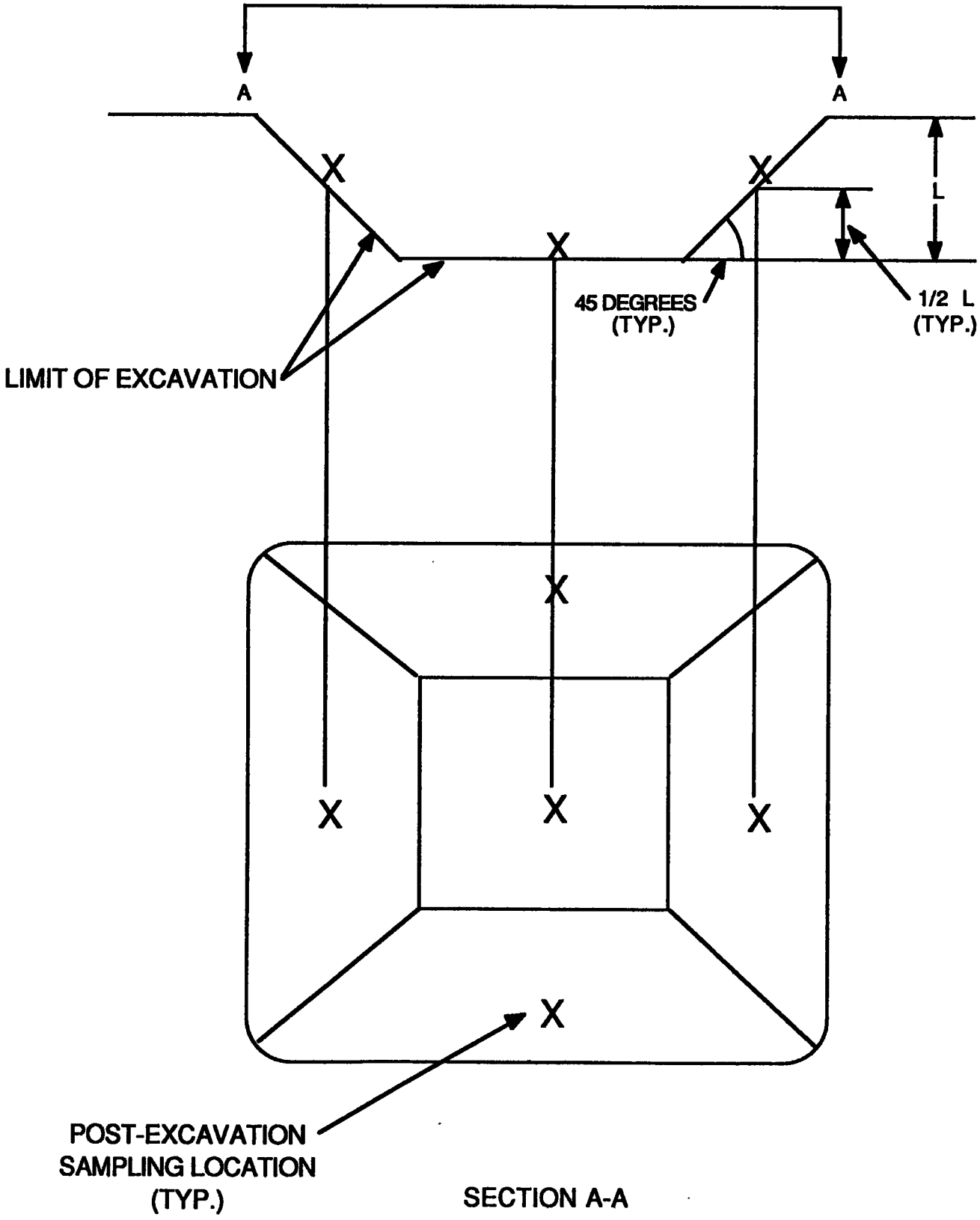
6.4 Post-Excavation Procedures

6.4.1 Post-Excavation Sampling and Analysis

Upon completion of the initial soil excavation, soil samples will be collected and analyzed to confirm the removal of contaminated soil. Figure 6-5 presents typical post-excavation sampling locations. Soil samples will be collected from the sidewalls and the bottom of each excavation. Soil samples will not be collected from the bottom of the

FIGURE 6-5

TYPICAL POST-EXCAVATION
SAMPLING POINTS



excavation when the excavation extends to or below the ground water table. The samples taken from the sidewalls will be collected at a depth of approximately one half (1/2) of the total depth of the excavation. Sample collection, maintenance and analysis procedures and protocols to be employed during this program are presented in the ECRA Environmental Assessment Program, Parcel Nos. 4, 5 and 6 report of January, 1988. The post-excavation samples collected at each excavation area will be analyzed for the contaminants that were found in concentrations high enough to warrant remedial action (see Table 6-1).

6.4.2 Additional Excavation

The post-excavation sampling program will be used to determine if areas require additional excavation. The remedial designation procedures presented in Section 6.1 will be used to determine whether further excavation is required. Additional soil remediation activities (if required) will follow the excavation plan presented in Section 6.3. After completion of the additional excavation, samples will again be collected in accordance with Section 6.4.1 to verify the effectiveness of remedial efforts.

6.4.3 Backfill of Excavated Areas

All materials that will be used to fill excavations will be approved by the NJDEP prior to use. The NJDEP will be notified at least fourteen (14) days prior to the start of backfill work.

6.4.4 Cleanup/Demobilization

After soil remediation work is completed, demobilization and cleanup will begin. All equipment will be thoroughly decontaminated before leaving the site. Disposable materials that have contacted contaminated soil will be disposed of in the same manner as the contaminated soil. Uncontaminated disposable materials will be collected and disposed of as normal refuse.

6.5 RCRA Closure Areas

One RCRA interim status facility is located in Parcel No. 5. The interim status facility is a former underground tank located at the southeast corner of Building D (Area 5-03). This area was investigated and discussed in the ECRA Environmental Assessment Program report for Parcel Nos. 4, 5 and 6.

Contaminated soil removed from the RCRA area as part of the soil remediation plan will be handled separately from other site areas. RCRA wastes will be shipped in separate loads under separate manifest.

6.6 Wetlands

Wetlands, meeting the definition established by the U.S. Army Corps of Engineers, have been identified within Parcel No. 5. Any soil remediation within defined wetland areas will be coordinated with the lead wetland regulatory agency as required.

6.7 Health and Safety Plan

A. Level D protection will be used, at a minimum, by all personnel implementing soil remediation procedures. Higher levels of protection, (levels A through C), may be prescribed according to the requirements of the specific work and the hazards of the substances to be removed. Appendix D presents a description of each level of personal protection.

B. Notifications by letter shall be made to all applicable federal, state and local agencies before any work is initiated.

C. A Hazard Evaluation Summary (HES) will be prepared covering the substance involved, concentrations (if known) and primary hazards such as reactivity, toxicity, ignitability, corrosivity, etc.

D. Personnel decontamination procedures will follow standard decontamination procedures common to specific types of work (e.g., asbestos work). Methods will include change of clothing procedures, personal hygiene, storage of boots/safety helmets, clothing, etc.).

E. Communication procedures and equipment shall be established and work crews will be trained in their use before work begins.

F. An environmental monitoring plan and equipment used for monitoring will be established and described. A monitoring log will be maintained.

G. Emergency procedures in the event of accidents, spill, fire/explosion, equipment failure of personal protective gear or other equipment will be established and described. Personnel will be trained to be familiar with these procedures.

H. Personal protective equipment will be selected prior to commencement of the work based upon the hazards of the substances to be removed.

7.0 GROUND WATER REMEDIATION PROGRAM

7.1 Ground Water Withdrawal System

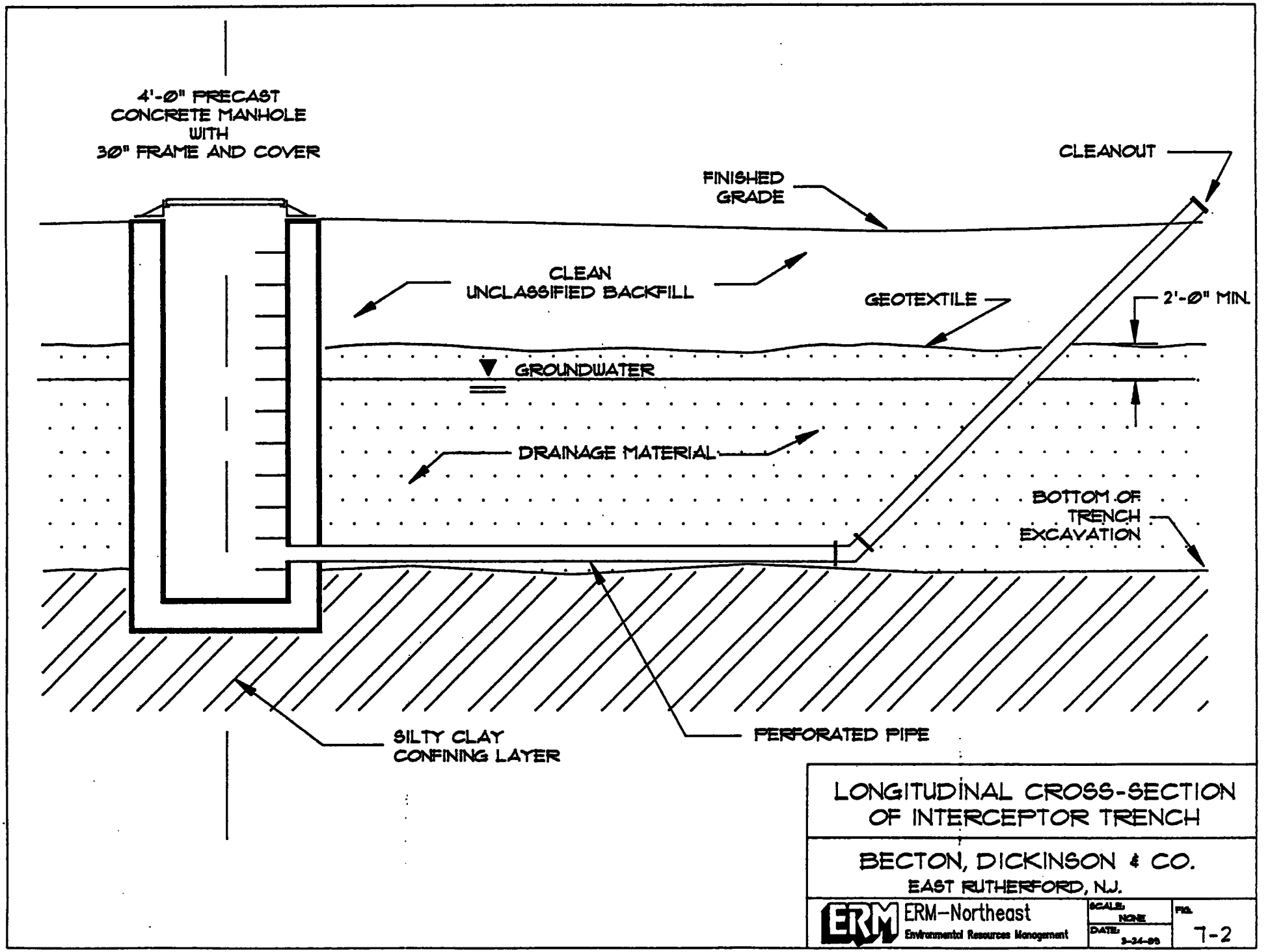
7.1.1 Interceptor Trenches and Piping Network

Ground water will be withdrawn from the upper water bearing zone using a series of interceptor trenches. The trenches will be located hydrogeologically downgradient of areas having the highest contaminant concentrations and at positions that will prevent off-site migration of contaminants. The interceptor trench system is designed to collect ground water in Parcel No. 5 (and Parcels 2 and 6) at the East Rutherford site which exhibits contaminant concentrations greater than the ground water remedial action criteria presented in Section 4.0 of this report. Figure 7-1, presented in a back pocket of this report, provides a site plan indicating the proposed location of the interceptor trenches. Ground water table contours, monitoring well locations and volatile organic concentrations (total of trichloroethylene, t-1,2-dichloroethylene and vinyl chloride) exceeding the ECRA RCLs are also shown on the figure.

The interceptor trenches will extend downward from the ground surface and will be keyed into the underlying silty clay confining layer. This installation technique is necessary to capture any heavier than water contaminants such as the chlorinated organics encountered on-site.

A six-inch perforated drain pipe will be installed along the bottom of the trench excavation. This drain pipe will serve to convey ground water intercepted by the trench to a collection manhole. Submersible pumps located within these manholes will pump the ground water to the proposed ground water treatment facility.

The trench will be backfilled with drainage material to an elevation two feet above the height of the ground water table. The selection of the drainage material will be based on properties that will enable the trench to pass ground water more readily than the surrounding subsurface soils. The use of this material is expected to create a relatively uniform drawdown throughout the entire length of the interceptor trench, thus forming an effective barrier and capture zone against the leading edge of the contaminated ground water plume. Figure 7-2 and 7-3 provide schematic cross-sections of a typical interceptor trench.

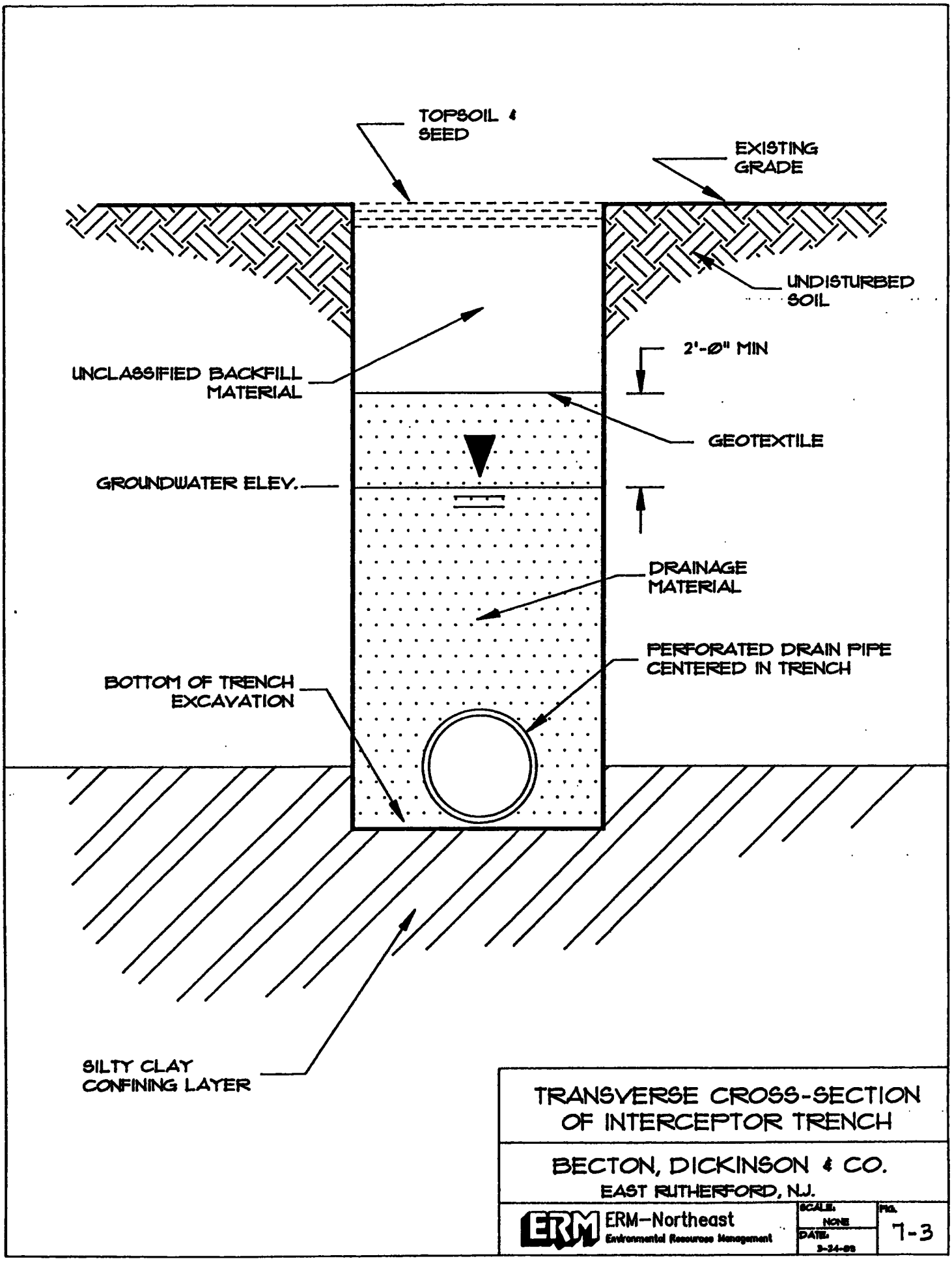


LONGITUDINAL CROSS-SECTION
OF INTERCEPTOR TRENCH

BECTON, DICKINSON & CO.
EAST RUTHERFORD, N.J.

ERM-Northeast
Environmental Resources Management

SCALE: NONE
DATE: 3-24-95
FIG. 7-2



TRANSVERSE CROSS-SECTION OF INTERCEPTOR TRENCH

BECTON, DICKINSON & CO.
EAST RUTHERFORD, N.J.

ERM ERM-Northeast
Environmental Resources Management

SCALE: NONE
DATE: 3-24-95

FIG. 7-3

A test trench has been constructed at the site in the manner described above during the pilot ground water treatability study. During the study the interceptor trench was pumped to provide water to the pilot treatment system and to evaluate the extent of the trench's capture zone. Actual field test data showed that the trench system performed as anticipated and was capable of containing and capturing the ground water.

The interceptor trenches will be hydraulically connected through a series of gravity flow drain pipes and force mains. Manholes and cleanouts will be installed at each trench or junction between trenches to facilitate maintenance. Figure 7-1, previously presented, provides a schematic of the piping interconnecting the trenches, the pumping stations, and the force main to the treatment plant.

7.1.2 Hydraulics of Trench Operation

The average seepage velocities for the materials within the unconfined aquifer unit were calculated to estimate the total ground water withdrawal rate for the entire interceptor trench system. Initially, when the cleanup plan for Parcel Nos. 1, 2 and 3 was prepared, pumping rates were calculated

using hydraulic conductivity values (K) derived from slug tests. These K values have since been refined by: (1) re-analyzing the tests using a more rigorous analytical method; and (2) analysis of the pumping test of the pilot trench. The results of these two analyses correlated well and provide a much higher level of confidence than before. It should be noted however, that K values for the upper unconfined aquifer are highly variable across the site, therefore, it is still difficult to predict K at specific locations.

In the Cleanup Plan previously prepared for Parcel Nos. 1 and 2, estimated K values were given as ranging from 1.0 to 10 ft/day (7.5 to 75 gpd/ft^2). The recalculated range, using the analyses described above, is $6x10^{-3}$ to 2.7 ft/day (0.5 to 20 gpd/ft^2).

The estimated trench yields given in the cleanup plan for Parcel Nos. 1, 2, and 3 can be refined considerably based on the recalculated values of K discussed above, as well as through the use of a digital aquifer flow model as a much more rigorous method of analysis. The model runs that have been conducted to date have simulated relatively low flow rates that can be sustained for extended periods (1-2 days) without the trenches going dry.

Modeling efforts are continuing as part of the preliminary design work for the full-scale ground water treatment plant.

Near future modeling efforts will be geared to address the following items:

(1) determine a theoretical maximum pumpage over a one day period for the entire ground water collection system; and

(2) generate recovery curves for each trench to estimate downtime between pumping cycles.

This information that will be gained from the above analyses is critical in sizing the maximum hydraulic loading rate for the proposed treatment system. Until this information is available it will be assumed that the hydraulic flow rate of 100-125 gpm presented in the cleanup plan for Parcel Nos. 1, 2 and 3 is appropriate.

7.2 Ground Water Treatment System

7.2.1 Proposed Treatment System

The ground water treatment system presented in the cleanup plan for Parcel Nos. 1 and 2 consisted of the following system components:

- o Clarification
- o UV/Peroxidation
- o Sludge Dewatering

This system remains the system of choice for the treatment of ground water extracted from trenches located in Parcel Nos. 5 and 6. The UV/peroxidation system has been pilot tested under actual site conditions and has been proven effective at removing volatile organic compounds from the ground water.

However, during the operation of the pilot plant it became evident that higher amounts of dissolved iron than anticipated were entering the pilot treatment system. Once in the system, hydrogen peroxide rapidly oxidized the iron, forming floc particles which greatly impeded the effectiveness of the ultraviolet (UV) lamps. To properly evaluate the

treatability of the UV/peroxidation system, the turbid water was stored in a tank allowing the iron floc to settle prior to passing ground water through the UV/peroxidation system. This pretreatment step was effective and allowed the UV/peroxidation system to be fully evaluated. The operation of the pilot plant identified the need for a metals removal system which would be used specifically to remove iron from the influent ground water stream prior to UV-peroxidation treatment.

Therefore, in order to handle the intermittent pumping of trenches and interferences due to dissolved iron, the proposed ground water treatment system will include the following steps:

- Flow Equalization
- Metals Removal
- Sludge Conditioning and Dewatering
- UV/Peroxidation

These individual system components are described in the following sections.

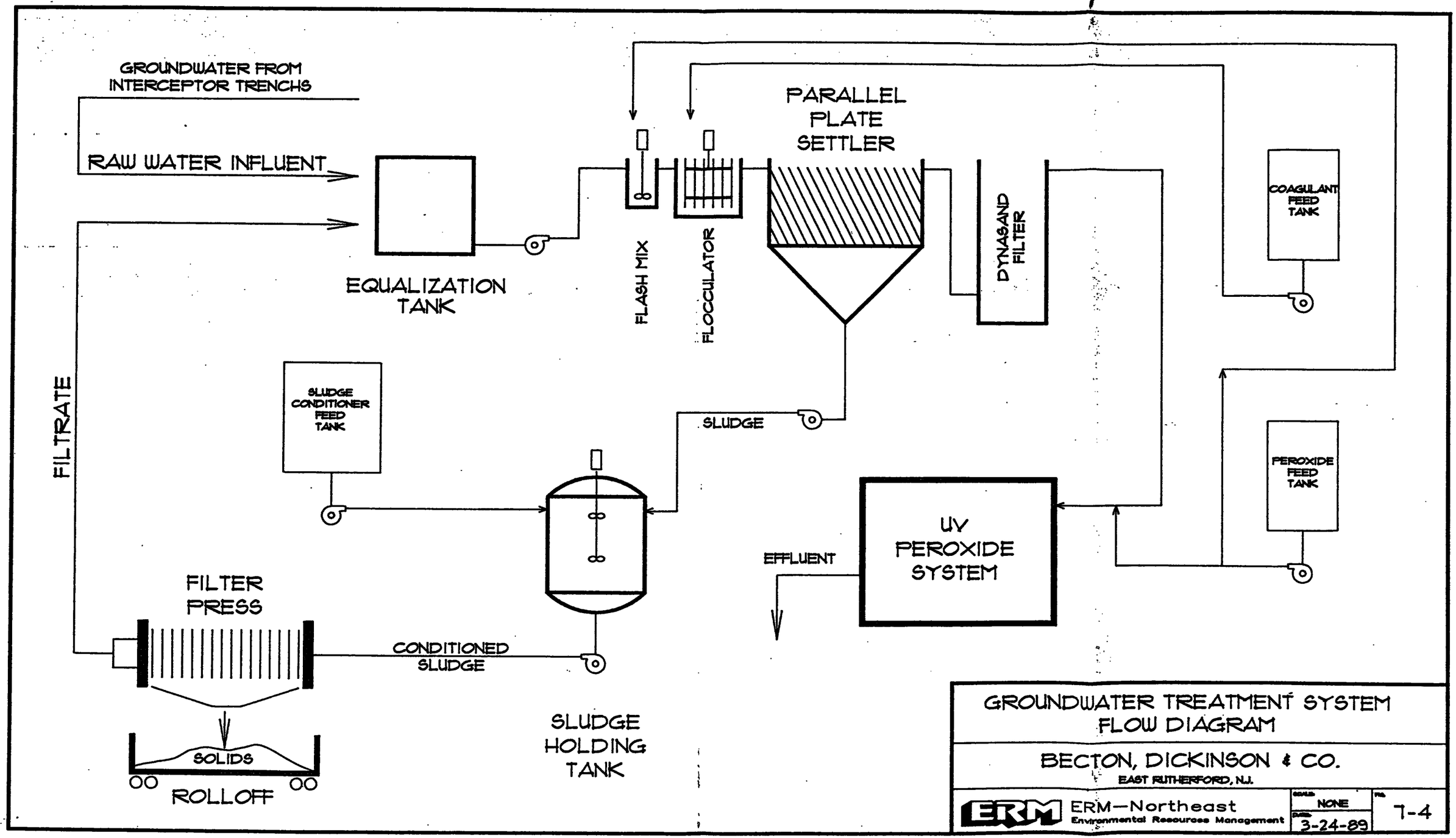
A schematic flow diagram of the ground water treatment plant is presented in Figure 7-4. The proposed location for the treatment facility is the southeast corner of Parcel No. 5.

7.2.2 System Components

Flow Equalization

An equalization tank will be provided at the influent to the ground water treatment plant. The equalization tank will serve to smooth out intermittent pumping and recovery cycles from the multiple trenches located throughout the site. Smaller treatment equipment sizing will result due to maximum hydraulic loading rates being dampened to a more consistent process flow rate.

The equalization tank will perform a second function as a stilling basin. Parcel No. 5 has hydrocarbon contamination in discrete areas. The hydrocarbon contamination is that of a relatively heavy oil such as lubricating or cutting oil. The residence time in the equalization tank will allow for oil/water phase


GROUNDWATER FROM INTERCEPTOR TRENCHS
RAW WATER INFLUENT
EQUALIZATION TANK
FLASH MIX
FLOCCULATOR
PARALLEL PLATE SETTLER
DYNASAND FILTER
COAGULANT FEED TANK
PEROXIDE FEED TANK
UV PEROXIDE SYSTEM
EFFLUENT
SLUDGE
SLUDGE CONDITIONER FEED TANK
FILTRATE
FILTER PRESS
CONDITIONED SLUDGE
SLUDGE HOLDING TANK
SOLIDS
ROLLOFF
GROUNDWATER TREATMENT SYSTEM
FLOW DIAGRAM
BECTON, DICKINSON & CO.
EAST RUTHERFORD, N.J.
ERM—Northeast
Environmental Resources Management
SCALE NONE
DATE 3-24-89
FIG. 7-4

separation. The oil will form a layer on top of the liquid which can easily be decanted.

Metals Removal

Operation of the pilot plant identified the need for an effective metals removal system. The metals removal system proposed for the ground water treatment plant will consist of a parallel plate separator followed by a sand filter.

A parallel plate separator was selected because it is very effective when used in a physical chemical process such as iron removal. This type of separator is readily available as a package unit and can come equipped with a flash mix and flocculation tank.

A parallel plate separator will also be effective in removing floatables or lighter than water liquids. This ability would add an additional factor of safety should any hydrocarbons pass into the treatment system.

To ensure that there is no turbidity remaining in the process stream prior to entering the UV/peroxidation

step, the effluent from the separator will be passed through a sand filter to remove any remaining floc break-through. The sand filter will be a constant backwash sand filter capable of handling high solids loading rates without requiring elaborate backwash systems. This type of filter is also available as a package unit.

Sludge Dewatering

Grit and metal sludges removed by the parallel plate separator will initially be stored in a hopper at the base of the unit. This hopper will periodically discharge to a sludge blending tank where the sludge can be conditioned prior to dewatering. The tank will be fitted with an agitator and all necessary chemical addition apparatus.

A sludge dewatering device will be selected based on the final hydraulic loading rates the plant will encounter. The pieces of equipment presently being considered for this purpose are a filter press and a disposable paper sludge dewatering filter. A filter press will produce a dryer filter cake and reduce the final volume of sludge to be disposed of. It is an

effective piece of equipment that usually has little down time. The disposable paper filter is more economical for low sludge volumes, as may be the case at this site.

UV/Peroxidation

Clarified ground water will flow through the UV-peroxidation unit where volatile organic constituents will be oxidized and ultimately destroyed. Section 5.0 provides technical details regarding the operation of the UV-peroxidation unit.

An aboveground hydrogen peroxide (H_2O_2) tank will be used to store the H_2O_2 for the treatment unit. The H_2O_2 tank will be provided with secondary containment for 100% of its volume. Both the inlet and outlet of the UV-Peroxidation unit will be equipped with sampling ports to allow for the periodic monitoring of volatile organic concentrations.

The treatment plant will be enclosed in a heated and weather resistent building. Piping exposed to the weather will be heat traced and insulated to prevent freezing in the winter.

7.2.3 Full Scale System Start-up

After the full scale ground water withdrawal and treatment systems are constructed, a one month startup period will be used to adjust the ground water withdrawal and treatment system to a full-time operating capacity. Ground water samples will be collected from the inlet and outlet of the UV-peroxidation unit at least every twelve (12) hours during the first week of continuous operation and once each day during the last three weeks of the startup period. Each sample will be analyzed to assess the performance of the treatment process.

The results of these analyses will be used to adjust the system to obtain a more effective and efficient operation. Some of the adjustments which can be made include:

- increasing or decreasing chemical dosages to all the treatment units
- increasing or decreasing the intensity of the UV lamps
- increasing or decreasing the retention time within process units

- o increasing or decreasing the system flow rate

Operation, Maintenance and Monitoring

An operations and maintenance manual will be prepared for the ground water withdrawal and treatment systems. The ground water withdrawal and treatment systems will be designed for unattended 24 hour a day operation. Safety interlocks will be installed to ensure that the system will be shut down if any critical components fail. For example, if insufficient flow is provided to the UV-peroxidation unit, the entire system including the pumping station will shut down.

The metals removal equipment will require operator attention during sludge dewatering operations. The frequency of this operation will be established during the final design of the plant.

Maintenance of the UV/peroxide system will be performed once or twice a month primarily to service the UV-peroxidation unit (clean UV lamp enclosures). At these times the entire system will be shut down for approximately 1/2 day and serviced (sludge pumped, pumps checked, etc.). System startup

procedures will follow those presented in the operations and maintenance manual.

During full time operation, the treatment system will generally be monitored on a daily basis. Ground water samples will be collected from the inlet and outlet sample ports of the UV-peroxidation unit. The outlet sample will be collected after a time equal to the hydraulic retention time of the system. Each sample will be analyzed for priority pollutant organic compounds. In addition, once each month, an outlet port sample will also be collected and analyzed for heavy metals (Cd, Cr, Cu, Pb, Hg, Ni, Zn) and total petroleum hydrocarbons. Sample collection, maintenance and analysis procedures will be performed in accordance with procedures presented in the previously submitted sampling and analysis plan. The operation and maintenance manual will detail these procedures.

8.0 MONITORING PROGRAM

This section presents a ground water monitoring program that will be implemented during the environmental remediation program and will extend over a minimum of two years. The monitoring program is designed to accomplish the following objectives:

- monitor ground water quality downgradient of areas where soil contaminants have been left in place at concentrations greater than the ECRA RCLs.

- monitor ground water quality at the hydrogeologic downgradient site perimeter to warn of potential off-site releases.

- monitor ground water beyond the ends of the interceptor trenches to establish that trench locations are effective in accomplishing their intended task.

- monitor ground water in previously identified contaminated areas to measure the effectiveness of the ground water remediation program.

Table 8-1 provides a summary of the monitoring program and lists the monitoring wells to be sampled, the sampling and analysis frequency, and the parameters of concern.

8.1 Monitoring Effectiveness of Ground Water Remediation

Monitoring wells in contaminated areas immediately upgradient of interceptor trenches will be periodically tested to evaluate the effectiveness of the ground water remediation program. Well numbers and the schedule of testing have not been included in Table 8-1 since the wells and schedule of testing will vary on an as needed basis in conjunction with the operation of the ground water collection and treatment systems.

8.2 Sample Collection, Maintenance and Analysis Procedures

Sample collection, maintenance and analysis will be performed in accordance with the procedures presented in the report entitled ECRA Environmental Assessment Program - Parcel No. 2 (submitted January, 1988). These procedures include the use of travel and field equipment rinseate blanks and duplicate samples. Only NJDEP certified laboratories will be used to conduct sample analyses.

TABLE 8-1
ON-GOING GROUND WATER MONITORING SUMMARY

Monitoring Wells	Parameters of Concern	MONITORING SCHEDULE(1) 1991 Sept.	1991 Dec.	1992 Mar.	1992 June	1992 Sept.	1992 Dec.	1993 Mar.	1993 June
MW-550, MW-551	Volatile organic compounds	X	X	X	X	X	X	X	X
MW-507, MW-551	Copper, mercury lead, zinc, total petroleum hydro-carbons	X	X	X	X	X	X	X	X
All Wells	Ground Water Elevations	X	X	X	X	X	X	X	X

(1) Monitoring schedule is assumed to begin in September 1991. Only NJDEP certified laboratories will be used to conduct the sample analysis.

8.3 Installation of Additional Monitoring Wells

Three additional monitoring wells will be installed to complete the ground water monitoring network. These wells are shown on Figure 7-1, previously presented. The wells will be installed and developed according to the procedures and NJDEP specifications presented in the report entitled ECRA Environmental Assessment Program - Parcel No. 2 (submitted January, 1988).

8.4 Reports to the NJDEP

Ground water quality data will be reported to the NJDEP on a quarterly basis. Reports will be submitted in the calendar month following the scheduled month of sample collection. NJDEP Ground Water Quality Report forms will be used to present the data.

8.5 Ground Water Quality Data Evaluation

Ground water quality data will be evaluated on a quarterly basis. Quarterly monitoring data will be compared to the ground water remedial action criteria presented in Section 4.0. Where contaminant levels are found to exceed these criterion, a written compliance report will be prepared and submitted to the NJDEP within 60 days following receipt of the laboratory data in

question. The report will indicate the contaminants of concern, the monitoring wells exhibiting the contamination and measures that will be taken to remedy the identified conditions.

8.6 Duration of Monitoring Program

The monitoring program will be conducted for a period of two years after the completion of site remediation activities for soils (July, 1991). The continuation of the monitoring program or a modification of the program will be evaluated after the conclusion of the initial two year monitoring period.

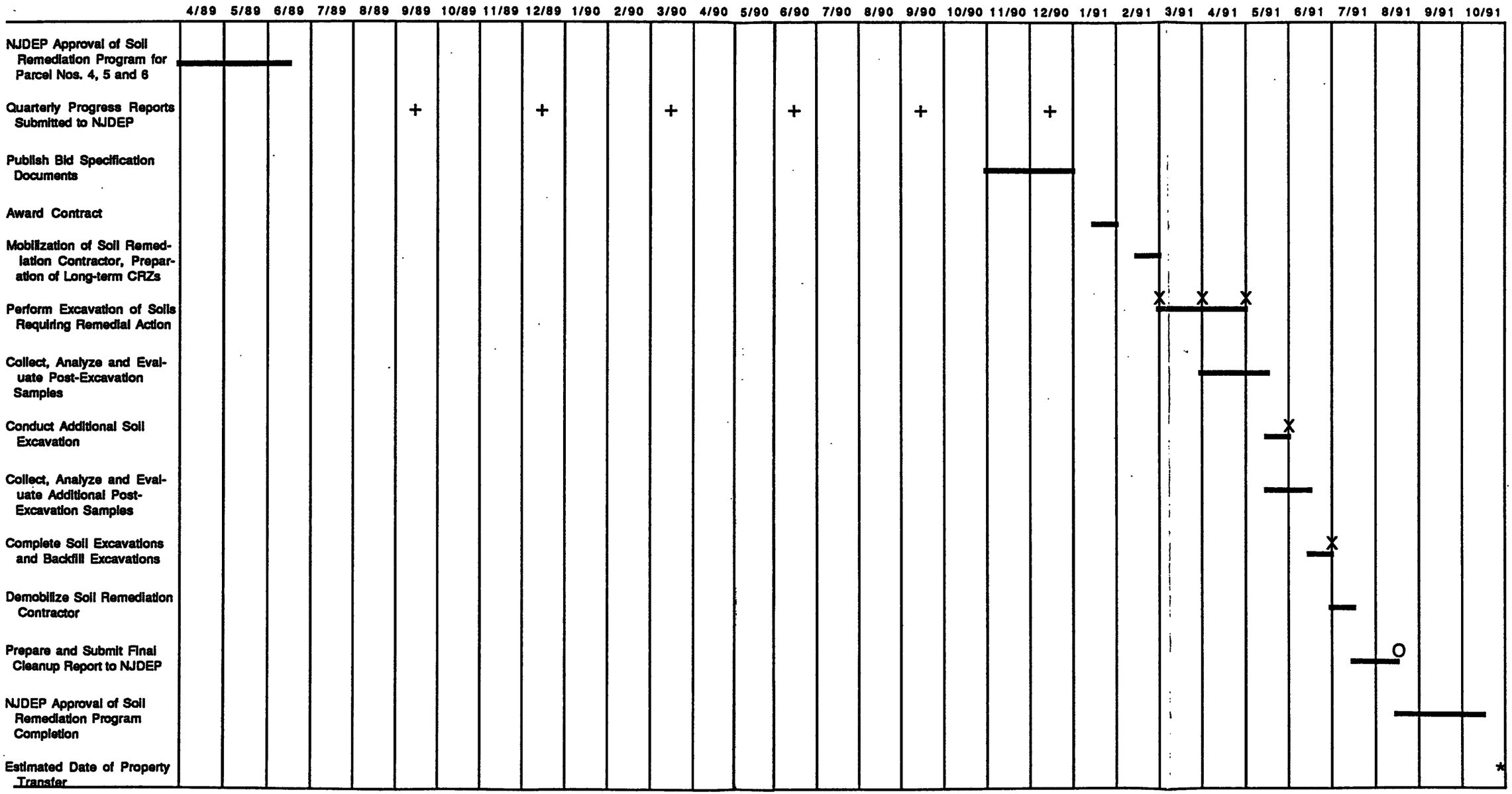
9.0 SCHEDULE OF REMEDIAL ACTIVITIES

Schedules for the completion of remedial activities in Parcel Nos. 4, 5 and 6 are presented in this section. The starting date for soil remediation is based upon the estimated schedule of property transfer (Parcel Nos. 4, 5 and 6) to the NCB. Ground water remediation of Parcel Nos. 5 and 6 will be completed concurrently with the implementation of the approved Parcel No. 2 ground water remediation program. The schedules presented below anticipate that the Remedial Action Plans for Parcel Nos. 4, 5 and 6 (with modification, if necessary) will receive NJDEP approval prior to the start of remedial activities.

9.1 Soil Remediation Program Schedule

As previously stated, the schedule of soil remediation activities is based upon B-D's schedule of property transfer. It is currently estimated that B-D will transfer the property contained within Parcel Nos. 4, 5 and 6 to the NCB on October 31, 1991. Therefore, all site remediation activities will be completed prior to this date. Figure 9-1 graphically depicts the soil remediation schedule.

FIGURE 9-1
SOIL REMEDIATION PROGRAM SCHEDULE, PARCEL NOS. 4, 5 AND 6



X Monthly Progress Reports Submitted to NJDEP
O Final Cleanup Report Submitted to NJDEP

Soil remediation bid specification plans and documents will be prepared and distributed to potential contractors by December, 1990. Appropriate sections of the final approved Remedial Action Plan will be made part of the bid specification package. Soil remediation work is expected to begin one month after the selection of a contractor and is conservatively expected to continue for 6 months to account for any additional soil excavation required by verification sample analyses. A final report of the completed soil remediation program will be submitted to the NJDEP one month following the completion of the soil work.

9.2 Ground Water Remediation Program Schedule

The ground water remediation program presented in the approved Remedial Action Plan for Parcel No. 2 included the following major construction items:

- design and construction of ground water interceptor trenches, interconnecting piping and pump stations in Parcel No. 2 and the southwestern portion of Parcel No. 5, and

- design and construction of a ground water treatment plant in Parcel No. 5.

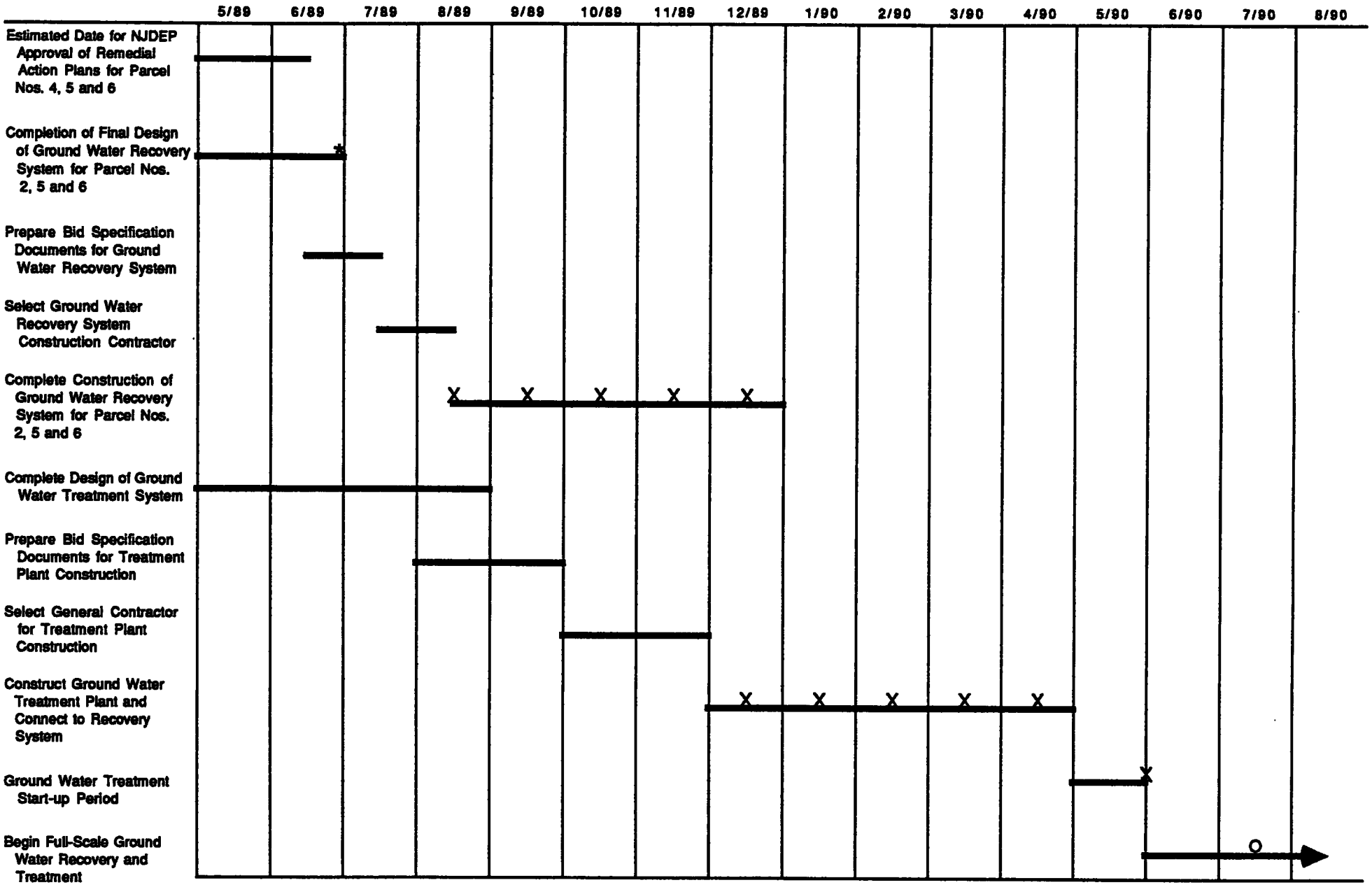
These construction activities are anticipated to be completed during the spring of 1990.

The proposed ground water remediation program for Parcel Nos. 5 and 6 includes the construction of four additional recovery trenches. This additional trench system is scheduled to be completed concurrently with the Parcel No. 2 ground water remediation program. Figure 9-2 graphically presents a schedule of the site wide ground water remediation activities.

9.3 Progress Reporting

During the implementation of site remediation activities, progress reports will be submitted to the NJDEP on a monthly basis. Monthly progress reports will continue to be submitted to the NJDEP through the completion of remedial activities. A final site remediation plan report will be submitted two months following the completion of all remedial construction activities.

FIGURE 9-2
GROUND WATER REMEDIATION PROGRAM SCHEDULE



* Schedule dependent upon NJDEP written approval of ground water remediation program
X Progress reports submitted to NJDEP
O Final Ground Water Remediation Report submitted to NJDEP

10.0 COST ESTIMATES FOR SITE REMEDIATION

The total construction cost for the completion of site remediation as presented in this remedial action plan is estimated to be $1,115,000. This cost consists of the following two components:

1.	Soil Remediation	$ 280,000
2.	Ground Water Remediation	$ 835,000
	Total Construction	$1,115,000

These cost estimates have been developed to determine the amount of the required financial assurance that must be provided to the NJDEP. Cost estimates for the soil and ground water programs are further detailed in the following sections.

10.1 Soil Remediation Program Cost Estimate

The total estimated cost for completing the soil remediation program is $280,000. Table 10-1 provides a breakdown of the estimated program organized by major project component. This cost includes a contingency factor to account for additional soil remediation required as a result of the evaluation of post-excavation sample analyses.

TABLE 10-1

COST ESTIMATE FOR
SOIL REMEDIATION PROGRAM
PARCEL 5

1.	Project Planning, Bid Preparation and Contract Award	$ 10,000
2.	Mobilization	$ 5,000
3.	Investigation of Remaining Areas	$ 3,000
4.	Excavation	$ 30,000
5.	Equipment Decontamination	$ 10,000
6.	Waste Transportation	$ 35,000
7.	Waste Disposal	$ 55,000
8.	Post Excavation Sampling	$ 15,000
9.	Backfill and Demobilization	$ 10,000
10.	Contract Management, Coordination with NJDEP, RCRA Closure	$ 25,000
	SUBTOTAL	$198,000
11.	Contingency for additional soil excavation required by post-excavation sampling @ 20 percent	$ 39,600
12.	Overall Project Contingency @ 20 percent	$ 39,600
	TOTAL COST	$277,200
	SAY	$280,000

10.2 Ground Water Remediation Program Cost Estimate

The estimated cost for installation of the ground water recovery and treatment system is $835,000. Table 10-2 provides a breakdown of the components that make up this cost.

TABLE 10-2
COST ESTIMATE FOR
GROUND WATER REMEDIATION
PARCEL 5

1.	Contract Planning, Bid Preparation and Contract Award	$ 10,000
2.	Installation of 425 LF of Collection Trench	420,000
3.	Manholes with Pump Installations	60,000
4.	Piping 800 LF	115,000
5.	Electric	50,000
6.	Resurfacing of Roads and Parking Lots, topsoil and seeding as appropriate	25,000
7.	Contract Management, Coordination with NJDEP	$ 15,000
		$695,000
8.	Overall Project Contingency @ 20 percent	$140,000
	TOTAL COST	$835,000

APPENDIX A

LABORATORY DATA REPORTING SHEETS

ERM-Northeast

EP TOXICITY ANALYSES

EnviroTest Laboratories Inc.

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

LAB#: 68095-001 DATE REC'D: 88/09/02 DATE COLL'D: 3/1-3/31 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-18 5-04-13

REPORT TO: same
BILL TO: same

T COLI		Cr+6		COD	
F COLI		Phenol		HARD-T	
SPC		CN		Ca Hard	
F		B		SO3	
NO3		Br		Cl	
NO2		Color		Alk	
T-PO4		Odor		BOD-Inf	
O-PO4		Turb		BOD-Eff	
SO4		pH		BOD-S	
MBAS		LI		TSS-Inf	
SiO2		Cond		TSS-Eff	
H2S		NH3-T		MLSS	
NH3-C		TKN		MLVSS	
VSS		Ca		K	
TS		Cr		Se	
VS		Co		Ag	
TDS		Cu		Na	
SS		Au		Tl	
% SOL	81%	Fe		Sn	
G & O		Pb	16,000 ug/l	Ti	
Al		Mg		V	
Sb		Mn		Zn	
As		Hg		THM	
Ba	0.14 mg/l	Mo		TOC	
Be		Ni			
Cd		Pd			

Remarks: The subject sample was homogenized then subjected to the EP Toxicity procedure as described in the May 19, 1980 Federal Register Vol. 45, No. 98.

Ronald A. Bayer
Laboratory Director 9/16/88

EnviroTest Laboratories Inc.

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

LAB#: 68095-002 DATE REC'D: 88/09/02 DATE COLL'D: 3/1-3/31 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-18 5-13-01

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :		BOD-S :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
TS :		Cr :	<0.01	Se :	
VS :		Co :		Ag :	
TDS :		Cu :		Na :	
SS :		Au :		Tl :	
% SOL :	71%	Fe :		Sn :	
G & O :		Pb :	105 ug/l	Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	
As :		Hg :	<0.4 ug/l	THM :	
Ba :		Mo :		TOC :	
Be :		Ni :			
Cd :	<0.01	Pd :			

Remarks: All results in mg/l unless otherwise indicated. The subject sample was homogenized then subjected to the EP Toxicity procedure as described in the May 19, 1980 Federal Register, Vol. 45, No. 98.

Ronald A. Bayer
Laboratory Director 9/19/88

ERM-Northeast

ARCHIVED SOIL SAMPLE ANALYSES

EnviroTest Laboratories Inc.

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

LAB#: 68095-007 DATE REC'D: 88/09/02 DATE COLL'D: 3/1-3/31 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-18 5-04-10

REPORT TO: same
BILL TO: same

T COLI		Cr+6		COD	
F COLI		Phenol		HARD-T	
SPC		CN		Ca Hard	
F		B		SO3	
NO3		Br		Cl	
NO2		Color		Alk	
T-PO4		Odor		BOD-Inf	
O-PO4		Turb		BOD-Eff	
SO4		pH		BOD-S	
MBAS		LI		TSS-Inf	
SiO2		Cond		TSS-Eff	
H2S		NH3-T		MLSS	
NH3-C		TKN		MLVSS	
VSS		Ca		K	
TS		Cr		Se	
VS		Co		Ag	
TDS		Cu		Na	
SS		Au		Tl	
% SOL	92%	Fe		Sn	
G & O		Pb		Ti	
Al		Mg		V	
Sb		Mn		Zn	76 mg/kg dry
As		Hg		THM	
Ba		Mo		TOC	
Be		Ni			
Cd		Pd			

Remarks:

Ronald A. Bayer
Laboratory Director 9/12/88

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Plainview, New York

Project #186.18
Samples Received 9/2/88

Lab. No.	Sample ID	TPH (mg/kg)
68095-010	5-07-04 (36-46")	56

For EnviroTest Laboratories, Inc.

Ronald A. Bayer
President

9/14/88

EnviroTest Laboratories Inc.

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

LAB#: 68095-008 DATE REC'D: 88/09/02 DATE COLL'D: 3/1-3/31 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-18 MW-516

REPORT TO: same
BILL TO: same

T COLI		Cr+6		COD	
F COLI		Phenol		HARD-T	
SPC		CN		Ca Hard	
F		B		NO3	
NO3		Br		Cl	
NO2		Color		Alk	
T-PO4		Odor		BOD-Inf	
O-PO4		Turb		BOD-Eff	
SO4		pH		BOD-S	
MBAS		LI		TSS-Inf	
SiO2		Cond		TSS-Eff	
H2S		NH3-T		MLSS	
NH3-C		TKN		MLVSS	
VSS		Ca		K	
TS		Cr		Se	
VS		Co		Ag	
TDS		Cu		Na	
SS		Au		Tl	
% SOL	86%	Fe		Sn	
G & O		Pb	28	Ti	
Al		Mg		V	
Sb		Mn		Zn	22
As		Hg		THM	
Ba		Mo		TOC	
Be		Ni			
Cd		Pd			

Remarks: All results in mg/kg dry weight.

Ronald A. Bayer
Laboratory Director 9/12/88

ERM-Northeast

SUPPLEMENTARY GROUND WATER SAMPLE ANALYSES

EnviroTest Laboratories Inc.

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

LAB#: 67696-005 DATE REC'D: 88/08/22 DATE COLL'D: 88/08/19 STATUS: closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-13 MW-2

REPORT TO: same
BILL TO: same

T COLI	:	Cr+6	:	COD	:
F COLI	:	Phenol	:	HARD-T	:
SPC	:	CN	:	Ca Hard	:
F	:	B	:	SO3	:
NO3	:	Br	:	Cl	:
NO2	:	Color	:	Alk	:
T-PO4	:	Odor	:	BOD-Inf	:
O-PO4	:	Turb	:	BOD-Eff	:
SO4	:	pH	: 6.4	BOD-S	:
MBAS	:	LI	:	TSS-Inf	:
SiO2	:	Cond	:	TSS-Eff	:
H2S	:	NH3-T	:	MLSS	:
NH3-C	:	TKN	:	MLVSS	:
VSS	:	Ca	:	K	:
TS	:	Cr	:	Se	:
VS	:	Co	:	Ag	:
TDS	:	Cu	:	Na	:
SS	:	Au	:	Tl	:
% SOL	:	Fe	:	Sn	:
O & O	:	Pb	:	Ti	:
Al	:	Mg	:	V	:
Sb	:	Mn	:	Zn	:
As	:	Hg	:	THM	:
Ba	:	Mo	:	TOC	:
Be	:	Ni	:		
Cd	:	Pd	:		

Remarks:

Ronald A. Bayer
Laboratory Director 8/25/88

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Plainview, New York

Project #186.13

Samples Received 8/22/88

Lab. No.	Sample ID	TPH (mg/l)
67696-001	MW-1	<0.5
67696-002	MW-4	4.9
67696-003	MW-5	1.1
67696-004	MW-6	1.3
67696-005	MW-2	54
67696-006	MW-3	<0.5

EnviroTest Laboratories Inc.

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

LAB#: 67696-006 DATE REC'D: 88/08/22 DATE COLL'D: 88/08/19 STATUS: closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-13 MW-3

REPORT TO: same
BILL TO: same

T COLI	:	Cr+6	:	COD	:
F COLI	:	Phenol	:	HARD-T	:
SPC	:	CN	:	Ca Hard	:
F	:	B	:	SO3	:
NO3	:	Br	:	Cl	:
NO2	:	Color	:	Alk	:
T-PO4	:	Odor	:	BOD-Inf	:
O-PO4	:	Turb	:	BOD-Eff	:
SO4	:	pH	: 6.7	BOD-S	:
MBAS	:	LI	:	TSS-Inf	:
SiO2	:	Cond	:	TSS-Eff	:
H2S	:	NH3-T	:	MLSS	:
NH3-C	:	TKN	:	MLVSS	:
VSS	:	Ca	:	K	:
TS	:	Cr	:	Se	:
VS	:	Co	:	Ag	:
TDS	:	Cu	:	Na	:
SS	:	Au	:	Tl	:
% SOL	:	Fe	:	Sn	:
G & O	:	Pb	:	Ti	:
Al	:	Mg	:	V	:
Sb	:	Mn	:	Zn	:
As	:	Hg	:	THM	:
Ba	:	Mo	:	TOC	:
Be	:	Ni	:		
Cd	:	Pd	:		

Remarks:

Ronald A. Bayer
Laboratory Director 8/25/88

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Plainview, New York

Project #186.13

Samples Received 8/22/88

Lab. No.	Sample ID	TPH (mg/l)
67696-001	MW-1	<0.5
67696-002	MW-4	4.9
67696-003	MW-5	1.1
67696-004	MW-6	1.3
67696-005	MW-2	54
67696-006	MW-3	<0.5

EnviroTest Laboratories Inc.

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

LAB#: 67696-002 DATE REC'D: 88/08/22 DATE COLL'D: 88/08/19 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-13 MW-4

REPORT TO: same
BILL TO: same

T COLI	:	Cr+6	: <0.01	COD	:		
F COLI	:	Phenol	:	HARD-T	:		
SPC	:	CN	:	Ca Hard	:		
F	:	B	:	SO3	:		
NO3	:	Br	:	Cl	:		
NO2	:	Color	:	Alk	:		
T-PO4	:	Odor	:	BOD-Inf	:		
O-PO4	:	Turb	:	BOD-Eff	:		
SO4	:	pH	: 6.6	BOD-S	:		
MBAS	:	L.I	:	TSS-Inf	:		
SiO2	:	Cond	:	TSS-Eff	:		
H2S	:	NH3-T	:	MLSS	:		
NH3-C	:	TKN	:	MLVSS	:		
VSS	:	Ca	:	K	:		
TS	:	Cr	: <0.05	Se	:		
VS	:	Co	:	Ag	:		
TDS	:	Cu	: <0.05	Na	:		
SS	:	Au	:	Tl	:		
% SOL	:	Fe	:	Sn	:		
G & O	:	Pb	: <0.05	Ti	:		
Al	:	Mg	:	V	:		
Sb	:	Mn	:	Zn	:	<0.05	
As	:	Hg	:	THM	:		
Ba	:	Mo	:	TOC	:		
Be	:	Ni	: <0.05				
Cd	:	Pd	:				

Remarks: All results in mg/l.

Ronald A. Bayer
Laboratory Director 9-7-88

LAB #67696-002

Client: ERM Northeast | Spl Location: Project #186.13 MW-4

Spl Coll'd: 8/19/88 | Sample Rec'd: 8/22/88

EPA Method 624 HSL Volatile Organics GC/MS

	COMPOUND	RESULTS Sample Concen. ug/l	MDL ug/l	BLANK Conc. ug/l
1)	Acrolein	ND	100	ND
2)	Acrylonitrile	ND	100	ND
3)	Benzene	ND	5.0	ND
4)	Bromodichloromethane	ND	5.0	ND
5)	Bromoform	ND	5.0	ND
6)	Bromomethane	ND	10	ND
7)	Carbon Tetrachloride	ND	5.0	ND
8)	Chlorobenzene	ND	5.0	ND
9)	Chloroethane	ND	10	ND
10)	2-Chloroethylvinyl ether	ND	10	ND
11)	Chloroform	BMDL	5.0	ND
12)	Chloromethane	ND	10	ND
13)	Cis-1,3-dichloropropene	ND	5.0	ND
14)	Dibromochloromethane	ND	5.0	ND
15)	1,1-Dichloroethane	ND	5.0	ND
16)	1,2-Dichloroethane	ND	5.0	ND
17)	1,1-Dichloroethene	ND	5.0	ND
18)	1,2-Dichloropropane	ND	5.0	ND
19)	Ethylbenzene	ND	5.0	ND
20)	Methylene chloride	ND	5.0	ND
21)	1,1,2,2-Tetrachloroethane	ND	5.0	ND
22)	Tetrachloroethene	BMDL	5.0	ND
23)	Toluene	ND	5.0	ND
24)	trans-1,3-Dichloropropene	ND	5.0	ND
25)	trans-1,2-Dichloroethylene	13	5.0	ND
26)	1,1,1-Trichloroethane	ND	5.0	ND
27)	1,1,2-Trichloroethane	ND	5.0	ND
28)	Trichloroethene	120	5.0	ND
29)	Trichlorofluoromethane	ND	5.0	ND
30)	Vinyl chloride	ND	10	ND
31)	Total Xylenes	ND	5.0	ND
32)	Acetone	110	50	ND
33)	Carbon Disulfide	ND	5.0	ND
34)	2-Butanone	ND	10	ND
35)	Vinyl Acetate	ND	10	ND
36)	4-Methyl-2-Pentanone	ND	10	ND
37)	2-Hexanone	ND	10	ND
38)	Styrene	ND	5.0	ND

For EnviroTest Laboratories, Inc.

Ronald A. Bayer
President

9/13/88

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Plainview, New York

Project #186.13

Samples Received 8/22/88

Lab. No.	Sample ID	TPH (mg/l)
67696-001	MW-1	<0.5
67696-002	MW-4	4.9
67696-003	MW-5	1.1
67696-004	MW-6	1.3
67696-005	MW-2	54
67696-006	MW-3	<0.5

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Project #186-13

Sample Received 11/10/88

Lab. No.	Sample ID	TPH (mg/l)
70297-001	MW-1	<0.5
70197-002	MW-2	190
70197-003	MW-3	<0.5

APPENDIX B

CROSS-SECTIONS - OPEN AREAS AWAY FROM PRODUCTION ACTIVITIES
PLAN VIEW DRAWINGS - IDENTIFIED AREAS OF ENVIRONMENTAL CONCERN

APPENDIX A

LABORATORY DATA REPORTING SHEETS

ERM-Northeast

EP TOXICITY ANALYSES

EnviroTest Laboratories Inc.

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

LAB#: 68095-001 DATE REC'D: 88/09/02 DATE COLL'D: 3/1-3/31 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-18 5-04-13

REPORT TO: same
BILL TO: same

T COLI		Cr+6		COD	
F COLI		Phenol		HARD-T	
SPC		CN		Ca Hard	
F		B		SO3	
NO3		Br		Cl	
NO2		Color		Alk	
T-PO4		Odor		BOD-Inf	
O-PO4		Turb		BOD-Eff	
SO4		pH		BOD-S	
MBAS		LI		TSS-Inf	
SiO2		Cond		TSS-Eff	
H2S		NH3-T		MLSS	
NH3-C		TKN		MLVSS	
VSS		Ca		K	
TS		Cr		Se	
VS		Co		Ag	
TDS		Cu		Na	
SS		Au		Tl	
% SOL	81%	Fe		Sn	
G & O		Pb	16,000 ug/l	Ti	
Al		Mg		V	
Sb		Mn		Zn	
As		Hg		THM	
Ba	0.14 mg/l	Mo		TOC	
Be		Ni			
Cd		Pd			

Remarks: The subject sample was homogenized then subjected to the EP Toxicity procedure as described in the May 19, 1980 Federal Register Vol. 45, No. 98.

Ronald A. Bayer
Laboratory Director 9/16/88

EnviroTest Laboratories Inc.

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

LAB#: 68095-002 DATE REC'D: 88/09/02 DATE COLL'D: 3/1-3/31 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-18 5-13-01

REPORT TO: same
BILL TO: same

T COLI		Cr+6		COD	
F COLI		Phenol		HARD-T	
SPC		CN		Ca Hard	
F		B		SO3	
NO3		Br		Cl	
NO2		Color		Alk	
T-PO4		Odor		BOD-Inf	
O-PO4		Turb		BOD-Eff	
SO4		pH		BOD-S	
MBAS		LI		TSS-Inf	
SiO2		Cond		TSS-Eff	
H2S		NH3-T		MLSS	
NH3-C		TKN		MLVSS	
VSS		Ca		K	
TS		Cr	<0.01	Se	
VS		Co		Ag	
TDS		Cu		Na	
SS		Au		Tl	
% SOL	71%	Fe		Sn	
G & O		Pb	105 ug/l	Ti	
Al		Mg		V	
Sb		Mn		Zn	
As		Hg	<0.4 ug/l	THM	
Ba		Mo		TOC	
Be		Ni			
Cd	<0.01	Pd			

Remarks: All results in mg/l unless otherwise indicated. The subject sample was homogenized then subjected to the EP Toxicity procedure as described in the May 19, 1980 Federal Register, Vol. 45, No. 98.

Ronald A. Bayer
Laboratory Director

9/19/88

ERM-Northeast

ARCHIVED SOIL SAMPLE ANALYSES

EnviroTest Laboratories Inc.

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

LAB#: 68095-007 DATE REC'D: 88/09/02 DATE COLL'D: 3/1-3/31 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-18 5-04-10

REPORT TO: same
BILL TO: same

T COLI		Cr+6		COD	
F COLI		Phenol		HARD-T	
SPC		CN		Ca Hard	
F		B		SO3	
NO3		Br		Cl	
NO2		Color		Alk	
T-PO4		Odor		BOD-Inf	
O-PO4		Turb		BOD-Eff	
SO4		pH		BOD-S	
MBAS		LI		TSS-Inf	
SiO2		Cond		TSS-Eff	
H2S		NH3-T		MLSS	
NH3-C		TKN		MLVSS	
VSS		Ca		K	
TS		Cr		Se	
VS		Co		Ag	
TDS		Cu		Na	
SS		Au		Tl	
% SOL	92%	Fe		Sn	
G & O		Pb		Ti	
Al		Mg		V	
Sb		Mn		Zn	76 mg/kg dry
As		Hg		THM	
Ba		Mo		TOC	
Be		Ni			
Cd		Pd			

Remarks:

Ronald A. Bayer
Laboratory Director 9/12/88

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Plainview, New York

Project #186.18
Samples Received 9/2/88

Lab. No.	Sample ID	TPH (mg/kg)
68095-010	5-07-04 (36-46")	56

For EnviroTest Laboratories, Inc.

Ronald A. Bayer
President

9/14/88

EnviroTest Laboratories Inc.

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

LAB#: 68095-008 DATE REC'D: 88/09/02 DATE COLL'D: 3/1-3/31 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-18 MW-516

REPORT TO: same
BILL TO: same

T COLI		Cr+6		COD	
F COLI		Phenol		HARD-T	
SPC		CN		Ca Hard	
F		B		[illegible]	
NO3		Br		Cl	
NO2		Color		Alk	
T-PO4		Odor		BOD-Inf	
O-PO4		Turb		BOD-Eff	
SO4		pH		BOD-S	
MBAS		LI		TSS-Inf	
SiO2		Cond		TSS-Eff	
H2S		NH3-T		MLSS	
NH3-C		TKN		MLVSS	
VSS		Ca		K	
TS		Cr		Se	
VS		Co		Ag	
TDS		Cu		Na	
SS		Au		Tl	
% SOL	86%	Fe		Sn	
G & O		Pb	28	Ti	
Al		Mg		V	
Sb		Mn		Zn	22
As		Hg		THM	
Ba		Mo		TOC	
Be		Ni			
Cd		Pd			

Remarks: All results in mg/kg dry weight.

Ronald A. Bayer
Laboratory Director 9/12/88

ERM-Northeast

SUPPLEMENTARY GROUND WATER SAMPLE ANALYSES

EnviroTest Laboratories Inc.

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

LAB#: 67696-005 DATE REC'D: 88/08/22 DATE COLL'D: 88/08/19 STATUS: closed
LNAME: ERM - Northeast FNAME:
STREET:
SPL LOCATION: #186-13 MW-2 CITY: STATE: ZIP:

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :	6.4	BOD-S :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
TS :		Cr :		Se :	
VS :		Co :		Ag :	
TDS :		Cu :		Na :	
SS :		Au :		Tl :	
% SOL :		Fe :		Sn :	
G & O :		Pb :		Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	
As :		Hg :		THM :	
Ba :		Mo :		TOC :	
Be :		Ni :			
Cd :		Pd :			

Remarks:

Ronald A. Bayer
Laboratory Director 8/25/88

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Plainview, New York

Project #186.13

Samples Received 8/22/88

Lab. No.	Sample ID	TPH (mg/l)
67696-001	MW-1	<0.5
67696-002	MW-4	4.9
67696-003	MW-5	1.1
67696-004	MW-6	1.3
67696-005	MW-2	54
67696-006	MW-3	<0.5

EnviroTest Laboratories Inc.

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

LAB#: 67696-006 DATE REC'D: 88/08/22 DATE COLL'D: 88/08/19 STATUS: closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-13 MW-3

REPORT TO: same
BILL TO: same

T COLI	:	Cr+6	:	COD	:
F COLI	:	Phenol	:	HARD-T	:
SPC	:	CN	:	Ca Hard	:
F	:	B	:	SO3	:
NO3	:	Br	:	Cl	:
NO2	:	Color	:	Alk	:
T-PO4	:	Odor	:	BOD-Inf	:
O-PO4	:	Turb	:	BOD-Eff	:
SiO4	:	pH	: 6.7	BOD-S	:
MBAS	:	LI	:	TSS-Inf	:
SiO2	:	Cond	:	TSS-Eff	:
H2S	:	NH3-T	:	MLSS	:
NH3-C	:	TKN	:	MLVSS	:
VSS	:	Ca	:	K	:
TS	:	Cr	:	Se	:
VS	:	Co	:	Ag	:
TDS	:	Cu	:	Na	:
SS	:	Au	:	Tl	:
% SOL	:	Fe	:	Sn	:
G & O	:	Pb	:	Ti	:
Al	:	Mg	:	V	:
Sb	:	Mn	:	Zn	:
As	:	Hg	:	THM	:
Ba	:	Mo	:	TOC	:
Be	:	Ni	:		
Cd	:	Pd	:		

Remarks:

Ronald A. Bayer
Laboratory Director 8/25/88

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Plainview, New York

Project #186.13

Samples Received 8/22/88

Lab. No.	Sample ID	TPH (mg/l)
67696-001	MW-1	<0.5
67696-002	MW-4	4.9
67696-003	MW-5	1.1
67696-004	MW-6	1.3
67696-005	MW-2	54
67696-006	MW-3	<0.5

EnviroTest Laboratories Inc.

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

LAB#: 67696-002 DATE REC'D: 88/08/22 DATE COLL'D: 88/08/19 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-13 MW-4

REPORT TO: same
BILL TO: same

T COLI	:	Cr+6	: <0.01	COD	:
F COLI	:	Phenol	:	HARD-T	:
SPC	:	CN	:	Ca Hard	:
F	:	B	:	SO3	:
NO3	:	Br	:	Cl	:
NO2	:	Color	:	Alk	:
T-PO4	:	Odor	:	BOD-Inf	:
O-PO4	:	Turb	:	BOD-Eff	:
SO4	:	pH	: 6.6	BOD-S	:
MBAS	:	L.I	:	TSS-Inf	:
SiO2	:	Cond	:	TSS-Eff	:
H2S	:	NH3-T	:	MLSS	:
NH3-C	:	TKN	:	MLVSS	:
VSS	:	Ca	:	K	:
TS	:	Cr	: <0.05	Se	:
VS	:	Co	:	Ag	:
TDS	:	Cu	: <0.05	Na	:
SS	:	Au	:	Tl	:
% SOL	:	Fe	:	Sn	:
G & O	:	Pb	: <0.05	Ti	:
Al	:	Mg	:	V	:
Sb	:	Mn	:	Zn	: <0.05
As	:	Hg	:	THM	:
Ba	:	Mo	:	TOC	:
Be	:	Ni	: <0.05		
Cd	:	Pd	:		

Remarks: All results in mg/l.

Ronald A. Bayer
Laboratory Director 9-7-88

LAB #67696-002

Client: ERM Northeast

Spl Location: Project #186.13 MW-4

Spl Coll'd: 8/19/88

Sample Rec'd: 8/22/88

EPA Method 624 HSL Volatile Organics GC/MS

COMPOUND	RESULTS Sample Concen. ug/l	RESULTS MDL ug/l	BLANK Conc. ug/l
1) Acrolein	ND	100	ND
2) Acrylonitrile	ND	100	ND
3) Benzene	ND	5.0	ND
4) Bromodichloromethane	ND	5.0	ND
5) Bromoform	ND	5.0	ND
6) Bromomethane	ND	10	ND
7) Carbon Tetrachloride	ND	5.0	ND
8) Chlorobenzene	ND	5.0	ND
9) Chloroethane	ND	10	ND
10) 2-Chloroethylvinyl ether	ND	10	ND
11) Chloroform	BMDL	5.0	ND
12) Chloromethane	ND	10	ND
13) Cis-1,3-dichloropropene	ND	5.0	ND
14) Dibromochloromethane	ND	5.0	ND
15) 1,1-Dichloroethane	ND	5.0	ND
16) 1,2-Dichloroethane	ND	5.0	ND
17) 1,1-Dichloroethene	ND	5.0	ND
18) 1,2-Dichloropropane	ND	5.0	ND
19) Ethylbenzene	ND	5.0	ND
20) Methylene chloride	ND	5.0	ND
21) 1,1,2,2-Tetrachloroethane	ND	5.0	ND
22) Tetrachloroethene	BMDL	5.0	ND
23) Toluene	ND	5.0	ND
24) trans-1,3-Dichloropropene	ND	5.0	ND
25) trans-1,2-Dichloroethylene	13	5.0	ND
26) 1,1,1-Trichloroethane	ND	5.0	ND
27) 1,1,2-Trichloroethane	ND	5.0	ND
28) Trichloroethene	120	5.0	ND
29) Trichlorofluoromethane	ND	5.0	ND
30) Vinyl chloride	ND	10	ND
31) Total Xylenes	ND	5.0	ND
32) Acetone	110	50	ND
33) Carbon Disulfide	ND	5.0	ND
34) 2-Butanone	ND	10	ND
35) Vinyl Acetate	ND	10	ND
36) 4-Methyl-2-Pentanone	ND	10	ND
37) 2-Hexanone	ND	10	ND
38) Styrene	ND	5.0	ND

For EnviroTest Laboratories, Inc.

Ronald A. Bayer
President

9/13/88

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Plainview, New York

Project #186.13

Samples Received 8/22/88

Lab. No.	Sample ID	TPH (mg/l)
67696-001	MW-1	<0.5
67696-002	MW-4	4.9
67696-003	MW-5	1.1
67696-004	MW-6	1.3
67696-005	MW-2	54
67696-006	MW-3	<0.5

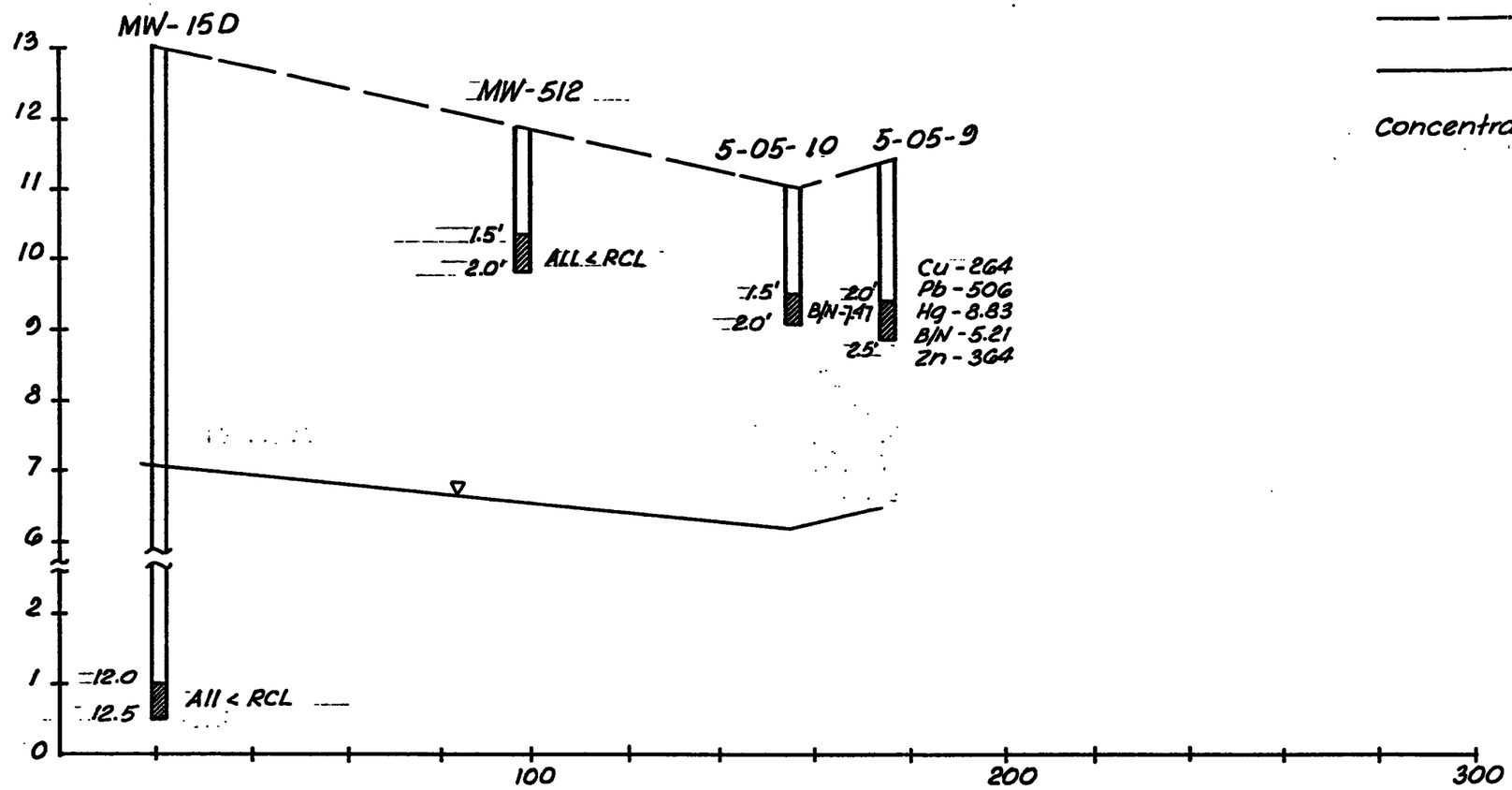
TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Project #186-13

Sample Received 11/10/88

Lab. No.	Sample ID	TPH (mg/l)
70297-001	MW-1	<0.5
70197-002	MW-2	190
70197-003	MW-3	<0.5



LEGEND

——— ——— ——— = Grade

——————— = Watertable

Concentrations in ppm

Scale: Horiz. 1"=30'
Vert. 1"= 2'

TITLE

SOIL CROSS SECTION $A_1 - A_2$

PARCEL NO. 5

PREPARED FOR

BECTON, DICKINSON & CO.
EAST RUTHERFORD, N.J.

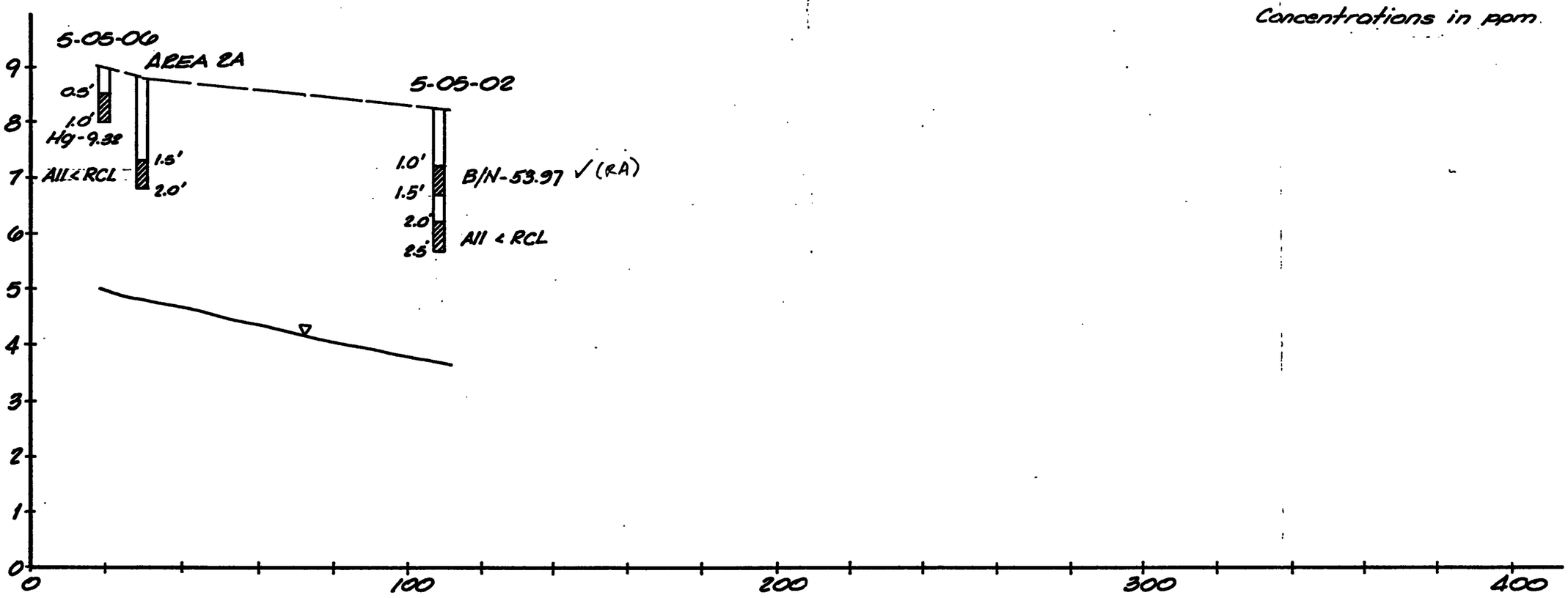
ERM-Northeast
Environmental Resources Management

SCALE SHOWN

DATE

FIGURE 2-3

139630



LEGEND

——— = Grade
——— = Watertable

Concentrations in ppm

Scale: Horiz. 1"=30'
Vert. 1"=2'

TITLE

SOIL CROSS SECTION $B_1 - B_2$

PARCEL NO. 5

PREPARED FOR

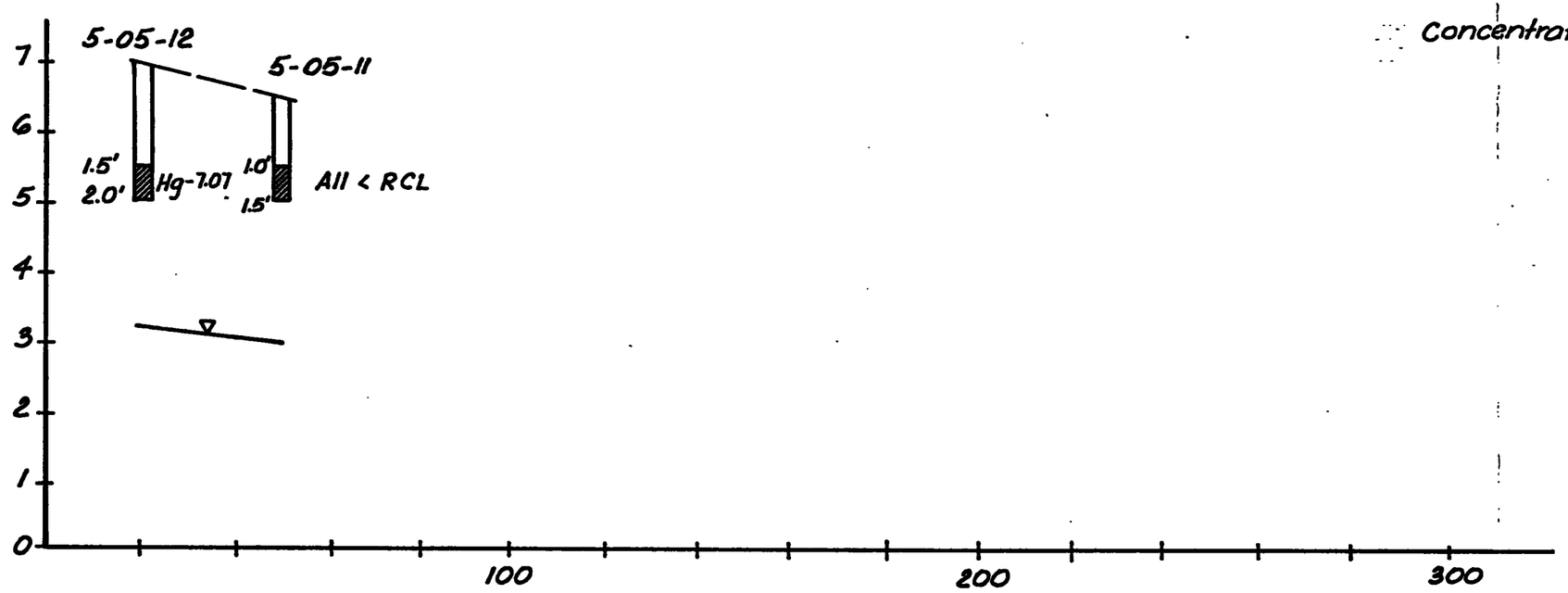
BECTON, DICKINSON & CO.
EAST RUTHERFORD, N.J.

ERM-Northeast
Environmental Resources Management

SCALE SHOWN
DATE

FIGURE 2-4

138838



LEGEND

— — — = Grade

——— = Watertable

Concentrations in ppm

Scale: Horiz. 1"=30'
Vert. 1"=2'

TITLE

SOIL CROSS SECTION C_1 - C_2

PARCEL NO. 5

PREPARED FOR

BECTON, DICKINSON & CO.
EAST RUTHERFORD, N.J.

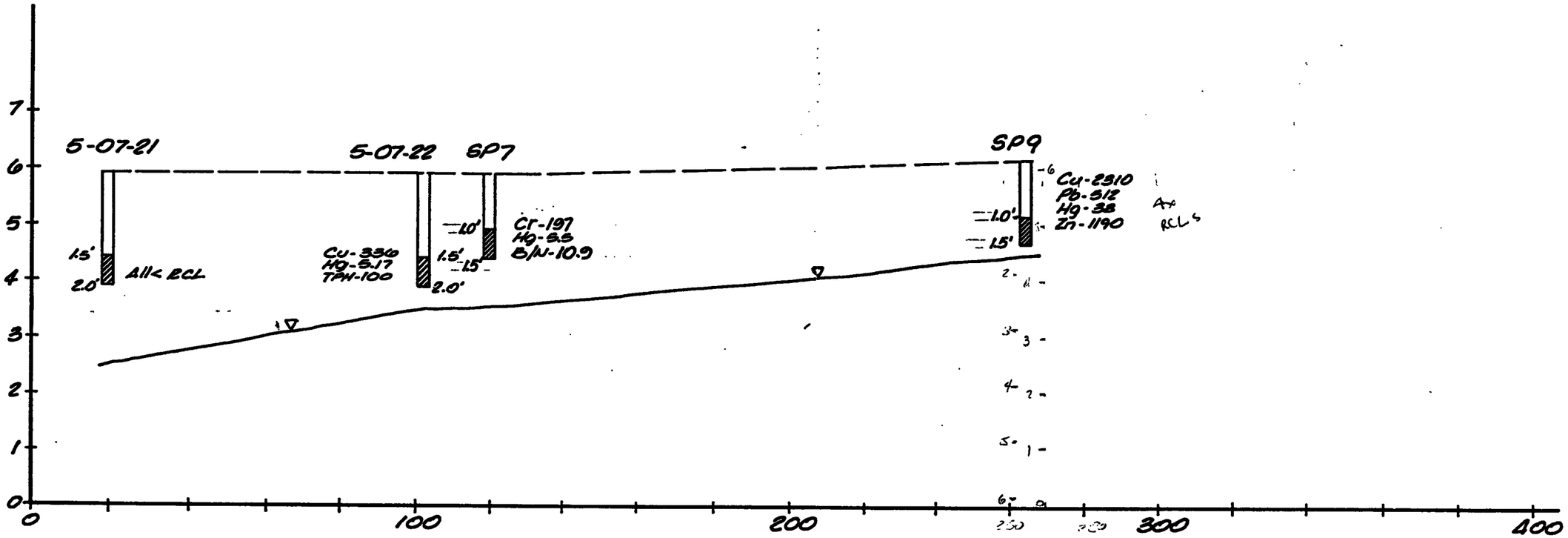
ERM-Northeast
Environmental Resources Management

SCALE SHOWN
DATE

FIGURE 2-5

LEGEND

— — — = Grade
——— = Watertable
Concentrations in ppm



Scale: Horiz. 1"=30'
Vert. 1"=2'

TITLE

SOIL CROSS SECTION $D_1 - D_2$

PARCEL NO. 5

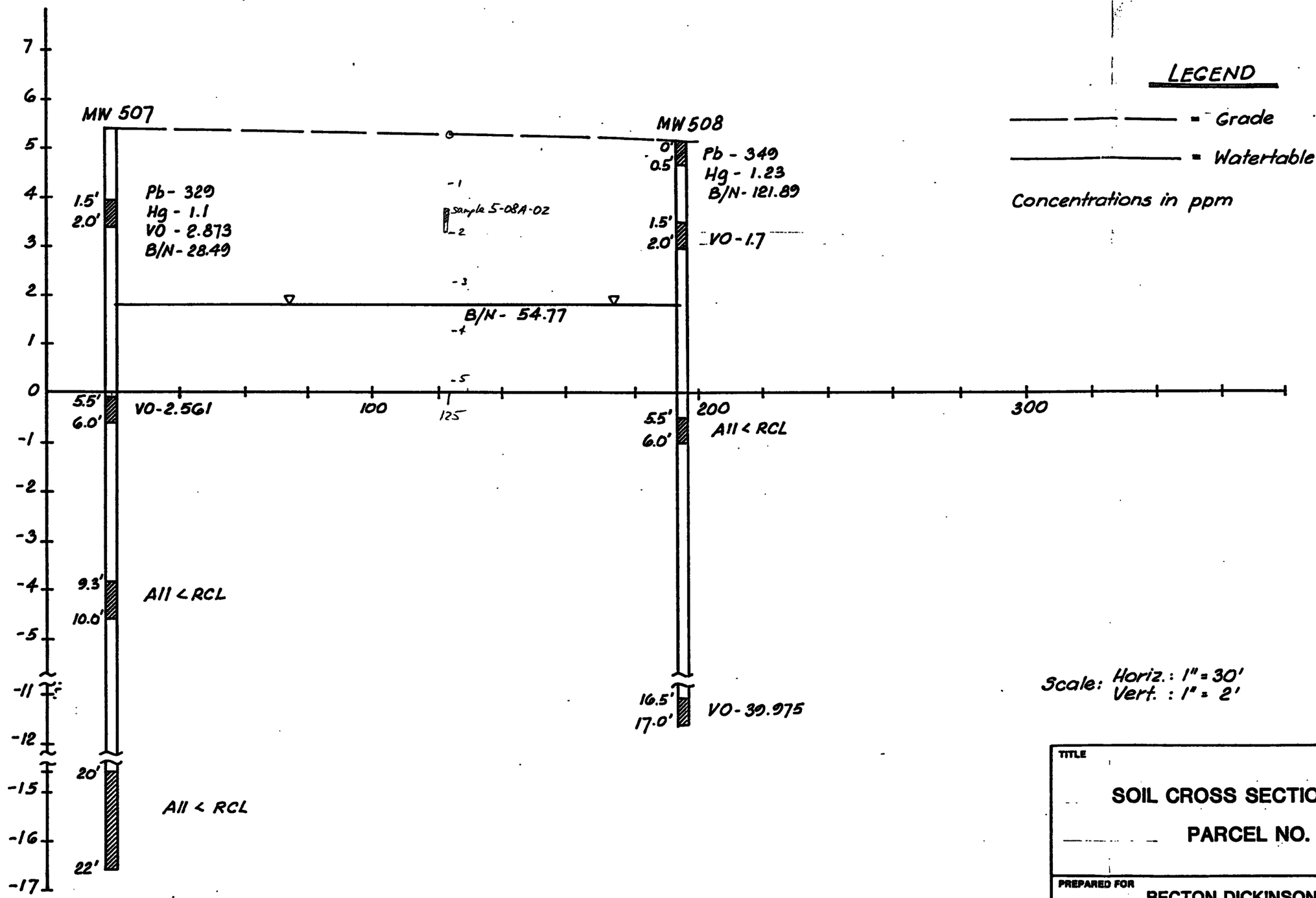
PREPARED FOR
BECTON, DICKINSON & CO.
EAST RUTHERFORD, N.J.

ERM-Northeast
Environmental Resources Management

SCALE SHOWN
DATE

FIGURE
2-6

13985



Scale: Horiz. : 1" = 30'
Verf. : 1" = 2'

TITLE

SOIL CROSS SECTION $E_1 - E_2$

PARCEL NO. 5

PREPARED FOR

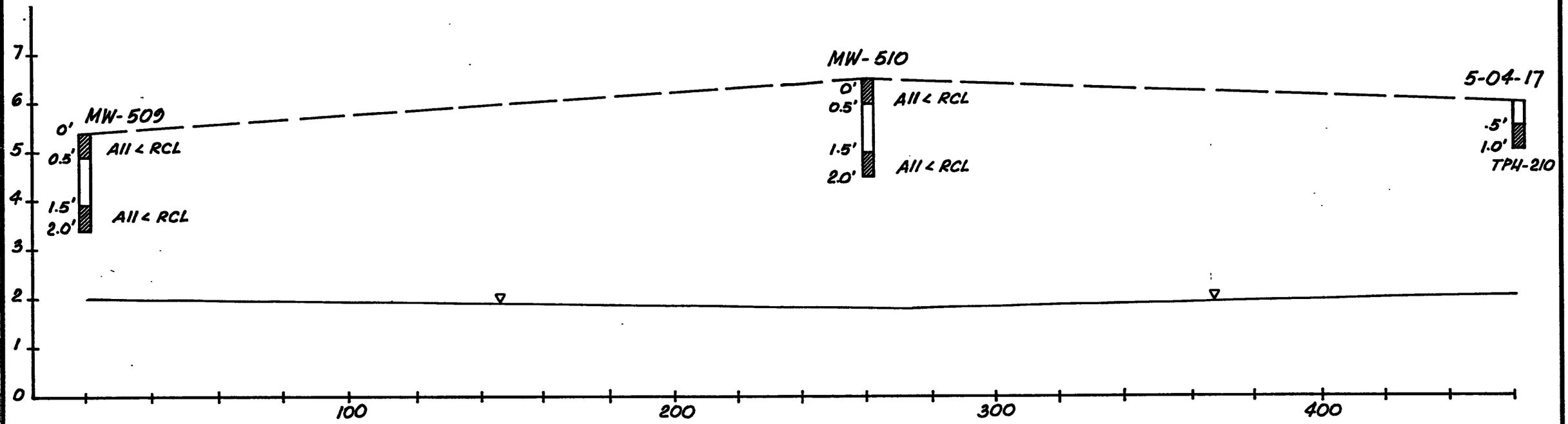
BECTON, DICKINSON & CO.
EAST RUTHERFORD, N.J.

ERM-Northeast
Environmental Resources Management

SCALE SHOWN
DATE

FIGURE 2-7

130838



LEGEND

——— ——— ——— = Grade

——————————— = Watertable

Concentrations in ppm

Scale: Horiz. : 1" = 30'
Vert. : 1" = 2'

TITLE

SOIL CROSS SECTION $F_1 - F_2$

PARCEL NO. 5

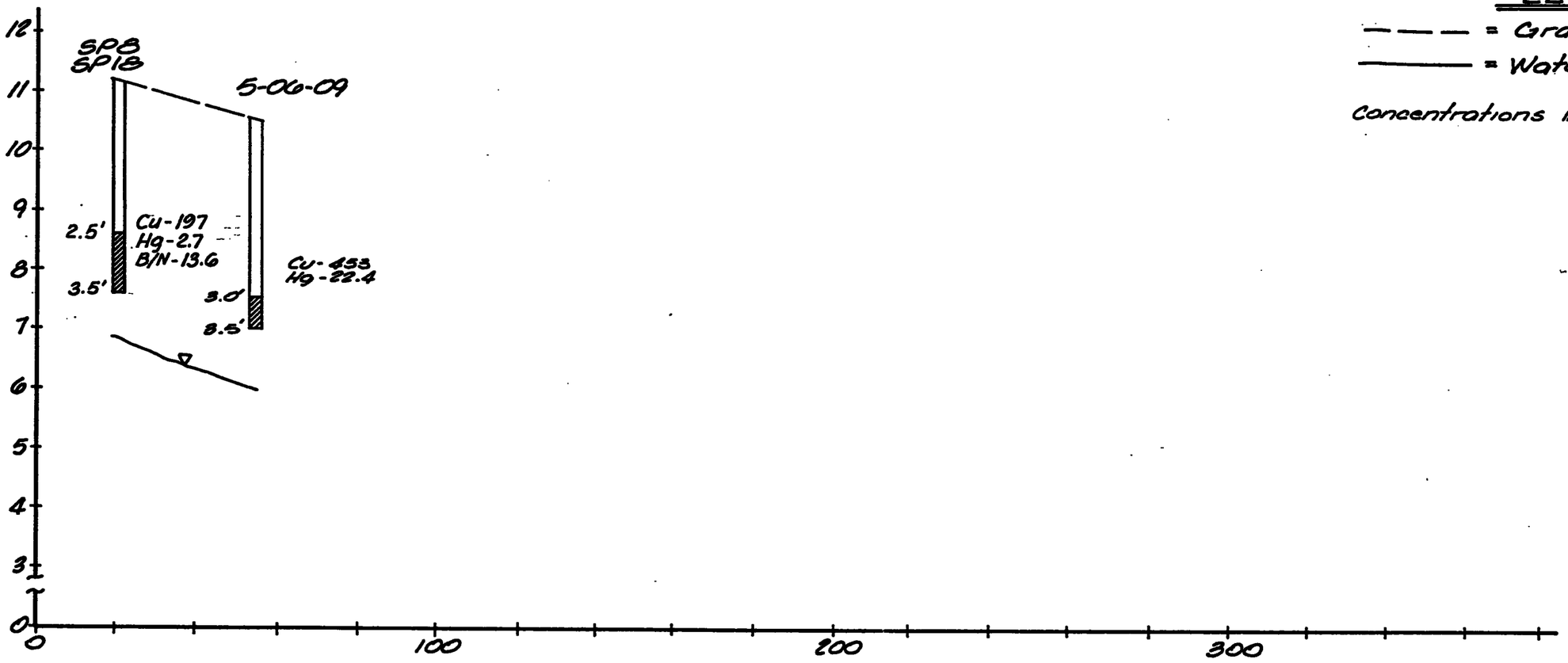
PREPARED FOR

BECTON, DICKINSON & CO.
EAST RUTHERFORD, N.J.

ERM-Northeast
Environmental Resources Management

SCALE SHOWN
DATE

FIGURE
2-8



LEGEND

— — — = Grade

——— = Watertable

Concentrations in ppm

Scale: Horiz. 1"=30'
Vert. 1"=2'

TITLE

SOIL CROSS SECTION $G_1 - G_2$

PARCEL NO. 5

PREPARED FOR

BECTON, DICKINSON & CO.

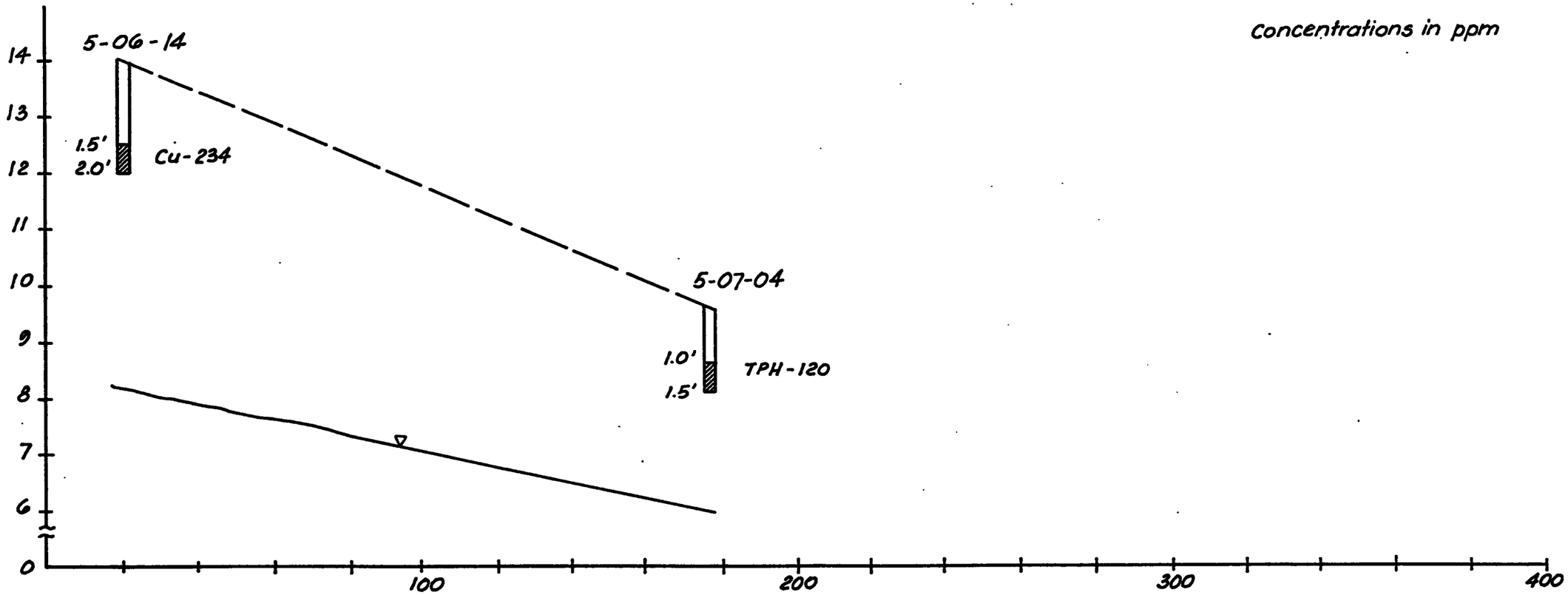
EAST RUTHERFORD, N.J.

ERM-Northeast
Environmental Resources Management

SCALE SHOWN

DATE

FIGURE 2-9



LEGEND

— — — — Grade

———— Watertable

Concentrations in ppm

Scale: Horiz. 1"=30'
Vert. 1"= 2'

TITLE

SOIL CROSS SECTION $H_1 - H_2$

PARCEL NO. 5

PREPARED FOR

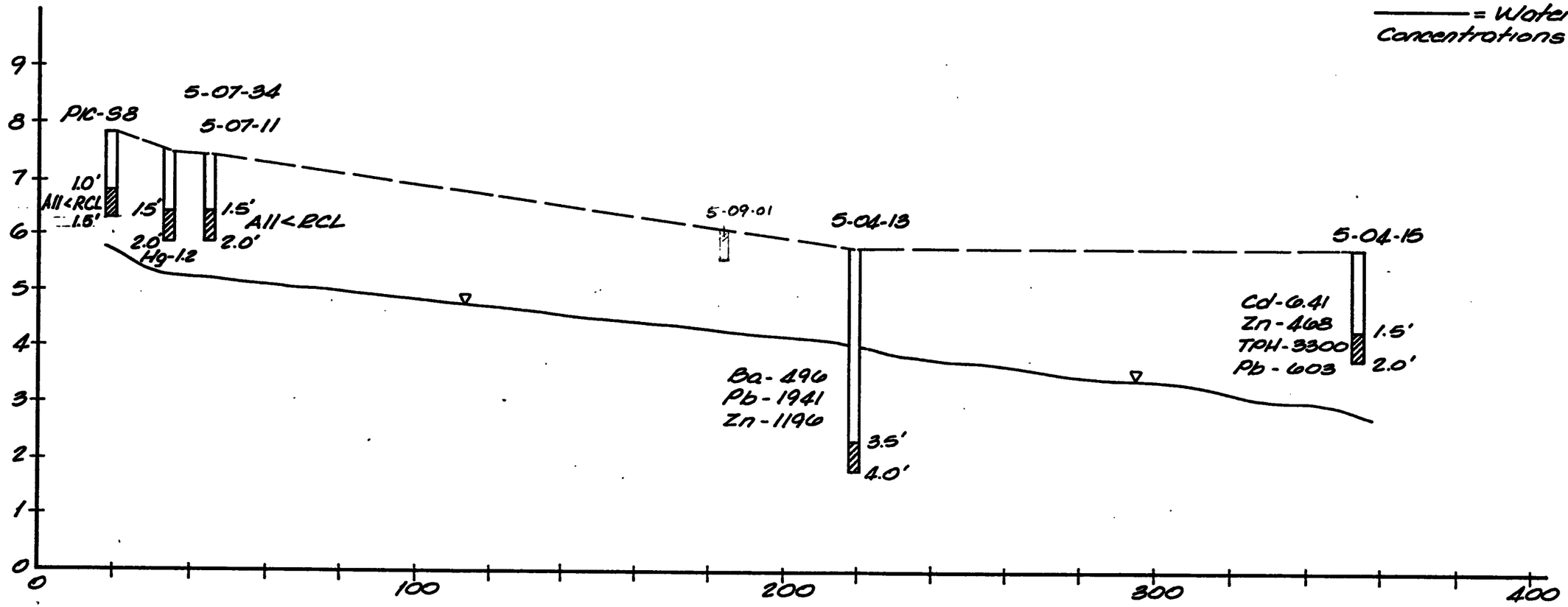
BECTON, DICKINSON & CO.

EAST RUTHERFORD, N.J.

ERM-Northeast
Environmental Resources Management

SCALE SHOWN
DATE

FIGURE 2-10



Scale: Horiz. 1"=30'
Vert. 1"=2'

TITLE

SOIL CROSS SECTION $I_1 - I_2$

PARCEL NO. 5

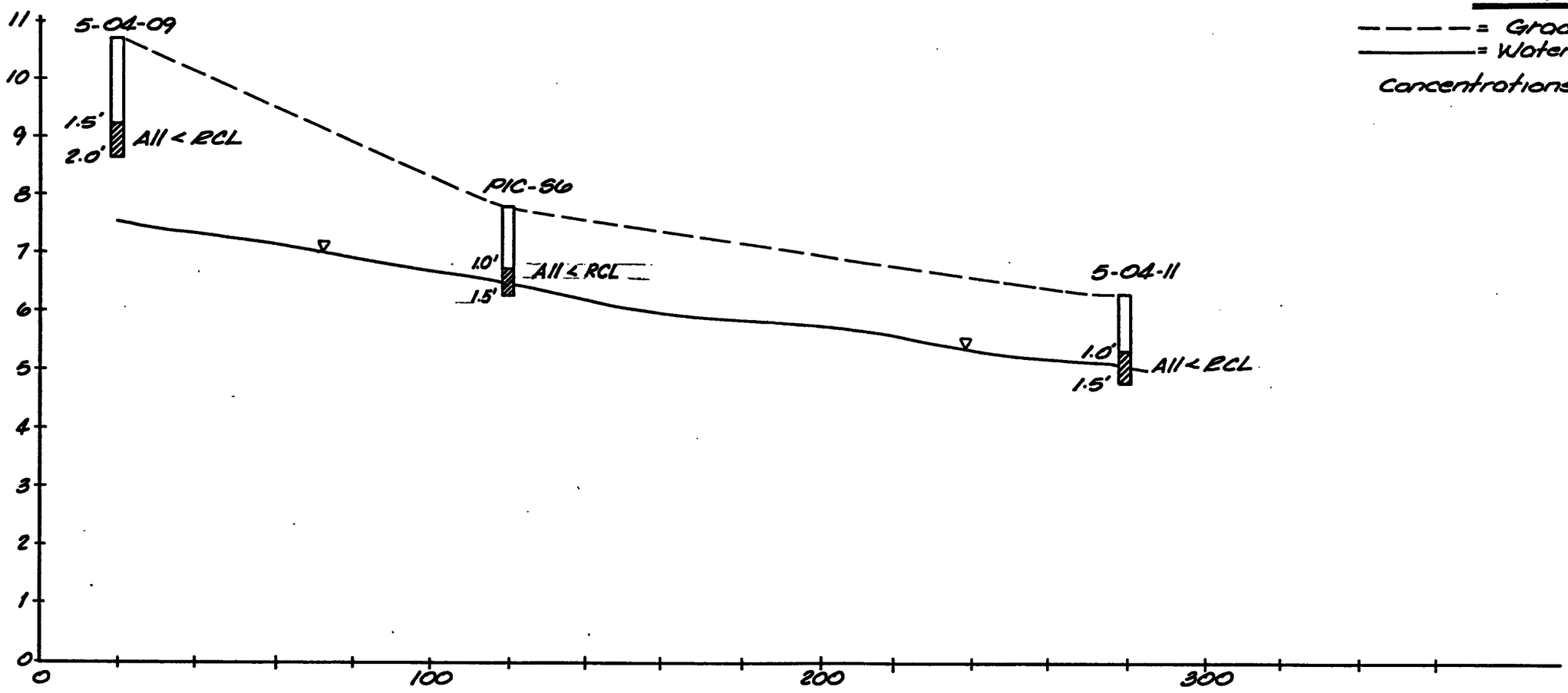
PREPARED FOR

BECTON, DICKINSON & CO.
EAST RUTHERFORD, N.J.

ERM-Northeast
Environmental Resources Management

SCALE SHOWN
DATE

FIGURE
2-11



LEGEND

– – – – = Grade

——— = Watertable

Concentrations in ppm

Scale: Horiz. 1" = 30'
Vert. 1" = 2'

TITLE

SOIL CROSS SECTION $J_1 - J_2$

PARCEL NO. 5

PREPARED FOR

BECTON, DICKINSON & CO.

EAST RUTHERFORD, N.J.

ERM-Northeast
Environmental Resources Management

SCALE SHOWN

DATE

FIGURE 2-12

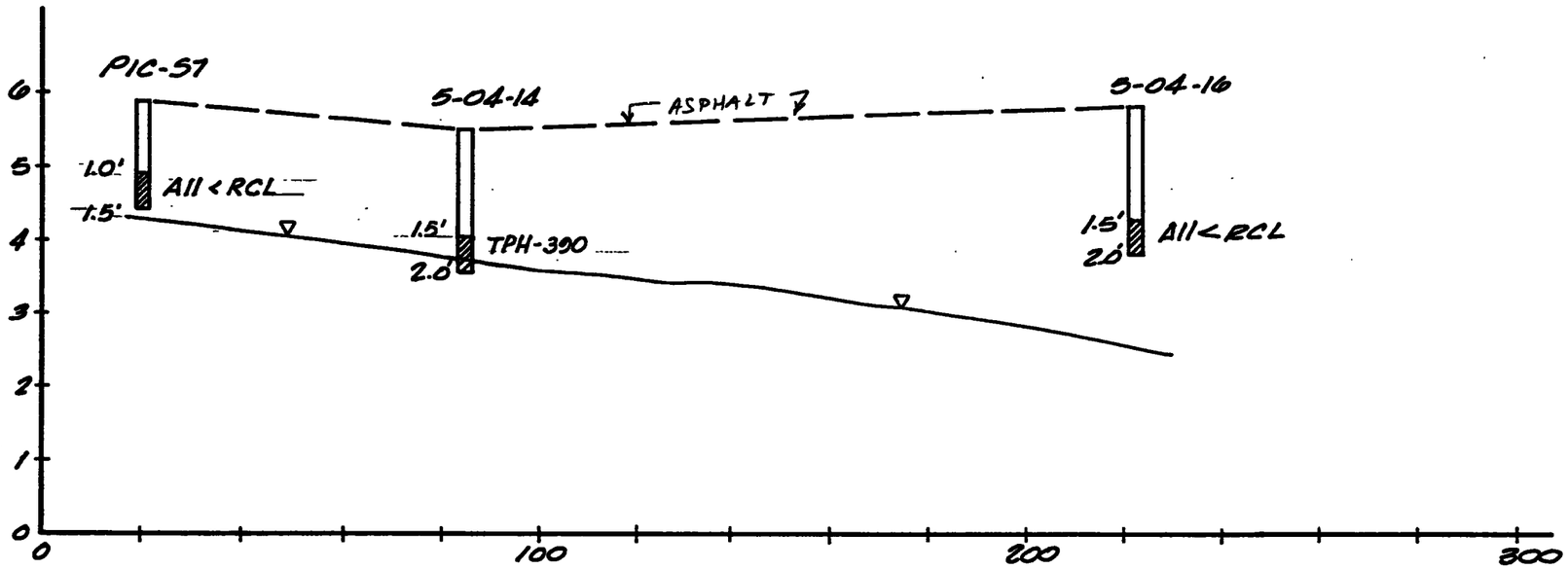
1390039

LEGEND

——— = Grade

——— = Watertable

Concentrations in ppm



Scale: Horiz. 1" = 30'
Vert. 1" = 2'

TITLE

SOIL CROSS SECTION $K_1 - K_2$

PARCEL NO. 5

PREPARED FOR

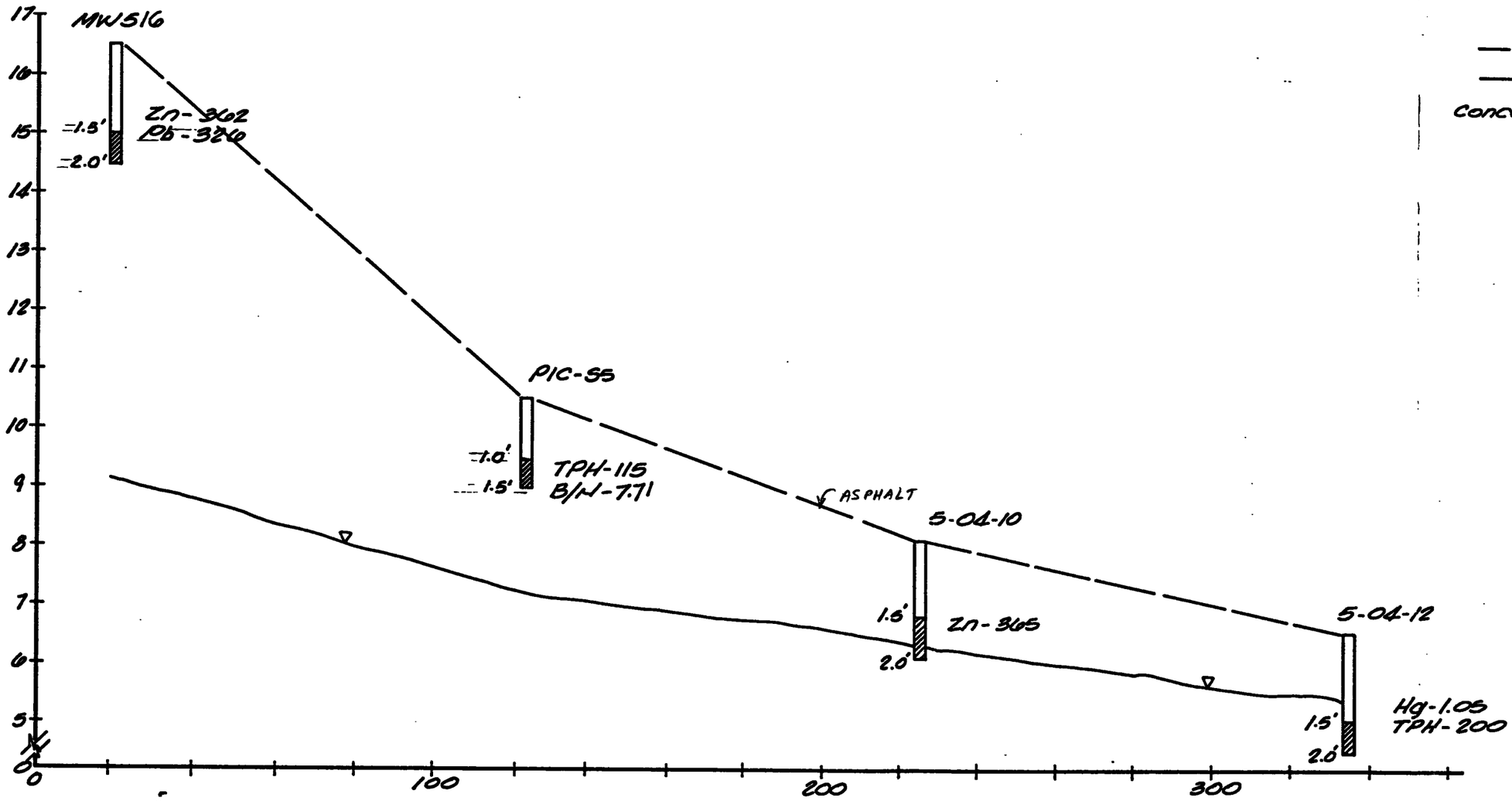
BECTON, DICKINSON & CO.
EAST RUTHERFORD, N.J.

ERM-Northeast
Environmental Resources Management

SCALE SHOWN

DATE

FIGURE 2-13



LEGEND

——— = Grade

——— = Watertable

Concentrations in ppm

Scale: Horiz. 1"=30'
Vert. 1"=2'

TITLE

SOIL CROSS SECTION $L_1 - L_2$

PARCEL NO. 5

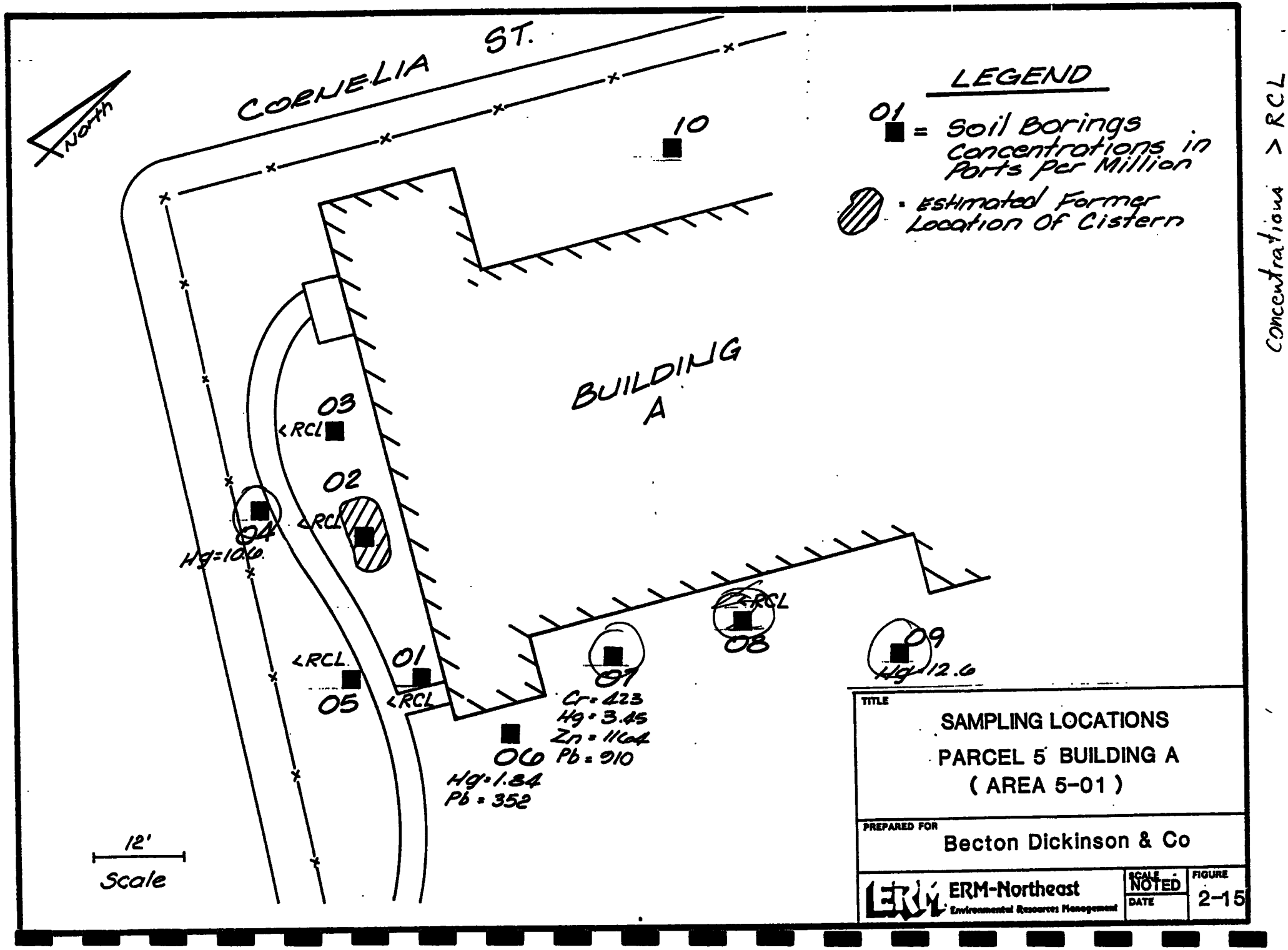
PREPARED FOR

BECTON, DICKINSON & CO.
EAST RUTHERFORD, N.J.

ERM-Northeast
Environmental Resources Management

SCALE SHOWN
DATE

FIGURE 2-14


CORNELIA ST.
North
10
BUILDING A
03
<RCL
02
<RCL
04
Hg=10.6
<RCL
01
<RCL
05
<RCL
06
Hg=1.84
Pb=352
07
Cr=423
Hg=3.45
Zn=1164
Pb=910
08
<RCL
09
Hg=12.6
12'
Scale
LEGEND
01 = Soil Borings Concentrations in Parts per Million
= Estimated Former Location Of Cistern
Concentrations > RCL
TITLE
SAMPLING LOCATIONS
PARCEL 5 BUILDING A
(AREA 5-01)
PREPARED FOR
Becton Dickinson & Co
ERM-Northeast
Environmental Resources Management
SCALE NOTED
DATE
FIGURE 2-15

North

BUILDING A

Asphalt

Troprock

Approx. Location of 2 Former 20,000 Gal Tanks

Above Ground 10,000 Gal Tank

3' Deep x 1' High Conc. Berm

Shed

Shed

Shed

BUILDING B

Grass

Dirt

Asphalt

Manhole For Blowdown Pit

MW-2 01
Cu - 349
Hg - 9.77
B/N - 133.26

02 <RCL

MW-501 03 <RCL

Asph.

Grass

Hydrants

MW-3 04
Cu - 340
Hg 1.76

Dirt

Grass

See Figure 4-10

0 12 24 Feet
Scale

LEGEND

01 ■ = Soil Boring

⊕ = Existing Monitoring Well

⊕ Newly Installed Monitoring Well

Concentrations in Parts Per Million

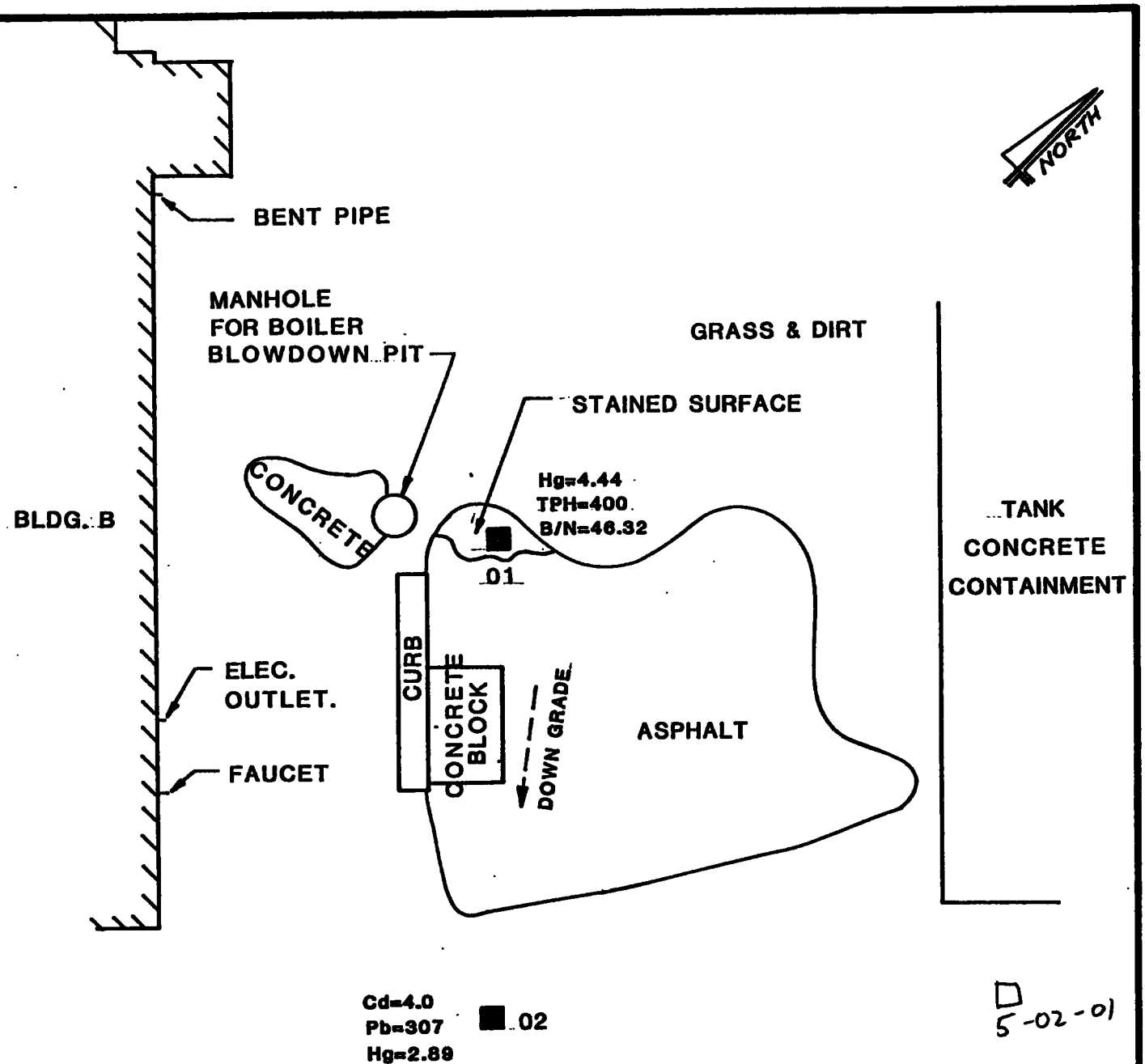
TITLE
SAMPLING LOCATIONS
PARCEL 5 BUILDING B
(AREA 5-02)

PREPARED FOR
Becton Dickinson & Co.

ERM-Northeast
Environmental Resources Management

SCALE Noted
DATE

FIGURE 2-16



LEGEND

■ SOIL BORINGS

CONCENTRATIONS IN PARTS PER MILLION

TITLE

SAMPLING LOCATIONS
PARCEL 5 . BOILER BLOWDOWN PIT
(AREA 5-02A)

PREPARED FOR

BECTON DICKINSON & CO.

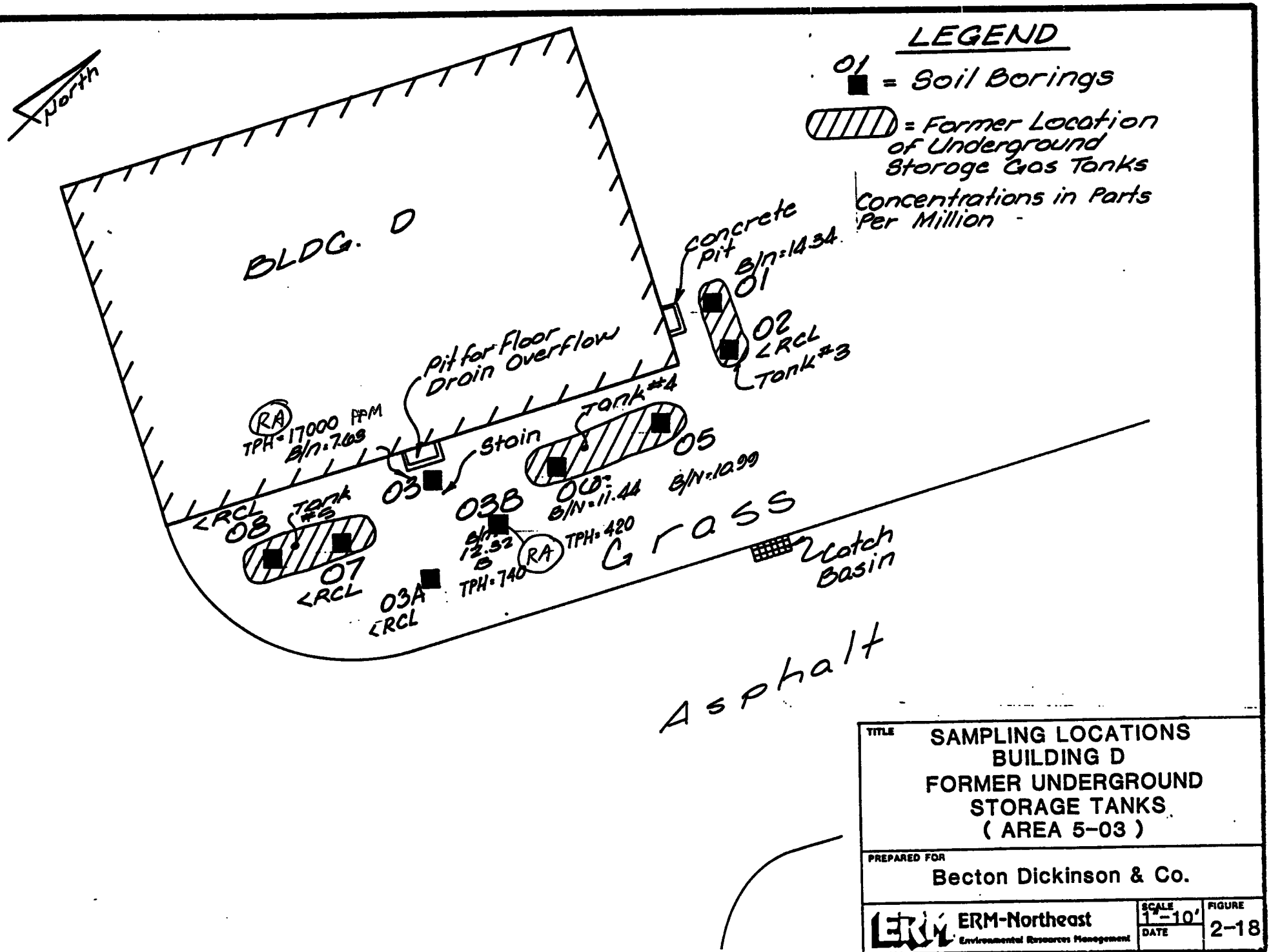
ERM-Northeast
Environmental Resources Management

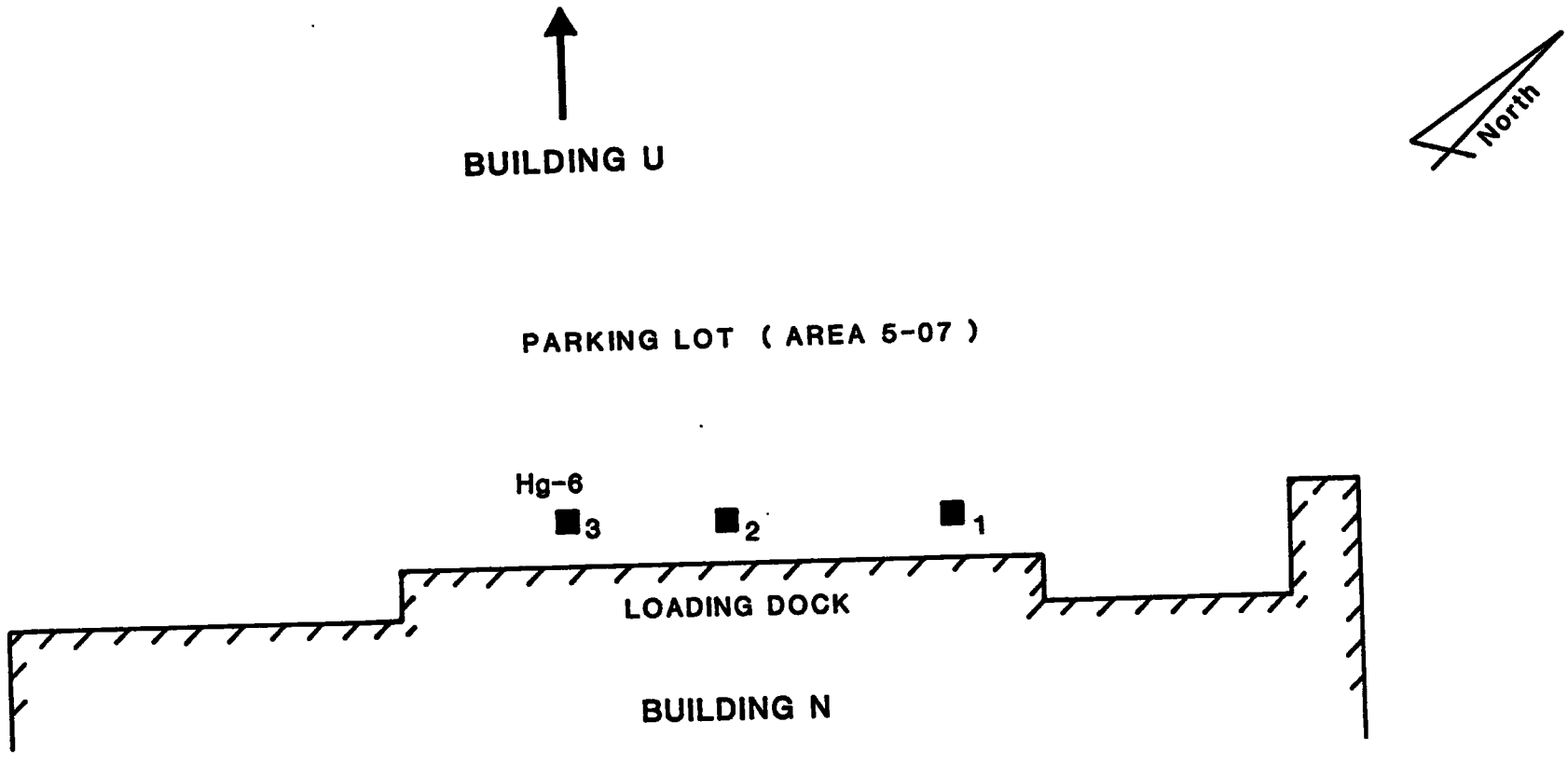
SCALE 1"=6'

DATE

FIGURE 2-17

139838


LEGEND
01 = Soil Borings
= Former Location of Underground Storage Gas Tanks
Concentrations in Parts Per Million
North
BLDG. D
concrete Pit
B/N=1434
01
02
<RCL
Tank #3
Pit for Floor Drain Overflow
Tank #4
RA
TPH=17000 PPM
B/N=7.69
Stain
05
03
03B
B/N=11.44
B/N=10.99
<RCL
08
Tank #5
07
<RCL
12.52
B
RA
TPH=420
TPH=740
03A
<RCL
Grass
Catch Basin
Asphalt
TITLE
SAMPLING LOCATIONS
BUILDING D
FORMER UNDERGROUND
STORAGE TANKS
(AREA 5-03)
PREPARED FOR
Becton Dickinson & Co.
ERM-Northeast
Environmental Resources Management
SCALE 1"=10'
DATE
FIGURE
2-18



LEGEND

■ = SOIL BORING

TITLE

SAMPLING LOCATIONS
BUILDING N
WESTERN LOADING DOCK
(AREA 5-08F)

PREPARED FOR

BECTON, DICKINSON & Co.

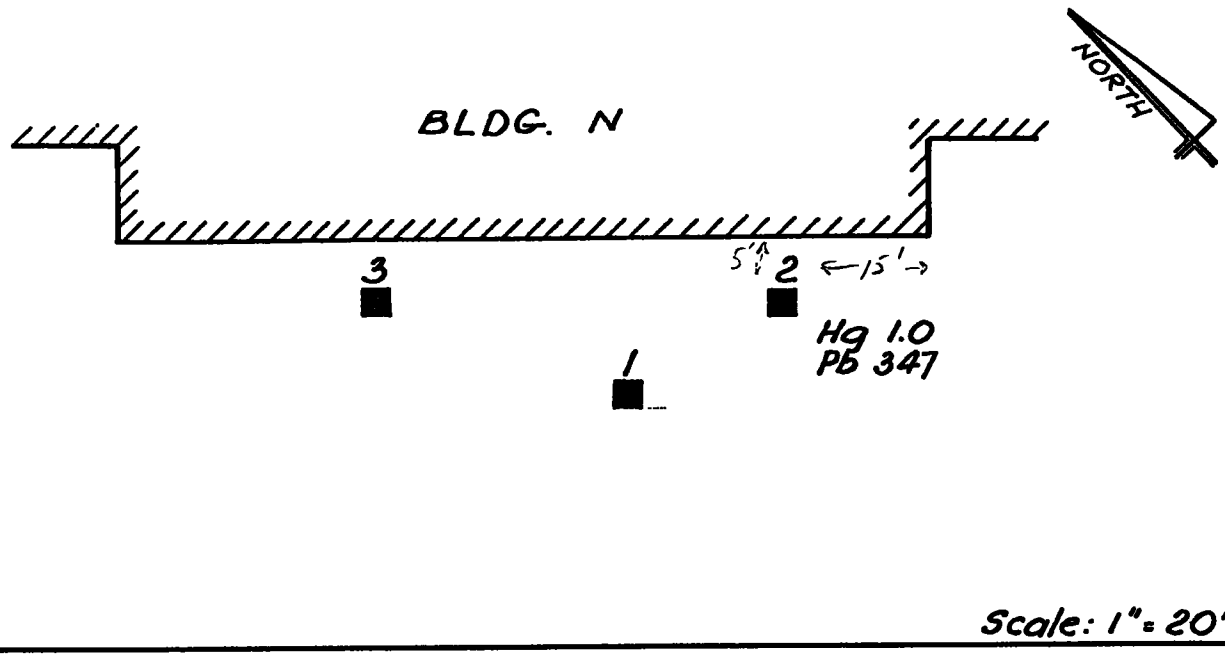
ERM-Northeast
Environmental Resources Management

SCALE

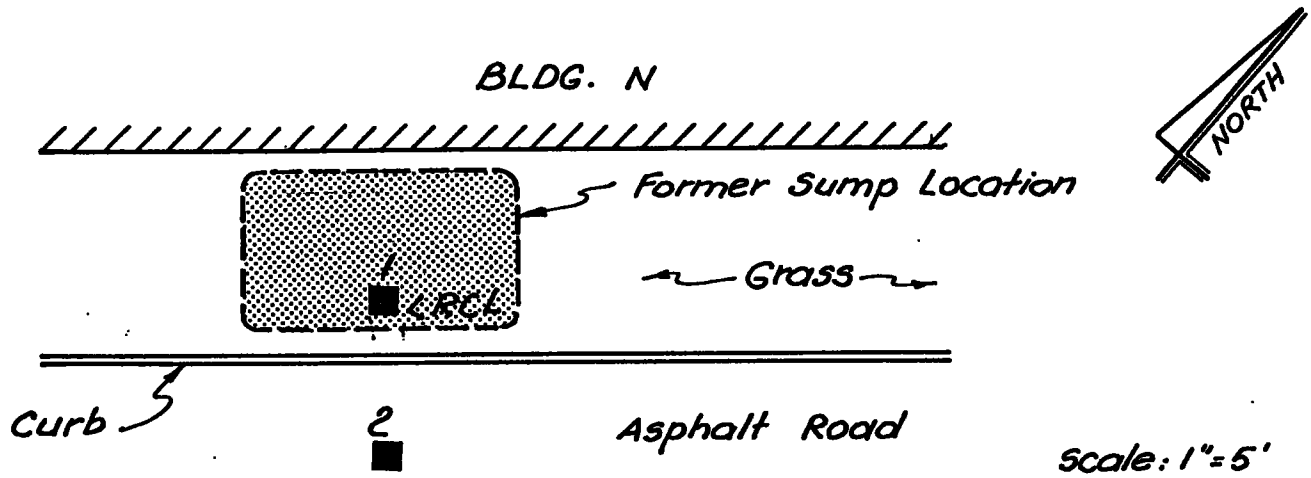
DATE

FIGURE

2-23



Scale: 1" = 20'



Scale: 1" = 5'

LEGEND

■ 2 = Soil Boring

SAMPLING LOCATIONS
BLDG. N – South Loading Dock
(Area 5-08A)

BLDG. N – Former Sump
(Area 5-08D)

PREPARED FOR

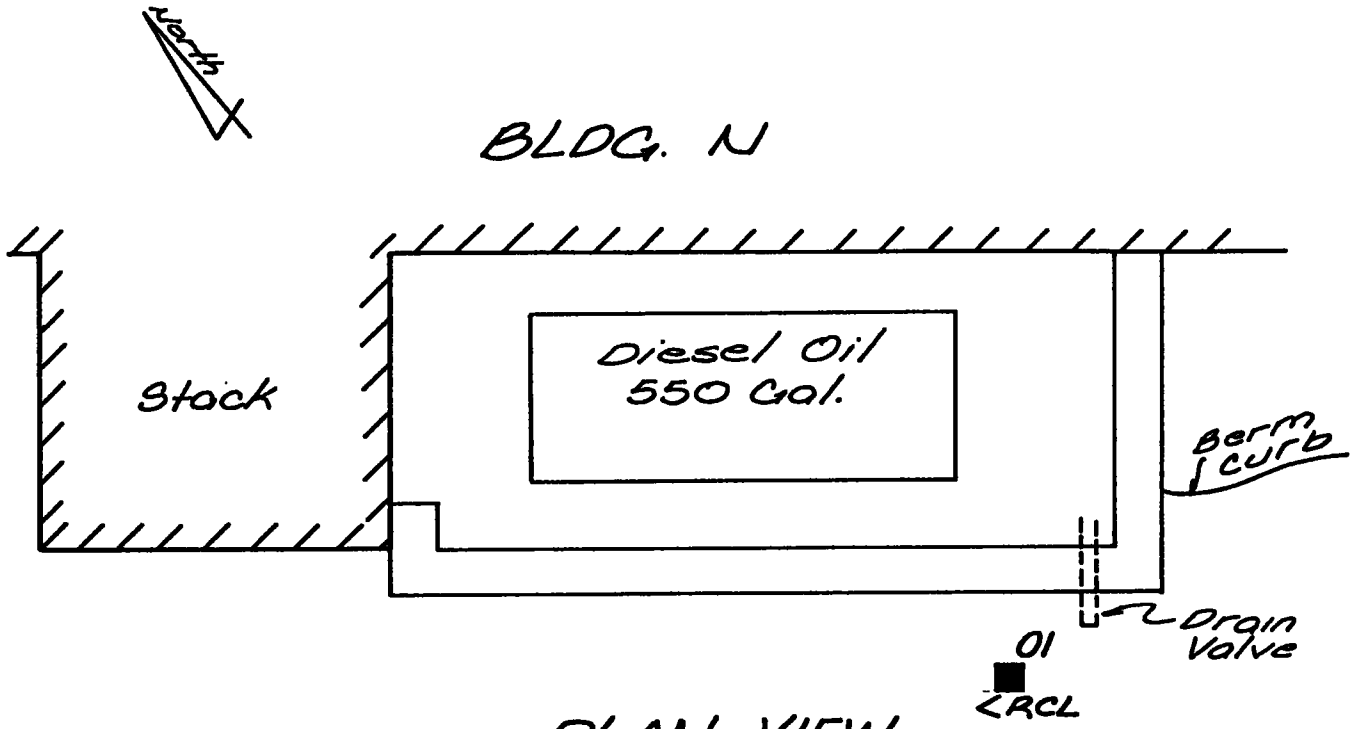
BECTON DICKINSON & CO.

ERM-Northeast
Environmental Resources Management

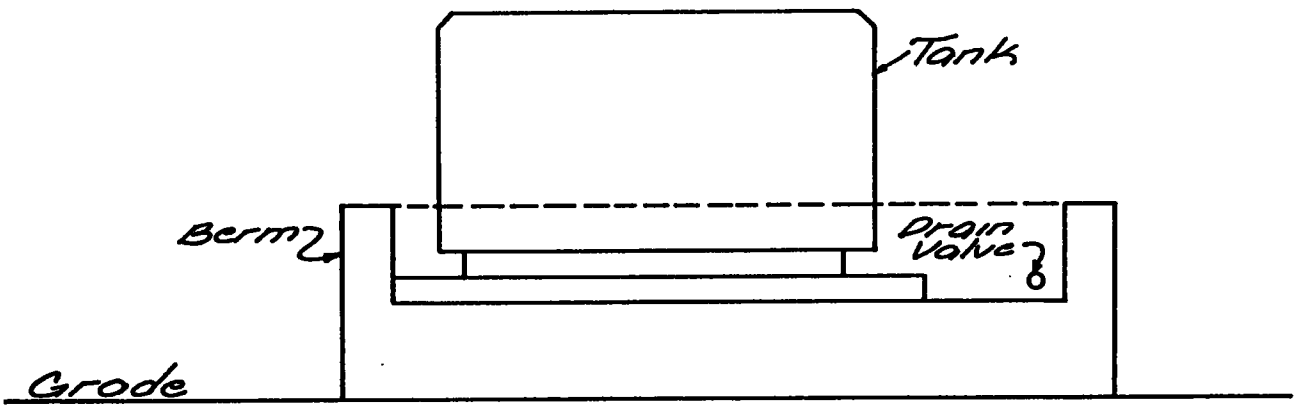
SCALE: NOTED
DATE:

FIGURE: 2-19

139839



PLAN VIEW



CROSS SECTION

LEGEND

01 ■ = Soil Boring

TITLE

SAMPLING LOCATION
BUILDING N – DIESEL TANK
(AREA 5-08 B)

PREPARED FOR

Becton Dickinson & Co

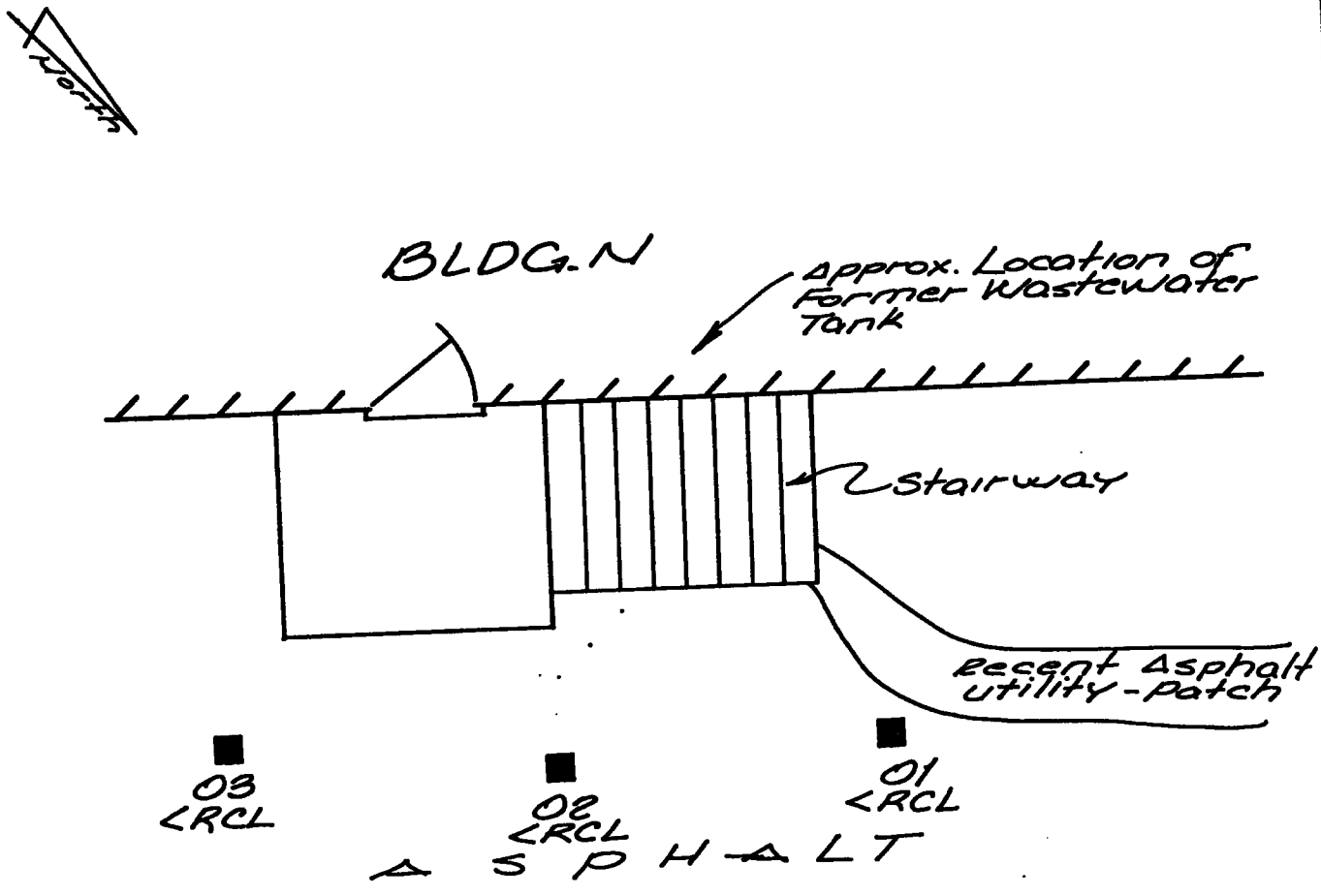
ERM ERM-Northeast Environmental Resources Management

SCALE 1"=2'

DATE

FIGURE 2-20

139839



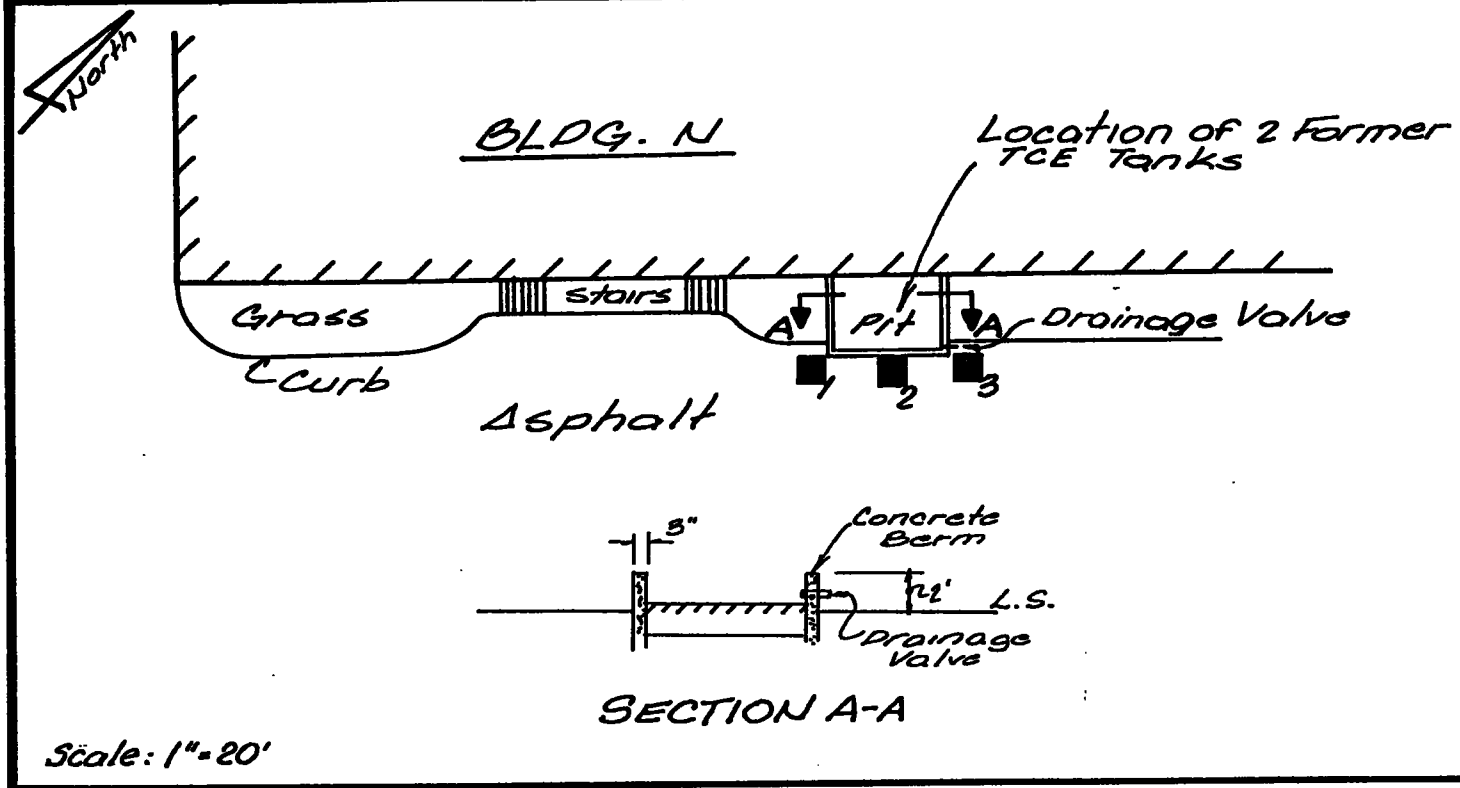
LEGEND

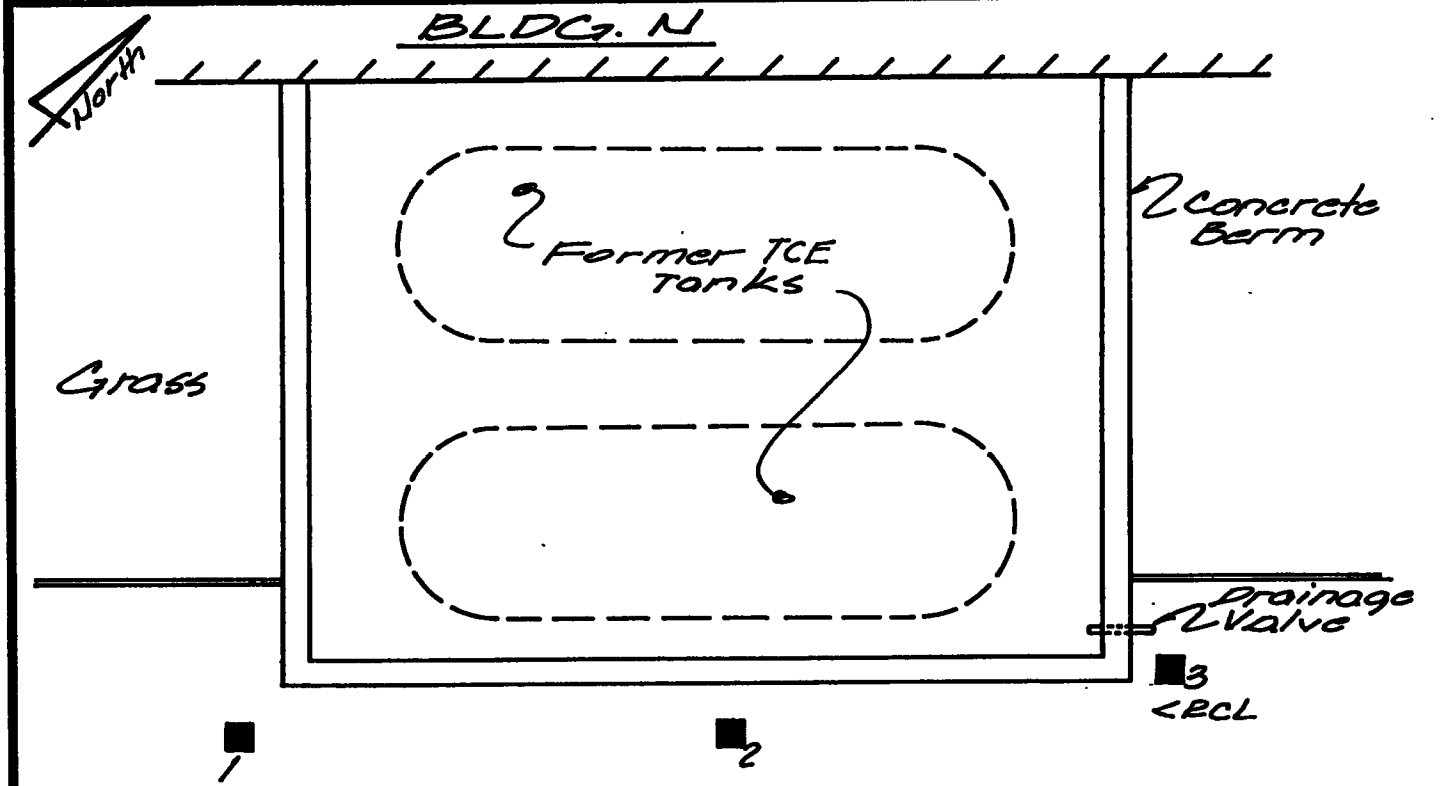
■ = Soil Boring

03 <RCL = Less Than Recommended Cleanup Level

TITLE	SAMPLING LOCATIONS BUILDING N FORMER WASTE WATER TREATMENT & TANK (AREA 5-08C)
PREPARED FOR	Becton, Dickinson & Co
ERM-Northeast Environmental Resources Management	SCALE 1"=6' / DATE / FIGURE 2-21

19839





TITLE: SAMPLING LOCATIONS BUILDING N FORMER ABOVE GROUND TCE TANKS (AREA 5-08E)

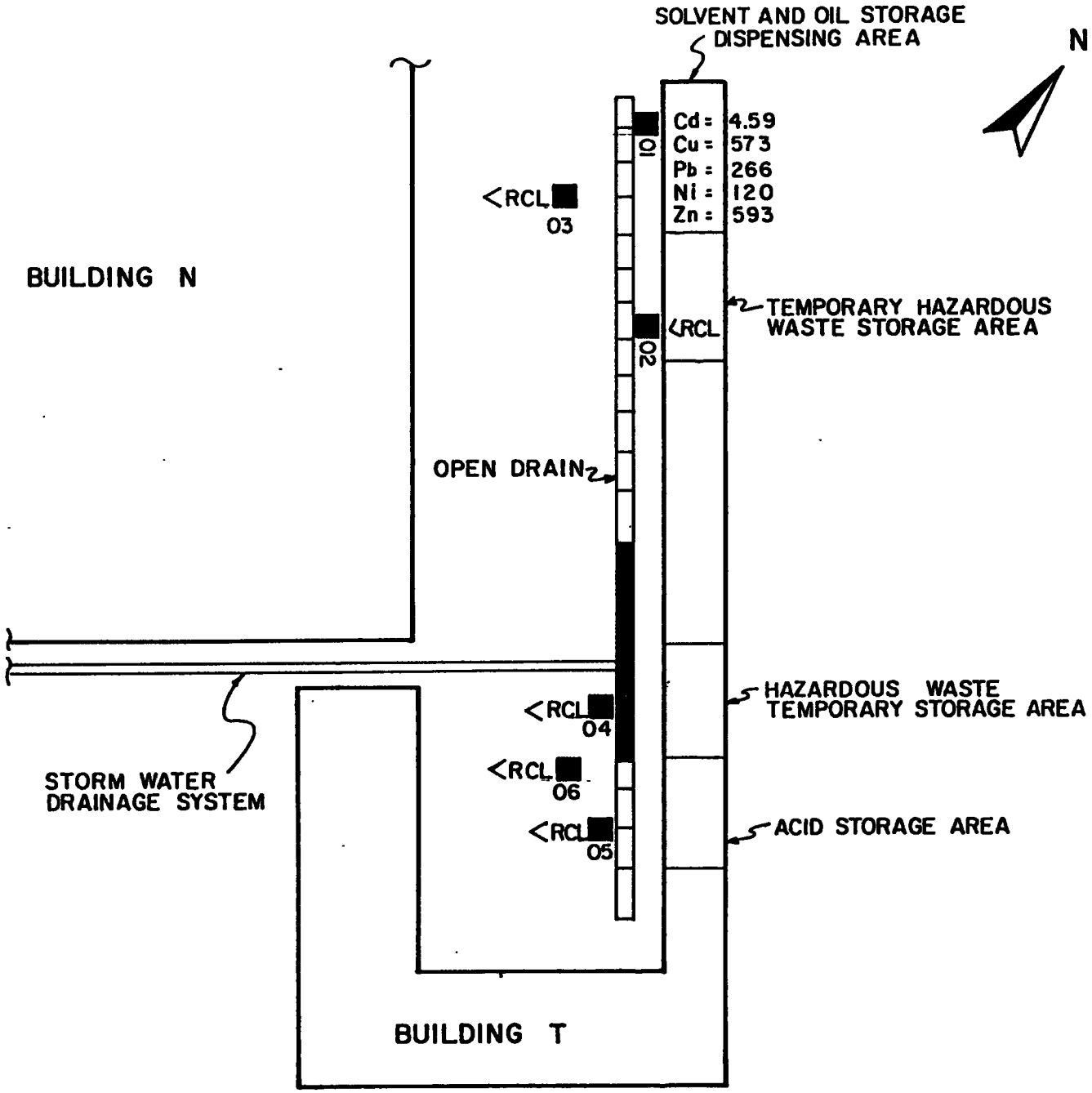
PREPARED FOR: Becton Dickinson & Co

ERM-Northeast
Environmental Resources Management

SCALE: noted
DATE:

FIGURE: 2-22

139239



LEGEND

■ SOIL BORING LOCATION

CONCENTRATIONS IN PARTS PER MILLION.

SAMPLING LOCATIONS BUILDING T HAZARDOUS SUBSTANCE STORAGE AREA (AREA 5-09)

PREPARED FOR

BECTON, DICKINSON & CO.

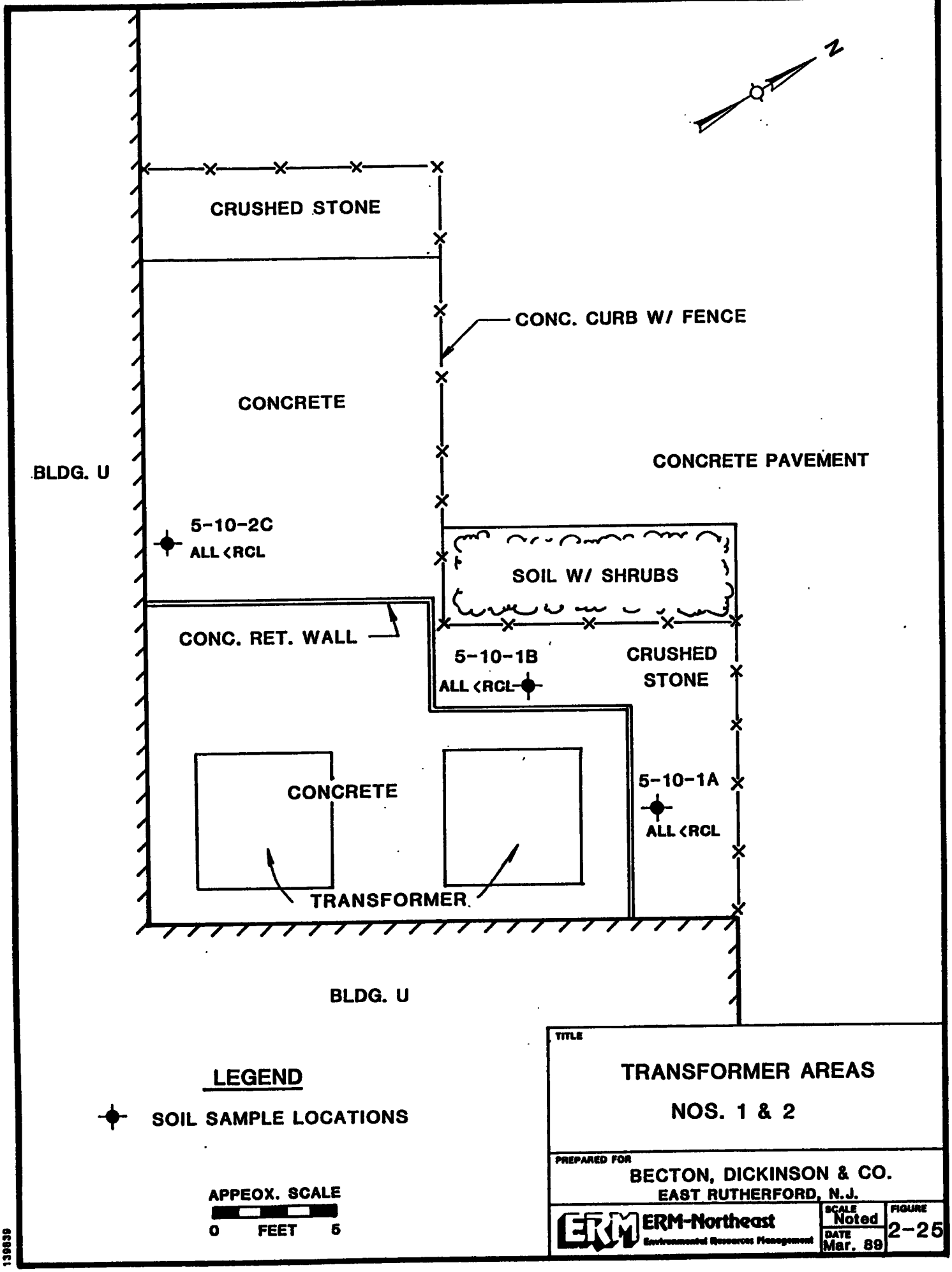
ERM-Northeast
Environmental Resources Management

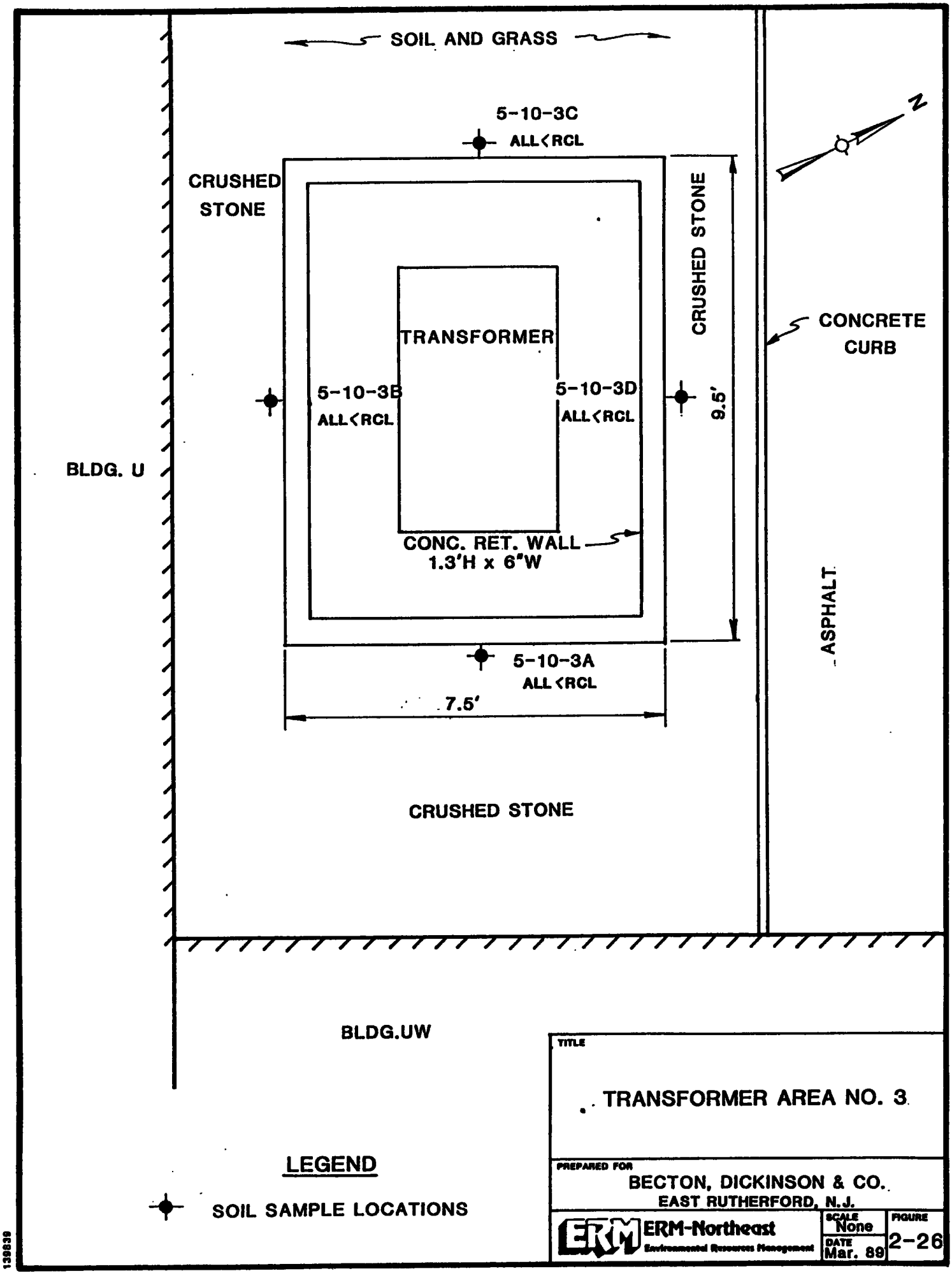
SCALE 1" = 40'

DATE

FIGURE 2-24

139839


N
CRUSHED STONE
CONC. CURB W/ FENCE
CONCRETE
BLDG. U
CONCRETE PAVEMENT
5-10-2C
ALL <RCL
SOIL W/ SHRUBS
CONC. RET. WALL
5-10-1B
ALL <RCL
CRUSHED STONE
CONCRETE
5-10-1A
ALL <RCL
TRANSFORMER
BLDG. U
LEGEND
SOIL SAMPLE LOCATIONS
APPEOX. SCALE
0 FEET 5
TITLE
TRANSFORMER AREAS
NOS. 1 & 2
PREPARED FOR
BECTON, DICKINSON & CO.
EAST RUTHERFORD, N.J.
ERM ERM-Northeast
Environmental Resources Management
SCALE Noted
DATE Mar. 89
FIGURE 2-25
139839



LEGEND

SOIL SAMPLE LOCATIONS

TITLE

TRANSFORMER AREA NO. 3

PREPARED FOR

BECTON, DICKINSON & CO.
EAST RUTHERFORD, N.J.

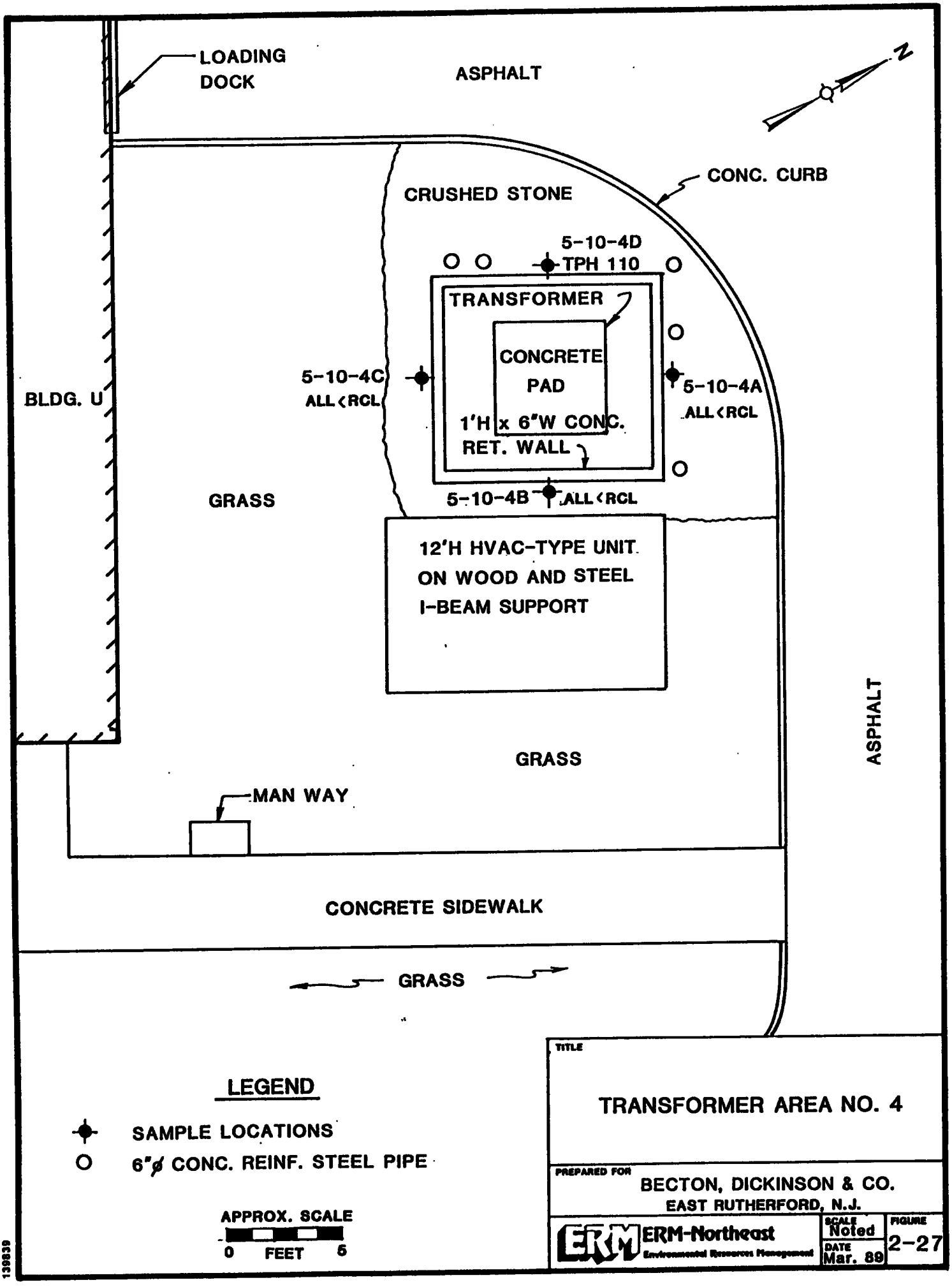
ERM-Northeast
Environmental Resources Management

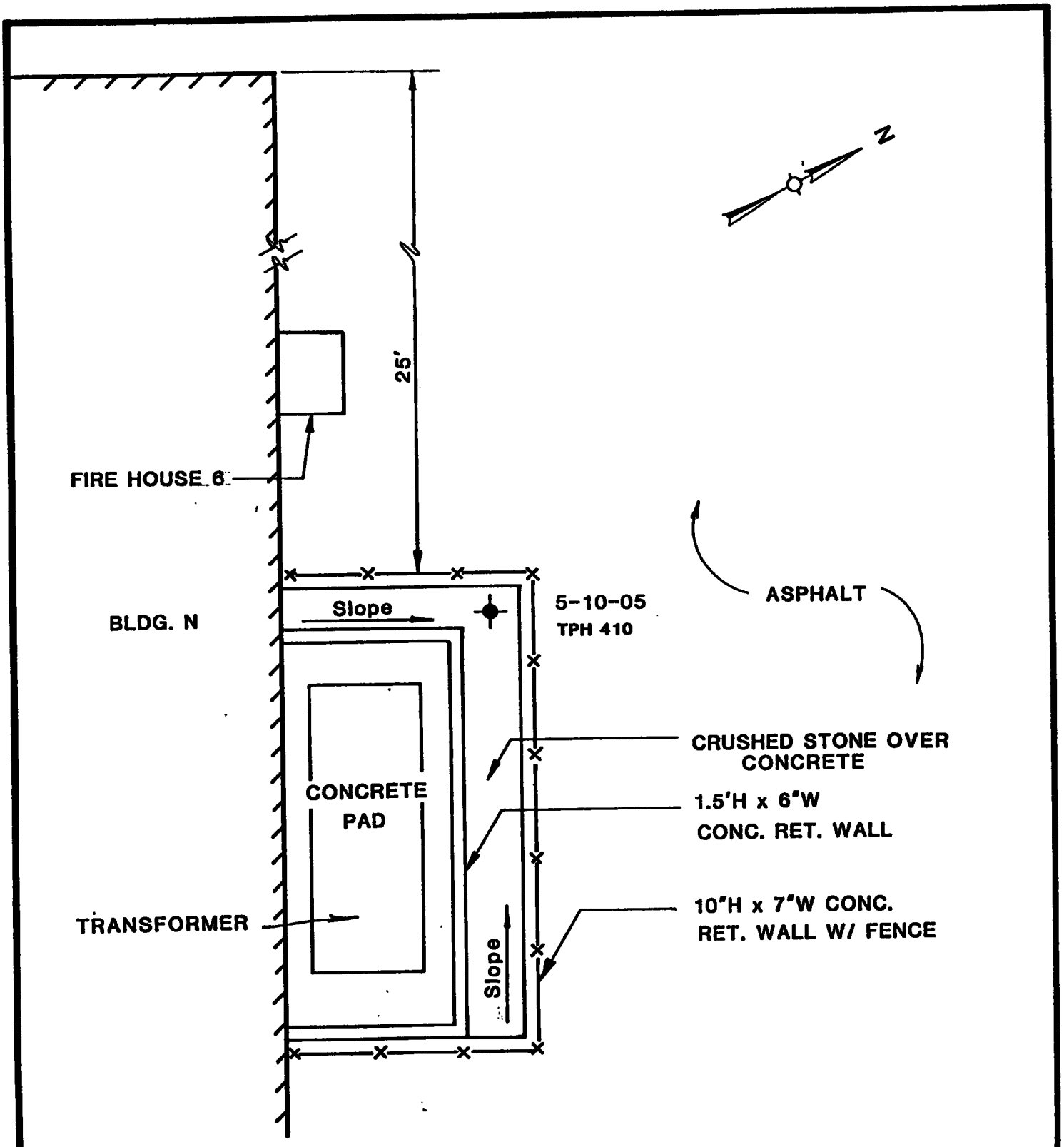
SCALE None

DATE Mar. 89

FIGURE 2-26

139839


LOADING DOCK
ASPHALT
N
CONC. CURB
CRUSHED STONE
5-10-4D
TPH 110
TRANSFORMER
CONCRETE PAD
1'H x 6"W CONC. RET. WALL
5-10-4C
ALL < RCL
5-10-4A
ALL < RCL
5-10-4B
ALL < RCL
BLDG. U
GRASS
12'H HVAC-TYPE UNIT ON WOOD AND STEEL I-BEAM SUPPORT
ASPHALT
GRASS
MAN WAY
CONCRETE SIDEWALK
GRASS
LEGEND
SAMPLE LOCATIONS
6"ø CONC. REINF. STEEL PIPE
APPROX. SCALE
0 FEET 5
TITLE
TRANSFORMER AREA NO. 4
PREPARED FOR
BECTON, DICKINSON & CO.
EAST RUTHERFORD, N.J.
ERM-Northeast
Environmental Resource Management
SCALE Noted
DATE Mar. 89
FIGURE 2-27
139839



LEGEND

SOIL SAMPLE LOCATION

APPROX. SCALE

0 FEET 5

TITLE

TRANSFORMER AREA NO. 5

PREPARED FOR

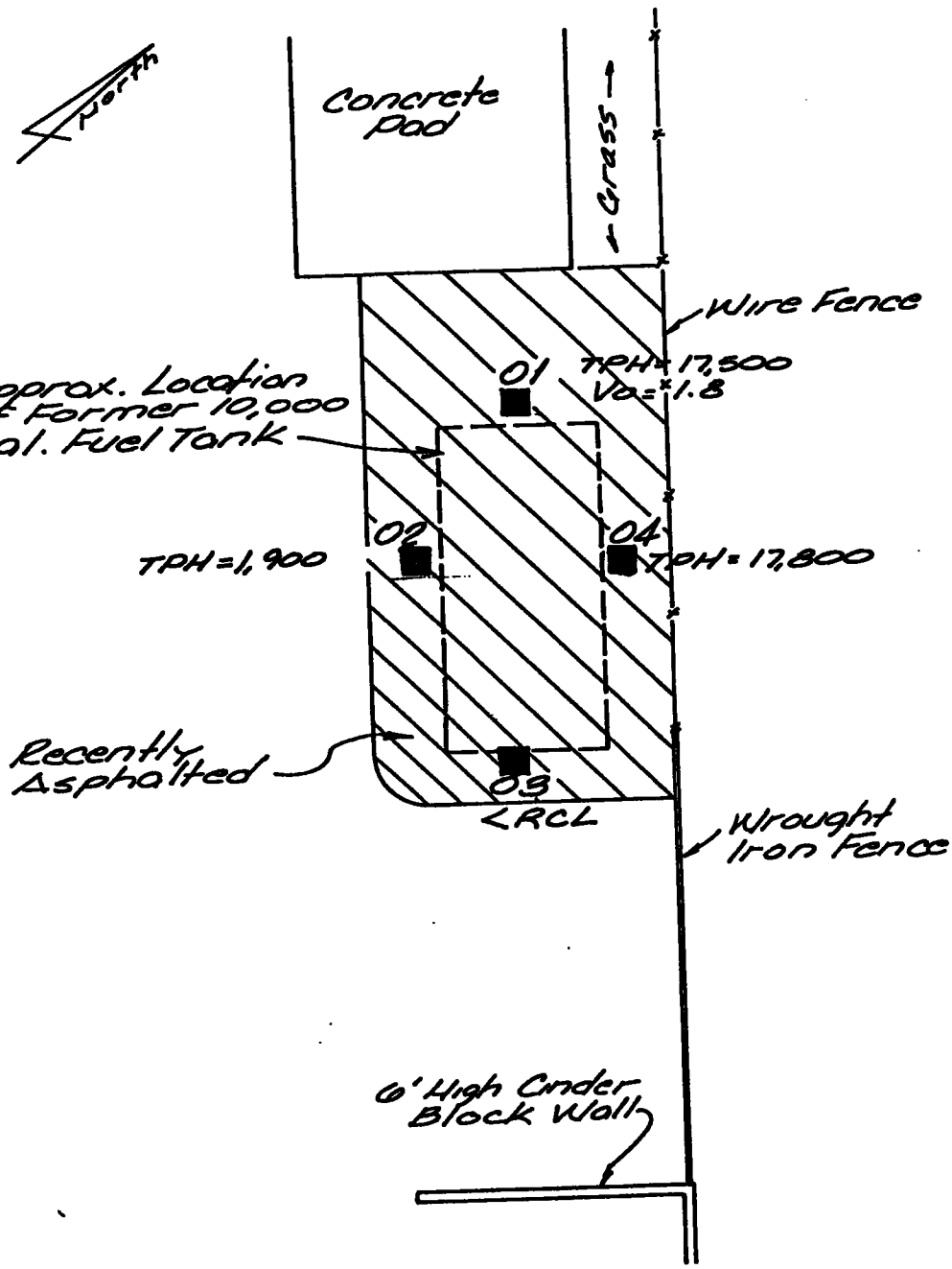
BECTON, DICKINSON & CO.
EAST RUTHERFORD, N.J.

ERM ERM-Northeast
Environmental Resources Management

SCALE Noted
DATE Mar. 89

FIGURE 2-28

139839



LEGEND

01 ■ = Soil Boring

Concentrations in Parts per Million

TITLE
SAMPLING LOCATIONS
BUILDING M
FORMER FUEL TANK
(AREA 5-11)

PREPARED FOR
Becton Dickinson & Co

ERM-Northeast
Environmental Resources Management

SCALE NOTED
DATE

FIGURE 2-29

39839

APPENDIX C

FATE AND TRANSPORT AND TOXICOLOGY DATA FOR CHEMICALS EVALUATED IN THE RISK ASSESSMENT

Physical, chemical, and fate data for each of the chemicals evaluated in the risk assessment (Parcels 4, 5, and 6) are summarized in Table C-1. Data presented include molecular weight, solubility in water, vapor pressure, Henry's Law Constant, organic carbon partition coefficient (Koc), octanol/water partition coefficient and fish bioconcentration factors. Water solubility is the maximum concentration of a chemical that dissolves in pure water at a specific temperature and pH. It is a critical property affecting environmental fate and transport. Vapor pressure is a relative measure of the volatility of a chemical in its pure state and is an important determinant of the rate of vaporization. Henry's Law Constant is another parameter important in evaluating air exposure pathways. The organic carbon partition coefficient is a measure of the tendency for organics to be adsorbed by soil and sediment. The octanol/water partition coefficient is a measure of how a chemical is distributed at equilibrium between octanol and water. It is a strong indicator of the tendency of a chemical to bioaccumulate in fatty tissues of organisms. The fish bioconcentration factor is a measure of the tendency of a chemical in water to accumulate in fish tissue.

Tables C-2 and C-3 present toxicity data for the chemicals of concern for carcinogenic and noncarcinogenic effects, respectively. Toxicity data presented for potential carcinogenic effects include potency factors and EPA weight of evidence ranking for both the

oral and inhalation exposure routes. Carcinogenic potency factors are upper 95% confidence limits on the slope of the dose-response curve. They are used to estimate potential carcinogenic risk. EPA weight of evidence ratings qualify the level of evidence that supports designating a chemical as a human carcinogen. A description of these ratings is provided in Table C-4. Toxicity data for noncarcinogenic effects (Table C-3) include subchronic and chronic acceptable intakes for both the oral and inhalation routes of exposure.

The chemicals of concern at the site are divided into five groups or families based on similar chemical and physical properties as indicated Table C-1. These groups are metals, volatile halogenated organics, volatile aromatics, PCBs and PAHs. TPHs include a variety of chemicals with widely ranging properties and are thus not presented. A description of each of these groups, in terms of their physical, chemical and fate properties as well as toxicity, is provided below.

Metals

Metals of concern in soils at the site include cadmium, chromium, copper, lead, mercury, nickel, silver and zinc. The physical/chemical properties of metals in the environment vary significantly depending on the metal species present (e.g.,

soluble, complexed, particulate). Most of the metals in soils at the site are believed to be in the elemental solid form. Metals in their elemental form are not highly mobile in soil or groundwater. There is little tendency to either volatilize to the atmosphere or dissolve and leach into groundwater. Fish bioconcentration factors for metals are moderate, with the highest being 5500 1/kg for mercury. Metals can be transported to air as fugitive dust.

With respect to toxicity, metals are primarily of concern for their noncarcinogenic effects. None of the selected metals are potential carcinogens for the oral exposure route; however, cadmium, hexavalent chromium, and nickel have potential carcinogenic effects associated with inhalation. Hexavalent chromium and nickel have an EPA weight of evidence rating of A and cadmium is rated as B1.

Volatile Halogenated Organics (Vol-Hal)

Volatile halogenated organics of concern in ground water at the site include chloroform, 1,2-trans-dichloroethylene, methylene chloride, tetrachloroethylene, 1,1,1-trichloroethane, trichloroethylene, trichlorofluoromethane, and vinyl chloride. As their name implies, these compounds have relatively high vapor pressures. The volatile halogenated organics are generally

moderately soluble in water, with solubilities ranging from 150 mg/l for tetrachloroethylene to 20,000 mg/l for methylene chloride. The organic carbon partition coefficients and log octanol water partition coefficients for these compounds are generally relatively low. Taken together, these properties suggest that the chemicals will tend to be mobile in groundwater.

As indicated in Table C-2, chloroform, methylene chloride, tetrachloroethylene, trichloroethylene, and vinyl chloride have potential carcinogenic effects associated with the oral and inhalation exposure routes. Vinyl chloride is rated as A, a human carcinogen. The remainder are classified as B2, probable human carcinogen.

Volatile Aromatics (Vol-Ar)

The only volatile aromatic of concern at the site is benzene. Benzene has a relatively high vapor pressure (95.2 mm Hg) and moderate solubility in water (1,750 mg/l). The organic carbon partition coefficient and log octanol water partition coefficient are relatively low. These properties indicate that benzene tends to be mobile in ground water. Benzene is rated as A, a human carcinogen.

Polychlorinated Biphenyls (PCBs)

PCBs refer to a group of many related molecules and isomers. All PCBs contain a biphenyl molecule chlorinated in any or all of the eight positions available. Commercially available mixtures consist of a variety of isomers (variously chlorinated biphenyls). Technical grade mixtures, known in the U.S. by their trade name Arochlor, are identified by a numbering system in which the last two digits indicate the average percentage chlorination. Arochlor 1254, for example, is a mixture of isomers with an average of 54% of the available bonding places on the molecule occupied by chlorine atoms. Typical commercial mixtures range from about 16% to 64% chlorine.

All PCBS have low solubility in water and low vapor pressure. All are heavier than water (specific gravity approximately 1.4). The high octanol/water partition coefficient indicates that PCBs will tend to adhere to soils and sediments. Thus PCBs in soil are likely to be relatively immobile. PCBs are extremely stable in the environment, experiencing little breakdown by chemical or biological processes. PCBs are ranked by the U.S. EPA as B2, probable human carcinogen.

Polynuclear Aromatic Hydrocarbons (PAHs)

Polynuclear aromatic hydrocarbons are a class of compounds formed during the incomplete combustion or pyrolysis of organic materials containing carbon and hydrogen. Several hundred different PAHs have been identified. Sixteen PAHs are included in the U.S. EPA's priority pollutant list.

In general, PAHs exhibit low vapor pressures, moderate to very low solubilities in water, and relatively high log octanol/water partition coefficients and bioconcentration factors. These properties suggest that PAHs are not highly mobile in soil or ground water and will tend to sorb to soil particles.

Carcinogenicity of different PAH compounds varies. Benzo[a]pyrene has a U.S. EPA weight of evidence rating of A (Human Carcinogen). Fourteen PAHs are rated as B1 or B2 and nine PAHs are rated as Group C (U.S. EPA, 1984).

TABLE C-1

PHYSICAL, CHEMICAL, AND FATE DATA

Chemical Name	CAS #	Family	Mole Weight (g/mole)	Water Solubility (mg/l)	Vapor Pressure (mm Hg)	Henry's Law Constant (atm-m3/mol)	Koc (ml/g)	Log Kow	Fish BCF (l/kg)
Benzene	71-43-2	Vol-Ar	78	1.75E+03	9.52E+01	5.59E-03	83	2.12	5.2
Cadmium & Compounds	7740-43-9	Metals	112		0.00E+00	NA			81
Chloroform	67-66-3	Vol-Hal	119	8.20E+03	1.51E+02	2.87E-03	31	1.97	3.75
Chromium III & Compounds	7440-47-3	Metals	52		0.00E+00	NA			16
Chromium VI & Compounds	7440-47-3	Metals	52		0.00E+00	NA			16
Copper & Compounds	7440-50-8	Metals	64		0.00E+00	NA			200
1,2-Dichloroethylene (trans)	540-59-0	Vol-Hal	97	6.30E+03	3.24E+02	6.56E-03	59	0.48	1.6
Lead & Compounds (inorganic)	7439-92-1	Metals	207		0.00E+00	NA			49
Mercury & Compounds (inorganic)	7439-97-6	Metals	201		2.00E-03	NA			5500
Methylene Chloride	75-09-2	Vol-Hal	85	2.00E+04	3.62E+02	2.03E-03	8.8	1.30	5
Nickel & Compounds	7440-02-0	Metals	59		0.00E+00	NA			47
PCBs	1336-36-3	PCBs	328	3.10E-02	7.70E-05	1.07E-03	530000	6.04	100000
PAHs		PAHs							
Silver	7440-22-4	Metals	108		0.00E+00	NA			3080
Tetrachloroethylene	127-18-4	Vol-Hal	166	1.50E+02	1.78E+01	2.59E-02	364	2.6	31
TPH									
1,1,1-Trichloroethane	79-00-5	Vol-Hal	133	4.50E+03	3.00E+01	1.17E-03	56	2.47	5
Trichloroethylene	79-01-6	Vol-Hal	131	1.10E+03	5.79E+01	9.10E-03	126	2.88	10.6
Trichlorofluoromethane	75-69-4	Vol-Hal	197	1.19E+03	6.67E+02	2.18E-04	89	3.72	110
Vinyl Chloride	75-01-4	Vol-Hal	63	2.67E+03	2.66E+03	8.19E-02	57	1.38	1.17
Zinc & Compounds	7440-66-6	Metals	65		0.00E+00	NA			47

Source: U.S. EPA, 1986

TABLE C-2
TOXICITY DATA FOR POTENTIAL CARCINOGENIC EFFECTS

	Oral Route		Inhalation Route	
Chemical Name	Potency Factor $(mg/Kg/day)^{-1}$	EPA Weight of Evidence	Potency Factor $(mg/Kg/day)^{-1}$	EPA Weight of Evidence
Benzene	5.20E-02	A	2.60E-02	A
Cadmium and Compounds	NA		6.10E+00	B1
Chloroform	8.10E-02	B2		B2
Chromium VI and Compounds	NA		4.10E+01	A
Methylene Chloride	7.50E-03	B2	1.43E-02	B2
Nickel and Compounds	NA		8.40E-01(1)	A
PAHs	1.15E+01(2)		6.11E+00(2)	
PCBs	7.00E+00	B2		B2
Tetrachloroethylene	5.10E-02	B2	1.00E+00 to 3.30E-03	B2
Trichloroethylene	1.10E-02	B2	4.60E-03	B2
Vinyl Chloride	2.30E+00	A	2.95E-01	A

Source: U.S. EPA, 1986

(1) Potency factor for refinery dust
(2) Reanalysis by U.S. EPA pending

TABLE C-3
TOXICITY DATA FOR NONCARCINOGENIC EFFECTS

Chemical Name	Acceptable Intake-Oral Route (mg/Kg/day) Subchronic (AIS)	Acceptable Intake-Oral Route (mg/Kg/day) Chronic (AIC)	Acceptable Intake-Inhalation Route (mg/Kg/day) Subchronic (AIS)	Acceptable Intake-Inhalation Route (mg/Kg/day) Chronic (AIC)
Benzene				
Cadmium and Compounds		1.30E-02		
Chloroform		1.00E-02		
Chromium III and Compounds	1.40E+01	1.00E+00		
Chromium VI and Compounds	2.50E-02	5.00E-03		
Copper and Compounds	3.70E-02	3.70E-02		1.00E-02
1,2-Dichloroethylene (trans)				
Lead and Compounds (inorganic)		1.40E-03		
Mercury and Compounds (inorganic)	1.40E-03	1.40E-03		
Methylene Chloride		6.00E-02		
Nickel and Compounds	1.40E-02	1.00E-02		
PAHs				
PCBs				
Silver		3.00E-03		
Tetrachloroethylene		2.00E-02		
1,1,1-Trichloroethane	3.10E+00	8.60E-02		3.10E+00
Trichloroethylene				
Trichlorofluoromethane		3.00E-01		
Vinyl Chloride				
Zinc and Compounds	2.10E-01	2.10E-01		

Source: U.S. EPA, 1986

TABLE C-4

EPA WEIGHT-OF-EVIDENCE CATEGORIES FOR POTENTIAL CARCINOGENS

EPA Category	Description of Group	Description of Evidence
Group A	Human Carcinogen	Sufficient evidence from epidemiologic studies to support a causal association between exposure and cancer
Group B1	Probable Human Carcinogen	Limited evidence of carcinogenicity in humans from epidemiologic studies
Group B2	Probable Human Carcinogen	Sufficient evidence of carcinogenicity in humans
Group C	Possible Human Carcinogen	Limited evidence of carcinogenicity in animals
Group D	Not Classified	Inadequate evidence of carcinogenicity in animals
Group E	No Evidence of Carcinogenicity in Humans	No evidence for carcinogenicity in at least two adequate animal tests or in both epidemiologic and animal studies

APPENDIX C

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In general, PAHs exhibit low vapor pressures, moderate to very low solubilities in water, and relatively high log octanol/water partition coefficients and bioconcentration factors. These properties suggest that PAHs are not highly mobile in soil or ground water and will tend to sorb to soil particles.

Carcinogenicity of different PAH compounds varies. Benzo[a]pyrene has a U.S. EPA weight of evidence rating of A (Human Carcinogen). Fourteen PAHs are rated as B1 or B2 and nine PAHs are rated as Group C (U.S. EPA, 1984).

TABLE C-1

PHYSICAL, CHEMICAL, AND FATE DATA

Chemical Name	CAS #	Family	Mole Weight (g/mole)	Water Solubility (mg/l)	Vapor Pressure (mm Hg)	Henry's Law Constant (atm-m3/mol)	Koc (ml/g)	Log Kow	Fish BCF (l/kg)
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Chloroform	67-66-3	Vol-Hal	119	8.20E+03	1.51E+02	2.87E-03	31	1.97	3.75
Chromium III & Compounds	7440-47-3	Metals	52		0.00E+00	NA			16
Chromium VI & Compounds	7440-47-3	Metals	52		0.00E+00	NA			16
Copper & Compounds	7440-50-8	Metals	64		0.00E+00	NA			200
1,2-Dichloroethylene (trans)	540-59-0	Vol-Hal	97	6.30E+03	3.24E+02	6.56E-03	59	0.48	1.6
Lead & Compounds (inorganic)	7439-92-1	Metals	207		0.00E+00	NA			49
Mercury & Compounds (inorganic)	7439-97-6	Metals	201		2.00E-03	NA			5500
Methylene Chloride	75-09-2	Vol-Hal	85	2.00E+04	3.62E+02	2.03E-03	8.8	1.30	5
Nickel & Compounds	7440-02-0	Metals	59		0.00E+00	NA			47
PCBs	1336-36-3	PCBs	328	3.10E-02	7.70E-05	1.07E-03	530000	6.04	100000
PAHs		PAHs							
Silver	7440-22-4	Metals	108		0.00E+00	NA			3080
Tetrachloroethylene	127-18-4	Vol-Hal	166	1.50E+02	1.78E+01	2.59E-02	364	2.6	31
TPH									
1,1,1-Trichloroethane	79-00-5	Vol-Hal	133	4.50E+03	3.00E+01	1.17E-03	56	2.47	5
Trichloroethylene	79-01-6	Vol-Hal	131	1.10E+03	5.79E+01	9.10E-03	126	2.88	10.6
Trichlorofluoromethane	75-69-4	Vol-Hal	197	1.19E+03	6.67E+02	2.18E-04	89	3.72	110
Vinyl Chloride	75-01-4	Vol-Hal	63	2.67E+03	2.66E+03	8.19E-02	57	1.38	1.17
Zinc & Compounds	7440-66-6	Metals	65		0.00E+00	NA			47

Source: U.S. EPA, 1986

TABLE C-2
TOXICITY DATA FOR POTENTIAL CARCINOGENIC EFFECTS

Chemical Name	Oral Route		Inhalation Route	
	Potency Factor $(mg/Kg/day)^{-1}$	EPA Weight of Evidence	Potency Factor $(mg/Kg/day)^{-1}$	EPA Weight of Evidence
Benzene	5.20E-02	A	2.60E-02	A
Cadmium and Compounds	NA		6.10E+00	B1
Chloroform	8.10E-02	B2		B2
Chromium VI and Compounds	NA		4.10E+01	A
Methylene Chloride	7.50E-03	B2	1.43E-02	B2
Nickel and Compounds	NA		8.40E-01(1)	A
PAHs	1.15E+01(2)		6.11E+00(2)	
PCBs	7.00E+00	B2		B2
Tetrachloroethylene	5.10E-02	B2	1.00E+00 to 3.30E-03	B2
Trichloroethylene	1.10E-02	B2	4.60E-03	B2
Vinyl Chloride	2.30E+00	A	2.95E-01	A

Source: U.S. EPA, 1986

(1) Potency factor for refinery dust
(2) Reanalysis by U.S. EPA pending

TABLE C-3
TOXICITY DATA FOR NONCARCINOGENIC EFFECTS

Chemical Name	Acceptable Intake-Oral Route (mg/Kg/day) Subchronic (AIS)	Acceptable Intake-Oral Route (mg/Kg/day) Chronic (AIC)	Acceptable Intake-Inhalation Route (mg/Kg/day) Subchronic (AIS)	Acceptable Intake-Inhalation Route (mg/Kg/day) Chronic (AIC)
Benzene				
Cadmium and Compounds		1.30E-02		
Chloroform		1.00E-02		
Chromium III and Compounds	1.40E+01	1.00E+00		
Chromium VI and Compounds	2.50E-02	5.00E-03		
Copper and Compounds	3.70E-02	3.70E-02		1.00E-02
1,2-Dichloroethylene (trans)				
Lead and Compounds (inorganic)		1.40E-03		
Mercury and Compounds (inorganic)	1.40E-03	1.40E-03		
Methylene Chloride		6.00E-02		
Nickel and Compounds	1.40E-02	1.00E-02		
PAHs				
PCBs				
Silver		3.00E-03		
Tetrachloroethylene		2.00E-02		
1,1,1-Trichloroethane	3.10E+00	8.60E-02		3.10E+00
Trichloroethylene				
Trichlorofluoromethane		3.00E-01		
Vinyl Chloride				
Zinc and Compounds	2.10E-01	2.10E-01		

Source: U.S. EPA, 1986

TABLE C-4

EPA WEIGHT-OF-EVIDENCE CATEGORIES FOR POTENTIAL CARCINOGENS

EPA Category	Description of Group	Description of Evidence
Group A	Human Carcinogen	Sufficient evidence from epidemiologic studies to support a causal association between exposure and cancer
Group B1	Probable Human Carcinogen	Limited evidence of carcinogenicity in humans from epidemiologic studies
Group B2	Probable Human Carcinogen	Sufficient evidence of carcinogenicity in humans
Group C	Possible Human Carcinogen	Limited evidence of carcinogenicity in animals
Group D	Not Classified	Inadequate evidence of carcinogenicity in animals
Group E	No Evidence of Carcinogenicity in Humans	No evidence for carcinogenicity in at least two adequate animal tests or in both epidemiologic and animal studies

BD responses to EPA Request for Information

ERM-Northeast

Nos. 14

SOIL AND GROUND WATER REMEDIAL ACTION PLAN - PARCEL NO. 6 BECTON DICKINSON AND COMPANY EAST RUTHERFORD, NEW JERSEY

MARCH, 1989

PREPARED FOR:

BECTON, DICKINSON AND COMPANY
ONE BECTON DRIVE
FRANKLIN LAKES, NEW JERSEY 07417-1880

PREPARED BY:

ERM-NORTHEAST
88 Sunnyside Boulevard
Plainview, New York 11803

ERM-Northeast

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APPENDIX A: LABORATORY DATA REPORTING SHEETS

EXECUTIVE SUMMARY

This Remedial Action Plan has been developed to address environmental concerns identified in Parcel No. 6 at Becton, Dickinson and Company's (B-D) East Rutherford, New Jersey site. B-D plans to cease operations in Parcel No. 6 (along with Parcel Nos. 4 and 5) and transfer ownership of the property in the fall of 1991.

Environmental concerns in Parcel 6 have been delineated through a series of comprehensive site investigations. These investigations have determined that the soils at the site are contaminated with a number of heavy metals and petroleum hydrocarbons. PCBs were also detected in soil at discrete locations. Chlorinated hydrocarbons were detected in ground water at one location requiring remediation.

An environmental and health based risk assessment was used to evaluate the level of cleanup required. A series of soil and ground water remedial action criteria were developed to protect ground and surface water. These criteria also fully considered the safety of individuals that will be working at the site following property transfer.

The remedial action plan was developed after a comprehensive evaluation of soil and ground water remediation alternatives. Excavation and off-site disposal was selected as the most appropriate method of achieving the soil criteria. To achieve the ground water remediation goals, a recovery trench will be strategically placed on the parcel. The recovered ground water will be conveyed to the on-site system for treatment. The treated effluent will be discharged to the local sewerage system.

1.0 INTRODUCTION

Becton, Dickinson and Company (B-D) owns and operates a medical apparatus manufacturing facility in the borough of East Rutherford, Bergen County, New Jersey. The location of the facility is shown on the general vicinity map provided as Figure 1-1. Due to the planned cessations of operations at the site, B-D prepared and submitted an initial Environmental Cleanup Responsibility Act (ECRA) notice to the New Jersey Department of Environmental Protection (NJDEP) in June, 1987. The site was divided into six parcels (Parcel Nos. 1 through 6) each having separate tax lot and block numbers. Figure 1-2 provides a plan view of the site divided into six parcels. Six separate ECRA submissions were therefore made. Each submission was subsequently assigned an individual ECRA case number by the NJDEP. B-D has since conducted a series of comprehensive environmental investigations and made various additional ECRA submissions.

Environmental investigations of Parcels 1, 2 and 3 were conducted on an expedited schedule from October, 1987 through December, 1987. B-D subsequently prepared and submitted Remedial Action Plans for these three parcels in July, 1988. The Remedial Action Plans were approved by the NJDEP in October, 1988. Parcels

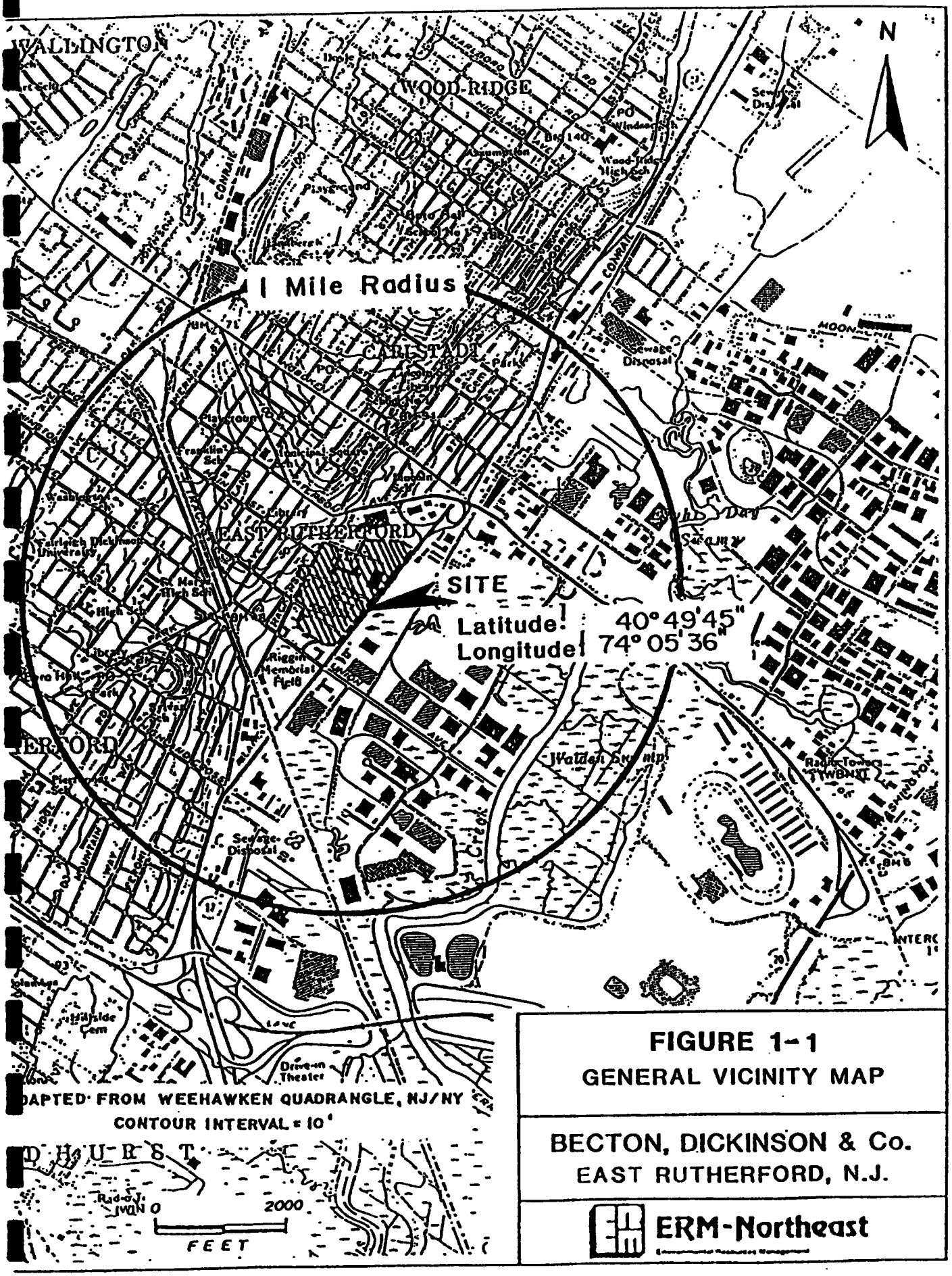


FIGURE 1-1
GENERAL VICINITY MAP

BECTON, DICKINSON & Co.
EAST RUTHERFORD, N.J.

ERM-Northeast

HACKENSACK STREET

CORNELIA STREET

ANN STREET

FRANCIS ST

STREET

ORCHARD STREET

STANLEY STREET

ROUTE 17

Linac

SCALE: 1"=165'±

LEGEND

D BUILDING

① PARKING LOT NUMBERS

PROPERTY NOT OWNED BY B-D

FIGURE 1-2
SITE PLAN
PARCEL DESIGNATIONS

BECTON, DICKINSON & Co.
EAST RUTHERFORD, N.J.

ERM-Northeast

1, 2 and 3 are currently in the remediation phase and are being handled by the NJDEP ECRA Cleanup Oversight section.

Similar environmental investigations were conducted in Parcel Nos. 4, 5 and 6 from February, 1988 through May, 1988. The investigation conducted in Parcel No. 6 at the East Rutherford site has revealed that contaminants are present in both soil and ground water above the NJDEP-ECRA RCLs. This Remedial Action Plan has been developed to address areas of environmental concern in Parcel No. 6 and to provide procedures for the remediation of this parcel.

1.1 Previous ECRA Submissions

Table 1-1 provides a summary listing of the documents previously submitted to the NJDEP. These documents are referenced in this report to avoid redundancy and improve the efficiency of the remedial procedures presentation.

1.2 Remedial Action Performance Standard

This Remedial Action Plan is designed to accomplish two objectives:

TABLE 1-1

SUMMARY OF ECRA SUBMISSIONS

Report Title	Report Summary	Submission Date
ECRA - Sampling and Analysis Plan, Volume I Parcels 1, 2, 3, 4, 5, and 6	Presents site information for the initial ECRA notice and the Sampling and Analysis Plan common to each of the 6 parcels	June 1987
ECRA - Sampling and Analysis Plan, Volume II Parcels 1, 2, 3, 4, 5, and 6	Presents parcel specific information for the Sampling and Analysis Plan including results of the Phase 1a Preliminary Environmental Investigation. Includes the GIS and SES ECRA forms for each parcel and supporting information.	June 1987
ECRA - Supplementary Information, Volume III Parcels 5 and 6	Presents the results of the 1b and Phase 1c Preliminary Environmental Investigations conducted in Parcels 5 and 6 and amends the June 1987 Sampling and Analysis Plans.	Dec. 1987
ECRA - Environmental Assessment Program Parcels 1, 2, and 3	Presents results of the comprehensive environmental program conducted in Parcels 1, 2, and 3 along with the results of the Phase 1b and 1c preliminary environmental investigations.	Feb. 1988
Soil and Ground Water Remedial Action Plan(s) Parcel 1 and 2, Parcel 3	Presents additional results of environmental investigations and procedures to remediate soil and ground water contamination in Parcels 1, 2 and 3.	July 1988
ECRA Environmental Assessment Program Parcels 4, 5 and 6	Presents results of the comprehensive environmental program conducted in Parcels 4, 5 and 6	Aug. 1988

- To remedy site environmental conditions on the basis of environmental and health based risk levels developed for the site.

- To address environmental quality issues to be consistent with future site development plans.

1.3 Overview of Report

The remainder of the report is organized into the following sections:

2.0 ENVIRONMENTAL CONDITIONS - This section presents s summary of environmental conditions at the site.

3.0 SITE DEVELOPMENT PLAN - The future site development plan is summarized in this section.

4.0 DEVELOPMENT OF REMEDIAL ACTION CRITERIA - This section addresses site cleanup levels developed for both soil and ground water.

5.0 SOIL REMEDIATION PROGRAM - This section presents the procedures proposed to remediate soil at the site.

6.0 GROUND WATER REMEDIATION PROGRAM - The program and procedures for ground water remediation are presented in this section.

7.0 SCHEDULE AND ESTIMATED COST OF REMEDIAL ACTIVITIES - A schedule and cost estimate for implementation of remedial activities and procedures is presented in this section.

2.0 ENVIRONMENTAL CONDITIONS

This section summarizes overall environmental conditions in Parcel No. 6.

2.1 Soil Quality Conditions

2.1.1 New Soil Quality Data

EP Toxicity Analysis

Four samples previously collected were analyzed for heavy metals using the extraction procedure. The choice of samples for reanalysis was based upon the original heavy metal analytical results. Each of the four samples had significant total metals concentrations. Table 2-1 presents a comparison of the samples' total metals concentrations versus the extraction procedure metals concentrations. Samples 6-8 and 6-22-01 were received by the laboratory within the maximum holding time. Although samples PIC-S1 and PIC-S4 were not received within the maximum holding time, the results of the analyses are valid for our purposes. Laboratory data reporting sheets are presented in Appendix A.

TABLE 2-1

COMPARISON OF TOTAL HEAVY METALS WITH EXTRACTION PROCEDURE (LEACHABLE HEAVY METALS)

Sample No.	Parameter	Total Concentration	Leachable Concentration
6-8	Chromium	109 ppm	<0.01 ppm
	Lead	2239 ppm	0.230 ppm
	Mercury	1.25 ppm	<0.4 ppb
6-22-01	Chromium	887 ppm	<0.01 ppm
	Lead	296 ppm	0.028 ppm
	Mercury	2.0 ppm	0.4 ppb
PIC-S1	Cadmium	6.2 ppm	0.05 ppm
	Lead	730 ppm	0.800 ppm
	Mercury	100 ppm	<0.4 ppb
	Silver	8.8 ppm	<0.01 ppm
PIC-S4	Chromium	130 ppm	<0.01 ppm
	Cadmium	100 ppm	<0.01 ppm
	Lead	150 ppm	0.04 ppm
	Mercury	1.5 ppm	<0.4 ppb

Additional Sample Analyses

On August 19, 1988, a soil sample was collected from zero to six inches deep at the location of sample PIC-S2. The sample (S-6-1) was collected at an adjacent location in order to verify the results of sample PIC-S2, also collected from zero to six inches deep. The initial analysis showed soil in that location to be contaminated with chromium at a concentration of 15,500 ppm and lead at a concentration of 3400 ppm. Table 2-2 compares the previously collected sample's results with the supplementary sample's total metals concentrations and extraction procedure metals concentrations. The laboratory data reporting sheets for sample S-6-1 are presented in Appendix A.

2.1.2 Areal and Vertical Extent of Contamination

Figure 2-1 (presented in a back pocket of this report) provides a plan view of Parcel No. 6 indicating the location of soil samples used to characterize both the open area away from production activities and the lone identified area of environmental concern.

TABLE 2-2

COMPARISON OF SAMPLES RESULTS:
SAMPLES PIC-S2 AND S-6-1

	PIC-S2	S-6-1	
Parameter	Total Concentration (ppm)	Total Concentration (ppm)	Leachable Concentration (ppm)
Chromium	15,500	220	1.8
Copper	500	160	0.85
Lead	3,400	65	0.19
Mercury	0.90	0.89	<0.4 ppb
Nickel	31	36	0.34
Zinc	67	110	1.1

Seven soil cross-sections were drawn through Parcel No. . Included in each cross-section is the ground surface, pproximate ground water table surface, soil sample locations and the concentrations of contaminants identified at levels xceeding the ECRA RCLs. The locations of the cross-sections are provided on Figure 2-1. Figures 2-2 through 2-8 provide he cross-sections.

Four soil samples were collected to characterize the identified area of environmental concern, a former disposal area used until 1985. The location of this area and sampling points is presented on Figure 2-1.

2.1.3 Summary of Soil Quality Conditions

In general, the areas of particular concern in Parcel No. 6 identified during the soil quality investigation include:

- Heavy metal contamination, particularly in the northwestern section of Parcel No. 6.

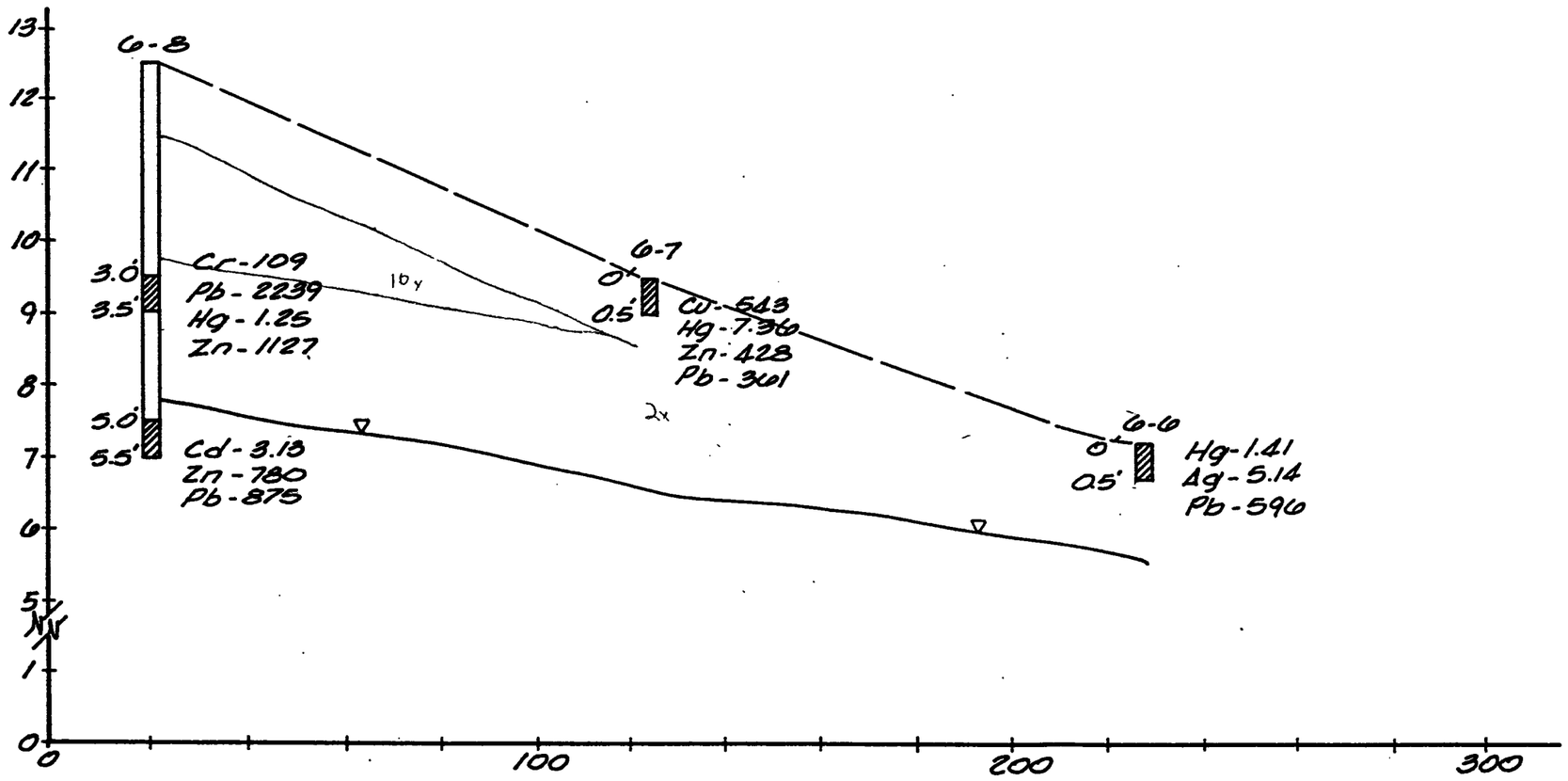
- Base-neutral organic compounds at an elevated concentration (197.85 ppm) in one location (Sample 6-19).

LEGEND

——— = Grade

——— = Watertable

Concentrations in ppm



Scale: Horiz. 1"=30'
Vert. 1"=2'

TITLE

SOIL CROSS SECTION $A_1 - A_2$

PARCEL NO. 6

PREPARED FOR

BECTON DICKINSON & CO.

EAST RUTHERFORD, N.J.

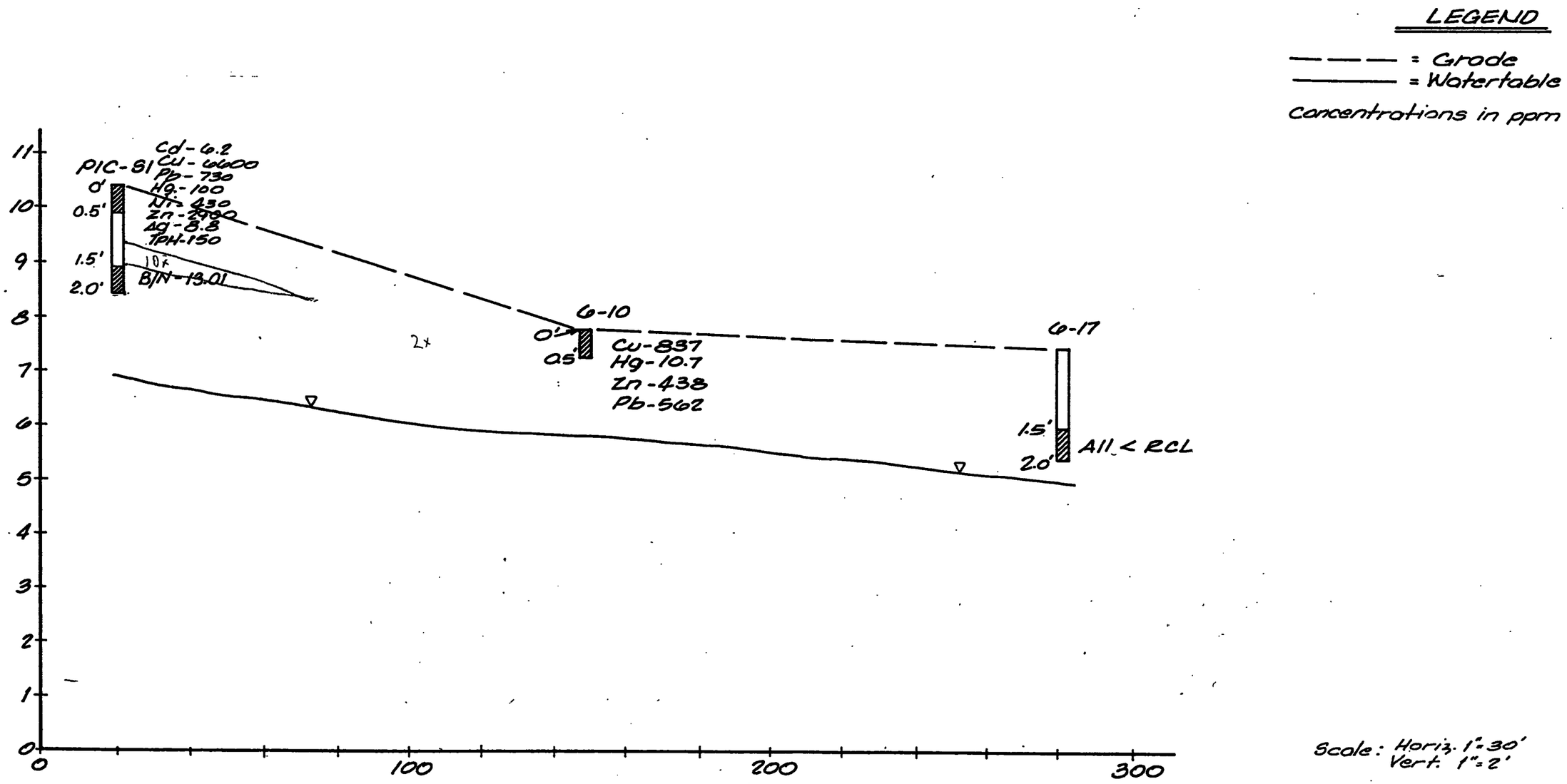
ERM-Northeast
Environmental Resources Management

SCALE SHOWN

DATE MAR., 1989

FIGURE 2-2

138839



TITLE

SOIL CROSS SECTION $B_1 - B_2$

PARCEL NO. 6

PREPARED FOR

BECTON DICKINSON & CO.

EAST RUTHERFORD, N.J.

ERM-Northeast
Environmental Resources Management

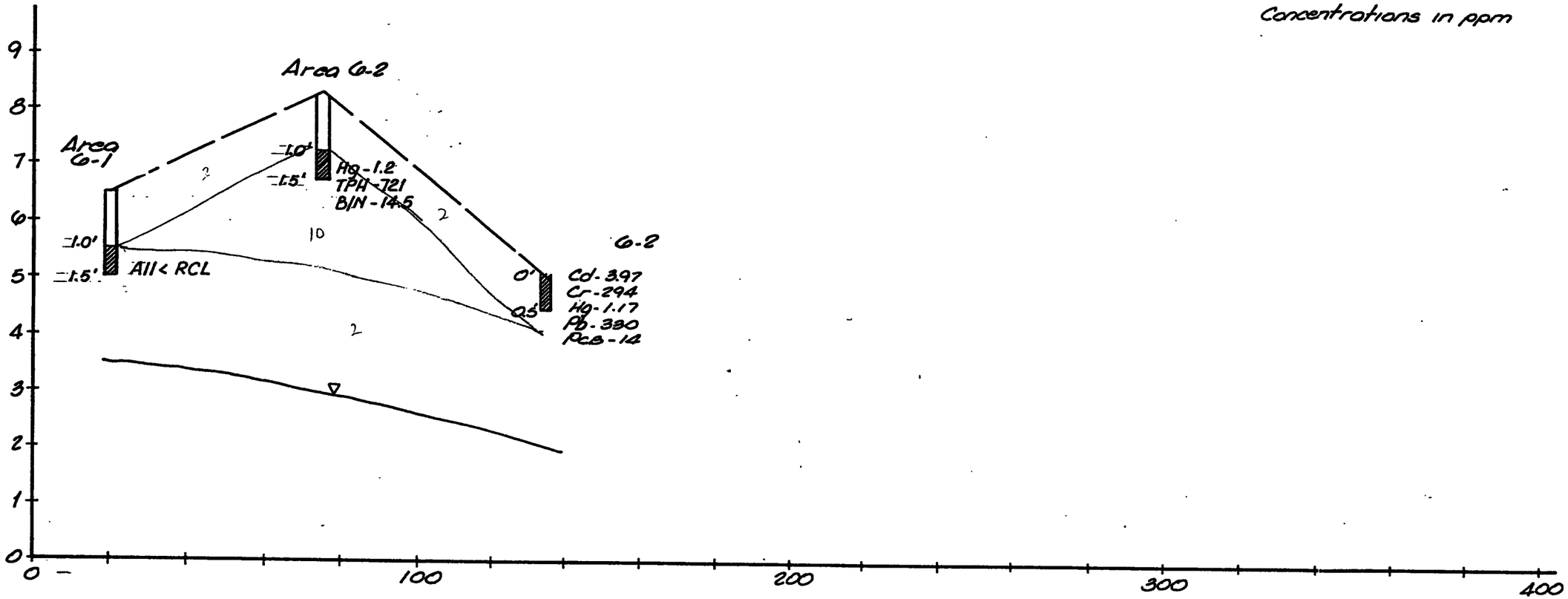
SCALE	FIGURE
SHOWN	2-3
DATE MAR., 1989	

LEGEND

— — — = Grade

——— = Watertable

Concentrations in ppm



Scale: Horiz. 1" = 30'
Vert. 1" = 2'

TITLE

SOIL CROSS SECTION $C_1 - C_2$

PARCEL NO. 6

PREPARED FOR

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ERM-Northeast
Environmental Resources Management

SCALE SHOWN

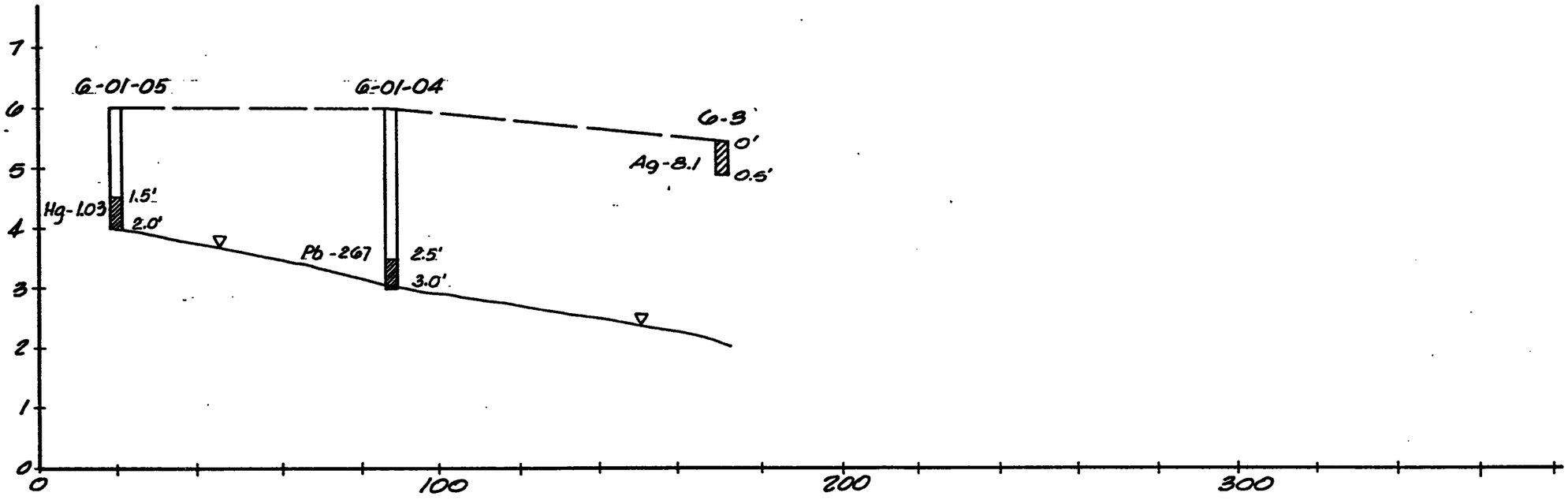
DATE MAR., 1989

FIGURE 2-4

138038

LEGEND

——— = Grade
——— = Watertable
Concentrations in ppm



Scale: Horiz. - 1" = 30'
Vert. - 1" = 2'

TITLE

SOIL CROSS SECTION $D_1 - D_2$

PARCEL NO. 6

PREPARED FOR

BECTON DICKINSON & CO.
EAST RUTHERFORD, N.J.

ERM-Northeast
Environmental Resources Management

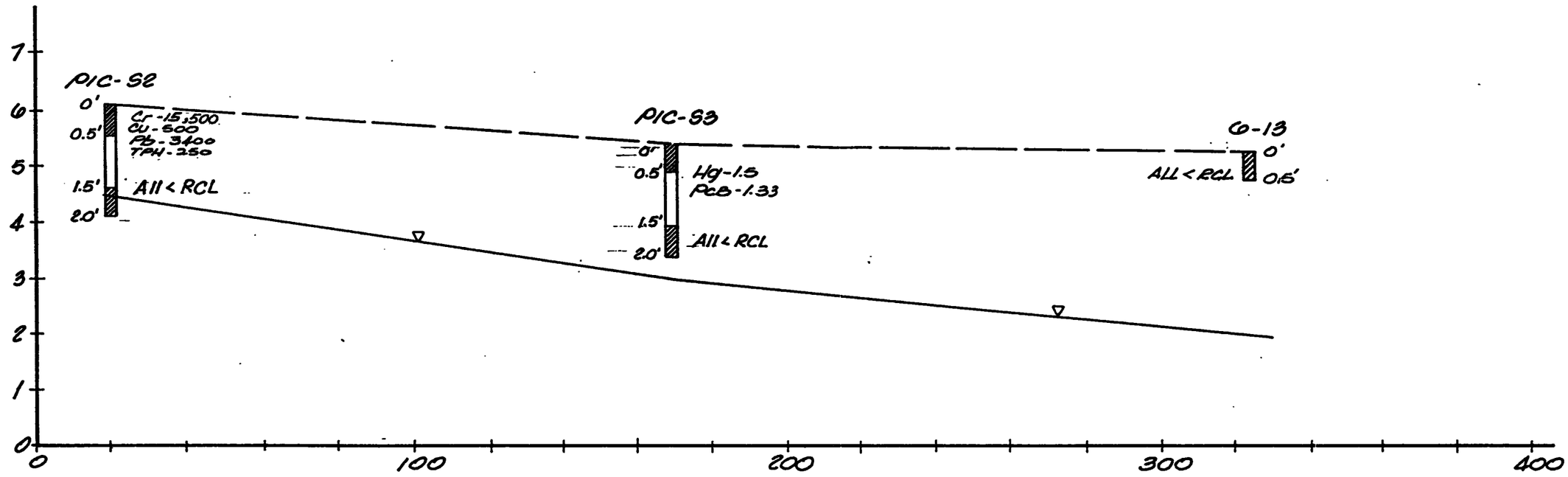
SCALE SHOWN
DATE MAR., 1989
FIGURE 2-5

LEGEND

——— = Grade

——— = Watertable

Concentrations in ppm



Scale: Horiz. 1"=30'
Vert. 1"=2'

TITLE

SOIL CROSS SECTION $E_1 - E_2$

PARCEL NO. 6

PREPARED FOR

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EAST RUTHERFORD, N.J.

ERM-Northeast
Environmental Resources Management

SCALE SHOWN

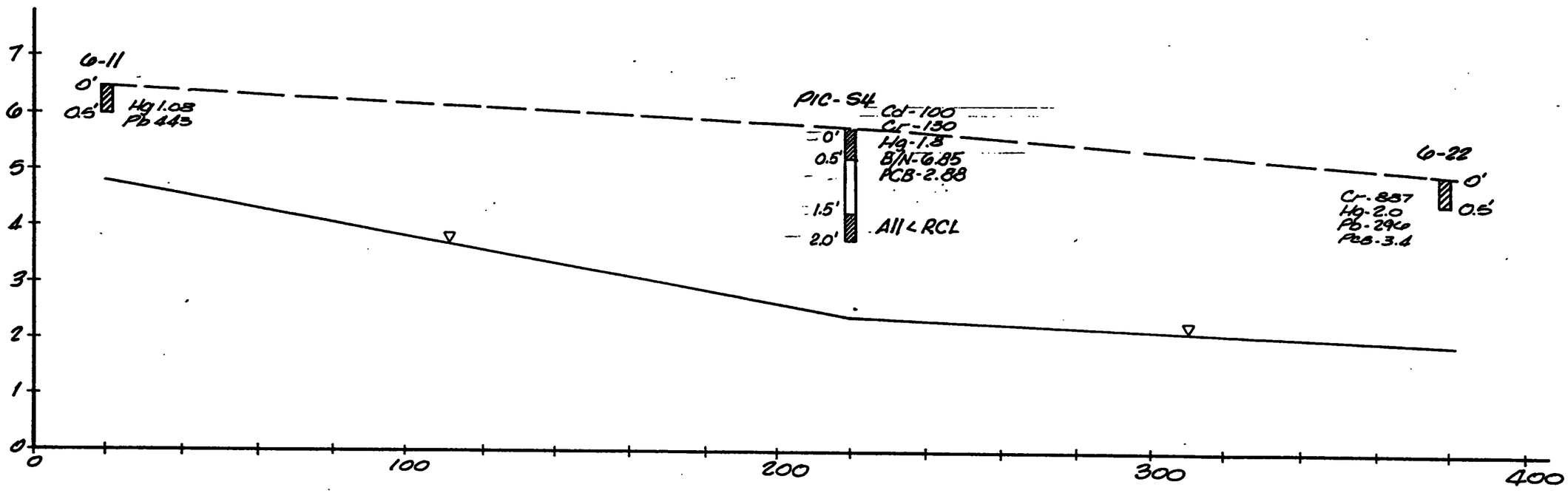
DATE MAR., 1989

FIGURE 2-6

LEGEND

——— = Grade
——— = Watertable

Concentrations in ppm



Scale: Horiz. 1"=30'
Vert. 1"=2'

TITLE

SOIL CROSS SECTION $F_1 - F_2$

PARCEL NO. 6

PREPARED FOR
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EAST RUTHERFORD, N.J.

ERM-Northeast
Environmental Resources Management

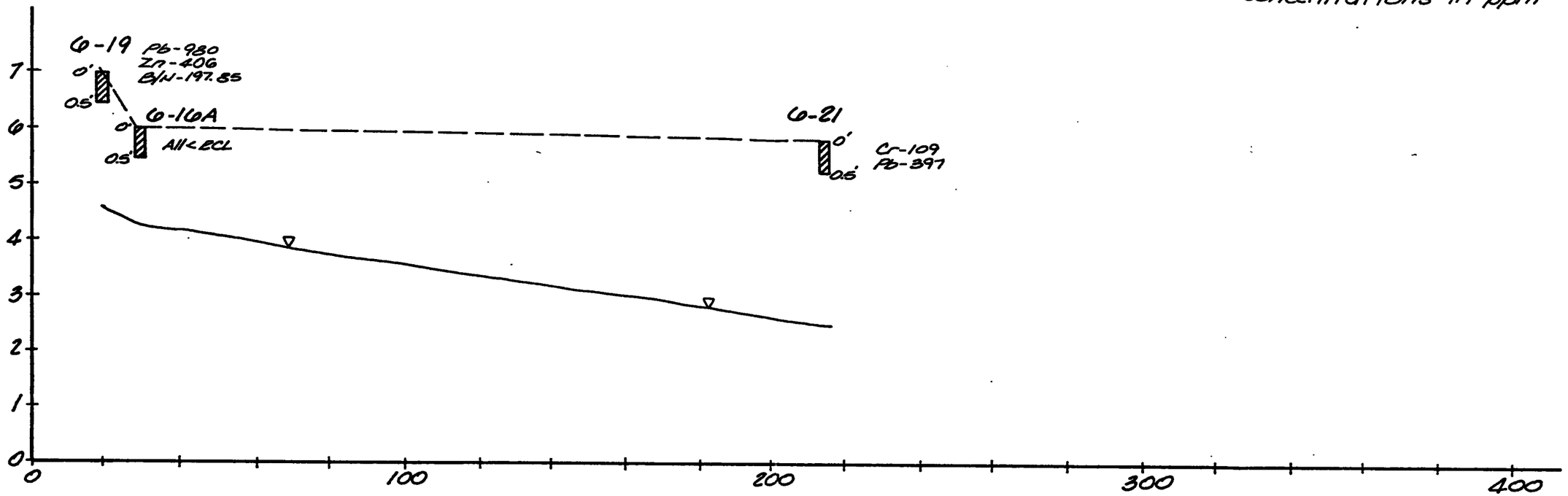
SCALE SHOWN
DATE MAR., 1989
FIGURE 2-7

130839

LEGEND

——— = Grade
——— = Watertable

Concentrations in ppm



Scale: Horiz. 1"=30'
Vert. 1"=2'

TITLE

SOIL CROSS SECTION G_1- G_2

PARCEL NO. 6

PREPARED FOR

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ERM-Northeast
Environmental Resources Management

SCALE SHOWN
DATE MAR., 1989
FIGURE 2-8

- Polychlorinated biphenyl contamination in the southern and southeastern section.

More specifically, soil quality conditions in Parcel No. 6 can be summarized as follows:

- Heavy metal contamination, predominantly copper, chromium, lead, mercury and zinc is generally found at shallow depths in Parcel No. 6. Table 2-3 provides concentration ranges for the five metals. These metals may be a result of metal turnings from the machining of brass parts and off-spec products being present in fill materials formerly deposited in Parcel No. 6. The machining of brass syringe fittings is a process that has been conducted at B-D's East Rutherford site for 50 years.

- Total petroleum hydrocarbon contamination occurred in discrete locations of Parcel No. 6. Concentrations ranged from 150 ppm to 721 ppm.

- Base neutral organic compound contamination was identified in discrete locations with concentrations ranging from 6.85 ppm to 197.85 ppm.

TABLE 2-3

SOIL CONTAMINANT DETECTION AND CONCENTRATION

Parameter	RCL (ppm)	No. of Samples Analyzed for Parameter	No. of Samples with Concentration of Parameter Above RCL	Range of Concentrations (ppm)	Average Concentration (ppm)
Cr	100	19	6	109-15,500	2,838
Cu	170	19	4	500-6600	2,120
Hg	1.0	19	10	1.08-100	12.8
Pb	250	19	12	296-3400	934
Zn	350	19	6	406-2900	1,013

- Polychlorinated biphenyls were detected in 4 of 19 samples analyzed at concentrations ranging from 1.3 to 14 ppm. The majority of the PCB contamination was found in the south and southeastern portions of Parcel 6.

- Volatile organic compound contamination is not a concern in soil.

- In general, soils in Parcel No. 6 consist of both man-made fill materials and predominantly brown silt and sand. The man-made fill contained material such as brick fragments, cinder blocks, glass, ceramic fragments, metal, coal, asphalt, wood, roofing shingles and plastic.

- Soil quality in the former disposal area is similar to conditions identified throughout Parcel No. 6.

2.2 Hydrogeologic Conditions

The B-D site and the local vicinity are underlain by unconsolidated glacial sediments of Pleistocene age. The glacial materials consist of a complex interbedding of sand, silt, clay

and gravel and is underlain by bedrock of the Brunswick Formation (Triassic age). The unconsolidated deposits form a southeastward thickening wedge of sediment that may be subdivided into seven generalized hydrogeologic units. These units exist from top to bottom, in the order listed below:

1. Unsaturated Zone
2. Shallow Unconfined Aquifer
3. Shallow Clay Unit
4. Semi-Confined Aquifer
5. Glacio-lacustrine Clay
6. Deep Confined Aquifer
7. Glacial Till

The Brunswick Formation lies beneath the glacial sediments and consists predominantly of shale and siltstone. The bedrock surface is irregular and dips steeply eastward.

2.2.1 Water Bearing Geologic Units

There are three principal water bearing (aquifer) units underlying the B-D site, the shallow unconfined aquifer, the intermediate semi-confined aquifer and the deep confined aquifer. Each of these units are found within Parcel No. 6.

(No wells or borings within Parcel 6 penetrate into the deep confined aquifer however, based on logs developed from work done in Parcel No. 5, it is assumed that this unit also underlies Parcel No. 6). The shallow unconfined unit consists primarily of moderate-to-well sorted, fine-to-medium grained glacial outwash deposits. In the eastern portion of the site along Route 17, this unit overlies the shallow clay unit and the intermediate semi-confined aquifer. The semi-confined aquifer is similar in composition to the upper unconfined unit, both being characterized by large areal variation in composition and a corresponding range of hydraulic conductivity values.

Below the semi-confined aquifer is the lacustrine clay unit and the underlying deep confined aquifer. In the western portion of Parcel No. 6, the upper unconfined aquifer lies directly atop the lacustrine clay. The deep confined aquifer consists of coarse-to-fine stratified sands with interbedded lenses of silt and gravel. The base of this unit is marked by a contact with the underlying glacial till or the Brunswick Shale.

2.2.2 Direction of Ground Water Flow

Ground water flow within Parcel No. 6 is generally in a south-southeastward direction. This is consistent for each of the three aquifer units. The rate of flow in the upper unconfined aquifer and the intermediate semi-confined aquifer is dependent on the hydraulic gradient and hydraulic conductivity, the latter of which varies considerably across the site. Flow rate in the deep confined aquifer is relatively slow due to the small hydraulic gradient present.

2.3 Ground Water Quality

2.3.1 Identification of Ground Water Contamination

Figure 2-9, presented in a back pocket of this report, presents a plan view of Parcel No. 6 identifying locations where ground water contaminants were detected at concentrations greater than the RCLs. The highest contaminant concentration observed to date is presented on the figure. Tables 2-4 and 2-5 provide a summary of the ground water sample analyses for volatile organic compounds in Parcel 6. Volatile organic compounds were identified as the primary ground water contaminant.

Table 2-4
SUMMARY OF VOLATILE ORGANIC COMPOUNDS
IN THE UNCONFINED AQUIFER
PARCEL 6
BECTON, DICKINSON & CO.
EAST RUTHERFORD, NJ
MARCH - MAY 1988

	PARCEL 6		
SAMPLE NUMBER	601S	602S	10
LABORATORY ID NUMBER	63577-003	63580-002	62804-003
Date Collected	4/6/88	4/6/88	3/11/88
UNITS (PPB)			
Acetone	U	U	6.5J
Bromomethane	U	U	U
2-Butanone	50J	U	U
Methylene Chloride	U	U	6.1BJ
Trans-1,2 Dichloroethene	29	U	U
Trichloroethene	U	U	U
Vinyl Chloride	13	U	U
Chloromethane	U	U	U
TOTAL VOLATILES	42	0	0

B - Also detected in blank
J - Quantitative estimate
U - Constituent not Detected
BMDL - Below method detection limit

Table 2-5
SUMMARY OF VOLATILE ORGANIC COMPOUNDS
IN THE SEMI-CONFINED AQUIFER
PARCEL 6
BECTON, DICKINSON & CO.
EAST RUTHERFORD, NJ
MARCH - MAY 1988

SAMPLE NUMBER	601M	601M	600 Dup of 601M	602M	10
LABORATORY ID NUMBER	63580-013	65022-007	65022-008	63580-001	62804-004
Date Collected	4/6/88	5/27/88	5/27/88	4/6/88	3/11/88
UNITS (PPB)					
Acetone	U	U	U	U	6.5J
Benzene	5.8	5	U	U	U
Bromomethane	U	U	U	U	U
2-Butanone	U	U	U	U	U
Chloroform	U	U	U	U	U
Chloromethane	U	U	U	U	U
Methylene Chloride	U	U	U	U	6.1BJ
1,1,-Dichloroethane	U	U	U	U	U
Trans-1,2 Dichloroethene	400	580	510	U	U
Trichloroethene	U	U	U	U	U
Vinyl Chloride	U	810	700	U	U
Trichlorofluoromethane	1000	U	U	U	U
1,1,1,-Trichloroethane	U	U	U	U	U
TOTAL VOLATILES	1406	1395	1210	0	0

B - Also detected in blank
J - Quantitative estimate
U - Constituent not Detected
BMDL - Below method detection limit

2.3.2 Summary of Ground Water Quality

Ground water quality in Parcel No. 6 can be summarized as follows:

- Of five monitoring wells in Parcel No. 6, only two wells displayed contaminants above the ECRA RCLs. The contaminants detected were vinyl chloride, trans-1,2 dichloroethylene and benzene. Total VOCs ranged from 42 to 1396 ppb.

- Volatile organic compound contamination is located southeast of the former disposal area. One of the two wells (MW-601M) displaying VOC contamination is screened in the semi-confined aquifer and the other well (MW-601S) is screened in the unconfined aquifer.

- PCBs, metals and petroleum hydrocarbons are not a concern in ground water. The pesticides 4,4-DDD and 4,4-DDT were observed in MW-601S at concentrations of 1.4 parts per billion (ppb) and 0.63 ppb respectively.

3.0 SITE DEVELOPMENT PLAN

B-D and National Community Bank (NCB) are currently negotiating the terms of a contract for the sale of the buildings and land of Parcel Nos. 4, 5 and 6.

NCB has indicated that the characteristics of the land in Parcel No. 6 will remain unchanged. No construction projects in Parcel No. 6 are anticipated by NCB.

NCB is fully aware of environmental conditions at the East Rutherford site. B-D will work closely with NCB to ensure that future site development activities will not interfere with the intent or operation of the environmental cleanup program presented in this report.

4.0 DEVELOPMENT OF REMEDIAL ACTION CRITERIA

Remedial action criteria were established for all chemicals reported in ground water or soil in concentrations in excess of the ECRA RCLs using the same methodology as presented in Section 4.0 of the Soil and Ground Water Remedial Action Plan, Parcel No. 5 report.

4.1 Soil and Ground Water Remedial Action Criteria

4.1.1 Soil Remedial Action Criteria

Criteria were developed for all contaminants reported in Parcel No. 6 soils in excess of the ECRA RCLs except for base/neutral extractable organics. Base/neutral extractable organics were present in excess of the RCLs in only a few discrete sampling locations. In all cases but one, the chemicals present were PAHs. A remedial action criterion has been developed for PAH in the Parcel No. 5 report. One sample contained diethyl phthalate as the predominant base/neutral extractable compound present. However, this location will be remediated because of lead contamination; therefore, no criterion was established for diethyl phthalate.

Nine of the contaminants in soil reported above RCLs in Parcel No. 6 were also found in Parcel No. 5 in excess of the RCLs (cadmium, chromium, copper, lead, mercury, nickel, zinc, PAHs, and TPH). The criteria for these chemicals are the same as listed in the Parcel No. 5 report. Two additional chemicals, silver and PCBs, were reported in Parcel No. 6 soils in excess of the RCLs. The criteria for silver are developed in the same manner as the criteria for other metals in Parcel No. 5. Figure 4-1 presents the soil remedial action criteria.

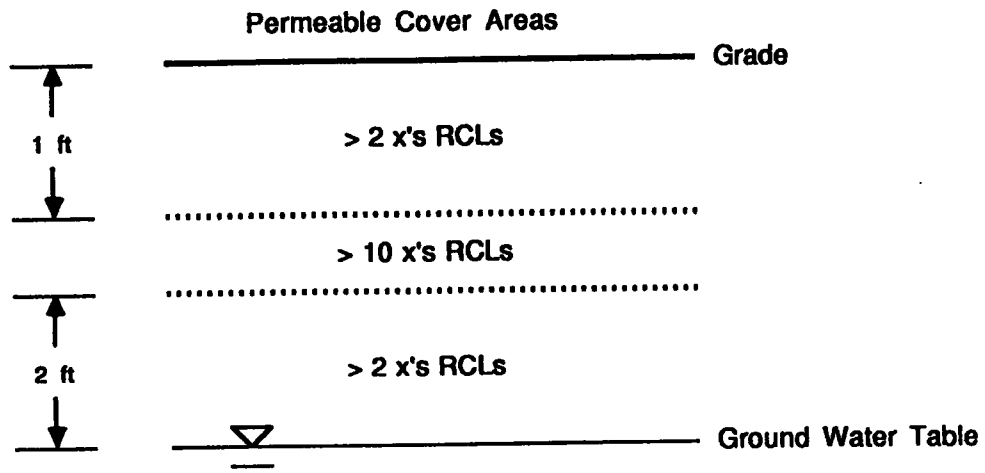
The remedial action criterion for PCBs is based upon U.S. EPA guidance. Regulation 40 CFR Part 761 - Polychlorinated Biphenyls Spill Cleanup Policy presents soil cleanup requirements for restricted access and non-restricted access areas. Restricted access areas are those areas that limit access to the public. Since all of Parcel No. 6 is enclosed within a fence which will be maintained during and following site remediation, Parcel No. 6 is considered a restricted access areas and will be subject to the following cleanup criteria.

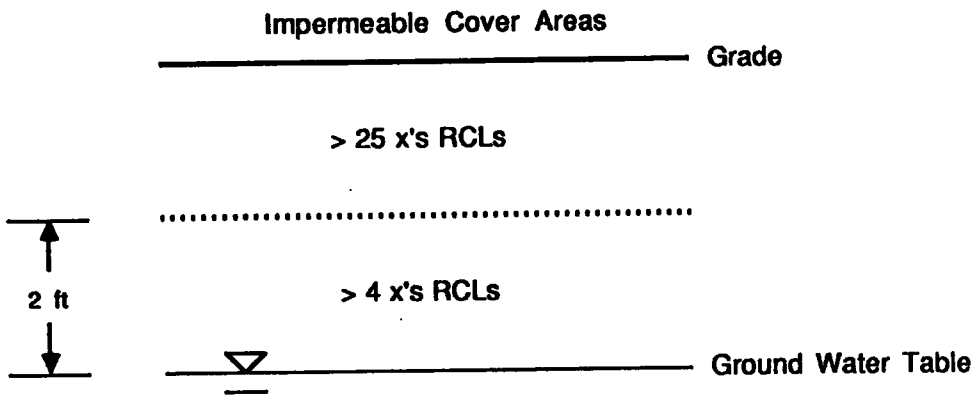
- All soils contaminated with PCBs at a concentration greater than 25 ppm by weight will require remediation.

FIGURE 4-1
REMEDIAL ACTION CRITERIA

Soil Remedial Action Criteria

* General Criteria for Permeable and Impermeable Cover Areas





* Soil Contaminant Specific Criteria

Mercury	-	2 ppm
Polynuclear Aromatic Hydrocarbons (PAH)	-	20 ppm
Polychlorinated Biphenyls (PCB) (Restricted Access Areas)	-	25 ppm

Ground Water Remedial Action Criteria

* Ground Water Contaminant Specific Criteria

Volatile Organic Compounds (VOC)	-	10 ppb

Excavated soils will be replaced with clean fill having a PCB concentration less than 1 ppm.

This is the same criterion used in the Soil and Ground Water Remedial Action Plan for Parcel Nos. 1 and 2 of the East Rutherford site.

4.1.2 Ground Water Remedial Action Criteria

Ground water remedial action criteria were developed for all contaminants reported in ground water at the site in excess of the ECRA RCLs. The only such chemicals were volatile organics, including benzene, 1,2-dichloroethylene, trichlorofluoromethane, and vinyl chloride. As is the case in the Parcel No. 5 report, the ground water remedial action criterion for total priority pollutant volatile organic compounds is 100 ppb. Figure 4-1, previously presented, presents the ground water remedial action criteria.

4.2 Risk Assessment of Proposed Criteria

The remedial action criteria were evaluated using the same assumptions as presented in the Parcel No. 5 report. Appendix C

of the report includes toxicity and environmental profiles for the contaminants of concern at Parcel No. 6.

4.2.1 Potential Exposure Routes

The exposure routes through which humans or the environment could potentially be exposed to site contaminants are the same as presented in the Parcel No. 5 report and include:

- volatilization of contaminants from soil;
- fugitive dust emissions from contaminated soil;
- direct contact with and ingestion of contaminated soil;
- surface water runoff to Berry's Creek;
- leaching of contaminants in soil to ground water; and
- exposure to contaminated ground water (ground water contamination independent of contributions from soil contamination).

Each of these routes is discussed below.

1. Volatilization of Contaminants from Soil

As is the case with Parcel No. 5, volatilization of contaminants from soil is not expected to be a significant exposure route. The RCL for total priority pollutant volatiles was not exceeded in the limited number of samples analyzed.

2. Fugitive Dust Emissions from Contaminated Soil

As is the case with Parcel No. 5, fugitive dust emissions following remediation are not expected to be significant because all soil surfaces will be covered either by impermeable surfaces or vegetation.

3. Direct Contact with and Ingestion of Contaminated Soils

As is the case for Parcel No. 5, direct contact with contaminated site soil by the public is not expected. Direct contact with soils following remediation by landscaping workers could occur. Therefore, this route is evaluated in Section 4.2.2 using the same assumptions presented in the Parcel No. 5 report.

4. Surface Water Runoff from the Site Discharging to Berry's Creek

Following remediation, transport of contaminated surface water runoff to the drainage ditch in Parcel No. 6 with subsequent discharge to Berry's Creek is not expected to be significant. Parcel No. 6 is relatively flat. The banks adjacent to the drainage ditch are well vegetated, thus reducing the likelihood of significant erosion.

5. Leaching of Contaminants in Soil to Ground Water

As is the case with Parcel No. 5, leaching of contaminants in soils at the site to the surficial water-bearing zone underlying the site represents a potential exposure route for humans and aquatic life. This route is evaluated in Section 4.2.2.

6. Exposure to Contaminated Ground Water

As is the case with Parcel No. 5, contaminated ground water at the site could migrate off-site with subsequent discharge to Berry's Creek. This route is evaluated in Section 4.2.2.

Summary of Potential Exposure Routes

Potential exposure to humans and the environment following remediation could occur through only three routes. First, contamination in ground water underlying the site could migrate off-site to Berry's Creek. Second, contamination in site soils could leach to ground water and migrate off-site to Berry's Creek. Third, landscapers could potentially be exposed to soil contaminants through direct contact with site soils. These exposure routes are evaluated in Section 4.2.2.

It should be noted that significant human exposure to Berry's Creek is highly unlikely. As described in the Parcel No. 5 report, Berry's Creek is classified as suitable for fishing and non-contact recreation only. It is not classified as suitable for drinking water. Furthermore, significant exposure to landscapers is also unlikely since no development of Parcel No. 6 is anticipated.

Evaluation of risk associated with all the chemicals of concern at the site except total petroleum hydrocarbons (TPH) is presented in the following section. Because total petroleum hydrocarbons are a group of chemicals with significantly varying fate and transport and toxicity

characteristics, appropriate health-based standards with which to compare estimated exposures in a risk assessment are not available.

The highest remedial action criterion for TPH in soils is 2500 ppm (i.e., 25 times the RCL of 100). This criterion appears to be protective of human health and the environment for two reasons. First, TPH contamination in soils is commonly due to solids such as coal and ash, which are not very mobile or likely to leach to ground water. Therefore, migration of TPH contamination to Berry's Creek in significant concentrations is not likely. Second, TPH contamination at the site occurred at least 40 years ago. In that time, there has been no significant impact on ground water. Ground water concentrations of TPH in Parcel No. 6 never exceeded the ECRA RCL. Therefore, no significant risk to human health or the environment is expected from these criteria.

4.2.2 Estimation of Exposure Point Concentrations and Comparison with Relevant Standards

Movement of Contaminated Ground Water to Berry's Creek

Ground water at the site flows toward and discharges to Berry's Creek. (Some ground water may be intercepted by the drainage ditch which also discharges to Berry's Creek). In modelling movement of contaminants in the ground water to Berry's Creek, the same very conservative assumptions used in the Parcel No. 5 report were made in order to provide worst-case estimates.

Only four chemicals were detected in ground water from Parcel No. 6 (benzene, 1,2-dichloroethylene, trichlorfluoromethane, and vinyl chloride). Therefore, in order to evaluate the proposed ground water remedial action criterion for total volatile organics (100 ppb), four hypothetical situations were considered: (1) all contamination (100 ppb) is due to benzene; (2) all contamination is due to 1,2-dichloroethylene; (3) all contamination is due to trichlorofluoromethane; and (4) all contamination is due to vinyl chloride.

Vinyl chloride and 1,2-dichloroethylene were evaluated in the Parcel No. 5 report. As indicated in that report, projected concentrations of these chemicals in Berry's Creek are less than the applicable human health and aquatic standards by approximately two orders of magnitude. Projected concentrations of benzene and trichlorofluoromethane are evaluated in Table 4-1 using the same assumptions. As indicated in this table, projected concentrations of these two chemicals are also below the applicable human health and aquatic standards. Therefore, no unacceptable impacts are expected to result from ground water following remediation.

Leaching of Soil Contaminants to Ground Water and Movement Off-site to Berry's Creek

Leaching of most of the contaminants of concern in soils at Parcel No. 6 following remediation was evaluated as a potential exposure route in the Parcel No. 5 report (cadmium, chromium, copper, lead, mercury, nickel, zinc, and PAHs). As indicated in that report, all projected concentrations at Berry's Creek are essentially at or below their respective drinking water standards or criteria and aquatic life criteria. Two additional chemicals were reported in Parcel No. 6: silver and PCBs. These two chemicals were evaluated

TABLE 4-1

COMPARISON OF PROJECTED GROUND WATER CONTAMINANT CONCENTRATIONS IN BERRY'S CREEK TO RELEVANT STANDARDS

Chemical	Remedial Action Criteria (ppb)	Projected Concentration In Berry's Creek (ppb)	National Primary Drinking Water Standard (ppb)	NJDEP Surface Water Quality Standard (FW2) (ppb)
Benzene	100	0.047	5	5(2)
Trichlorofluoromethane	100	0.047	0.19(1)	0.19(2)

(1) U.S. EPA Ambient Water Quality Criterion for protection of human health based on 10^{-6} cancer risk. No national primary drinking water standard has been established.

(2) Standard for toxic substances (general) is "none which would cause standards for drinking water to be exceeded after appropriate treatment." Therefore, the drinking water standard or criterion is cited.

using the same assumptions as used in the Parcel No. 5 report. The results are presented in Table 4-2. As indicated in this table, projected concentrations in Berry's Creek are below the applicable human health and aquatic life criteria. Therefore, no adverse impacts are expected to result from these four chemicals.

Direct Contact with Site Soils

The potential risk to site landscapers resulting from direct contact with site soils was evaluated for most of the chemicals of concern at the site in the Parcel No. 5 report (cadmium, chromium, copper, lead, mercury, nickel, zinc, and PAHs). As indicated in that report, predicted intakes via inhalation are well below the acceptable intakes. Predicted oral plus dermal intakes are essentially at or below the relevant criteria. The two additional chemicals reported in Parcel No. 6, silver and PCBs, are evaluated in Table 4-3 using the same assumptions presented in the Parcel No. 5 report. As indicated in this table, predicted inhalation and oral plus dermal intakes are well below the relevant human health criteria. Because of the conservative assumptions made in this model, these predicted intakes present no unacceptable risks to landscapers.

TABLE 4-2

COMPARISON OF PROJECTED SOIL CONTAMINANT CONCENTRATIONS
IN BERRY'S CREEK TO RELEVANT STANDARDS

Chemical	Restoration Criteria in Soil 25 x RCL (ppm)	Projected Concentration in Berry's Creek (ppb)	National Primary Drinking Water Standard (ppb)	NJDEP Surface Water Quality Standard For SE2 Waters (ppb)
Silver	125	0.064	50	50(3)
PCBs	25(1)	0.0024	0.0126(2)	0.03

(1) Restoration criterion is not four times the RCL.
(2) Ambient water quality criteria for ingestion of drinking water.
(3) NJDEP surface water quality standard for FW2 waters. No standard established for SE2 waters.

TABLE 4-3

COMPARISON OF PROJECTED INTAKES
TO ACCEPTABLE INTAKES - SOIL EXPOSURE

Chemical	Oral + Dermal Intake (mg/Kg/day)	Subchronic Acceptable Intake (Oral) (mg/Kg/day)	Inhalation Intake (mg/Kg/day)	Subchronic Acceptable Intake (Inhalation) (mg/Kg/day)
Silver	3.51×10^{-6}	3.00×10^{-2}	5.10×10^{-9}	9.52×10^{-4} (1)
PCBs	8.78×10^{-6}	1.61×10^{-5} (2)	1.28×10^{-8}	4.76×10^{-2} (1)

(1) Acceptable intake derived from OSHA Permissible Exposure Limit (PEL) using standard assumptions of 70 Kg adult inhaling 20 m^3/day of air. No subchronic acceptable intake given in the SPHEM.

(2) Acceptable intake based on carcinogenic potency factor (CPF).

4.2.3 Summary and Conclusions

On the basis of the risk assessment, no unacceptable risks to human health or the environment are expected following remediation of the site using the proposed remedial action criteria. Projected concentrations of site soil and ground water contaminants at Berry's Creek, using very conservative models, are essentially at or below the National Primary Drinking Water Standards or other health-based drinking water standards. The projected concentrations also meet the NJDEP Surface Water Quality Standards for SE2 waters, and FW2 waters for chemicals for which no SE2 standard exists. Projected exposures to site landscapers due to contact with site soils, again using conservative assumptions, also essentially meet or are below the relevant acceptable intakes.

5.0 SOIL REMEDIATION PROGRAM

This section describes the program to be followed to remediate soil contamination in Parcel No. 6.

5.1 Remedial Classification of Soils

Soil quality remediation criteria discussed in Section 4.0 of this report have been used to identify soil as requiring remedial action (RA), further investigation (FI) or no action (NA).

Table 5-1 identifies the remedial classification of soil in Parcel No. 6. Soil location is specified by parcel number, area number and soil sample location number. There are ten areas in Parcel No. 6 that require remedial action and three areas that require further investigation. In the cases where remedial or further investigative action is indicated, the parameters of concern for that location are also listed in Table 5-1. Soils identified as requiring further investigation are deficient in data needed for the RA or NA classification. Procedures to evaluate the FI areas are presented in Section 5.1.1. Figure 5-1 (back pocket) shows the locations of the RA and FI areas.

TABLE 5-1

REMEDIAL CLASSIFICATION OF SOILS

Area	Location	Remedial Designation	Parameters of Concern
Parcel No. 6			
Cross Section A_1-A_1	6-8	RA	Pb, Zn
	6-7	RA	Cu, Hg
	6-6	RA	Pb
Cross-Section B_1-B_2	PIC-S1	RA	Cd, Cu, Hg, Ni, Pb, Zn,
	6-10	RA	Cu, Hg, Pb
	6-17	NA	
Cross-Section C_1-C_2	Area 6-1	NA	
	Area 6-2	FI	TPH
	6-2	RA	Cr
Cross-Section D_1-D_2	6-01-05	NA	
	6-01-04	NA	
	6-3	NA	
Cross-Section E_1-E_2	PIC-S2	RA	Cr, Cu, Pb, TPH
	PIC-S3	NA	
	6-13	NA	
Cross-Section F_1-F_2	6-11	NA	
	PIC-S4	RA	Cd PCB
	6-22	RA	Cr PCBs
Cross-Section G_1-G_2	6-19	RA	Pb, BN
	6-16A	NA	
	6-21	NA	

5.1.1 Sampling and Analysis Plan for Areas Requiring Further Investigation

The locations with remedial designations of FI require further investigation to determine if remedial action is necessary. Additional sampling will be performed at these locations. A 6-inch column sample will be collected within one foot of the water table at these locations. The samples will be analyzed for the parameters of concern identified in Table 5-1. Sample collection, maintenance and analysis procedures presented in Section 2.0 of ECRA Environmental Assessment Program, Parcel No. 2 of January, 1988. Analytical data will be evaluated and compared to the criteria discussed in Section 4.0 of this report in order to determine if remedial action is required.

5.2 Soil Remediation Procedures

Section 5.0 of the Soil and Ground Water Remedial Action Plan, Parcel No. 5 presents an evaluation of soil remediation alternatives. Excavation and off-site disposal was selected as the most appropriate method for remediating soil conditions.

Section 6.0 of the Soil and Ground Water Remedial Action Plan, Parcel No. 5 presents procedures for soil remediation. These same procedures will be used to accomplish soil remediation in Parcel No. 6 and are included in this report by reference.

The total volume of soil to be removed in Parcel No. 6 is estimated to be 100 cubic yards. Additional soil may be required to be removed depending upon the results of the investigative program presented in Section 5.1.1.

5.3 Wetlands

Wetlands, meeting the definition established by the U.S. Army Corps of Engineers, have been identified within Parcel No. 6. Soil remediation within defined wetland areas will be coordinated with the lead wetland regulatory agency as required.

6.0 GROUND WATER REMEDIATION PROGRAM

The ground water remediation program presented in the Parcel No. 5 Remedial Action Plan addresses ground water concerns both in Parcel Nos. 5 and 6. The program presents procedures for withdrawing, treating and discharging ground water to accomplish site remediation goals.

Ground water withdrawal will be accomplished by a series of interconnected recovery trenches. Figure 7-1 presented in the Parcel No. 5 report provides the location of the ground water recovery trenches. Ground water will then be pumped through a piping network to an on-site treatment plant. The treatment plant effluent will then be discharged to the Bergen County Utilities Authority (POTW) through the local sewer system.

The ground water remediation program and procedures presented in the Soil and Ground Water Remedial Action Plan, Parcel No. 5 is incorporated into this report by reference. Additional information in regards to the evaluation of ground water withdrawal and treatment technologies is provided in the Soil and Ground Water Remedial Action Plan for Parcel Nos. 1 and 2 (July, 1988).

7.0 SCHEDULE AND ESTIMATED COST OF REMEDIAL ACTIVITIES

7.1 Schedule of Site Remediation Activities

The schedule of site remediation activities for Parcel No. 6 will follow the schedule of remedial activities presented in Section 9.0 of the Soil and Ground Water Remedial Action Plan, Parcel No. 5.

7.2 Cost Estimate for Site Remediation

The total cost for the completion of site remediation as presented in this remedial action plan is estimated to be $330,000. This cost consists of the following two components:

1.	Soil Remediation	$185,000
2.	Ground Water Remediation	145,000
	Total Construction	$330,000

These cost estimates have been developed to determine the amount of the required financial assurance that must be provided to the NJDEP prior to property transfer.

A breakdown of the cost estimates for the soil and ground water remediation are provided on Tables 7-1 and 7-2, respectively.

TABLE 7-1

COST ESTIMATE FOR
SOIL REMEDIATION PROGRAM
PARCEL 6

1.	Project Planning, Bid Preparation and Contract Award	$ 5,000
2.	Mobilization	$ 5,000
3.	Investigation of Remaining Areas	$ 2,000
4.	Excavation	$ 25,000
5.	Equipment Decontamination	$ 5,000
6.	Waste Transportation	$ 20,000
7.	Waste Disposal	$ 40,000
8.	Post Excavation Sampling	$ 15,000
9.	Backfill and Demobilization	$ 3,000
10.	Contract Management, Coordination with NJDEP, RCRA Closure	$ 10,000
	SUBTOTAL	$130,000
11.	Contingency for additional soil excavation required by post-excavation sampling @ 20 percent	$ 26,000
12.	Overall Project Contingency @ 20 percent	$ 26,000
	TOTAL COST	$182,000
	SAY	$185,000

TABLE 7-2

COST ESTIMATE FOR GROUND WATER REMEDIATION
PARCEL NO. 6

1.	Contract planning, bid preparation and contract award	$ 3,000
2.	Installation of 25 LF of collection trench	$ 35,000
3.	Manholes with pump installations (4)	$ 30,000
4.	Piping 200 LF	$ 25,000
5.	Electric	$ 15,000
6.	Resurfacing of roads and parking lots, topsoil and seeding as appropriate	$ 5,000
7.	Contract management, coordination with NJDEP	$ 5,000
		$118,000
8.	Overall Project Contingency @ 20%	$ 24,000
	TOTAL COST	$142,000
	SAY	$145,000

APPENDIX A

LABORATORY DATA REPORTING SHEETS

ERM-Northeast

EP TOXICITY ANALYSES

EnviroTest Laboratories Inc.

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

LAB#: 68095-003 DATE REC'D: 88/09/02 DATE COLL'D: 3/1-3/31 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-18 6-8 (3-3.5)

REPORT TO: same
BILL TO: same

T COLI		Cr+6		COD	
F COLI		Phenol		HARD-T	
SPC		CN		Ca Hard	
F		B		SO3	
NO3		Br		Cl	
NO2		Color		Alk	
T-PO4		Odor		BOD-Inf	
O-PO4		Turb		BOD-Eff	
SO4		pH		BOD-S	
MBAS		LI		TSS-Inf	
SiO2		Cond		TSS-Eff	
H2S		NH3-T		MLSS	
NH3-C		TKN		MLVSS	
VSS		Ca		K	
TS		Cr	<0.01	Se	
VS		Co		Ag	
TDS		Cu		Na	
SS		Au		Tl	
% SOL	65%	Fe		Sn	
O & O		Pb	230 ug/l	Ti	
Al		Mg		V	
Sb		Mn		Zn	
As		Hg	<0.4 ug/l	THM	
Ba		Mo		TOC	
Be		Ni			
Cd	<0.01	Pd			

Remarks: All results in mg/l unless otherwise indicated. The subject sample was homogenized then subjected to the EP Toxicity procedure as described in the May 19, 1980 Federal Register, Vol. 45, No. 98.

Ronald A. Bayer
Laboratory Director 9/19/88

EnviroTest Laboratories Inc.

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

LAB#: 68095-004 DATE REC'D: 88/09/02 DATE COLL'D: 3/1-3/31 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-18 6-22-1

REPORT TO: same
BILL TO: same

T COLI		Cr+6		COD	
F COLI		Phenol		HARD-T	
SPC		CN		Ca Hard	
F		B		SO3	
NO3		Br		Cl	
NO2		Color		Alk	
T-PO4		Odor		BOD-Inf	
O-PO4		Turb		BOD-Eff	
SO4		pH		BOD-S	
MBAS		LI		TSS-Inf	
SiO2		Cond		TSS-Eff	
H2S		NH3-T		MLSS	
NH3-C		TKN		MLVSS	
VSS		Ca		K	
TS		Cr	<0.01 mg/l	Se	
VS		Co		Ag	
TDS		Cu		Na	
SS		Au		Tl	
% SOL	74%	Fe		Sn	
G & O		Pb	28 ug/l	Ti	
Al		Mg		V	
Sb		Mn		Zn	
As		Hg	0.4 ug/l	THM	
Ba		Mo		TOC	
Be		Ni			
Cd		Pd			

Remarks: The subject sample was homogenized then subjected to the EP Toxicity procedure as described in the May 19, 1980 Federal Register, Vol. 45, No. 98.

Ronald A. Bayer
Laboratory Director 9/19/88

viroTest
boratories Inc.

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

68095-005 DATE REC'D: 88/09/02 DATE COLL'D: 3/1-3/31 STATUS: Closed
: ERM - Northeast FNAME:
ET: CITY: STATE: ZIP:
OCATION: #186-18 P1C-S1

RT TO: same
TO: same

I:		Cr+6 :		COD :	
LI:		Phenol:		HARD-T :	
:		CN :		Ca Hard:	
:		B :		SO3 :	
:		Br :		Cl :	
:		Color :		Alk :	
:		Odor :		BOD-Inf:	
:		Turb :		BOD-Eff:	
:		pH :		BOD-S :	
:		LI :		TSS-Inf:	
:		Cond :		TSS-Eff:	
:		NH3-T :		MLSS :	
:		TKN :		MLVSS :	
:		Ca :		K :	
:		Cr :		Se :	
:		Co :		Ag :	<0.01
:		Cu :		Na :	
:		Au :		Tl :	
:	94%	Fe :		Sn :	
:		Pb :	800 ug/l	Ti :	
:		Mg :		V :	
:		Mn :		Zn :	
:		Hg :	<0.4 ug/l	THM :	
:		Mo :		TOC :	
:		Ni :			
:	0.05	Pd :			

Remarks: All results in mg/l unless otherwise indicated. The subject sample homogenized then subjected to the EP Toxicity procedure as described in the 19, 1980 Federal Register, Vol. 45, No. 98.

Ronald A. Bayer
Laboratory Director 9/19/88

ERM-Northeast

SAMPLE S-6-1

EnviroTest Laboratories Inc.

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

LAB#: 67697-001 DATE REC'D: 88/08/22 DATE COLL'D: 88/08/19 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-13 S-6-1

REPORT TO: same
BILL TO: same

T COLI	:	Cr+6	:	COD	:
F COLI	:	Phenol	:	HARD-T	:
SPC	:	CN	:	Ca Hard	:
F	:	B	:	SO3	:
NO3	:	Br	:	Cl	:
NO2	:	Color	:	Alk	:
T-PO4	:	Odor	:	BOD-Inf	:
O-PO4	:	Turb	:	BOD-Eff	:
SO4	:	pH	:	BOD-S	:
MBAS	:	L.I	:	TSS-Inf	:
SiO2	:	Cond	:	TSS-Eff	:
H2S	:	NH3-T	:	MLSS	:
NH3-C	:	TKN	:	MLVSS	:
VSS	:	Ca	:	K	:
TS	:	Cr	: 220	Se	:
VS	:	Co	:	Ag	:
TDS	:	Cu	: 160	Na	:
SS	:	Au	:	Tl	:
% SOL	: 92	Fe	:	Sn	:
G & O	:	Pb	: 65	Ti	:
Al	:	Mg	:	V	:
Sb	:	Mn	:	Zn	: 110
As	:	Hg	: 0.89	THM	:
Ba	:	Mo	:	TOC	:
Be	:	Ni	: 36		
Cd	:	Pd	:		

Remarks: All results in mg/kg dry weight

Ronald A. Bayer
Laboratory Director

9-7-88

EnviroTest Laboratories Inc.

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

LAB#: 67697-002 DATE REC'D: 88/08/22 DATE COLL'D: 88/08/19 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-13 S-6-1

REPORT TO: same
BILL TO: same

T COLI	:	Cr+6	:	COD	:
F COLI	:	Phenol	:	HARD-T	:
SPC	:	CN	:	Ca Hard	:
F	:	B	:	SO3	:
NO3	:	Br	:	Cl	:
NO2	:	Color	:	Alk	:
T-PO4	:	Odor	:	BOD-Inf	:
O-PO4	:	Turb	:	BOD-Eff	:
SO4	:	pH	:	BOD-S	:
MBAS	:	LI	:	TSS-Inf	:
SiO2	:	Cond	:	TSS-Eff	:
H2S	:	NH3-T	:	MLSS	:
NH3-C	:	TKN	:	MLVSS	:
VSS	:	Ca	:	K	:
TS	:	Cr	: 1.8	Se	:
VS	:	Co	:	Ag	:
TDS	:	Cu	: 0.85	Na	:
SS	:	Au	:	Tl	:
% SOL	:	Fe	:	Sn	:
G & O	:	Pb	: 0.19	Ti	:
Al	:	Mg	:	V	:
Sb	:	Mn	:	Zn	: 1.1
As	:	Hg	: <0.4 ug/l	THM	:
Ba	:	Mo	:	TOC	:
Be	:	Ni	: 0.34		
Cd	:	Pd	:		

Remarks: All results in mg/l unless otherwise indicated. The subject sampl was homogenized then subjected to the EP Toxicity procedure as described in the May 19, 1980 Federal Register, Vol. 45, No. 98.

Ronald A. Bayer
Laboratory Director 9-7-88

DJScari

BD responses to EPA Request for Information

ERM-Northeast Nos. 14

VERIFICATION REPORT FOR ECRA SITE REMEDIATION PARCEL NOS. 1 AND 2 ECRA CASE NOS. 87573 AND 87574 BECTON, DICKINSON AND COMPANY EAST RUTHERFORD, NEW JERSEY

NOVEMBER, 1989

PREPARED FOR:

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ONE BECTON DRIVE
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PREPARED BY:

ERM-NORTHEAST, INC.
88 SUNNYSIDE BOULEVARD
PLAINVIEW, NEW YORK 11803

ERM-Northeast

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Copies of written documents have been provided in this report verifying manifested waste disposal, laboratory sample analyses, etc. These documents are presented by category in these report appendices. The following provides a listing of Appendices and the documentation contained in each.

Appendix A - Previous Documentation Submissions

- Documentation Letter Dated March 2, 1989
- Remedial Activities Documentation Report - Building Decontamination and Soil Excavation Prior to Buildings S, J-K, and Q Demolition
- March, 1989 Monthly Update Letter
- Letter Dated April 20, 1989, Modification to Remedial Action Plan
- April, 1989, Monthly Update Letter
- May, 1989, Monthly Update Letter
- June, 1989, Monthly Update Letter
- July, 1989, Monthly Update Letter

Appendix B - Laboratory Analyses Data Sheets

Appendix B-1 - Phase I Data for:

- Location 24-04
- Location 24-05
- Former Transformer Area
- Location 102-01A
- Location 102-03A
- Beneath Building Q Slab
- Location Q-CSPL

Appendix B-2 - Phase II Data for:

- Location 22-02
- Location 23-04
- Location 23-05
- Location 23-07
- Location 25-05
- Location 26-02
- Location 26-03
- Location 27-02
- Location 27-08
- Location 27-09
- Location 27-12
- Location 28-05

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- Location 29-03
- Location 29-06
- Location 29-09
- Location 29-16
- Location 101-03
- Location 101-12
- Location 101-19
- Location 226-03
- Location 226-05
- Location 233-01
- Location 235-01
- Pilot Trench Soil Stockpile
- Building W Electroplating Area Concrete Chip Samples
- Building W Soniclean Room Concrete Chip Samples
- Building W Floor Pits
- Building W Tunnels
- Building W Tunnel Troughs
- Stormwater Drainage System

Appendix B-3 - Phase III Data for:

- Location 24-01
- Location 101-17
- Location 225-01
- Location 226-01
- Location 226-02
- Location 226-04
- Location 229-Px5
- Location 240-01
- Location 240-02
- Location 240-03
- Location 2-W-07
- Location 2-W-12
- Location 2-W-20
- Location 2-W-22
- Building GRX Borings
- Building G-1 Borings
- Building L Borings
- Building W Borings
- Building X-1 Borings

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Appendix C - Manifest Forms

Appendix C-1 - Manifest Forms for Phase I Waste Shipments

- Transformer Carcasses
- PCB-contaminated Soil
- Drilling Cuttings
- Non-hazardous Soil

Appendix C-2 - Manifest Forms for Phase II Waste Shipments

- Washwater from Holding Tank

Appendix C-3 - Manifest Forms for Phase III Waste Shipments

- Non-hazardous Soil
- Roll-off Container A (Electroplating Debris)
- Drums (Building Decontamination Solids)

1.0 INTRODUCTION

1.1 Background

Becton, Dickinson and Company (B-D) owns a medical apparatus manufacturing facility in the borough of East Rutherford, Bergen County, New Jersey as shown in Figure 1-1. B-D submitted an initial Environmental Cleanup Responsibility Act (ECRA) notice to the New Jersey Department of Environmental Protection (NJDEP) in June, 1987. A separate ECRA submission was made for each of the six parcels shown in Figure 1-2. Each submission was subsequently assigned an individual ECRA case number. This report covers only Parcel Nos. 1 and 2 which have ECRA Case Nos. 87573 and 87574, respectively.

B-D has since conducted a series of comprehensive environmental investigations and engineering studies and made various additional ECRA submissions. B-D prepared and submitted a Remedial Cleanup Plan and a Building Decontamination Plan for Parcel Nos. 1, and 2, in July, 1988 in order to accommodate the planned property transfer to the Federal Reserve Bank (FRB) in 1989. The Remedial Cleanup Plan and the Building Decontamination Plan were approved by the NJDEP in October, 1988. B-D has implemented these remedial plans.

FIGURE 1-1

General Vicinity Map – Becton, Dickinson & Co.

East Rutherford, New Jersey

Source: Weehawken Quadrangle, N.J./N.,Y.

Scale: 1"=2000'

ERM-Northeast
Environmental Resources Management

146821

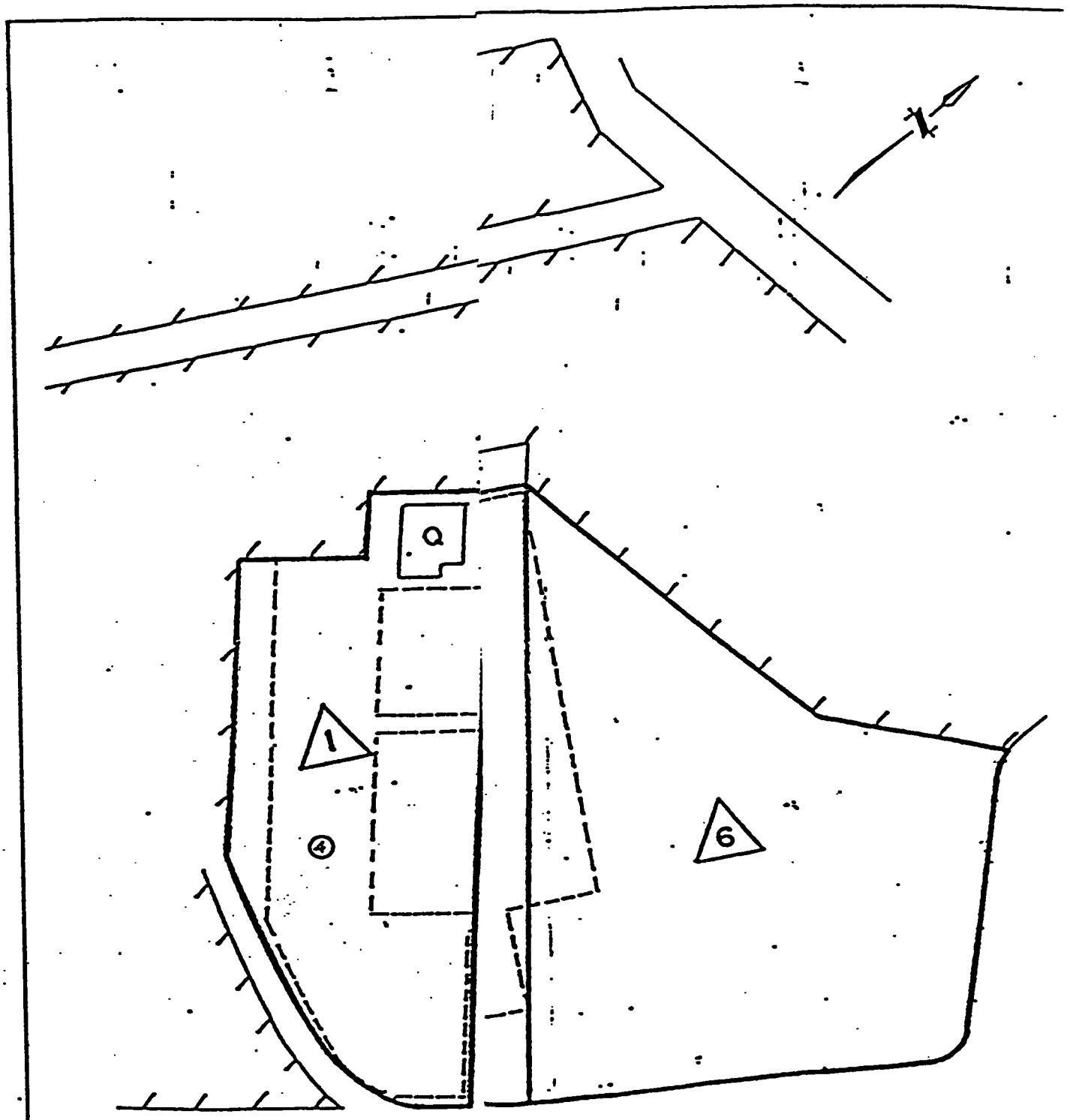


FIGURE 1-2
SITE PLAN
PARCEL DESIGNATIONS

BECTON, DICKINSON & Co.
EAST RUTHERFORD, N.J.

ERM-Northeast

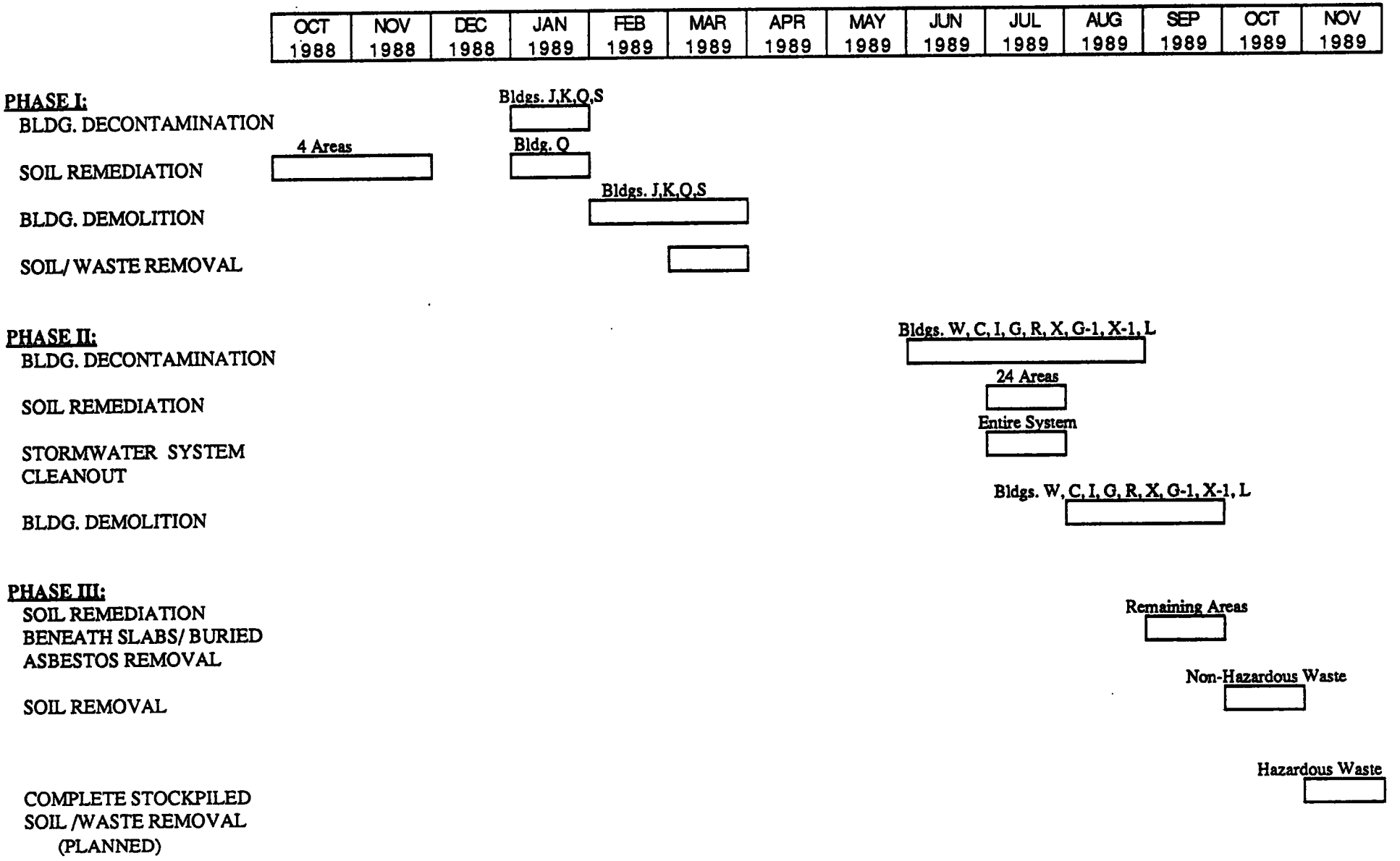
1.2 Overview of Site Remediation

In order to prepare the property for transfer to the FRB, B-D has completed the demolition of all site buildings. Site remediation activities have been coordinated with demolition activities and have been conducted in three phases from October, 1988 through October, 1989. Figure 1-3 provides an implementation schedule summary for these activities.

Phase I of building demolition occurred during March, 1989, and included Buildings S, J-K and Q. In order to address environmental issues impacted by the Phase I demolition, B-D implemented the Remedial Cleanup Plan and the Building Decontamination Plan as it pertained to Buildings S, J-K and Q and soil conditions immediately surrounding the buildings. This first phase of building decontamination and soil remediation, Phase I, was conducted from October, 1988 through February, 1989. A letter and documentation report describing these activities was submitted to the NJDEP in March of 1989.

The remaining buildings in Parcel No. 2 have been demolished in Phase II. This final phase of building demolition was completed from August 1, 1989 through October 15, 1989. Phase II remedial activities were performed both prior to and concurrently with

FIGURE 1-3
CHRONOLOGY SUMMARY OF SITE REMEDIATION & DEMOLITION



demolition activities. Included in the Phase II work was the decontamination of all remaining buildings, remediation of the storm water drainage system and soil remediation in all areas but those found under concrete floor slabs. All remedial activities were conducted in accordance with the NJDEP approved Cleanup Plan. Phase II remedial activities were implemented from June, 1989 through September, 1989.

Phase III remedial activities were completed after the building demolition contractor broke up concrete slabs and exposed underlying soil. These activities included soil remediation of all remaining soil areas and areas identified under concrete floor slabs, removal of contaminated concrete from the electroplating area in Building W, and the removal and disposal of the buried asbestos tile identified in the eastern corner of the site. Phase III remedial activities were implemented from September, 1989 through October, 1989.

The majority of soil and other waste material stockpiled during Phase I, II and III site remediation activities have been disposed of off-site. The remaining materials are scheduled for removal in November. A tabular summary of the wastes, quantities, disposal sites and status of disposal is provided in Tables 1-1 and 1-2.

TABLE 1-1

SUMMARY OF SITE REMEDIATION
WASTES GENERATED DURING ECRA CLEANUP

	Phase I	Phase II	Phase III	Totals
o Building Decontamination Solids	5 cubic yards	90 cubic yards	---	95 cubic yards
o Building Decontamination Liquids	1000 gallons	1200 gallons	---	2200 gallons
o Hazardous Soil	150 cubic yards	15 cubic yards	92 cubic yards	257 cubic yards
o Non-Hazardous Soil	126 cubic yards	240 cubic yards	225 cubic yards	591 cubic yards
o Stormwater System Solids	---	50 cubic yards	---	50 cubic yards
o Contaminated Concrete	---	---	76 cubic yards	76 cubic yards
o Asbestos in Buildings	5060 linear ft., (pipe insulation) 6000 sq. ft. (tiles)	11,000 linear ft. (pipe insulation) 7400 sq. ft. (tiles)	---	16,060 linear ft 13,400 sq. ft.
o Buried Asbestos/Soil	---	---	900 cubic yards	900 cubic yards
o Washwater from Soil and Stormwater System Remediation		21,500 gallons	---	21,500 gallons

TABLE 1-2

SUMMARY OF SITE REMEDIATION
WASTE DISPOSAL LOCATIONS

	Phase I	Phase II	Phase III
o Building Decontamination Solids	Chem Waste Emelle, AL General Electric (transformer carcasses) Philadelphia, PA	CECOS International Inc. Landfill, Niagara Falls, NY (Pending Approval) Chem Waste Emelle, AL	----
o Building Decontamination Liquids	Pilot Ground Water Treatment Plant EI Dupont Chambers Works Deepwater, NJ	EI Dupont Chambers Works Deepwater, NJ	----
o Hazardous Soil	Breitenstine Landfill Waynesburg, OH CECOS International Inc. Landfill Niagara Falls, NY	Peoria Disposal Company Peoria, IL (Pending Approval)	Peoria Disposal Company Peoria, IL (Pending Approval)
o Non-Hazardous Soil	CECOS International Inc. Landfill Niagara Falls, NY	Breitenstine Landfill Waynesburg, OH	Breitenstine Landfill Waynesburg, OH
o Stormwater System Solids	----	Rollins Environmental Services, Deer Park, TX (Pending Approval)	----
o Contaminated Concrete	----	Peoria Disposal Company Peoria, IL (Pending Approval)	----

TABLE 1-2 (CONTINUED)

SUMMARY OF SITE REMEDIATION
WASTE DISPOSAL LOCATIONS

	Phase I	Phase II	Phase III
o Asbestos in Buildings	IMF Landfill Clarksburg, WV	IMF Landfill Clarkesburg	----
o Buried Asbestos	----	----	Grand Central Landfill Penn Argyl, PA
o Washwater from Soil and Stormwater System Remediation	----	EI Dupont Chambers Works Deepwater, NJ	----

The following tables have been provided to summarize site remediation activities completed to date:

Table 1-1 Summary of Site Remediation, Wastes Generated During ECRA Cleanup

Table 1-2 Summary of Site Remediation, Waste Disposal Locations

Table 1-3 Summary of Site Remediation, Remediation Costs

Details of the completed remedial activities are presented in subsequent sections of this report.

Table 1-4 presents a chronological listing of both milestone events in the ECRA cleanup of Parcel Nos. 1 and 2 and submissions to the NJDEP documenting the cleanup activities. This table begins with the NJDEP approval of the Remedial Cleanup Plan for Parcel Nos. 1 and 2.

From March, 1989 to July, 1989, update letters were submitted to the NJDEP on a monthly basis summarizing remedial activities and schedules. All previous documentation submissions are included in this report as Appendix A.

TABLE 1-3

SUMMARY OF SITE REMEDIATION
REMEDIATION COSTS

	Phase I	Phase II & III		Totals
o Contractor Site Work (including disposal)	$308,800	$ 999,400		$1,308,200
o ERM Consulting/Management	$132,000	$ 636,200		$ 768,200
o Laboratory Services	$ 48,000	$ 56,600		$ 104,600
o Drilling	----	$ 35,600		$ 35,600
Totals	$488,800	$1,727,800		$2,216,600
			SAY	$2,217,000

TABLE 1-4

MILESTONE EVENTS
ECRA REMEDIATION OF PARCEL NOS. 1 AND 2
BECTON, DICKINSON AND COMPANY
EAST RUTHERFORD, NEW JERSEY

October 31, 1988	-	Received formal NJDEP approval of the Remedial Cleanup Plan (RAP) and Building Decontamination Plan (BDP) for Parcel Nos. 1 and 2
January 17, 1989	-	Completion of Phase I building decontamination
January 19, 1989	-	Completion of Phase I soil remediation
March 6, 1989	-	Disposal of soil excavated during Phase I soil remediation
March 2, 1989	-	Submission of Phase I documentation letter and report
March 30, 1989	-	Collection of soil samples at locations classified as requiring "further investigation" in the RAP
April 20, 1989	-	Submission of March, 1989 monthly update letter
May 2, 1989	-	Submission of April, 1989 monthly update letter
June 22, 1989	-	Submission of May, 1989 monthly update letter
June 27, 1989	-	Meeting at NJDEP Headquarters in Trenton, New Jersey with representatives from NJDEP, B-D and ERM-Northeast
July 19, 1989	-	Completion of Phase II Building decontamination
July 24, 1989	-	Submission of June, 1989 monthly update letter

TABLE 1-4 (CONTINUED)

MILESTONE EVENTS
ECRA REMEDIATION OF PARCEL NOS. 1 AND 2
BECTON, DICKINSON AND COMPANY
EAST RUTHERFORD, NEW JERSEY

July 28, 1989	-	Completion of Phase II soil remediation
August 9, 1989	-	Completion of storm and industrial sewer cleanout work
August 11, 1989	-	Submission of July, 1989 monthly update letter
September 23, 1989	-	Completion of Phase III soil remediation and building decontamination
October 2, 1989	-	Completion of Phase III asbestos abatement

1.3 Purpose and Overview of Verification Report

This report is designed to document the implementation of the Remedial Cleanup Plan and the Building Decontamination Plan in Parcel Nos. 1 and 2 from October, 1988 through October, 1989. The intention of submitting this documentation prior to completion of all remedial activities is to expedite NJDEP's review of the ECRA cleanup completed in order that B-D receive approval on the site cleanup (minus ground water concerns). Documentation of the remainder of the waste disposal activities will be submitted to the NJDEP as a supplement to this verification report. This approach to receiving final approval of cleanup from the NJDEP was discussed during a meeting attended by representatives of B-D and the NJDEP (Messrs. Goliszewski, Yannett, Urbanic) on June 27, 1989, and more recently with Annett Christian (NJDEP) on October 26, 1989.

The remainder of the report is organized into the following sections:

2.0 REVIEW OF PHASE I REMEDIAL ACTIVITIES - This section reviews the documented soil remediation and building decontamination activities completed during Phase I.

3.0 DOCUMENTATION OF PHASE II REMEDIAL ACTIVITIES - A summary of the soil and storm water drainage system remediation and building decontamination activities completed during Phase II are presented in this section.

4.0 DOCUMENTATION OF PHASE III REMEDIAL ACTIVITIES - This section presents a summary of the soil remediation, building decontamination, and asbestos abatement activities completed during Phase III.

5.0 WORK REMAINING TO BE COMPLETED - This section describes the waste disposal activities to be completed.

2.0 REVIEW OF PHASE I REMEDIAL ACTIVITIES

Complete documentation of Phase I remedial activities was presented to the NJDEP in a letter dated March 2, 1989, and a report entitled Remedial Activities Documentation Report - Building Decontamination and Soil Excavation Prior to Building S and Building Q Demolition, dated March, 1989. This documentation is included in Appendix A of this report and should be referred to where additional detail is required. Phase I remedial cleanups were also documented in the March, 1989 monthly update letter also included in Appendix A. The following site remediation activities were implemented from October, 1988 to March, 1989 in preparation for the Phase I building demolition:

- Removal and disposal of electrical transformers. Excavation and disposal of transformer mounting pad and contaminated soil - Area 29

- Excavation and disposal of soil from the southwest side of Building S - Open Area No. 4

- Excavation and disposal of soil from the northeast side of Building Q - Area 102

- Excavation and stockpile of additional soil from Area 102
- Excavation and stockpile of soil from beneath the Building Q floor slab
- Decontamination including asbestos removal of Buildings S, J-K and Q.

The following sections summarize the Phase I remedial activities and provide site plans showing excavation and verification sampling locations and analysis results. Verification sample laboratory data reporting sheets are provided in Appendix B. The Phase I laboratory data reporting sheets are presented in Appendix B-1.

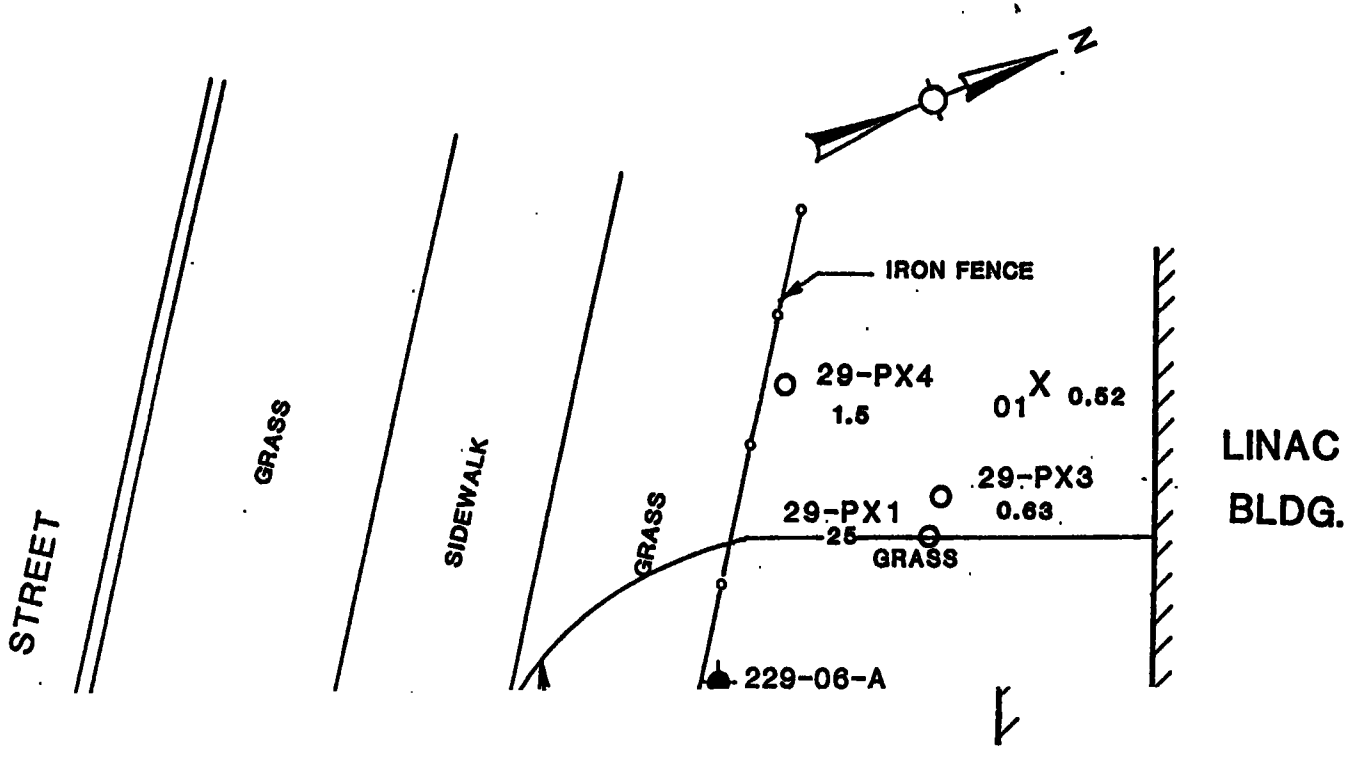
2.1 Soil Remediation

Soil remediation was accomplished in accordance with the NJDEP approved Remedial Cleanup Plan. Soil was excavated and stockpiled on-site while disposal facility acceptance was obtained. Verification samples were collected and analyzed. The resulting data was reviewed to determine whether excavations were complete or needed to be expanded. Verification sample laboratory data sheets for Phase I activities are provided in Appendix B-1. After

disposal facility acceptance was obtained, the contaminated soil was loaded into dump trailers (with the exception of PCB contaminated soil that was loaded directly into roll-off containers during excavation) and transported to the land disposal facilities. Copies of manifests accompanying waste shipments to disposal facilities are included in Appendix C. Manifests that accompanied Phase I wastes to the respective land disposal facilities are included in Appendix C-1.

The following figures present the areal extent of excavations and the locations and analytical results of verification samples for Phase I Soil Remediation. Figures 2-1, 2-2, 2-3 and 2-4 present the results of the Phase I Soil Remediation for Area 29-Former Transformer Area, Open Area No. 4, Area 102 and beneath the Building Q floor slab, respectively.

Table 2-1 presents a summary of soil quantities removed from each area and the facility at which the material was disposed. Included in this table is 145 tons of drilling cuttings that were solidified and disposed of from November 28 to December 12, 1988. These drilling cuttings were collected during the investigative phase of the project.



LEGEND

- SAMPLING LOCATION
- X — POST EXCAVATION VERIFICATION SAMPLE COLLECTED 8/31/88
- O — POST EXCAVATION VERIFICATION SAMPLE COLLECTED 10/25/88

ALL CONCENTRATIONS ARE OF PCBS IN PARTS PER MILLION

TITLE

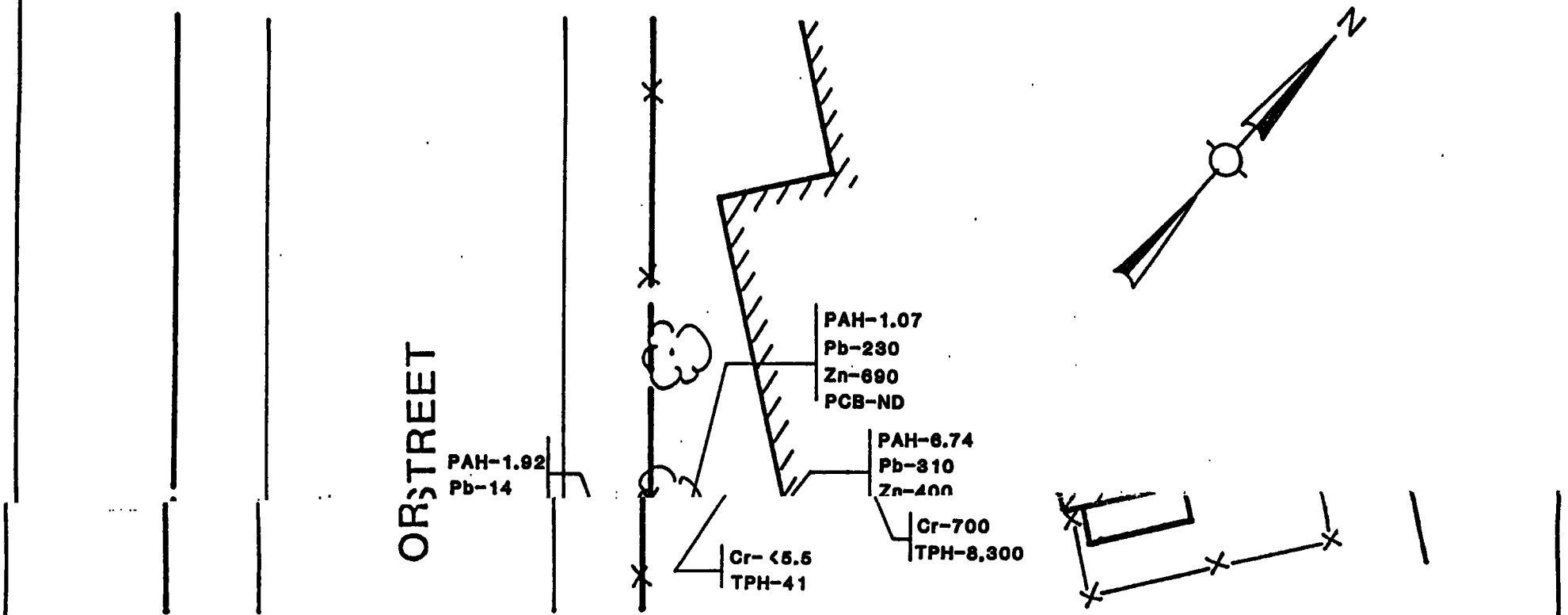
AREA 29 - FORMER TRANSFORMER AREA

PREPARED FOR

BECTON DICKINSON & CO.
EAST RUTHERFORD, N.J.

ERM-Northeast
Environmental Resources Management

SCALE 1/4"=1'-0"
DATE 9/89
FIGURE 2-1



LEGEND

- SAMPLING LOCATION
- x POST EXCAVATION VERIFICATION SAMPLE COLLECTED 8/25/88
- o POST EXCAVATION VERIFICATION SAMPLE COLLECTED 10/28 TO 11/1/88

ALL CONCENTRATIONS IN PARTS PER MILLION

TITLE

OPEN AREA NO. 4

PREPARED FOR

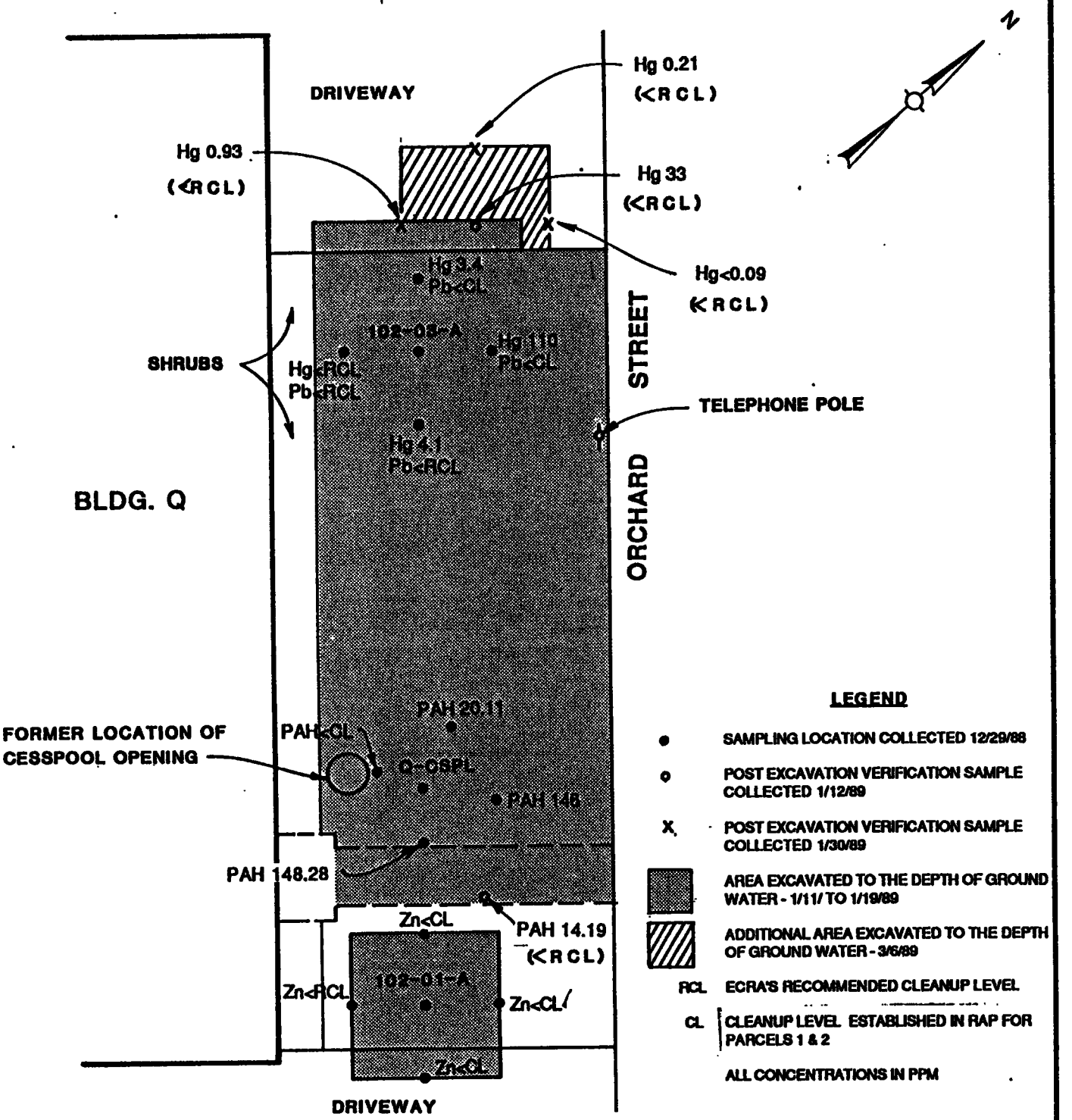
BECTON DICKINSON & CO.
EAST RUTHERFORD, N.J.

ERM-Northeast
Environmental Resources Management

SCALE 1" = 20'

DATE 9/89

FIGURE 2-2



TITLE

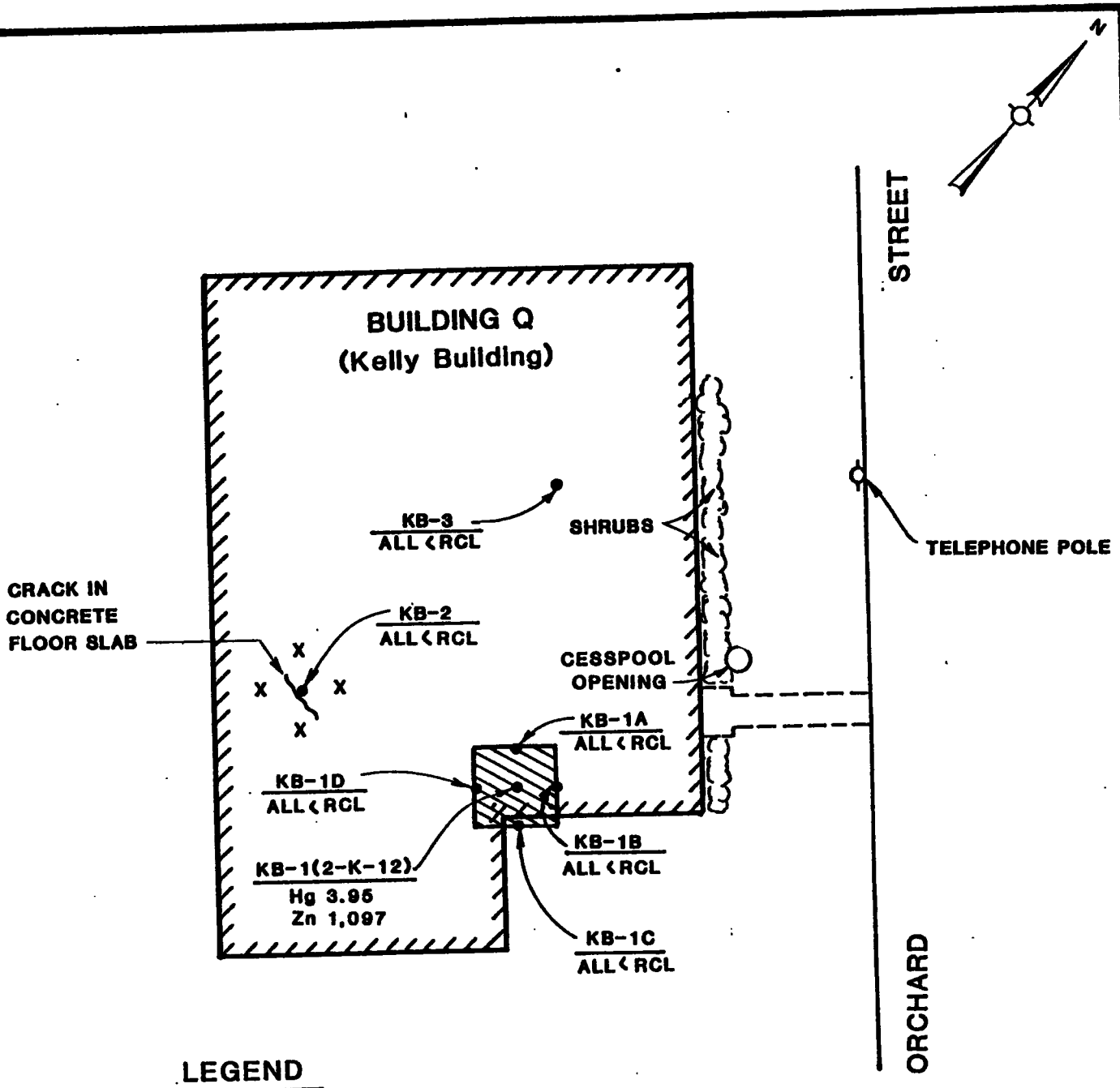
AREA 102

PREPARED FOR

BECTON, DICKINSON & CO.
EAST RUTHERFORD, N.J.

ERM-Northeast
Environmental Resources Management

SCALE	FIGURE
1"=10'	2-3
DATE 9/89	



LEGEND

- ● SOIL SAMPLE COLLECTED FROM 0-6" BELOW FLOOR SLAB
- X ARCHIVED SOIL SAMPLE COLLECTED FROM 0-6" BELOW FLOOR SLAB
- AREA EXCAVATED TO THE DEPTH OF GROUND WATER - 3/6/89
- RCL ECRA'S RECOMMENDED CLEANUP LEVEL

ALL CONCENTRATIONS IN PPM

TITLE

SOIL SAMPLING AND EXCAVATION BENEATH BUILDING Q (KELLY BUILDING) FLOOR SLAB

PREPARED FOR

BECTON, DICKINSON & CO.
EAST RUTHERFORD, N.J.

ERM-Northeast
Environmental Resources Management

SCALE 1"=20'
DATE 9/89
FIGURE 2-4

139839

ERM-Northeast

TABLE 2-1

PHASE I
SOIL EXCAVATED/DISPOSED

Material	Amount	Disposal Site
Drill cuttings	145 tons	Breitenstine Landfill Waynesburg, Ohio
Area 29 - Former Transformer Area		
o Soil and concrete pad (PCB)	50 cu. yds.	CECOS International Inc. Landfill Niagara Falls, NY
Open Area No. 4		
- Location 24-03 o Soil (PCB, Pb, Zn, PAH)	10 cu. yds.	CECOS International Inc. Landfill
- Location 24-04 o Soil (Cu, Pb, Zn)	10 cu. yds.	CECOS International Inc. Landfill
- Location 24-05 o Soil (Pb, Zn)	10 cu. yds.	CECOS International Inc. Landfill
- Location 24-02 o Soil (Cr, TPH)	8 cu. yds.	CECOS International Inc. Landfill
Area 102 - Northeast of Building Q		
o Soil (Hg, Pb, Zn, PAH)	70 cu. yds.	CECOS International Inc. Landfill
o Additional Excavation (Hg)	10 cu. yds	Stockpiled on-site (disposed of in Phase III)
Beneath Building Q Floor Slab		
o Soil (Hg, Zn)	8 cu. yds.	Stockpiled on-site (disposed of in Phase III)

2.2 Building Decontamination - Buildings S, J-K and Q

Building decontamination was completed in accordance with the NJDEP approved Building Decontamination Plan in each of the three buildings demolished during Phase I. In Building J-K, the only decontamination task necessary was the removal of asbestos. However, in Buildings S and Q, building decontamination consisted of the following:

- collection and disposal of hazardous substances;
- asbestos abatement;
- decontamination of building structures and equipment; and,
- disposal of waste materials.

Table 2-2 presents a summary of the material generated during building decontamination activities and the disposal facility at which the material was disposed. CECOS International, Inc. completed the collection and disposal of hazardous substances, decontamination of building structures and equipment and disposal of waste materials. Asbestos abatement (removal and disposal) in the three buildings demolished during Phase I was performed by Quality Asbestos Removal (QAR) of Carteret, New Jersey.

TABLE 2-2

PHASE I BUILDING DECONTAMINATION WASTES GENERATED/DISPOSED

Material	Amount	Disposal Site
o Transformer oil		UNISON
o Transformer carcass	2	General Electric Philadelphia, PA
o Liquid from cesspool	500 gallons	Treated at pilot ground water treatment plant
	110 gallons	E.I. Dupont Chambers Works Deepwater, NJ
o Sludge from cesspool Decanted liquid from Cesspool sludge	55 gallons (1 drum)	Stored on-site (Pending disposal)
o Lab Drain Pipe	110 pounds (2 drums)	Stored on-site*
o Stained floor tile	710 pounds (4 drums)	Stored on-site*
o Lead plates and pellets	30 sq. ft. of 5/8 in. plate (cut) and 250 lbs. pellets (3 drums)	Recycled off-site A&B Scrap Dealers Paterson, NJ
o Lab glassware	600 pounds (3 drums)	Recycled off-site
o Disposable syringes	20 pounds (2-3 cubic foot boxes)	Disposed of by B-D in disintegrator
o Lab-packed chemicals	3-3 cu. ft. boxes 2 sealed 5-gal. carboys, 1 5-gal. safety can	Disposed of off-site by B-D RCRA waste handler
o Batteries	3 car batteries 3 emergency lighting stations	Disposed of off-site by B-D RCRA waste handler

TABLE 2-2 (CONTINUED)

PHASE I BUILDING DECONTAMINATION WASTE GENERATED/DISPOSED

Material	Amount	Disposal Site
o Oil drained from compressor, solidified with vermiculite	20 pounds (1 drum)	Stored on-site+
o Water from sump in LINAC Building	240 gals. (4 drums)	Dupont Chambers Works
o Water and solids from bottom of sump in LINAC Building	120 gals. (2 drums)	Dupont Chambers Works
o Mercury, glass tube and reservoir from disassembled barometer	Hg - 1/3 litre	Disposed of off-site by B-D RCRA waste handler
o Floor scarification sweepings	1 drum	Stored on-site
o Asbestos - Buildings pipe insulation floor tile	approx. 5,000 LF. approx. 6,000 SF.	IMF Landfill Clarksburg, West Virginia
o Asbestos - Building Q, J-K pipe insulation	60 LF.	

*Placed in Roll-off Container No. A (See Section 3.3.3)

+Placed in Roll-off Container No. B (See Section 3.3.3)

2.3 Cost of Phase I Remedial Activities

Table 2-3 presents the estimated cost of the Phase I remedial activities. The cost estimate includes the costs of soil remediation and building decontamination activities.

2.4 Phase I Demolition

Phase I demolition began in February, 1989 and included the demolition of Buildings Q, S (and the adjoining LINAC Building) and J-K. Demolition was completed in April, 1989.

TABLE 2-3

ESTIMATED COST OF PHASE I REMEDIAL ACTIVITIES

Category	Estimated Cost
Consulting/Management	$ 132,000.00
Laboratory Services	$ 48,000.00
Remediation Contractors and Disposal*	$ 308,800.00
Estimated Total Cost	$ 488,800.00

* Includes building decontamination, asbestos removal and soil remediation.

3.0 DOCUMENTATION OF PHASE II REMEDIAL ACTIVITIES

Phase II remedial activities included soil remediation of twenty-four of the thirty-nine remaining areas requiring remediation, cleanout of the site-wide stormwater drainage system, building decontamination of the remaining buildings, and demolition. Sevenson Environmental Services, Inc. (SES) of Chadds Ford, Pennsylvania, performed the Phase II Soil Remediation and their subcontractor, VSI Technologies, Inc. of Baltimore, Maryland performed the stormwater system cleanout. CECOS International, Inc. of Edison, New Jersey performed building decontamination activities and Quality Asbestos Removal of Carteret, New Jersey performed asbestos removal.

The soil remediation, stormwater drainage system cleanout, and building decontamination are each addressed in separate subsections. Following each subsection is a list and summary of waste generated during the respective activities. Laboratory data reporting sheets from sampling associated with Phase II remedial activities are included in this report as Appendix B-2.

3.1 Soil Remediation

The contract to perform the Phase II soil remediation and the cleanout of the stormwater drainage system was awarded to SES after a competitive bidding process. Technical specifications for the soil and stormwater drainage system remediation were written based upon the NJDEP approved Soil and Ground Water Remedial Cleanup Plan and Building Decontamination Plan. The specifications were distributed to several qualified bidders, bids were received and evaluated, and the contract was awarded to SES. SES performed the Phase II soil remediation during July, 1989.

3.1.1 Overview of Remedial Procedures

Locations requiring soil remediation were identified using the Soil and Ground Water Remedial Action Plan (RAP). This plan established cleanup levels for contamination in soil. When these levels were exceeded, excavation and disposal of soil was required. All soil locations that required remediation are presented on Figure 3-1, presented in a back pocket of this report. Soil was excavated and then transported to plastic-lined stockpile locations in dump trucks. Separate stockpile locations were established for soil identified as New Jersey non-hazardous waste, New Jersey

hazardous waste, and PCB contaminated soil. After excavation, required verification samples were collected by ERM-Northeast personnel and analyzed for parameters of concern.

Verification Sampling and Analysis Strategy

Verification soil samples were collected from four points along the perimeter of each soil excavation area so prescribed by the RAP. A fifth verification sample was collected at the base of each excavation where ground water was not encountered. In accordance with the approved RAP, verification samples were not collected from soil excavation locations (either along perimeter walls or the base) below the ground water table.

In order to more efficiently perform site work, verification sampling was conducted at some locations prior to soil excavation. This pre-post-excavation sampling was performed to delineate the extent of soil contamination as much as possible prior to excavation work commencing. This verification sampling strategy was proposed in a letter dated April 20, 1989 (Appendix A) and approved by the NJDEP in the June 27, 1989 meeting. Soil excavation locations not delineated by pre-post-excavation sample analysis were

delineated by verification samples collected after excavations were completed. All verification samples were analyzed by EnviroTest Laboratories of Newburgh, New York (NJDEP # 73507) on a 1-week turnaround time basis to add to project expediency. Laboratory data reporting sheets for the Phase II verification sample analyses are presented in Appendix B-2.

If a verification sample (collected either prior to or after the excavation) showed contamination levels higher than the cleanup levels, the excavation was extended in the respective direction (northeast, southeast, southwest, northwest or vertically). This sampling and excavation procedure was repeated at each location until a sample in each direction showed contamination levels below cleanup levels. In accordance with the approved Cleanup Plan, soil excavations were not extended below the depth of the ground water table.

Excavation Backfill

Excavations were backfilled with one of two types of backfill approved by the NJDEP. The majority of excavations was backfilled with soil from the construction activities at B-D Headquarters in Franklin Lakes, New Jersey. This soil is

from undeveloped forest land in northern New Jersey. The second type of backfill used was soil generated during the installation of the pilot ground water recovery trench. A plan to sample and evaluate the trench soil for use as fill was approved by the NJDEP during the previously-mentioned meeting of June 27, 1989. All but a 10 foot long section of the 100 foot long trench soil stockpile was determined to be suitable for use as fill. The 10 foot long section exhibited a concentration of chromium of 180 ppm. This concentration is above the ECRA RCL for chromium, thereby making the soil unsuitable for use as fill; however, the concentration is less than the cleanup level and therefore the soil does not require any remedial cleanup. Laboratory data reporting sheets for samples of the trench soil stockpile are included in Appendix B-2.

After verification sample analysis determined an excavation to be complete, the excavation was backfilled with one of the approved materials. None of the excavations required structural compaction.

3.1.2 Verification of Remedial Procedures

This section discusses each soil location, in numerical order, that was excavated and backfilled during Phase II soil remediation. Plan views (Figure Nos. 3-2 through 3-25) are provided for each soil location, showing the areal extent of excavation and the results of all verification sample analyses. The plan view drawings are based upon drawings prepared by a professional surveyor licensed in New Jersey. Original survey drawings are currently on file and will be provided as necessary.

Table 3-1 presents a summary of the Phase II soil remediation including the sample locations, the dimensions of the excavations, the volume of soil removed, and the stockpile location where the material was placed.

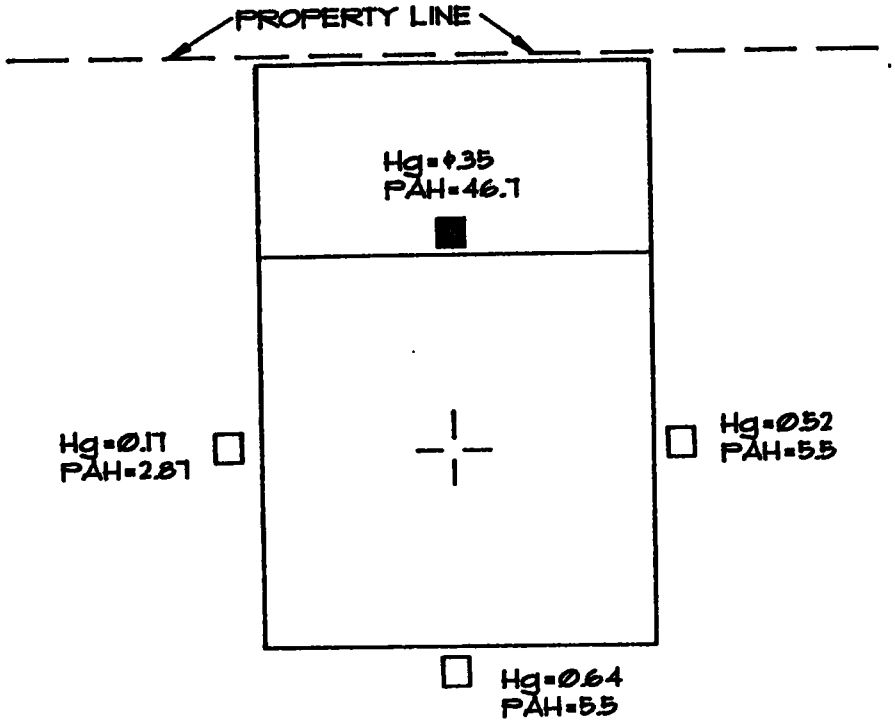
Location 22-02

Location 22-02 is shown on Figure 3-2. The parameters of concern at this location were mercury and polynuclear aromatic hydrocarbons (PAH). This location was excavated to at least 20 inches below grade, where a verification sample

TABLE 3-1
PHASE II SOIL REMEDIATION SUMMARY

LOCATION	STOCKPILE	DIMENSION (FEET)	DEPTH (IN)	VOLUME (CU. YDS.)
22-02	Non - Hazardous	15 X 10	20	9.3
23-04	Non - Hazardous	20 x 10	22	13.6
23-05	Non - Hazardous	10 X 10	20	6.2
23-07	Non - Hazardous	15 X 15	20	13.8
25-05	Non - Hazardous	10 X 10	22	6.8
26-02	Non - Hazardous	10 X 10	50	15.4
26-03	Non - Hazardous	10 X 10	42	13.0
27-02	Non - Hazardous	15 X 10	20	9.3
27-07	Non - Hazardous	10 X 10	24	7.4
27-08	Non - Hazardous	10 X 10	12	3.7
27-09	Non - Hazardous	10 X 10	16	4.9
27-12	Non - Hazardous	15 X 10	25	11.6
28-05	Non - Hazardous	10 X 10	33	10.2
29-03	Non - Hazardous	10 X 10	41	12.7
29-06	Non - Hazardous	10 X 10	36	11.1
29-09	Non - Hazardous	10 X 10	20	6.2
29-16	Non - Hazardous	15 X 10	36	16.7
101-03	Non - Hazardous	10 X 10	28	8.6
101-12	Non - Hazardous	10 X 10	40	12.3
101-19	Non - Hazardous	10 X 10	46	14.2
226-03	Non - Hazardous	15 X 14	18	11.7
226-05	Non - Hazardous	20 X 13	18	14.4
233-01	Hazardous	10 X 10	50	15.4
235-01	Non - Hazardous	10 X 10	23	7.1

Total Cubic Yards = 255.6



LOCATION 22-02

REMEDIATION SUMMARY

PARAMETERS OF CONCERN: Hg, PAH
EXCAVATION DEPTH: 20"
EXCAVATION VOLUME: 9.3 CUBIC YARDS

LEGEND

All concentrations are in parts per million unless otherwise noted.
ND=concentration not detected

- location of previous sampling requiring remedial action (center of original excavation)
- verification sample above action levels
- verification sample below action levels

TITLE

RESULTS OF ECRA CLEANUP
SOIL LOCATION - 22-02

PREPARED FOR
BECTON, DICKINSON & COMPANY
EAST RUTHERFORD, N.J.

ERM-Northeast
Environmental Resources Management

SCALE 1/5"=1'
DATE 10/89
FIGURE 3-2

139839

displayed concentrations of mercury and PAH below the cleanup levels.

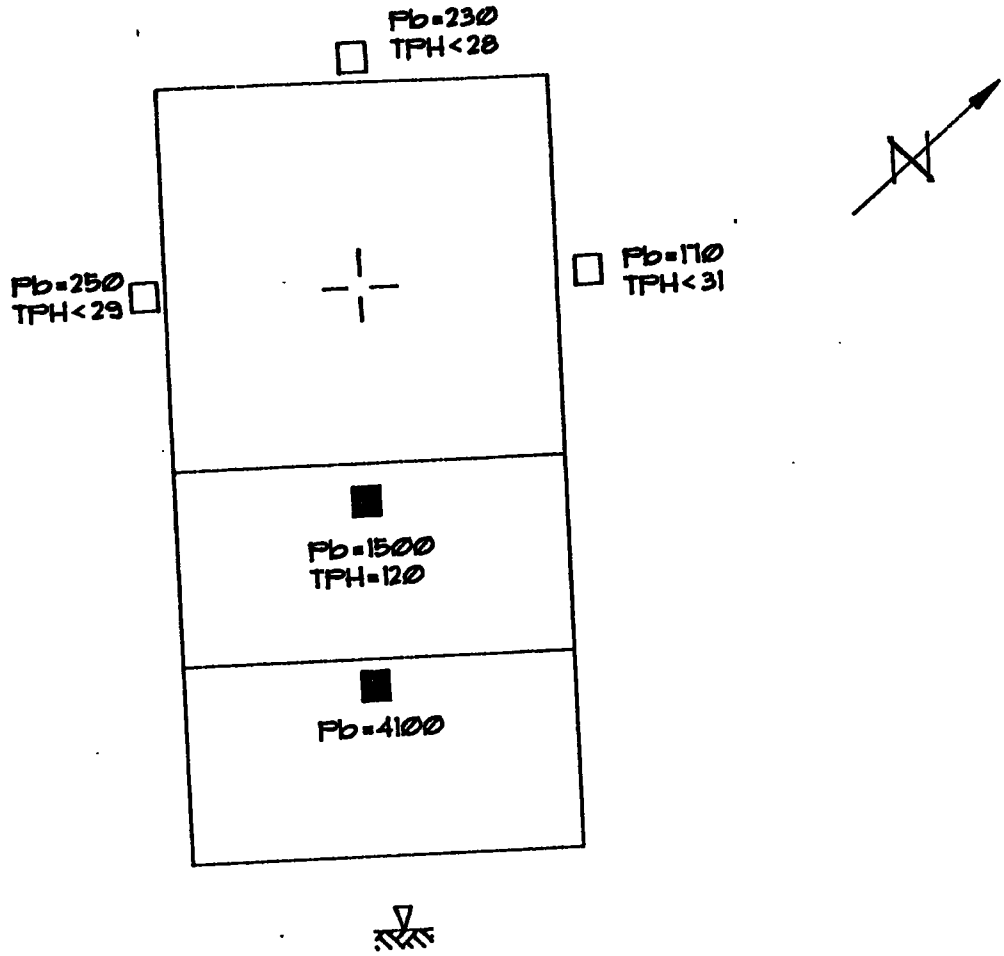
The excavation was extended westward because a perimeter verification sample displayed a concentration of PAH above the cleanup level. The extended western perimeter was subsequently verified to be below the cleanup levels.

Approximately 9 cubic yards of material were excavated from this location, which was backfilled on July 27, 1989.

Location 23-04

Location 23-04 is shown on Figure 3-3. The parameters of concern at this location were lead and total petroleum hydrocarbons (TPH). This location was excavated to at least 22 inches below grade where ground water was encountered.

The excavation, located on a steep hill, was extended southeastward down the hill because a perimeter verification sample displayed a concentration of lead above the cleanup level. Once the additional soil was removed, ground water filled the southeastern end of the excavation to grade.



LOCATION 23-04
REMEDIATION SUMMARY

PARAMETERS OF CONCERN: Pb, TPH
EXCAVATION DEPTH: 22"
EXCAVATION VOLUME: 13.6 CUBIC YARDS

LEGEND
All concentrations are in parts per million unless otherwise noted.
ND=concentration not detected

- Ground water recharge prevented sample collection or further excavation
- location of previous sampling requiring remedial action (center of original excavation)
- ■ verification sample above action levels
- □ verification sample below action levels

TITLE

RESULTS OF ECRA CLEANUP SOIL LOCATION - 23-04

PREPARED FOR
BECTON, DICKINSON & COMPANY
EAST RUTHERFORD, N.J.

ERM-Northeast
Environmental Resources Management

SCALE 1/5"=1'
DATE 10/89
FIGURE 3-3

39839

Therefore, no verification sample was collected in that direction.

Approximately 14 cubic yards of material were excavated from this location, which was backfilled on July 27, 1989.

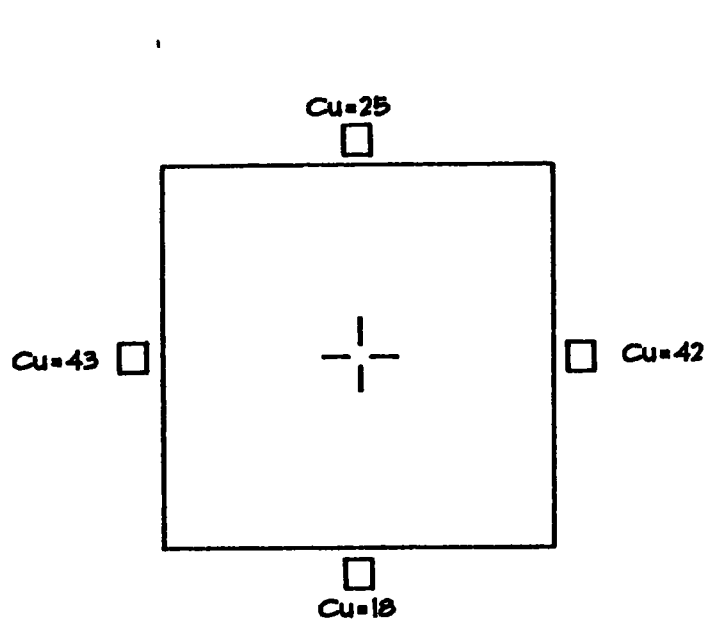
Location 23-05

Location 23-05 is shown on Figure 3-4. The parameter of concern at this location was copper. This location was excavated to at least 20 inches below grade, where a verification sample displayed a concentration of copper below the cleanup level. All perimeter verification samples also displayed concentrations of copper below the cleanup level.

Approximately 6 cubic yards of material were excavated from this location, which was backfilled on July 26, 1989.

Location 23-07

Location 23-07 is shown on Figure 3-5. The parameter of concern at this location was lead. This location was excavated to at least 20 inches below grade, where a



LOCATION 23-05
REMEDIATION SUMMARY

PARAMETER OF CONCERN: Cu
EXCAVATION DEPTH: 20"
EXCAVATION VOLUME: 62 CUBIC YARDS

LEGEND
All concentrations are in parts per million unless otherwise noted.
ND=concentration not detected

location of previous sampling requiring remedial action (center of original excavation)

verification sample above action levels

verification sample below action levels

TITLE

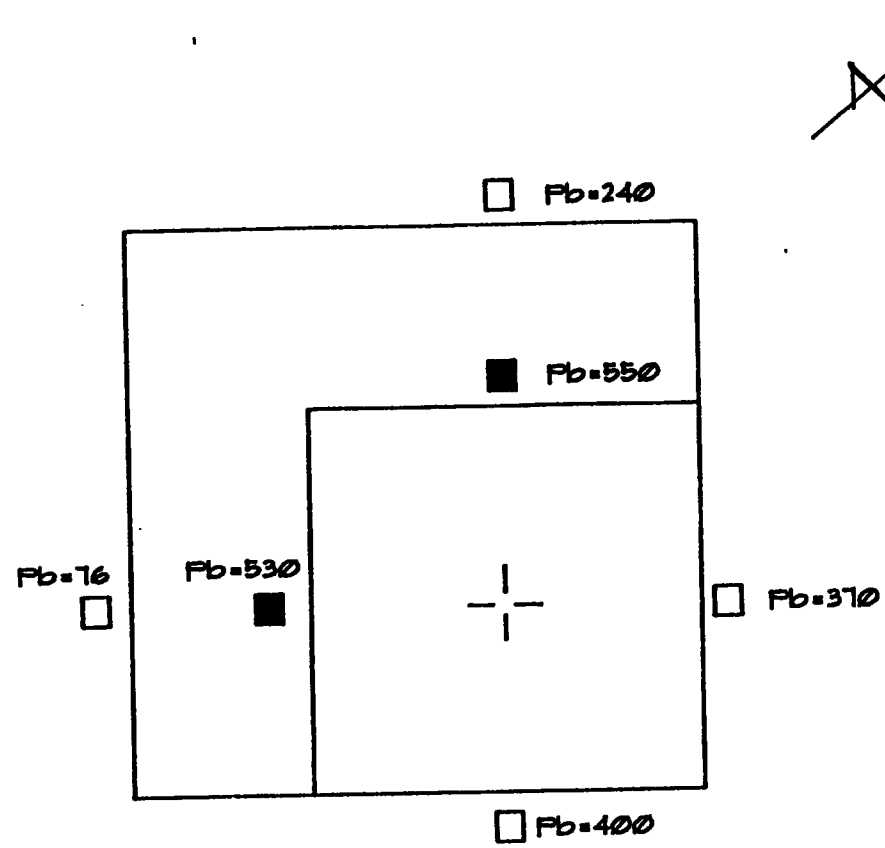
RESULTS OF ECRA CLEANUP
SOIL LOCATION - 23-05

PREPARED FOR
BECTON, DICKINSON & COMPANY
EAST RUTHERFORD, N.J.

ERM-Northeast
Environmental Resources Management

SCALE 1/5"=1'
DATE 10/89
FIGURE 3-4

139839



LOCATION 23-07
REMEDIATION SUMMARY

PARAMETER OF CONCERN: Pb
EXCAVATION DEPTH: 20"
EXCAVATION VOLUME: 13.8 CUBIC YARDS

LEGEND
All concentrations are in parts per million unless otherwise noted.
ND=concentration not detected

- location of previous sampling requiring remedial action (center of original excavation)
- ■ verification sample above action levels
- □ verification sample below action levels

TITLE

RESULTS OF ECRA CLEANUP
SOIL LOCATION - 23-07

PREPARED FOR
BECTON, DICKINSON & COMPANY
EAST RUTHERFORD, N.J.

ERM-Northeast
Environmental Resources Management

SCALE 1/5"=1'
DATE 10/89
FIGURE 3-5

139639

verification sample displayed a concentration of lead below the cleanup level.

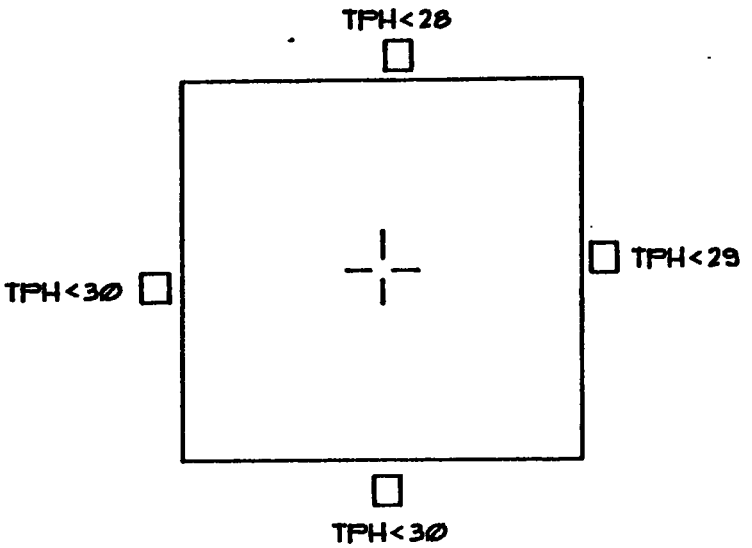
The excavation was extended northwestward and southwestward because two perimeter verification samples displayed concentrations of lead above the cleanup level. The extended sides were subsequently verified to be below the cleanup levels.

Approximately 14 cubic yards of material were excavated from this location, which was backfilled on July 26, 1989.

Location 25-05

Location 25-05 is shown on Figure 3-6. The parameter of concern at this location was TPH. This location was excavated to 22 inches below grade, where a verification sample displayed a concentration of TPH below the cleanup level. All perimeter verification samples also displayed concentrations of TPH below the cleanup level.

Approximately 7 cubic yards of material were excavated from this location, which was backfilled with clean fill on July 26, 1989.



LOCATION 25-05
REMEDIATION SUMMARY

PARAMETER OF CONCERN: TPH
EXCAVATION DEPTH: 22"
EXCAVATION VOLUME: 6.8 CUBIC YARDS

LEGEND
All concentrations are in parts per million unless otherwise noted.
ND=concentration not detected

location of previous sampling requiring remedial action (center of original excavation)

■ verification sample above action levels

□ verification sample below action levels

TITLE

RESULTS OF ECRA CLEANUP
SOIL LOCATION - 25-05

PREPARED FOR
BECTON, DICKINSON & COMPANY
EAST RUTHERFORD, N.J.

ERM-Northeast
Environmental Resources Management

SCALE 1/5"=1'
DATE 10/89
FIGURE 3-6

139839

Location 26-02

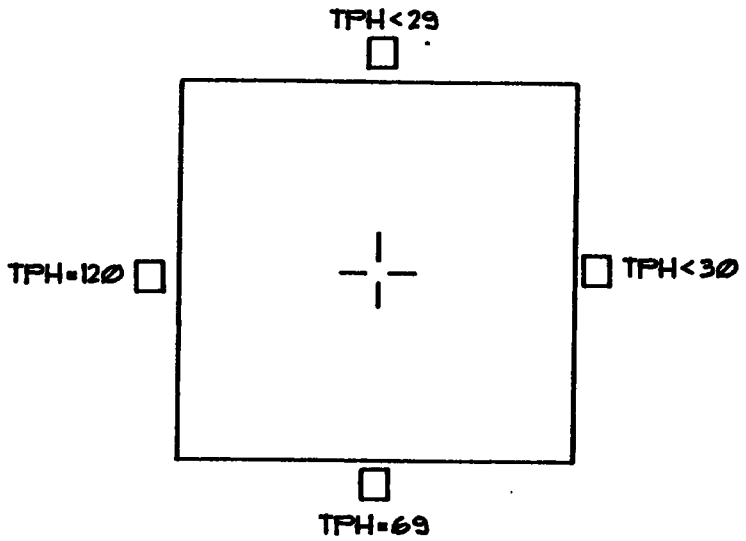
Location 26-02 is shown on Figure 3-7. The parameter of concern at this location was TPH. This location was excavated to 50 inches below grade, where ground water was encountered. All perimeter verification samples displayed concentrations of TPH below the cleanup level.

Approximately 15 cubic yards of material were excavated from this location. The excavation at location 26-02 was backfilled on July 20, 1989.

Location 26-03

Location 26-03 is shown on Figure 3-8. The parameter of concern at this location was mercury. This location was excavated to at least 42 inches below grade, where a verification sample displayed a concentration of mercury below the cleanup level. All perimeter verification samples also displayed concentrations of mercury below the cleanup level.

Approximately 13 cubic yards of material were excavated from this location, which was backfilled on July 25, 1989.



LOCATION 26-02
REMEDIATION SUMMARY

PARAMETER OF CONCERN: TPH
EXCAVATION DEPTH: 50"
EXCAVATION VOLUME: 15.4 CUBIC YARDS

LEGEND
All concentrations are in parts per million unless otherwise noted.
ND=concentration not detected

location of previous sampling requiring remedial action (center of original excavation)

verification sample above action levels

verification sample below action levels

TITLE

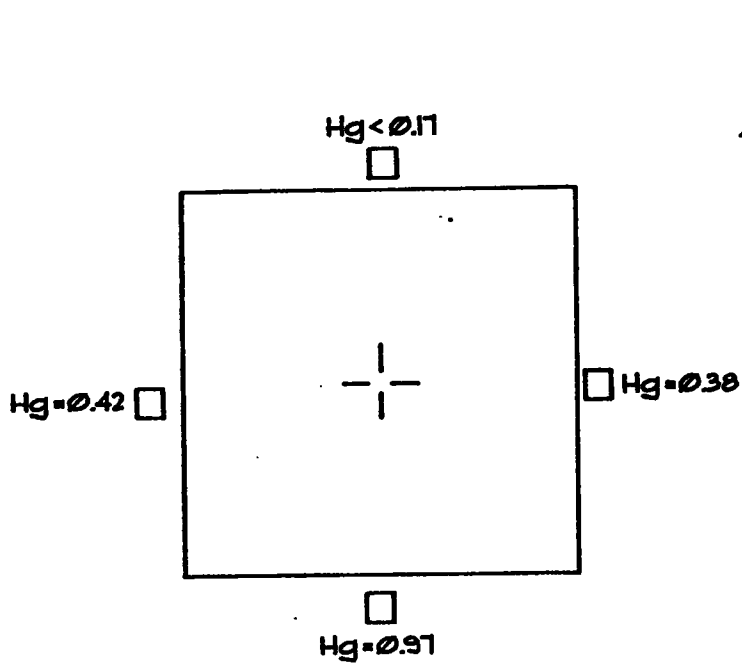
RESULTS OF ECRA CLEANUP
SOIL LOCATION - 26-02

PREPARED FOR
BECTON, DICKINSON & COMPANY
EAST RUTHERFORD, N.J.

ERM-Northeast
Environmental Resources Management

SCALE 1/5"=1'
DATE 10/89
FIGURE 3-7

139839



LOCATION 26-Ø3
REMEDIATION SUMMARY

PARAMETER OF CONCERN: Hg
EXCAVATION DEPTH: 42"
EXCAVATION VOLUME: 13 CUBIC YARDS

LEGEND
All concentrations are in parts per million unless otherwise noted.
ND=concentration not detected

location of previous sampling requiring remedial action (center of original excavation)

verification sample above action levels

verification sample below action levels

TITLE
RESULTS OF ECRA CLEANUP
SOIL LOCATION - 26-03

PREPARED FOR
BECTON, DICKINSON & COMPANY
EAST RUTHERFORD, N.J.

ERM-Northeast
Environmental Resource Management

SCALE 1/5"=1'
DATE 10/89
FIGURE 3-8

139839

Location 27-02

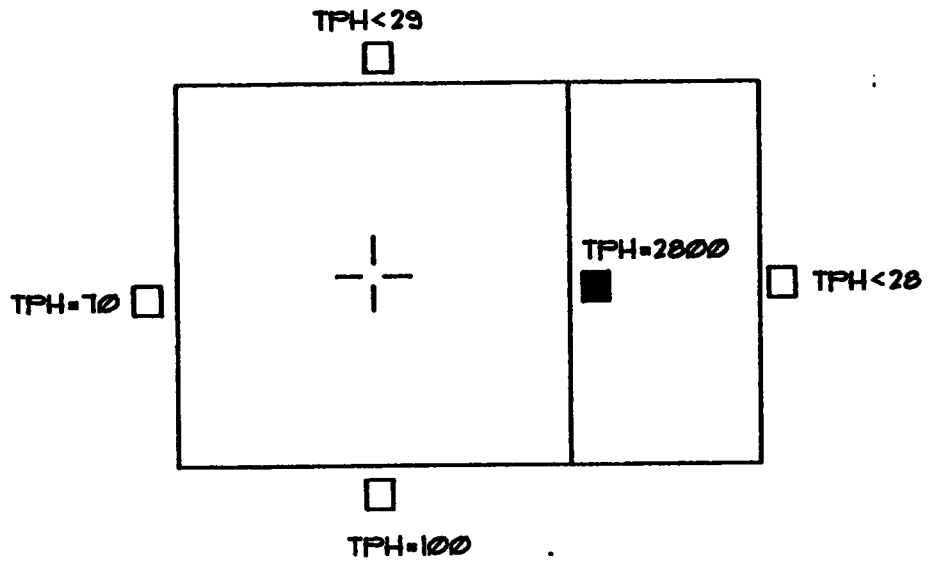
Location 27-02 is shown on Figure 3-9. The parameter of concern at this location was TPH. This location was excavated to at least 20 inches below grade, where ground water was encountered.

The excavation was extended northeastward because a perimeter verification sample displayed concentrations of TPH above the cleanup level. The extended northeastern side was subsequently verified to be less than the cleanup levels.

Approximately 9 cubic yards of material was excavated from this location, which was backfilled on July 26, 1989.

Location 27-07

Location 27-07 is shown on Figure 3-10. The parameter of concern at this location was TPH. This location was excavated to 24 inches below grade, where ground water was encountered.



LOCATION 27-02
REMEDIATION SUMMARY

PARAMETER OF CONCERN: TPH
EXCAVATION DEPTH: 20"
EXCAVATION VOLUME: 9.3 CUBIC YARDS

LEGEND
All concentrations are in parts per million unless otherwise noted.
ND=concentration not detected

location of previous sampling requiring remedial action (center of original excavation)

verification sample above action levels

verification sample below action levels

TITLE

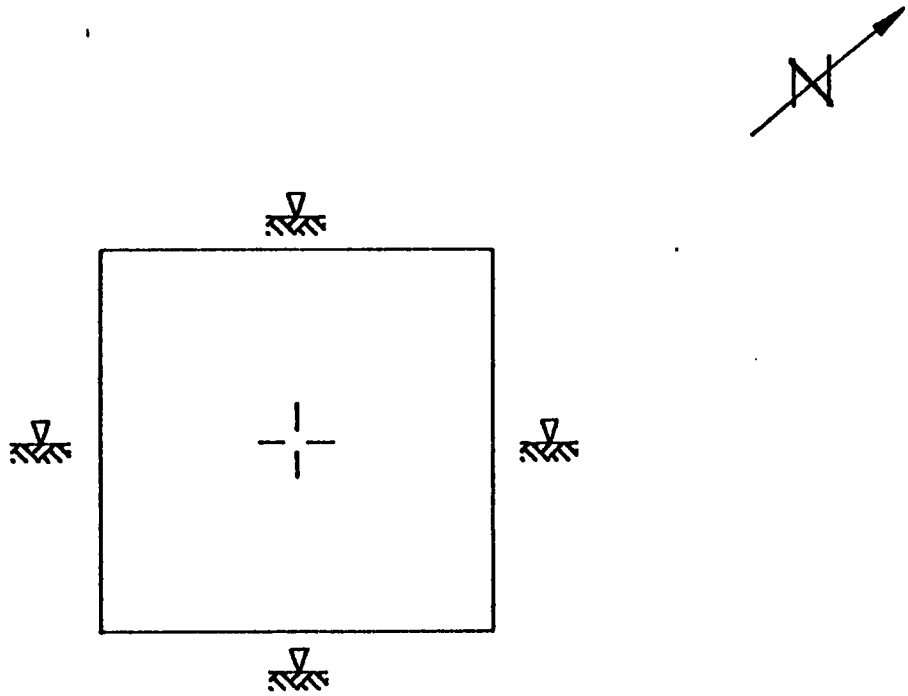
RESULTS OF ECRA CLEANUP
SOIL LOCATION - 27-02

PREPARED FOR
BECTON, DICKINSON & COMPANY
EAST RUTHERFORD, N.J.

ERM-Northeast
Environmental Resources Management

SCALE 1/5"=1'
DATE 10/89
FIGURE 3-9

139839



LOCATION 27-07
REMEDIATION SUMMARY

PARAMETER OF CONCERN: TPH
EXCAVATION DEPTH: 24"
EXCAVATION VOLUME: 7.4 CUBIC YARDS

LEGEND
All concentrations are in parts per million unless otherwise noted.
ND=concentration not detected

- ground water recharge prevented sample collection or further excavation
- location of previous sampling requiring remedial action (center of original excavation)
- ■ verification sample above action levels
- □ verification sample below action levels

TITLE

RESULTS OF ECRA CLEANUP
SOIL LOCATION - 27-07

PREPARED FOR
BECTON, DICKINSON & COMPANY
EAST RUTHERFORD, N.J.

ERM-Northeast
Environmental Resources Management

SCALE 1/5"=1'
DATE 10/89
FIGURE 3-10

139839

Verification samples were not collected at this location. The excavation filled with ground water to grade after the soil had been removed.

Approximately 7 cubic yards of material was excavated from this location, which was backfilled on July 20, 1989.

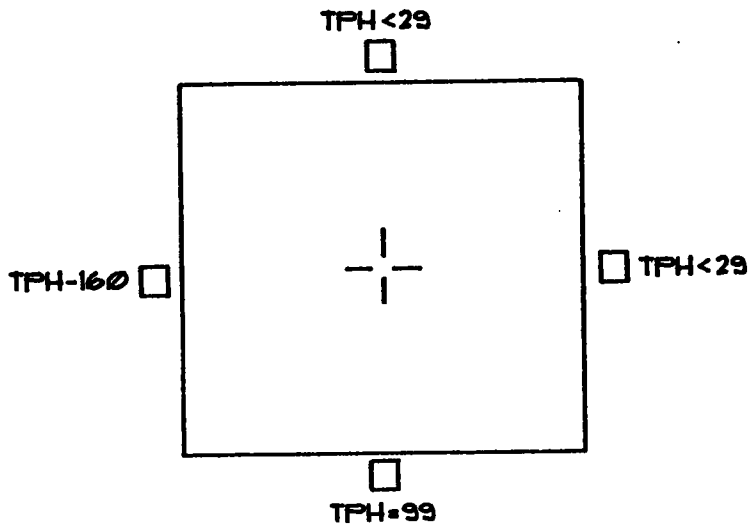
Location 27-08

Location 27-08 is shown on Figure 3-11. The parameter of concern at this location was TPH. This location was excavated to 12 inches below grade, where a verification sample displayed a concentration of TPH below the cleanup level. All perimeter verification samples also displayed concentrations of TPH below the cleanup level.

Approximately 4 cubic yards of material were excavated from this location, which was backfilled with clean fill on July 25, 1989.

Location 27-09

Location 27-09 is shown on Figure 3-12. The parameter of concern at this location was TPH. This location was



LOCATION 27-08
REMEDIATION SUMMARY

PARAMETER OF CONCERN: TPH
EXCAVATION DEPTH: 12"
EXCAVATION VOLUME: 3.1 CUBIC YARDS

LEGEND
All concentrations are in parts per million unless otherwise noted.
ND=concentration not detected

location of previous sampling requiring remedial action (center of original excavation)

■ verification sample above action levels

□ verification sample below action levels

TITLE

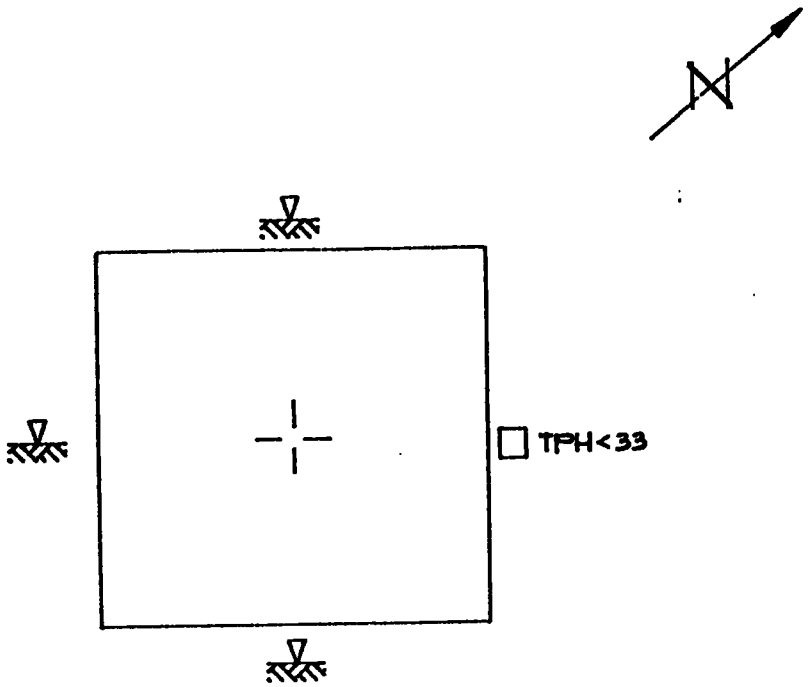
RESULTS OF ECRA CLEANUP
SOIL LOCATION - 27-08

PREPARED FOR
BECTON, DICKINSON & COMPANY
EAST RUTHERFORD, N.J.

ERM-Northeast
Environmental Resources Management

SCALE 1/5"=1'
DATE 10/89
FIGURE 3-11

139838



LOCATION 27-09
REMEDIATION SUMMARY

PARAMETER OF CONCERN: TPH
EXCAVATION DEPTH: 16"
EXCAVATION VOLUME: 4.9 CUBIC YARDS

LEGEND
All concentrations are in parts per million unless otherwise noted.
ND=concentration not detected

- ground water recharge prevented sample collection or further excavation
- location of previous sampling requiring remedial action (center of original excavation)
- ■ verification sample above action levels
- □ verification sample below action levels

TITLE

RESULTS OF ECRA CLEANUP
SOIL LOCATION -27-09

PREPARED FOR
BECTON, DICKINSON & COMPANY
EAST RUTHERFORD, N.J.

ERM-Northeast
Environmental Resources Management

SCALE 1/5"=1'
DATE 10/89
FIGURE 3-12

139839

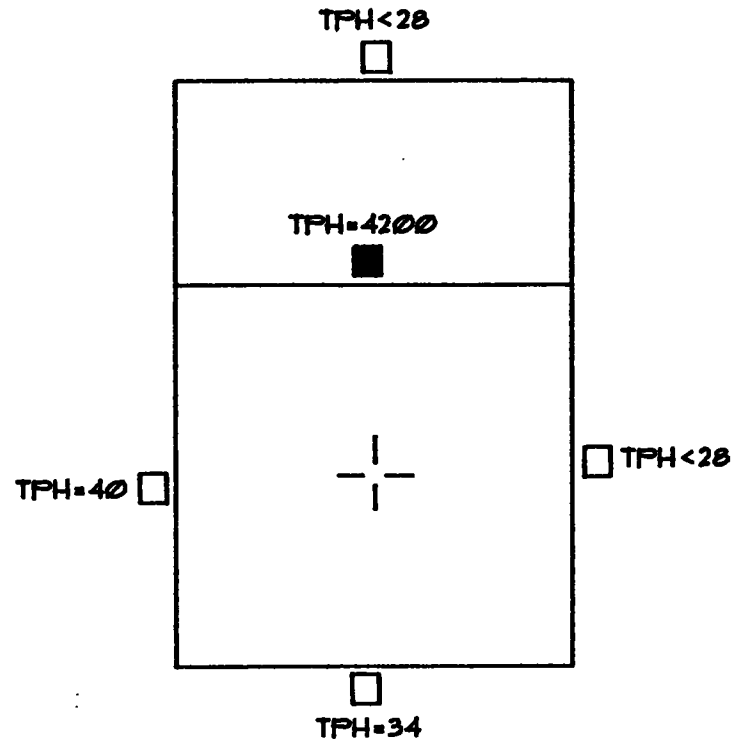
excavated to 16 inches below grade, and ground water immediately filled the excavation. Verification samples were not collected at this location. Ground water rose to grade at all but one face of the excavation. A perimeter verification sample was collected at the exposed face and displayed a concentration of TPH below the cleanup level.

Approximately 5 cubic yards of material were excavated from this location. The excavation at location 27-09 was backfilled on July 26, 1989.

Location 27-12

Location 27-12 is shown on Figure 3-13. The parameter of concern at this location was TPH. This location was excavated to at least 25 inches below grade, where a verification sample displayed a concentration of TPH below the cleanup level.

The excavation was extended northwestward because a perimeter verification sample displayed a concentration of TPH above the cleanup level. The extended northwestern side was subsequently verified to be less than the cleanup level.



LOCATION 27-12
REMEDIATION SUMMARY

PARAMETER OF CONCERN: TPH
EXCAVATION DEPTH: 25"
EXCAVATION VOLUME: 11.6 CUBIC YARDS

LEGEND
All concentrations are in parts per million unless otherwise noted.
ND=concentration not detected

location of previous sampling requiring remedial action (center of original excavation)

verification sample above action levels

verification sample below action levels

TITLE

RESULTS OF ECRA CLEANUP
SOIL LOCATION - 27-12

PREPARED FOR
BECTON, DICKINSON & COMPANY
EAST RUTHERFORD, N.J.

ERM-Northeast
Environmental Resources Management

SCALE 1/5"=1'
DATE 10/89
FIGURE 3-13

139839

Approximately 12 cubic yards of material were excavated from this location, which was backfilled on July 26, 1989.

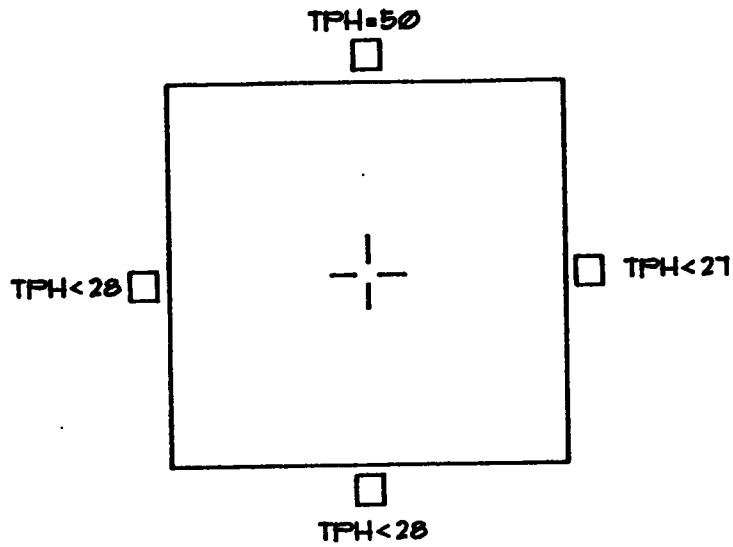
Location 28-05

Location 28-05 is shown on Figure 3-14. The parameter of concern at this location was TPH. This location was excavated to at least 33 inches below grade, where a verification sample displayed a concentration of TPH below the cleanup level. All perimeter verification samples also displayed concentrations of TPH below the cleanup level.

Approximately 10 cubic yards of material were excavated from this location. The excavation at location 28-05 was backfilled on July 25, 1989.

Location 29-03

Location 29-03 is shown on Figure 3-15. The parameters of concern at this location were cadmium, copper, lead, mercury, and zinc. This location was excavated to at least 41 inches below grade, where ground water was encountered. All perimeter verification samples displayed concentrations



LOCATION 28-05
REMEDIATION SUMMARY

PARAMETER OF CONCERN: TPH
EXCAVATION DEPTH: 33"
EXCAVATION VOLUME: 102 CUBIC YARDS

LEGEND
All concentrations are in parts per million unless otherwise noted.
ND=concentration not detected

location of previous sampling requiring remedial action (center of original excavation)

verification sample above action levels

verification sample below action levels

TITLE

RESULTS OF ECRA CLEANUP
SOIL LOCATION - 28-05

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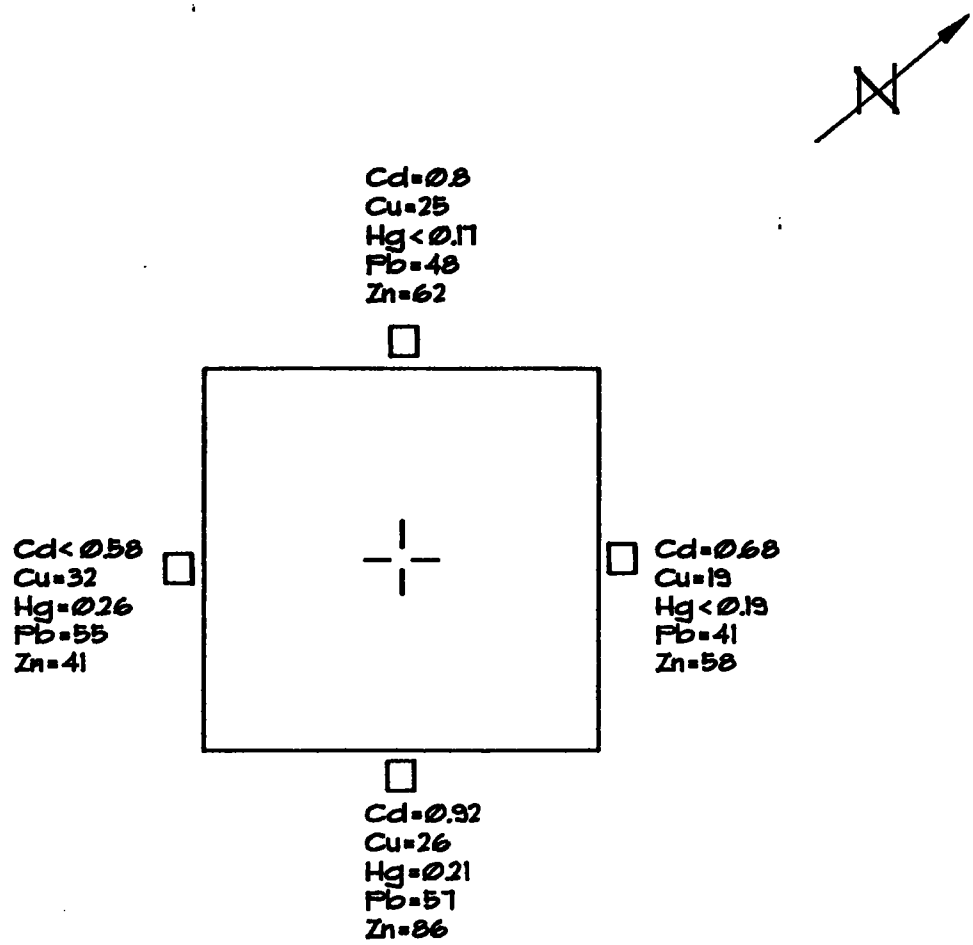
Environmental Resources Management

SCALE 1/5"=1'
DATE 10/89
FIGURE 3-14

139839



LOCATION 29-03
REMEDIATION SUMMARY

PARAMETERS OF CONCERN: Cd, Cu, Hg, Pb, Zn
EXCAVATION DEPTH: 41"
EXCAVATION VOLUME: 12.7 CUBIC YARDS

LEGEND
All concentrations are in parts per million unless otherwise noted.
ND=concentration not detected

location of previous sampling requiring remedial action (center of original excavation)

verification sample above action levels

verification sample below action levels

TITLE

RESULTS OF ECRA CLEANUP
SOIL LOCATION - 29-03

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ERM-Northeast
Environmental Resources Management

SCALE 1/5"=1'
DATE 10/89
FIGURE 3-15

139839

of cadmium, copper, lead, mercury, and zinc below the cleanup levels.

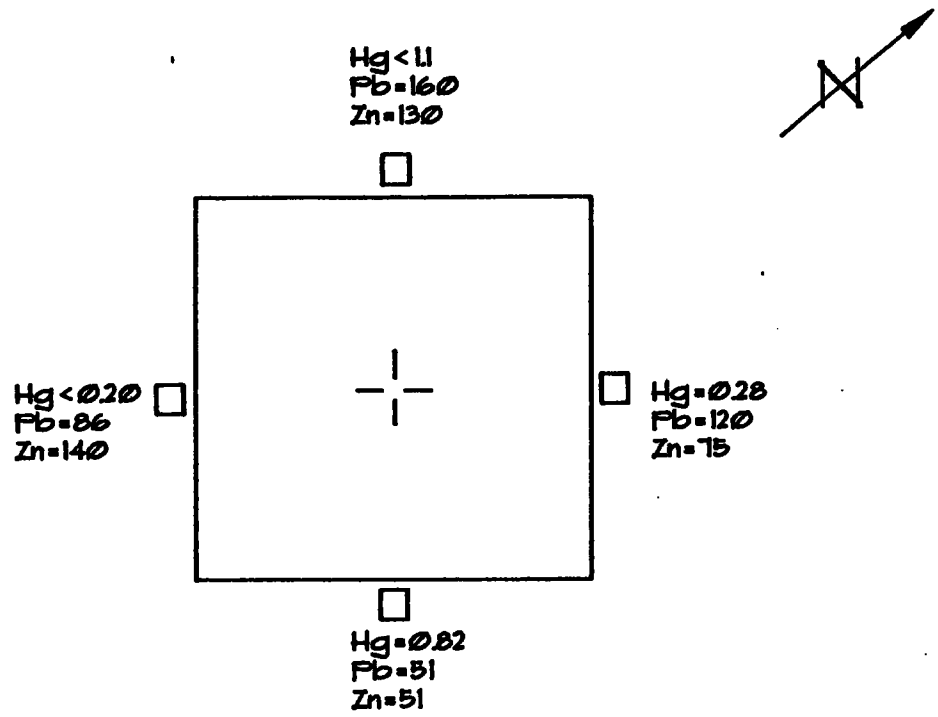
Approximately 13 cubic yards of material were excavated from this location, which was backfilled on July 19, 1989.

Location 29-06

Location 29-06 is shown on Figure 3-16. The parameters of concern at this location were mercury, lead and zinc. This location was excavated to at least 36 inches below grade, where ground water was encountered.

All perimeter verification samples displayed concentrations of mercury, lead, and zinc below the cleanup levels.

Approximately 11 cubic yards of material were excavated from this location. The excavation at location 29-06 was backfilled on July 26, 1989.



LOCATION 29-06
REMEDIATION SUMMARY

PARAMETERS OF CONCERN: Hg, Pb, Zn
EXCAVATION DEPTH: 36"
EXCAVATION VOLUME: 11.1 CUBIC YARDS

LEGEND
All concentrations are in parts per million unless otherwise noted.
ND=concentration not detected

- location of previous sampling requiring remedial action (center of original excavation)
- verification sample above action levels
- verification sample below action levels

TITLE

RESULTS OF ECRA CLEANUP
SOIL LOCATION - 29-06

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ERM-Northeast
Environmental Resources Management

SCALE 1/5"=1'
DATE 10/89
FIGURE 3-16

139838

Location 29-09

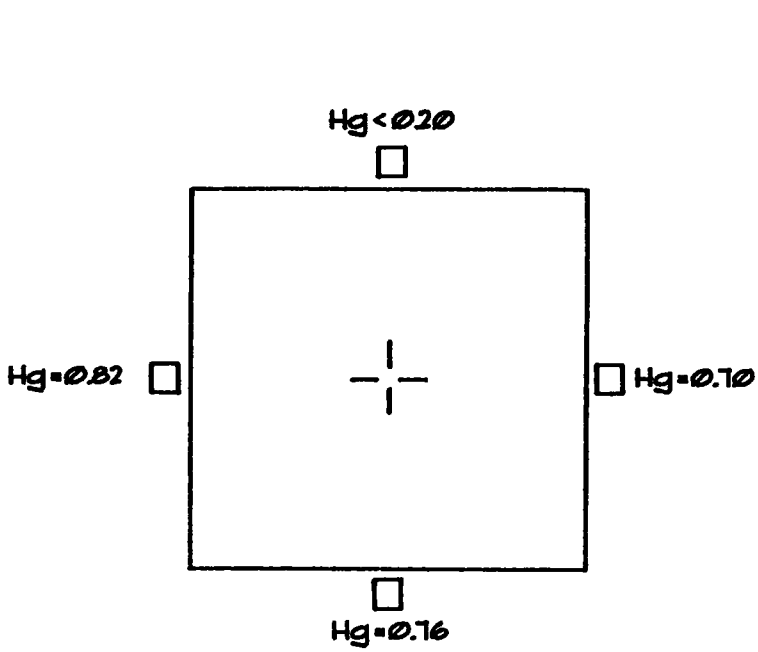
Location 29-09 is shown on Figure 3-17. The parameter of concern at this location was mercury. This location was excavated to at least 20 inches below grade where a verification sample displayed a concentration of mercury below the cleanup level. All perimeter verification samples also displayed concentrations of mercury below the cleanup level.

Approximately 6 cubic yards of material were excavated from this location, which was backfilled on July 19, 1989.

Location 29-16

Location 29-16 is shown on Figure 3-18. The parameters of concern at this location were lead and mercury. This location was excavated to at least 36 inches below grade, where ground water was encountered.

The excavation was extended northwestward because a perimeter verification sample displayed a concentration of lead above the cleanup levels. The extended northwestern perimeter was verified to be below the cleanup level.



LOCATION 29-Ø9
REMEDIATION SUMMARY

PARAMETER OF CONCERN: Hg
EXCAVATION DEPTH: 2Ø"
EXCAVATION VOLUME: 6.2 CUBIC YARDS

LEGEND
All concentrations are in parts per million unless otherwise noted.
ND=concentration not detected

- location of previous sampling requiring remedial action (center of original excavation)
- verification sample above action levels
- verification sample below action levels

TITLE
RESULTS OF ECRA CLEANUP
SOIL LOCATION - 29-09

PREPARED FOR
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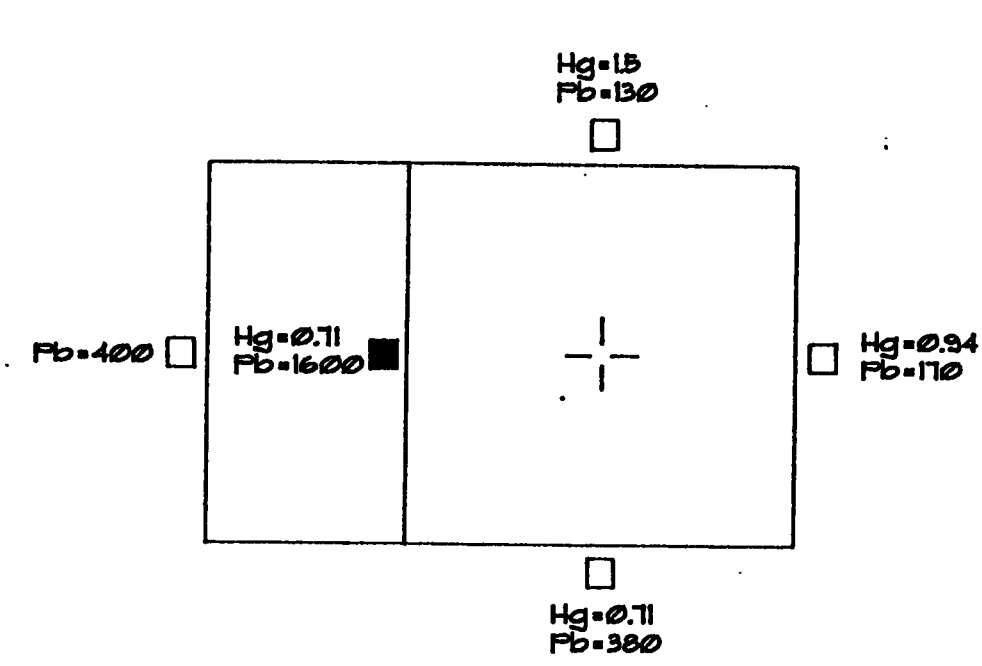
ERM-Northeast
Environmental Resources Management

SCALE 1/5"=1'
DATE 10/89
FIGURE 3-17

139839



LOCATION 29-16
REMEDIATION SUMMARY

PARAMETERS OF CONCERN: Hg, Pb
EXCAVATION DEPTH: 36"
EXCAVATION VOLUME: 16.7 CUBIC YARDS

LEGEND
All concentrations are in parts per million unless otherwise noted.
ND=concentration not detected

location of previous sampling requiring remedial action (center of original excavation)

verification sample above action levels

verification sample below action levels

TITLE
RESULTS OF ECRA CLEANUP
SOIL LOCATION - 29-16

PREPARED FOR
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ERM-Northeast
Environmental Resources Management

SCALE 1/5"=1'
DATE 10/89
FIGURE 3-18

139839

Approximately 17 cubic yards of material were excavated from this location, which was backfilled with clean fill on July 26, 1989.

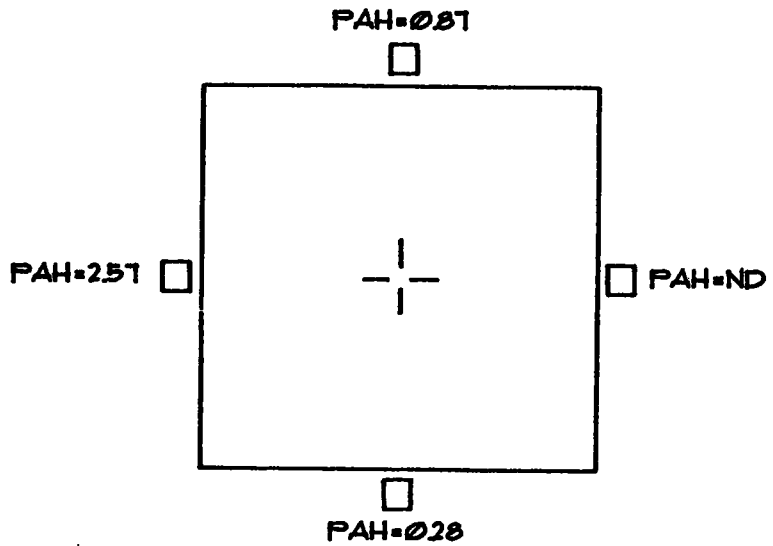
Location 101-03

Location 101-03 is shown on Figure 3-19. The parameter of concern at this location was PAH. This location was excavated to at least 28 inches below grade, where ground water was encountered. All perimeter verification samples displayed concentrations of PAH below the cleanup level.

Approximately 9 cubic yards of material were excavated from this location, which was backfilled on July 26, 1989.

Location 101-12

Location 101-12 is shown on Figure 3-20. The parameter of concern at this location was mercury. This location was excavated to at least 40 inches below grade, where ground water was encountered. All perimeter verification samples displayed concentrations of mercury below the cleanup level.



LOCATION 101-03
REMEDIATION SUMMARY

PARAMETER OF CONCERN: PAH
EXCAVATION DEPTH: 28"
EXCAVATION VOLUME: 8.6 CUBIC YARDS

LEGEND
All concentrations are in parts per million unless otherwise noted.
ND = concentration not detected

-|- location of previous sampling requiring remedial action (center of original excavation)

■ verification sample above action levels

□ verification sample below action levels

TITLE
RESULTS OF ECRA CLEANUP
SOIL LOCATION -101-03

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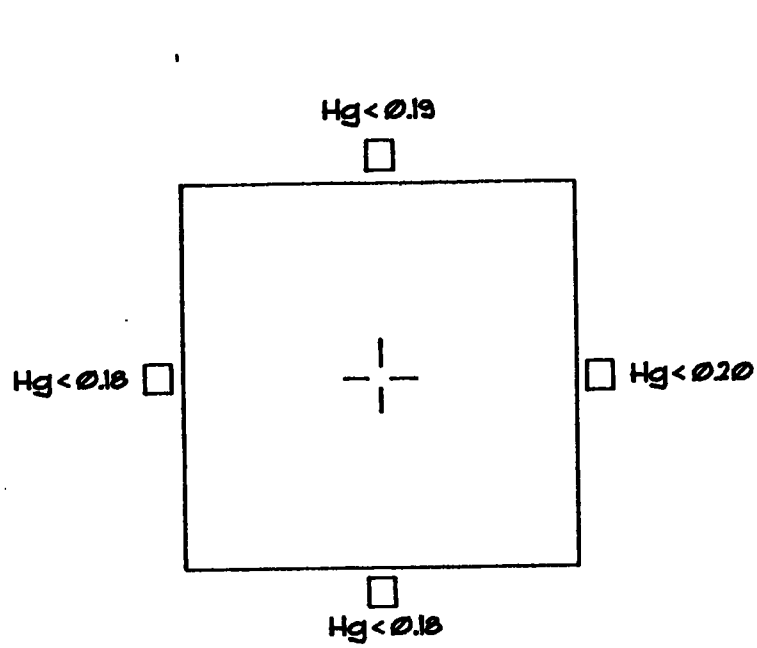
ERM-Northeast
Environmental Resource Management

SCALE 1/5"=1'
DATE 10/89
FIGURE 3-19

139839



LOCATION 101-12
REMEDIATION SUMMARY

PARAMETER OF CONCERN: Hg
EXCAVATION DEPTH: 40"
EXCAVATION VOLUME: 12.3 CUBIC YARDS

LEGEND
All concentrations are in parts per million unless otherwise noted.
ND=concentration not detected

location of previous sampling requiring remedial action (center of original excavation)

verification sample above action levels

verification sample below action levels

TITLE

RESULTS OF ECRA CLEANUP
SOIL LOCATION - 101-12

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ERM-Northeast
Environmental Resources Management

SCALE 1/5"=1'
DATE 10/89
FIGURE 3-2(

139839

Approximately 12 cubic yards of material were excavated from this location, which was backfilled on July 22, 1989.

Location 101-19

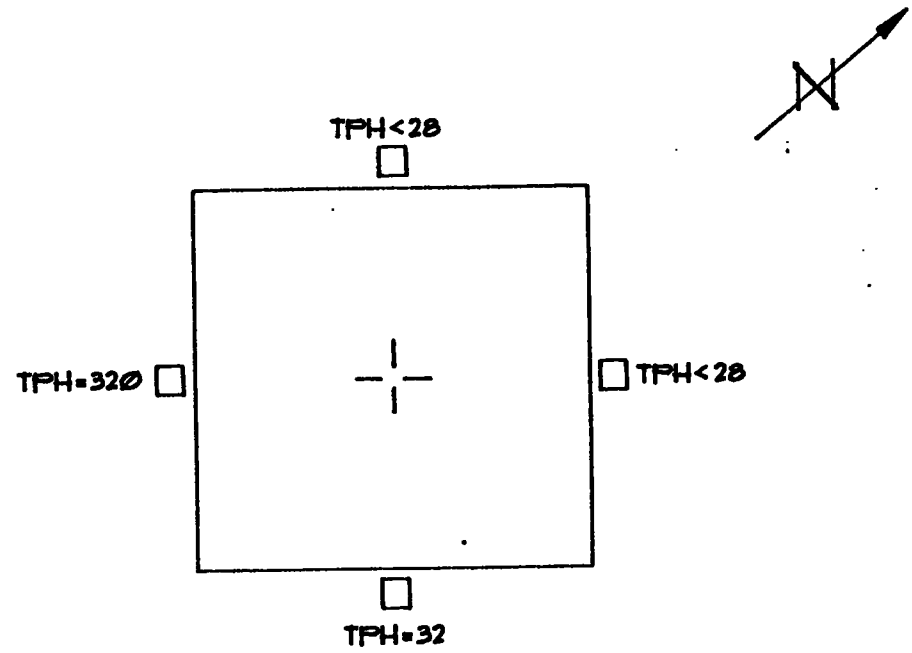
Location 101-19 is shown on Figure 3-21. The parameter of concern at this location was TPH. This location was excavated to at least 46 inches below grade, where ground water was encountered. All perimeter verification samples displayed concentrations of TPH below the cleanup level.

Approximately 14 cubic yards of material were excavated from this location, which was backfilled on July 26, 1989.

Locations 226-03 and 226-05(1)

Locations 226-03 and 226-05(1) are shown on Figures 3-23 and 3-22, respectively. The parameters of concern at location 226-03 were chromium, copper, nickel, PAH, and TPH. The parameters of concern at location 226-05(1) were copper and zinc.

As shown on Figures 3-22 and 3-23, the entire soil area between the asphalt pavement, the property line, and the



LOCATION 101-19
REMEDIATION SUMMARY

PARAMETER OF CONCERN: TPH
EXCAVATION DEPTH: 46"
EXCAVATION VOLUME: 142 CUBIC YARDS

LEGEND
All concentrations are in parts per million unless otherwise noted.
ND=concentration not detected

location of previous sampling requiring remedial action (center of original excavation)

verification sample above action levels

verification sample below action levels

TITLE

RESULTS OF ECRA CLEANUP
SOIL LOCATION - 101-19

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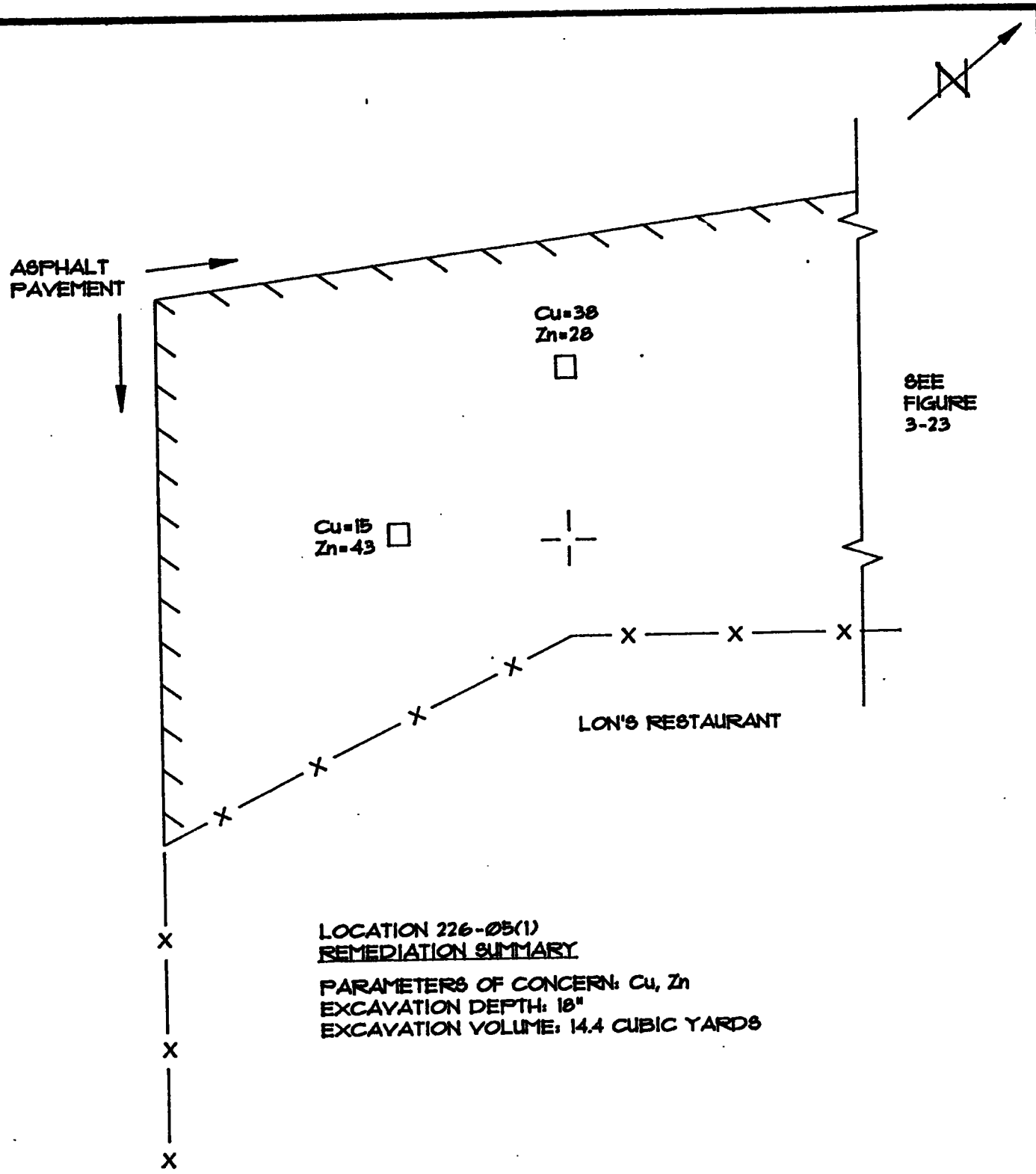
Environmental Resources Management

SCALE 1/5"=1'
DATE 10/89
FIGURE 3-21

139839



LEGEND
All concentrations are in parts per million unless otherwise noted.
ND=concentration not detected

—— X —— X —— X B-D Iron Fence

location of previous sampling requiring remedial action (center of original excavation)

verification sample above action levels

verification sample below action levels

TITLE

RESULTS OF ECRA CLEANUP
SOIL LOCATION - 226-05(1)

PREPARED FOR
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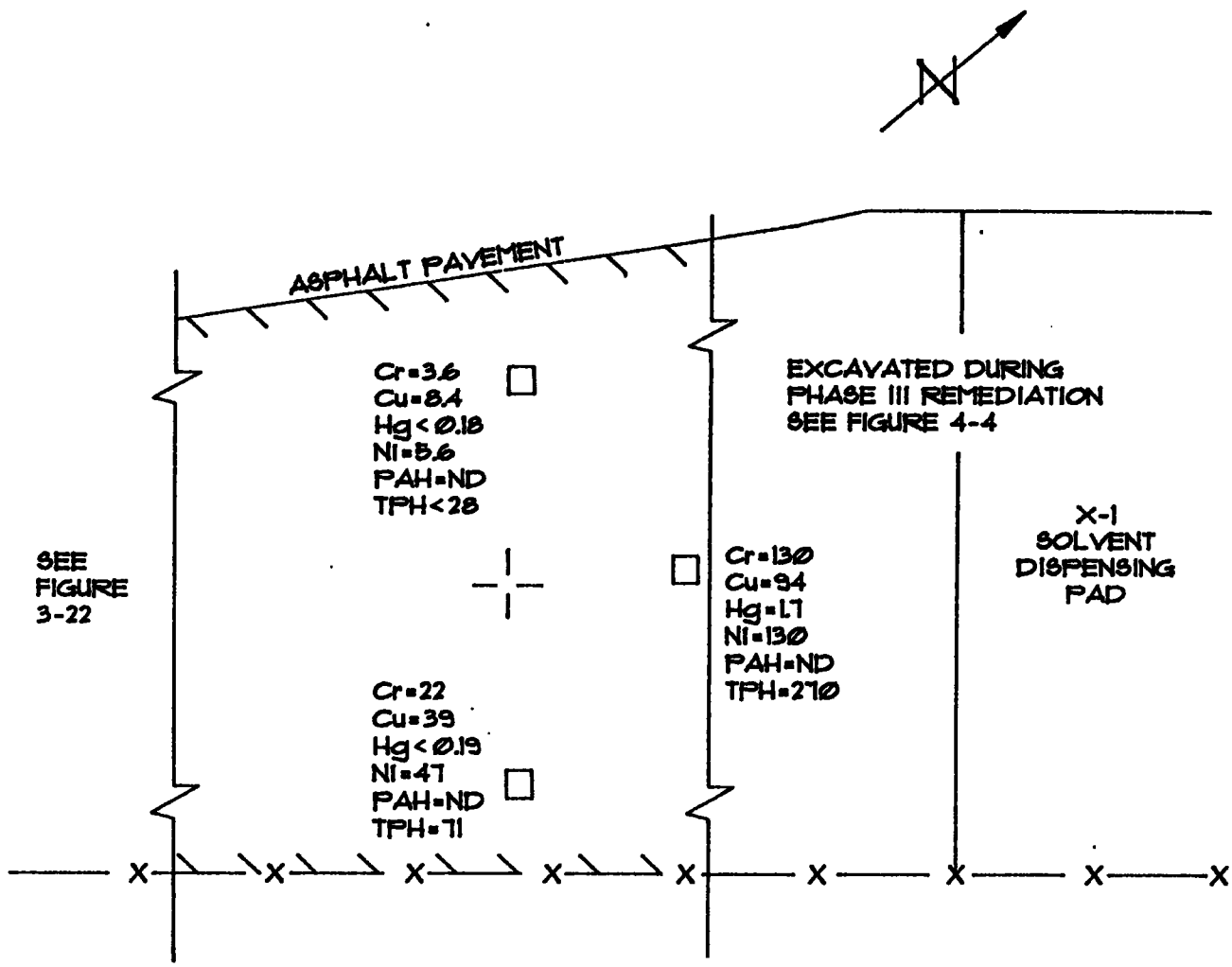
ERM-Northeast
Environmental Resources Management

SCALE 1/5"=1'
DATE 10/89
FIGURE 3-22

139839



LOCATION 226-03

REMEDIATION SUMMARY

PARAMETERS OF CONCERN: Cr, Cu, Hg, Ni, PAH, TPH
EXCAVATION DEPTH: 18"
EXCAVATION VOLUME: 11.7 CUBIC YARDS

LEGEND

All concentrations are in parts per million unless otherwise noted.
ND=concentration not detected

X——X——X B-D Iron Fence

location of previous sampling requiring remedial action (center of original excavation)

verification sample above action levels

verification sample below action levels

TITLE

RESULTS OF ECRA CLEANUP
SOIL LOCATION - 226-03

PREPARED FOR

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Environmental Resources Management

SCALE 1/5"=1'
DATE 10/89
FIGURE 3-23

139839

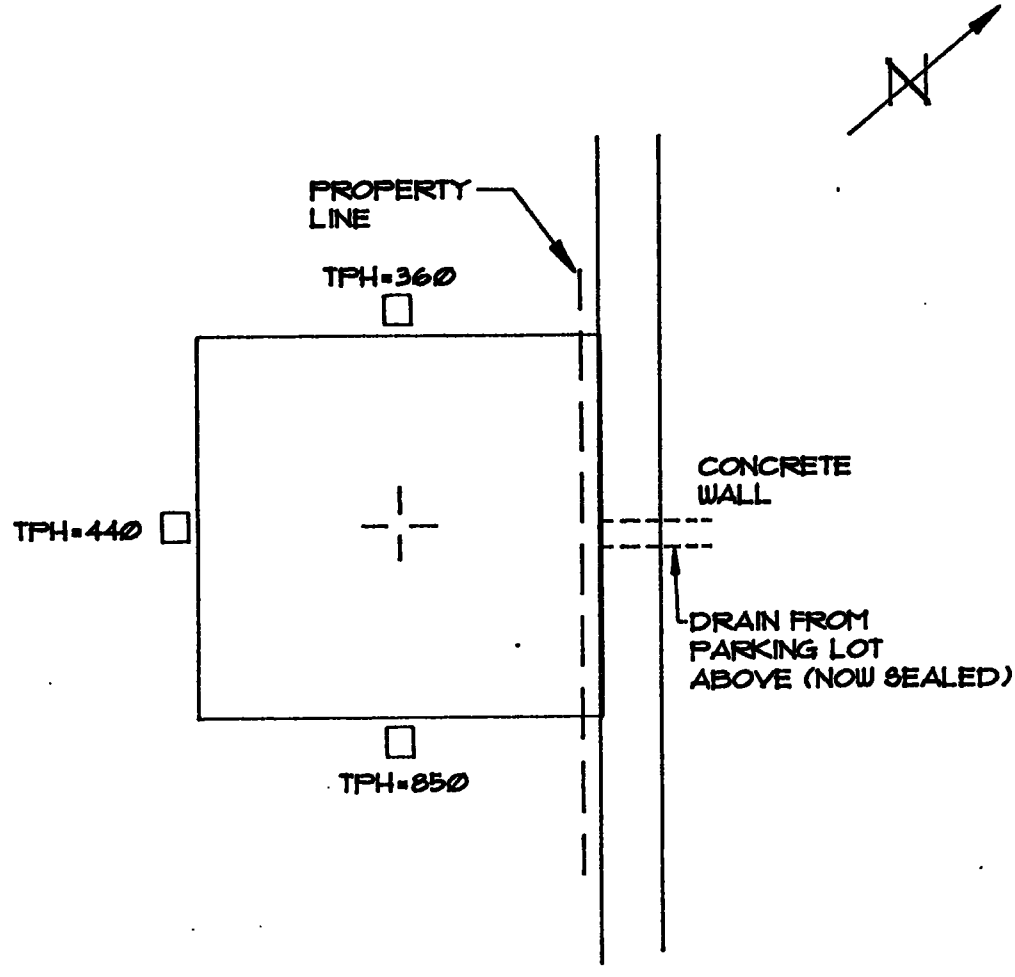
Building X-1 concrete slab was removed to a depth of at least 18 inches below grade. This soil area, which also contains locations 226-01 and 226-02, was removed because of the proximity of the four excavations. Perimeter verification samples showed contaminant concentrations to be less than the cleanup levels.

Approximately 26 cubic yards of soil were removed from this location. The entire soil area shown in Figures 3-22 and 3-23 was backfilled on July 25, 1989.

Location 233-01

Location 233-01 is shown on Figure 3-24. The parameter of concern at this location was TPH. This location was excavated to at least 50 inches below grade, where ground water was encountered. All perimeter verification samples displayed concentrations of TPH below the cleanup level.

Approximately 15 cubic yards of material were excavated from this location and placed in the hazardous waste stockpile. The excavation at location 233-01 was backfilled on July 24, 1989.



LOCATION 233-01
REMEDIATION SUMMARY

PARAMETER OF CONCERN: TPH
EXCAVATION DEPTH: 5Ø"
EXCAVATION VOLUME: 15.4 CUBIC YARDS

LEGEND
All concentrations are in parts per million unless otherwise noted.
ND=concentration not detected

- location of previous sampling requiring remedial action (center of original excavation)
- ■ verification sample above action levels
- □ verification sample below action levels

TITLE
RESULTS OF ECRA CLEANUP
SOIL LOCATION - 233-01

PREPARED FOR
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ERM-Northeast
Environmental Resources Management

SCALE 1/5"=1'
DATE 10/89
FIGURE 3-24

139839

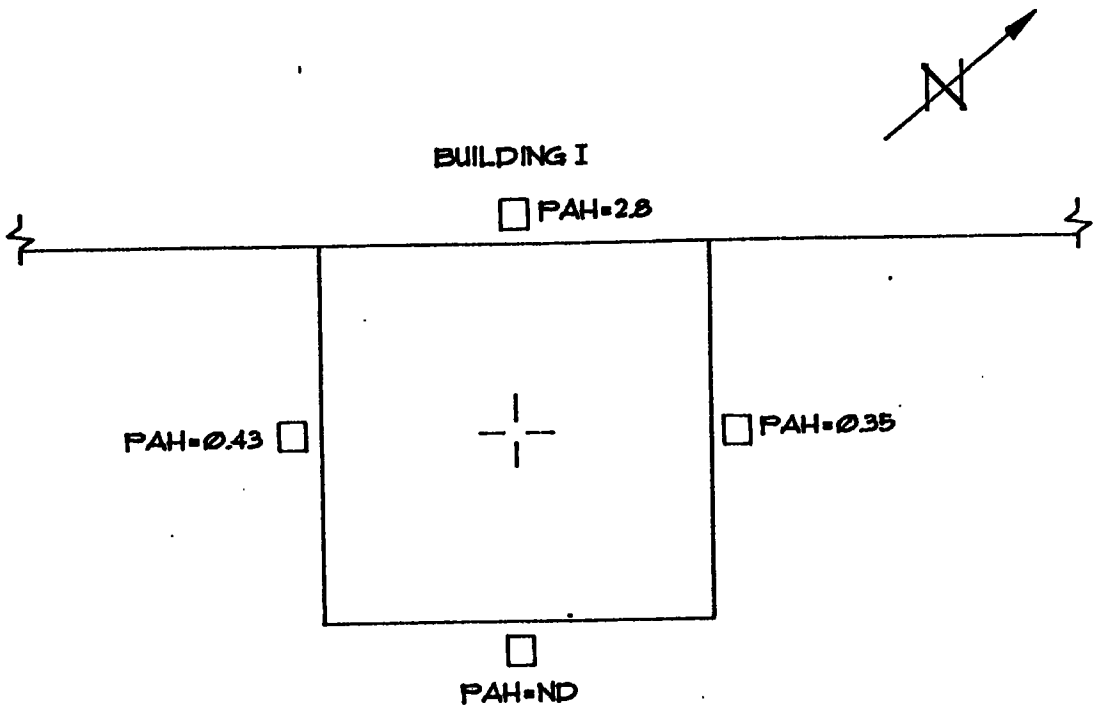
Location 235-01

Location 235-01 is shown on Figure 3-25. The parameters of concern at this location were base neutral organic compounds (BN) and PAH. This location was excavated to at least 23 inches below grade, where a verification sample displayed concentrations of BN and PAH below the cleanup levels. All perimeter verification samples also displayed concentrations of BN and PAH below the cleanup levels.

Approximately 7 cubic yards of material were excavated from this location which was backfilled on July 25, 1989.

3.1.3 Disposal of Contaminated Soil

During the course of soil remediation, three soil stockpiles were established based upon prior characterization of soil contamination. The three stockpiles were for non-hazardous soil, hazardous soil and polychlorinated biphenyl (PCB) contaminated soil.



LOCATION 235-01
REMEDIATION SUMMARY

PARAMETERS OF CONCERN: BN Organics, PAH
EXCAVATION DEPTH: 23"
EXCAVATION VOLUME: 7.1 CUBIC YARDS

LEGEND
All concentrations are in parts per million unless otherwise noted.
ND=concentration not detected

location of previous sampling requiring remedial action (center of original excavation)

verification sample above action levels

verification sample below action levels

TITLE

RESULTS OF ECRA CLEANUP
SOIL LOCATION - 235-01

PREPARED FOR
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EAST RUTHERFORD, N.J.

ERM-Northeast
Environmental Resources Management

SCALE 1/5"=1'
DATE 10/89
FIGURE 3-25

139839

Non-Hazardous Soil

Twenty-nine loads of non-hazardous soil were transported to Breitenstine landfill in Waynesburg, Ohio on September 28 (10 loads), September 29 (15 loads) and October 6, 1989 (4 loads). A total of 673.4 tons of non-hazardous soil was removed from the site. The non-hazardous waste manifests that accompanied the waste to the disposal facility are included in Appendix C-3.

PCB - Contaminated Soil

One load of PCB-contaminated soil was transported to the Chemical Waste Management, Inc. facility in Emelle, Alabama on September 29, 1989. A total of 26.7 tons of PCB-contaminated soil was removed from the site. The hazardous waste manifest that accompanied the waste to the disposal facility is included in Appendix C-3.

3.2 Stormwater Drainage System Remediation

The stormwater sewers located in Parcel No. 2 were cleaned during July and August, 1989 by VSI Technologies, Inc. of Baltimore, Maryland, a subcontractor to SES. Figure 3-26, provided

in a back pocket of this report, presents a plan view of the basins, grated trenches and connecting piping that make up the sewer system.

Sampling of sediment in various catch basins was performed by ERM-Northeast personnel prior to cleaning in order to characterize material within the basins. Sampling results are included on Figure 3-26 and laboratory data reporting sheets are included in Appendix B-2.

The pipes, trenches, catch basins, and cesspools that formed the parcel-wide drainage system were cleaned to remove all solids and sediments from the system.

3.2.1 Overview of Remedial Procedures

Equipment used during the cleanout consisted of a 10,000 psi high-pressure waterline, a vacuum truck, and water pumps. Roll-offs were used for the staging of solids prior to disposal and a temporary holding tank was used for the storage of wastewater prior to disposal.

The drainage system was divided into seven segments to better manage the cleanup efforts. The line designations are

shown on Figure 3-26. From the sampling results, some lines (Lines 4, 5, and the Building W Tunnels) were found to contain elevated levels of contamination and were cleaned separately from other lines. All material removed from these lines was placed in a dedicated roll-off for disposal as a hazardous waste. Lines with lower levels of contamination (Lines 1, 1A, 2, and 3) were placed in a separate roll-off to avoid cross-contamination.

Cleaning Procedures

All catch basins, trenches, and cesspools were cleaned by spraying all surfaces with high pressure water. Solids and washwater were then removed by the vacuum truck.

Pipes were accessed from the catch basins and open trenches. Each line was cleaned from its upgradient end to its downgradient end, so that solids, washwater, and stormwater always flowed from cleaned lines to uncleaned lines. A self-propelling nozzle was placed on the high pressure water line, and the nozzle travelled from the downgradient end of each pipe to the upgradient end. A high pressure jet stream was sprayed radially from the back of the nozzle propelling the nozzle forward in each pipeline while

cleaning the pipe walls. Sediments and washwater were flushed into the catch basin or trench used to access the pipeline. All solids and washwater were removed from the catch basin by the vacuum truck.

When the vacuum truck was full, the liquid was decanted into the holding tank. Solids that had settled in the truck were transferred into the appropriate roll-off.

The cleanliness of the lines was verified by observing the washwater that was generated during cleaning. Each component of the lines was cleaned repeatedly until the washwater was crystal clear and there were no noticeable odors present. Where possible, a visual inspection of the pipeline was made. A detailed description of the cleaning of each line, and the verification procedures taken is provided in Section 3.2.2.

Waste Disposal

Wastewater was transferred from the holding tank into a tanker trailer truck which transported the wastewater to the disposal facility. E.I. Dupont Chambers Works wastewater treatment facility in Deepwater, N.J. was used for disposal.

Five loads of wastewater (approximately 23,500 gallons) were disposed. The non-hazardous waste manifests that accompanied the wastewater are provided in Appendix C-2.

Solids which had settled to the bottom of the holding tank while awaiting disposal were added to the roll-off containers. Residual free liquids and semi-solids were solidified with inert absorbent material. Samples were collected from the roll-offs, to characterize these wastes. The solidified material and the holding tank liner was placed with the solids collected during the drain system cleanout activities for disposal.

Prior to implementing the storm water drain cleanout, it was anticipated that wastes from certain lines (Nos. 4, 5, Tunnels) would require incineration due to the land ban disposal restrictions. However, waste classification from sample analysis showed that all solids required incineration.

After solidification of residual free liquids and semi-solids, the resulting stabilized material (estimated at 70 tons) in the two roll-offs was evenly distributed in these containers. Disposal site acceptance (incineration) is currently being applied for. Acceptance is expected in

November at which time the roll-offs will be transported to the disposal site.

3.2.2 Description of Cleaning and Verification Procedures

The following paragraphs provide a detailed description of the cleaning and verification procedures employed for each portion of the storm water drainage system. The descriptions for each line are presented in the order of cleaning (upgradient portions first) and are not necessarily in numerical order.

Line 1

Line 1 is located beneath the former slab of Buildings G, R, and X, and is comprised of pipes, catch basins, and a drainage trench. This line provides drainage for stormwater, and is impacted by tidal flow from Berry's Creek. A 90 gpm pump was not capable of diverting incoming tidal flow from any of the catch basins except those upgradient of Building G. Therefore, the cleanout of this line had to be performed at low tide. When daily work was completed, sandbags were placed at the mouth of the pipe that had been cleaned last. This

prevented downgradient solids from depositing in cleaned sections of pipe when the tide rose.

The integrity of Line 1 was poor. Three of the seven sections of pipe, identified in Figure 3-26, had breaks in them. In addition, the concrete bottoms in two of the catch basins had deteriorated. In these catch basins, soil was removed from the bottom until no stormwater sediments remained.

The initial washwater generated from Line 1 was grayish black with a petroleum-like odor. Several of the pipelines had to be cleaned numerous times until the draining washwater ran clear and odorless. Pipelines that had breaks in them could not generate clear washwater since the high-pressure unit blasted soil into the pipeline. However, there was a noticeable difference between the dirty washwater (from storm drain sediments) and washwater containing soil. The soil that was blasted into the pipelines was a clean sandy material and could be distinguished easily from the dirty (grayish black at first) washwater. Cleaning was performed until it was evident that all contaminated material had been removed from a pipe and that any remaining turbidity was attributable to soil forced into the pipe.

fair. The grated trenches were in very good condition with all sides and bottoms intact. However, the pipes were in poor condition, with separation at most joints. Also, one of the pipes was collapsed, making cleaning impossible past this break.

Line 2 was reasonably clean and required a minimum of cleaning effort. Sandy sediments were removed from all structures in Line 2. The cleaning of this line was performed until all washwater ran crystal clear.

After Line 2 was cleaned, sandbags were placed in Catch Basin E to prevent Line 3 sediments from flowing into Line 2. All Line 2 trenches were covered with geotextile and gravel to prevent debris from falling into the trenches.

All sediments collected from Line 2 were placed in the "non-hazardous" roll-off.

Line 1A

Line 1A is located between Building W and Buildings G, R, and X, and consists of a drainage trench and pipes. Line

1A provides stormwater drainage and is also affected by tidal flow, as was Line 1.

The integrity of this line is good. The sides and bottom of the trench are intact and there were no breaks found in the pipe at the upgradient end of the line.

The cleaning of this line consisted primarily of removing sandy sediments and was performed until the washwater ran crystal clear.

When the cleaning of Line 1A was completed, the grated trench was covered with geotextile and gravel to prevent debris from falling into the trench.

Sandbags that were placed in catch basin A to protect Line 1 also protected Line 1A, preventing solids from washing into the cleaned lines during tidal, storm, or cleaning events.

All sediments collected from Line 1A were placed in the "non-hazardous" roll-off.

Tunnels

The north and south tunnels running beneath the Building W slab were built as pipe chases for roof leaders. Each tunnel had a concrete trough which ran along the side to drain stormwater from the building roof. Historically, production area floor drains were also connected to this system.

Both troughs were in good condition, with no noticeable breaks or holes. The pipe connecting the north tunnel trough to Catch Basin A was in good condition, and was accessed at Catch Basin A. The pipe connecting the south tunnel trough to Line 5 was also in good condition, but had to be accessed from the downgradient end of the trough.

The cleaning of the open troughs was straightforward. The high pressure unit was used to spray the sediments to the downgradient end, where the vacuum removed the sediments and washwater. Cleaning was performed until the washwater ran crystal clear.

Testing by ERM-Northeast personnel indicted high levels of contamination in the north tunnel trough. All material

removed from both troughs was therefore placed in the "hazardous" roll-off.

Line 4

Line 4, located between the downgradient part of Line 3 and Building W, is made up of catch basins and pipes. This line provides stormwater drainage, and is affected by tidal flow in the downgradient end. This tidal flow is only noticeable at highest tide, and did not hamper the cleaning efforts.

The integrity of Line 4 was good. All structures were intact with no breaks. Visual inspection of the pipes was possible in this line, and was made for each pipe.

This line contained dark, sediments in the pipes and catch basins. Most of the pipes had to be washed several times with the high-pressure unit before clean water flowed through the pipes. The cleanliness of the catch basins was verified with the final flow of crystal clear water.

Previous sampling indicated elevated levels of contamination in the sediment of Line 4. For this reason,

all solids removed from Line 4 were placed in the "hazardous" roll-off.

Line 3

Line 3 is located on the southwest side of Buildings L and W, and is made up of pipes, catch basins, and two septic tanks. Line 3 runs from the septic tanks at the upgradient end, to Catch Basin B at the downgradient end.

This line provides ground water drainage in an area of artesian conditions, and the downgradient end is also affected by the tidal flow mentioned previously. The flow of ground water through the system made it necessary to use pumps to divert the ground water around the segment being cleaned so that the pipes could be cleaned. Cleaning of the downgradient end of Line 3 also had to be scheduled according to the tides, as was Line 1, since the pumps were not capable of removing all of the high-tidal flow.

The integrity of Line 3 was good. The catch basins were intact, although two catch basins had caved-in floors. The pipes had a few breaks at the joints which made cleaning difficult, but flow was not blocked or impeded to any extent.

Some sediments and water were removed from the septic tanks. The rest of the line contained only sandy sediments. All of the material removed from this line was placed in the "non-hazardous" roll-off. The cleaning of this line was performed until the washwater ran crystal clear.

When the cleaning of Line 3 had been completed, sandbags were placed in catch basin B to prevent material from uncleaned lines from flowing into this line during storm, tidal, or cleaning events.

Line 5

Line 5 is comprised of the pipes that connect Catch Basins A & B and Catch Basins A & C, and Catch Basins A, B, and C. Line 5 provides common drainage for all of the other lines in Parcel No. 2, and carries stormwater and ground water, as well as tidal flow.

All work on this line was conducted at low tide. Ground water flow was diverted from Catch Basin B to Catch Basin C so that the pipes had no water flowing through them and could be easily cleaned.

A large amount of material was removed from Line 5 which was found to be in good condition. Sediments half-filled each pipe in the line, and also were deposited approximately 2 feet above each catch basin bottom. These sediments reduced the efficiency of the site-wide drainage system by creating a bottleneck at the common downgradient drainage point. After the line was cleaned out, the improvement of flow was noticeable.

The Line 5 cleanout took approximately one day to complete because of the volume of sediments removed. Cleaning was repeated until the washwater flowed crystal clear.

Because Line 5 was downgradient from Line 4 and the tunnel troughs, where sampling had indicated high levels of contamination, the material removed from Line 5 was placed in the "hazardous" roll-off.

After Line 5 was cleaned, the three catch basins were covered with geotextile and gravel to prevent debris and sediment from washing into the system. When cleanout of the parcel-wide drainage system was completed, all sandbags were removed to allow unimpeded ground water flow from the site.

The sandbags were placed in the "hazardous" roll-off to be disposed of along with the stormwater system sediments.

3.3 Phase II Building Decontamination

In preparation for Phase II demolition, the Building Decontamination Plan for Parcel Nos. 1 and 2 was implemented in Buildings C, G, G-1, I, L, R, W, X, and X-1, to ensure that no hazardous materials were present in the demolition debris. Decontamination was performed by CECOS International, Inc. during June, July, and August, 1989.

3.3.1 Description of Decontamination Procedures

Building Decontamination was performed in three steps. Initially, all identifiably hazardous substances and all unknown substances remaining in each building were collected and sorted into compatible groups. B-D had previously vacated the buildings and removed most equipment and substances for resale and/or reuse. B-D subsequently disposed of valueless substances collected in this step using their industrial/ hazardous waste transporter and disposer.

The next step was asbestos abatement. All asbestos containing materials were removed from each building by Quality Asbestos Removal (QAR) of Carteret, New Jersey. QAR removed approximately 11,000 linear feet of pipe insulation, 7,200 square feet of wall board and transite and 200 square feet of floor tile in Buildings W, L, GRX, G-1 and I. Buildings C and X-1 did not contain asbestos.

Building decontamination was implemented following asbestos removal. Building decontamination tasks included: washing or removing stained areas, decontaminating remaining equipment and fixtures by draining fluids and washing, and collecting and removing residual wastes.

Concrete stains were removed by power washing or by scabbling. Scabbling equipment consisted of machines that work like small jackhammers to break up the surface (upper 1/8 to 1/4 inch) of the concrete. The residue from this process was consolidated for later disposal. Concrete floors with an epoxy surface or with minor staining were cleaned with a power washing machine. All contaminated building material that could be removed from the buildings, such as wood flooring and shelving, PVC and metal piping, and stained floor tiles, was placed in roll-off containers for disposal.

All sludge was removed from drainage pits identified in Buildings L and W. These pits were then power washed, with the wash and rinse water collected for disposal.

All washwaters generated during building decontamination were placed in the stormwater cleanout holding tank for disposal at the E.I. Dupont Chambers Works wastewater treatment facility.

3.3.2 Verification Procedures and Summary

The following sections will discuss specific decontamination tasks performed in each building, and will provide a summary of wastes generated during building decontamination activities. Building decontamination is discussed in the order in which it was performed.

Table 3-1 of the Building Decontamination Plan (Table 3-1, BDP) for Parcel Nos. 1 and 2 presented a list of materials, equipment and other building features identified as possibly requiring decontamination cleanup. This list was compiled during an investigation of each building in Parcel Nos. 1 and 2 conducted in the summer of 1988.

Since this time, B-D has performed considerable work dismantling the manufacturing process equipment. Equipment, machinery, tanks, etc. were relocated to other B-D facilities or sold (for either reuse or scrap metal). For example, all electroplating equipment and tanks were sold to another electroplating manufacturing company.

Therefore, prior to beginning decontamination work, an in-depth investigation of Buildings C, G, G-1, I, L, R, W, X and X-1 was conducted to determine which items listed in Table 3-1, BDP required decontamination cleanup. Table 3-2, presented in this report, duplicates a portion of Table 3-1, BDP and indicates whether decontamination cleanup was required for each concern listed. The specific cleanup action taken is listed in the "action" column. If no decontamination was required, "NDR" is listed in the "action" column. Where B-D had previously removed the equipment machinery, substance, etc., "removed" is listed in the action column.

3.3.2.1 Building W

Decontamination work was performed in Building W during June and July, 1989. The four major tasks in Building W were the decontamination of the electroplating area, the metal

TABLE 3-2

SUMMARY OF REQUIRED DECONTAMINATION PLAN ACTIVITIES AND COMPLETED REMEDIAL ACTIONS

Parcel No.	Building Designation	Potentially Hazardous Raw Materials and Wastes	Action	Equipment	Action	Building Features	Action	Miscellaneous
	G, Mechanic Shop	- Gas cylinders, oils/ grease, maintenance supplies	Removed	- Modine unit heaters, bench saw, drill press, lathe, abandoned equipment stored under overhang pipe racks with pipe stock	Removed	- Natural gas system PV&F - Concrete floors have oily residue & stains	NDR Removed	
	R, Carpenter Shop & Hardware Stock Room	- Paints & thinners - Jugs acid - Jars of unknowns (oils, greases, adhesives) - Gas cylinders	Removed Removed Removed Removed	- Cyclone & bag filter - Sump condensate tk & pump - Sump pump - Wall heating units - Electric motor storage	NDR NDR NDR NDR Removed	- Dust Collection system - Sump - Concrete floors stained - Natural gas system PV&F - Sta PV&F - Drain (plate cover)	NDR NDR Removed NDR NDR Cleaned	
	X, Machine Shop Office Locker Room Storage Area	- Janitorial supplies - Used oil storage drums & oils	Removed Removed	- Electrical motor storage - Water heater - Modine unit heaters - Lathes, drill presses	Removed NDR NDR NDR	- Drain (green plate cover) - Natural gas piping - Sta PV&F - Concrete floors oily residue and stained/walls stained & oily residue - Roof drain with cleanout	Cleaned Removed NDR Removed NDR	
	G-1, Storage Shed & Overhang Drum Storage Area (empties)	- Solvents, fuel oils, alcohols	Removed	- Exhaust system duct work in compartment #1 - PV&F Sta heat in all 3 compartments - Floors stained & residue buildup, walls stained in all three compartments - Floors stained & oily residue under overhang	NDR Removed Removed			
	X-1, Storage Area with Roof			- Concrete sump - Concrete slab	Cleaned Cleaned			
	W-1	- 55 gal drums used oil	Removed	- Dust collection duct system - Sta PV&F - Drain piping stub ups above floor - Access to trough covered by metal plates - Trough below floor - Floor oily & stained - Gas piping PV&F - Small access plate in floor	NDR NDR Cleaned Cleaned Cleaned NDR NDR			

NDR - No Decontamination Required

TABLE 3-2
SUMMARY OF REQUIRED DECONTAMINATION PLAN ACTIVITIES AND COMPLETED REMEDIAL ACTIONS

Parcel No.	Building Designation	Potentially Hazardous Raw Materials and Wastes	Action	Equipment	Action	Building Features	Action	Miscellaneous
	L-1, Plant Office					- HVAC above drop ceiling	NDR	
						- Stm PV&F	NDR	
	L-1, 2nd Floor Data/ Computer Area above Plant Office					- HVAC above drop ceiling	NDR	
	L (Outside L-1)					- Concrete pad stained	No Staining Observed	Transformers Removed
	L-2, QC Office, L3, 4, 5, 6					- HVAC above drop ceiling	NDR	
						- Stm PV&F above drop ceiling	NDR	
	L-7, Teflon Room	- Caustic soda wash bath	Removed	- Modine unit heater	NDR	- Sinks to stub up drain	Removed	
				- Oven	Removed	- PV&F steam	NDR	
				- Teflon mill	Removed	- Natural gas system	NDR	
				- Caustic soda dip tank with fume hood	Removed	- Exhaust vent	NDR	
						- HVAC vent	NDR	
						- Floors stained	Removed	
	L-8, 9, 10			- Water heater in Mens Room	NDR	- HVAC ducts	NDR	
						- PV&F steam	NDR	
						- PV&F city water	NDR	
	Aisle "A"					- PV&F Stm	NDR	
	L-13, Loading Dock	- Hydrogen gas cylinder storage area full/empty	Removed	- Modine unit heater	NDR	- Stm PV&F	Removed	
		- (20) 5 gal safety cans acetone, methanol, butyl alcohol, waste alcohols, 7 safety cans varsol, oakite	Removed			- Floor has oily residue	Removed	
	L-12, Caged Area	- Oil	Removed	- Shelving for stock	Removed	- Floors stained & oily residues near packaging equipment	Removed	
				- Conveyor system	Removed			
				- Packaging equipment	Removed			
				- Oil tank recirculating system	Removed	- STM PV&F	NDR	
						- HVAC system	NDR	

NDR - No Decontamination Required

SUMMARY OF REQUIRED DECONTAMINATION PLAN ACTIVITIES AND COMPLETED REMEDIAL ACTIONS

Parcel No.	Building Designation	Potentially Hazardous Raw Materials and Wastes	Action	Equipment	Action	Building Features	Action	Miscellaneous
						- Two floor drains	Cleaned	
						- Access plates (sump)	Cleaned	
	IL-11			- Shelving	Removed	- HVAC	NDR	
						- Floors stained	Removed	
						- STM PV&F	NDR	
						- Sump and trough in floor under shelves covered by plates, sump covered with plate under shelves	Cleaned	
	IL-14, Annealing Area			- Annealing equipment	NDR	- Floors stained	Removed	
						- Sump	Cleaned	
						- STM PV&F	NDR	
						- Natural gas piping	Removed	
						- HVAC duct system	NDR	
	IL-15, A/C Gauge Room	- Cans of adhesive aersol	Removed			- HVAC duct system	NDR	
						- STM PV&F above drop ceiling	NDR	
	IL-16			- Shelves	Removed	- HVAC duct systems overhead	NDR	
						- STM PV&F	NDR	
						- Natural gas piping	Removed	
						- Floors are stained & residue buildup	Removed	
	IL-17, 18	- Kegs of abrasives	Removed	- Polishing abrasives	Removed	- Sta PV&F	NDR	
				- Dust collector & bag house	NDR	- HVAC system	NDR	
						- Dust collector duct work to torit cyclone	NDR	
						- Floors stained, walls stained	NDR	
	IL-19	- Fiber drums of Uni-Fine powder	Removed	- Torit cyclone	NDR	- Condensate PV&F system with sump outside	NDR	
				- Unit heater machine	NDR			
				- Dust collector & bag house	NDR	- Dust collector duct work to torit cyclone	NDR	
						- Ceiling, floors stained with heavy powder build-up	NDR	
	IL-20			- Compressor	NDR	- Compressor PV&F	NDR	
						- Floor oil stain & powder residue, walls with powder residue build-up	No Staining Observed	

NDR - No Decontamination Required

TABLE 3-2
SUMMARY OF REQUIRED DECONTAMINATION PLAN ACTIVITIES AND COMPLETED REMEDIAL ACTIONS

Parcel No.	Building Designation	Potentially Hazardous Raw Materials and Wastes	Action	Equipment	Action	Building Features	Action	Miscellaneous
	IL-21	- Bags of dryolite	Removed	- Deep well pump	Removed	- Deep well abandoned	Abandoned	
	IL-22	- 5 gal buckets oils & greases	Removed	- Lathes, drill presses, alcohol dip bath tank, soak/cleaner tanks, alcohol dip tank, acid dip tank, flammable storage cabinet for alcohols	Removed	- One large oil skimming sump	Cleaned	
		- Safety cans of oils & greases	Removed			- STM PV&F	NDR	
		- 50 lb bags of sodium bicarbonate	Removed			- HVAC duct work	NDR	
		- 55 gal drums of cleaning products	Removed			- Floor drains	Cleaned	
						- Stub up drains	Cleaned	
						- Drains with hard piping	Cleaned	
						- Floors with heavy oily residues & chemical staining	Cleaned	
						- Above grade troughs to floor drain stub ups	Removed	
						- Oil drip pans	Removed	
						- Fume hood exhaust systems for acid wash tanks & alcohol dip tank	Removed	
	IL Aisle "B"			- Wall heating units	NDR	- STM PV&F	NDR	
	IL-23	- Oils/solvents	Removed	- Lamp room equipment	Removed	- Raised wood floor with grating - heavy oil residue & staining on wood floor & concrete floor below	Removed	
		- (8) gas cylinders hydrogen	Removed	- Parts washing tub with drain to 5 gal cans	Removed			
		- 55 gal used oil drums	Removed	- 2 floor mounted hydraulic lifts	NDR			
		- Safty cans for solid waste (oil soaked pads)	Removed			- Sta PV&F	NDR	
						- HVAC duct work	NDR	
						- Natural gas PV&F	Removed	
						- Oxygen PV&F	Removed	
						- Oil drip pans	Removed	
						- Walls oil residue	Removed	
						- Concrete floor beneath wood	Cleaned	
	IL-24, Loading Dock & Compressor Area	- 55 gal drum oil	Removed	- Condensate pump, compressors knock out drums, rinse tanks	Removed	- Sump & drain	NDR	
						- Floors oily residue	Cleaned	
						- Sta PV&F	NDR	
						- Oil drip pans	Removed	
						- Air compressor exhaust ducts	NDR	
						- Dock area staining	Removed	
						- Trough outside of dock entrance	Cleaned	

NDR - No Decontamination Required

TABLE 3-2
SUMMARY OF REQUIRED DECONTAMINATION PLAN ACTIVITIES AND COMPLETED REMEDIAL ACTIONS

Parcel No.	Building Designation	Potentially Hazardous Raw Materials and Wastes	Action	Equipment	Action	Building Features	Action	Miscellaneous
	L-25, Mandrel Room	- Safety can	Removed	- Unit heater, mandrel equipment, torit dust collector, 2 lathes, surface grinder, drill press	Removed	- Sta PV&F	NDR	
						- Floor oily residue	Removed	
	L-26			- Office equipment, pump at sump	Removed	- Sta PV&F	NDR	
						- 3 sumps with metal covers	Cleaned	
	L-27, Men's Room					- Sta PV&F	NDR	
	L-28, Women's Room					- Sta PV&F	NDR	
	L-29, Porter Storage	- Storage batteries, cans used paints	Removed			- Sta PV&F	NDR	
						- Floors stained	Removed	
	J & K Offices, Restrooms, Utility & Equipment Rooms			- Water heater	NDR	- HVAC above drop ceiling	NDR	
						- PV&F Sta above drop ceiling	NDR	
						- PV&F risers to wall heating units	NDR	
						- PV&F horizontal runs to wall heating units	NDR	
	I, Offices	- 20 gal phosphoric acid	Removed	- Blue print equipment with developing chemicals	Removed	- Concrete floor by back door has chemical residue & staining	Removed	
		- 5 gal bucket oil products	Removed					
		- 5 gal fuel can	Removed					
		- 95 lb car boy of sulfuric acid	Removed			- HVAC above drop ceiling	NDR	
						- Wall heating units	NDR	
		- Sodium nitrate 2.5 kg jar	Removed			- PVF Stm system	NDR	
		- Glycerol 1 gal jar	Removed					
		- Trichloroethylene	Removed					
		- Various reagents in plastic jars						
		- Ammonium hydroxide	Removed					
	C, Gardiners Shed	- Gasoline, motor oils, anti-freeze, cleaning products	Removed	- Mowers	Removed	- Concrete floors have oily residue	Removed	
						- PV&F steam/wall heating units	Removed	

NDR - No Decontamination Required

SUMMARY OF REQUIRED DECONTAMINATION PLAN ACTIVITIES AND COMPLETED REMEDIAL ACTIONS

Parcel No.	Building Designation	Potentially Hazardous Raw Materials and Wastes	Action	Equipment	Action	Building Features	Action	Miscellaneous
	W-2, Old Plating Shop			- Auto plating machine	Removed	- Sump	Cleaned	
						- Drain piping stub up	NDR	
						- Floors chemical residue build up	Removed	
	W-3			- Benches	Removed	- Floors, walls, ceiling have stains and/or chemical residue build up	Removed	
						- Drain piping along wall to floor stub ups	NDR	
						- Exhaust ducts	NDR	
						- Sta PV&F	NDR	
	W-4	- Waste alcohol storage cans	Removed	- Drills/mills/buffing wheels/ grinders	Removed	- Trough access plate	Cleaned	
						- Dust collector exhaust ducts	NDR	
						- HVAC duct system	NDR	
						- Sta PV&F	NDR	
						- Floors stained	Removed	
						- Gas piping	NDR	
						- Small access plate covers in floor	Cleaned	
	W "A" & "B" Aisles	- 55 gal drums, oil	Removed			- Sta PV&F	NDR	
		- Brass turnings & scrap metal	Removed			- HVAC duct work	NDR	
	W-5	- Trichloroethane	Removed	- Vapor degreaser	Removed	- Trough access plate	Cleaned	
		- 55 gal drums	Removed	- Overhead oil recirculating tank	Removed	- Sta PV&F	NDR	
		- Waste oil cans & drums	Removed			- Natural gas PV&F	NDR	
		- Solid waste safety cans (rags)	Removed	- Maching shop equipment lathes/presses, hand screws	Removed	- HVAC duct work	NDR	
		- Drums cutting oils	Removed			- Overhead oil recirculating PV&F	Removed	
		- Safety cans liquid waste (oils)	Removed			- Floors oily residue & build-up	Removed	
						- Oil drip pans	Removed	
	W-6, Dock	- Acid storage in carboys & plating chemicals	Removed	- Hoding unit heater	NDR	- Floors stained	Removed	
						- Natural gas piping system	NDR	
	W-7, Plating Shop & Store Room	- Plating chemicals	Removed	- HDPE tanks	Removed	- Access plate to troughs	Cleaned	
		Acids/caustic soda		- Lined tanks	Removed	- Sta PV&F	NDR	
		Strippers/bleach		- HDPE evaporators	Removed	- Raised floor made of wood is stained	Removed	
		Alkaline based cleaning compounds		- Pumps	Removed	- Walls stained	Removed	
				- Filters	Removed			

NDR - No Decontamination Required

TABLE 3-2
SUMMARY OF REQUIRED DECONTAMINATION PLAN ACTIVITIES AND COMPLETED REMEDIAL ACTIONS

Parcel No.	Building Designation	Potentially Hazardous Raw Materials and Wastes	Action	Equipment	Action	Building Features	Action	Miscellaneous
				- Barrel & rack plating lines	Removed	- Concrete floor under wood floor sloped to drain to troughs	Removed	
				- Tumblers	Removed			
				- Centrifuges	Removed			
				- Rectifiers	Removed	- Plating bath exhaust	Removed	
				- Generator	Removed	- Hoods & ducts	Removed	
						- Evaporators	Removed	
						- Acid dip tank exhaust Hoods & ducts	Removed	
						- HVAC duct work	Removed	

NDR - No Decontamination Required

fittings production area, the tunnel floor and walls, and the floor drainage system. Figure 3-27 (back pocket) presents a plan view of Building W.

Electroplating Area

Metal parts associated with the medical apparatus formerly manufactured at B-D were electroplated with a noncorrosive chrome finish in the southeastern end of Building W - the electroplating area. All equipment associated with the electroplating process including plating tanks, pumps, centrifuges, as well as the plating solutions, was sold by B-D to an electroplating facility for reuse. The entire wood floor and portions of the wooden partition that separated the electroplating area from the rest of Building W that had been stained by electroplating liquids were removed and placed in a roll-off container for storage prior to disposal. The entire polyvinyl chloride (PVC) exhaust ductwork system was removed and placed in the same roll-off container. Two rooms adjacent to the electroplating area had floor stains from electroplating liquid seepage under the walls. The stained floor tiles in these rooms were also removed and placed in the roll-off along with the PVC piping, located in the south tunnel of Building W.

The electroplating area was swept to remove debris including small pieces of the wood flooring and PVC ductwork generated during building decontamination. The concrete floor was then scabbled to remove staining identified beneath the elevated wooden floor. The scabbling residue was placed in drums for subsequent disposal. To verify the effectiveness of the decontamination of the concrete floor, concrete chip samples were collected and analyzed for EP Toxicity chromium, copper, lead, nickel and zinc. The results of these samples were used to determine which sections of concrete required removal and disposal after demolition. The locations and results of the chip samples are presented on Figure 3-27 located in a back pocket of this report. The laboratory data reporting sheets for these samples are included in Appendix B-2.

Metal Fittings Production Area

The metal fittings production area previously contained screw machines where brass rods and tubes were machined before being electroplated. Floor stains from water soluble cutting oil were identified around the former locations of the screw machines. The entire production area was broom swept and

stained areas were scabbled. All debris and residue was placed in drums.

Tunnels Beneath Building W

Both tunnels that ran beneath the Building W floor slab contained sediment and some standing water on the floors. Samples of the sediment were collected and analyzed for disposal characterization. Locations and results of these samples are presented on Figure 3-27. Laboratory data reporting sheets for these samples are included in Appendix B-2. The sediment and water were removed using a vacuum. The sediment was placed in drums and the water was placed in the stormwater system cleanout holding tank. CECOS cleaned the floors and walls of the tunnels, but did not clean the drainage troughs. The drainage troughs were cleaned during stormwater system cleanout by VSI Technologies as stated earlier.

Floor Drainage System

After all other cleaning had been performed in Building W, the floor pits and drains were cleaned out. Locations of these pits and drains are presented on Figure 3-27. Sediment

removed from the pits was placed in drums. This sediment had been previously sampled. Sample results are presented on Figure 3-27 and laboratory data reporting sheets are presented in Appendix B-2. The pits and drainage lines were cleaned with a power washer and the washwater was collected and placed in the holding tank for subsequent disposal.

Miscellaneous Areas

Additional decontamination tasks completed in Building W include the following. The soniclean room (see Figure 3-27) was scabbled to remove floor stains. The residue was placed in drums. The remainder of the Building W floor was made of tile. Heavily stained tiles were removed and placed in the roll-off container. The rest of the floor was power washed to remove minor staining. The wash water was collected and placed in the holding tank.

3.3.2.2 Parcel No. 2 Outbuildings

The outbuildings in Parcel No. 2, consisting of Buildings C, G, G-1, I, R, X, and X-1, were decontaminated during July, 1989. The locations of these buildings are indicated on Figure 1-2.

Building I-Offices

The only building decontamination concern identified in Building I was minor floor staining located at the loading dock. The concrete slab was scabbled at that location and the solids were placed in a drum for disposal.

Building C - Gardener's Shed

The only building decontamination concern in Building C was minor floor staining. The entire concrete floor slab of this building was scabbled and the solids were placed in a drum for disposal.

Buildings G, R and X - Maintenance Buildings

Buildings G, R, and X were connected and formed one L-shaped building that housed the maintenance department. Buildings G, R, and X housed (1) the mechanic's shop, (2) the carpenter's shop and stockroom, and (3) the machine shop, an office and a locker room, respectively, The only decontamination concern identified in Buildings G and R were minor floor staining. These areas were scabbled. Heavy floor stains were identified in Building X around the former

locations of equipment such as lathes and drill presses. Since the floor of Building X was a tile floor, these stains were removed using a detergent solution. Stains on the concrete block wall were also removed by washing. All wash and rinse water was collected for disposal.

Building G-1, Paint Shed

Building G-1 was a small storage shed that consisted of three compartments housing oils, paints and other materials. The concrete floor slab in all three compartments was stained. The entire slab was scabbled and the solids were collected. One compartment was equipped with wooden shelves. The stained shelves were removed and placed into a roll-off container along with the electroplating wood floor.

Building X-1, Product Dispensing Pad

Building X-1, the raw materials dispensing pad consisted of a beamed reinforced concrete pad covered by a corrugated roof supported by steel columns and a masonry block wall. The building decontamination concerns identified were staining of the floor slab and the presence of a 1 foot by 1 foot sump.

The entire slab was scabbled and sediments were removed from the sump for disposal.

3.3.2.3 Building L

Decontamination activities in Building L were conducted during August, 1989. Major tasks included the decontamination of the Lamp Machine Room, the manufacturing area including the oil recirculating system, and the floor drainage system. Figure 3-28 (back pocket) presents a plan view of Building L.

Glass syringes were cut and formed out of glass tubes and rods in the lamp machine room. The lamp machines utilized hydraulic, cutting, and lubricating oils. Oil seeped onto and through the raised wood flooring and onto the concrete floor below. The oil-stained wood was removed and placed into roll-off containers for subsequent disposal. Two 30 cubic-yard containers were completely filled with wood.

After the wood flooring had been removed, an absorbent was spread on the concrete floor to soak up any oily residue. The floor was then swept and scraped and the absorbent was reapplied until no free oil or residue remained on the concrete. All residue generated during this process was

placed in drums. The entire concrete floor was then scabbled, exposing the unstained concrete below. The solids generated during the scabbling process were also placed in drums.

The manufacturing area in Building L was used for the grinding, polishing and finishing steps of glass syringe manufacture. Floor staining was identified in the vicinity of the former locations of the equipment in this area. Most of the concrete floor had an epoxy coating and was cleaned easily by power washing. The areas of floor that were not epoxy-coated were used for packaging and storage, and had only minor staining requiring power washing. Figure 3-28 indicates the location of the oil recirculating system in Building L. Initially, high pressure water was forced through each of the lines and into the oil recirculating sump. This water was then collected for disposal. The sump was then power washed.

Figure 3-28 also shows the location of the floor drainage system in Building L. All of the drainage pits were cleaned to remove sediment. The sediment was placed in drums for disposal. The drainage pits and pipes were then power washed. The floors in the Compressor Room, Mandrell Room, Pressure Blast Room, Teflon Room, and the loading docks were also power washed to remove minor floor staining. All wash and rinse

water generated during the decontamination of Building L was collected and placed in the stormwater system cleanout holding tank for subsequent disposal.

3.3.3 Waste Handling and Disposal

Table 3-3 presents a summary of the wastes generated during Phase II Building Decontamination activities. The table indicates from which building the waste was removed, the quantity of the waste generated, the facility at which the waste was disposed and/or the current storage location.

Drums of compatible wastes were transferred to two separate roll-off containers designated A and B. Roll-off Container A contains wastes generated during the decontamination of the electroplating area in Building W and other compatible wastes. Roll-off Container B contains wastes generated during decontamination of the lamp machine room in Building L and compatible TPH contaminated wastes. Table 3-3 lists the wastes that were bulked together in the roll-off containers.

On October 16, 1989 CECOS International, Inc. transported Roll-off Container A to the Chemical Waste Management, Inc. facility in Emelle, Alabama. On November 15, 1989, CECOS

ERM-Northeast

TABLE 3-3

PHASE II BUILDING DECONTAMINATION WASTES GENERATED/DISPOSED

Material	Amount	Disposal Site
Building C, G, R, I, X-1		
o Concrete Floor Scabbling Residue	1 drum	Stored on-site+
Building G-1		
o Concrete Floor Scabbling Residue	1 drum	Stored on-site+
o Wood Shelving	5 cubic feet	Stored on-site*
Building X		
o Washwater	100 gals.	E.I. Dupont Chambers Works Wastewater Treatment Facility, Deepwater, NJ
Building L		
o Wood Flooring from Lamp Room	60 cu. yds. (2 30 yd.roll-offs)	Stored on-site#
o Oily Solids Including Concrete Floor Scabbling Residue	22 drums	Stored on-site+
o Floor Pit Solids	6 drums	Stored on-site+
o Oily Glass	3 drums	Stored on-site+
o Washwater	400 gals.	Dupont WTF
Building W		
o Electroplating Area Wood Flooring	15 cu. yds	Stored on-site*
o PVC Ductwork and Piping from Electroplating Area	8 cu. yds.	Stored on-site*
o Floor Tiles	1 cu. yd.	Stored on-site*
o Assorted used personnel protective equipment (gloves, tyvex suits, dust masks, etc.)	1 cu. yd.	Stored on-site*

* Placed in Roll-off Container No. A (See Section 3.3.3)
\+ Placed in Roll-off Container No. B (See Section 3.3.3)
\# Placed in Roll-off Container Nos. C and D (see Section 3.3.3)

TABLE 3-3 (CONTINUED)

Material	Amount	Disposal Site
Building W (Continued)		
o Soniclean Room Sweepings and Scabbling Residue	55 gals. (1 drum)	Stored on-site+
o Electroplating Sweepings and Scabbling Residue	120 gals. (2 drums)	Stored on-site=
o Production Area Scabbling Residue	50 gals. (1 drum)	Stored on-site=
o South Tunnel Sludge	55 gals. (1 drum)	Stored on-site=
o North Tunnel Sludge	80 gals. (2 drums)	Stored on-site=
o Floor Pit Solids	40 gals.	Stored on-site+
o Washwater	500 gallons	Dupont WTF
Asbestos - Buildings		
W, L, GRX, G-1 and I		
o Pipe insulation	11,000 lin.ft.	IMF Landfill
o Wallboard/transite	7,200 sq.ft.	Clarkburg, West Virginia
o Floor Tile	200 sq.ft.	

* Placed in Roll-off Container No. A (See Section 3.3.3)
\+ Placed in Roll-off Container No. B (See Section 3.3.3)
\+ Disposed of separately in 55-gallon drums (see Section 3.3.3)

International, Inc. transported all of the drums to the same facility.

Copies of the hazardous waste manifests that accompanied the Phase III waste materials to the disposal facility are included in Appendix C-3.

3.4 Building Demolition

The remaining demolition began on August 28, 1989 and included Buildings W, GRX, G-1, X-1, I, C, and L.

In order to accommodate the decontamination and soil remediation concerns associated with Building W, demolition of Building W proceeded as follows:

- o demolition of the walls and roof;
- o break-up of the floor slab where contamination of the concrete slab or of the soil beneath the slab has been identified;
- o mobilization of the soil clean-up contractor for removal of the contaminated concrete and soil; and
- o final demolition of the floor slab

This work is further described in Section 4.0 of this report.

4.0 DOCUMENTATION OF PHASE III REMEDIAL ACTIVITIES

Phase III remedial activities included soil remediation below the Building W floor slab and at all the remaining areas, removal of the contaminated concrete floor slab from the former electroplating area in Building W, and the excavation and disposal of the buried asbestos tile identified in the eastern corner of the site. SES performed the soil remediation and the concrete removal from September 19 to 23, 1989 and QAR performed the buried asbestos remediation from September 18 to October 2, 1989.

The soil remediation, concrete removal and asbestos remediation are each addressed in a separate subsection below. Table 4-1 presents a summary of waste generated during each of the above tasks and the facility at which the waste was disposed.

4.1 Soil Remediation

Phase III Soil Remediation was accomplished in accordance with the NJDEP approved ECRA Cleanup Plan. An overview of remedial procedures is presented in Section 3.1.1 of this report. In order to gain access to soil beneath concrete slabs, the demolition contractor demolished the walls and roofs of Buildings W and X-1 and broke up the concrete slabs into pieces small enough to be

TABLE 4-1

WASTE GENERATED/DISPOSED DURING PHASE III REMEDIAL ACTIVITIES

Material	Amount	Disposal Site
Soil (remaining areas)		
- Location 24-01	34 cu. yds.	Stockpiled On-Site
- Location 101-17	100 cu. yds.	Breitenstine Landfill
- Location 223-01	24 cu. yds.	Stockpiled On-Site
- Location 225-01	11 cu. yds.	Stockpiled On-Site
- Location 229-PX5	23 cu. yds.	Stockpiled On-Site
Soil (below concrete slabs)		
- Location 226-01	15 cu. yds.	Breitenstine Landfill
- Location 226-02	20 cu. yds.	Breitenstine Landfill
- Location 226-04A	22 cu. yds.	Breitenstine Landfill
- Location 240-01	11.2 cu. yds.	Breitenstine Landfill
- Location 240-02	11.2 cu. yds.	Breitenstine Landfill
- Location 240-03	11.2 cu. yds.	Breitenstine Landfill
- Location 2-W-07	11 cu. yds.	Stockpiled On-Site
- Location 2-W-12	17 cu. yds.	Breitenstine Landfill
- Location 2-W-20	22 cu. yds.	Breitenstine Landfill
- Location 2-W-22	8 cu. yds.	Breitenstine Landfill
Contaminated Concrete from the Building W Electroplating Area	76 cu. yds.	Stockpiled On-Site
Excavated Asbestos Tile and Soil	900 cu. yds.	Grand Central Landfill Penn Argyl, PA

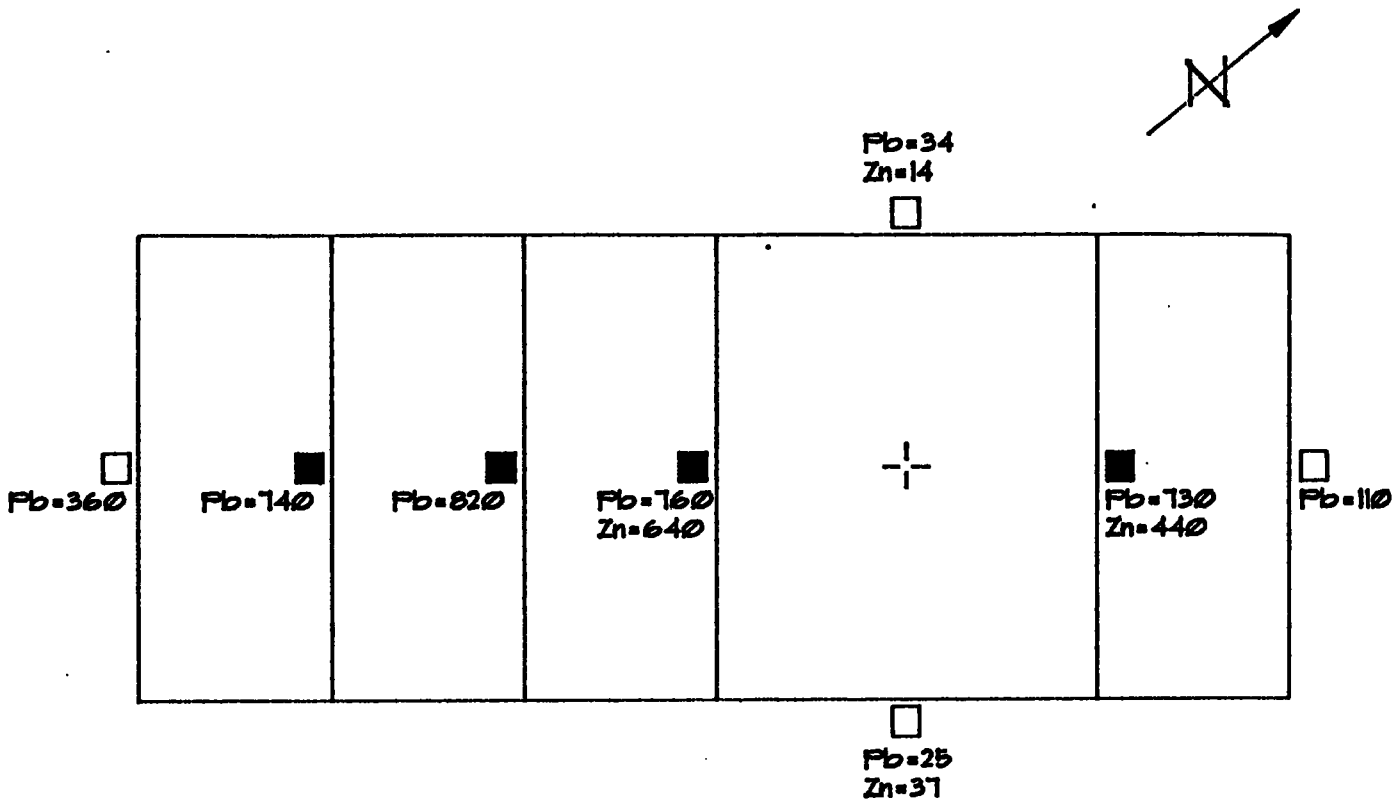
manipulated by SES. SES was then able to excavate the contaminated soil beneath the slab. In addition, SES was able to complete three excavations begun in Phase II and extended two or more times due to verification samples having concentrations above the cleanup levels. All soil excavated during Phase III was added to the appropriate soil stockpile for subsequent disposal.

4.1.1 Verification of Remedial Procedures

This section will discuss each soil location that was excavated during the Phase III Soil Remediation. Plan view drawings of each location are provided, showing the areal extent of the excavation and the result of all verification samples collected. Laboratory data reporting sheets for all Phase III verification samples are included in Appendix B-3.

Location 24-01

Location 24-01 is shown on Figure 4-1. The parameters of concern at this location were lead and zinc. This location was excavated to at least 37 inches below grade where ground water was encountered. The excavation was extended northeastward and southwestward because perimeter verification samples displayed concentrations of lead above the cleanup



LOCATION 24-01
REMEDIATION SUMMARY

PARAMETERS OF CONCERN: Pb, Zn
EXCAVATION DEPTH: 3'1"
EXCAVATION VOLUME: 342 CUBIC YARDS

LEGEND
All concentrations are in parts per million unless otherwise noted.
ND=concentration not detected

_|_ location of previous sampling requiring remedial action (center of original excavation)

■ verification sample above action levels

□ verification sample below action levels

TITLE

RESULTS OF ECRA CLEANUP
SOIL LOCATION - 24-01

PREPARED FOR
BECTON, DICKINSON & COMPANY
EAST RUTHERFORD, N.J.

ERM-Northeast
Environmental Resources Management

SCALE 1/5"=1'
DATE 10/89
FIGURE 4-1

139839

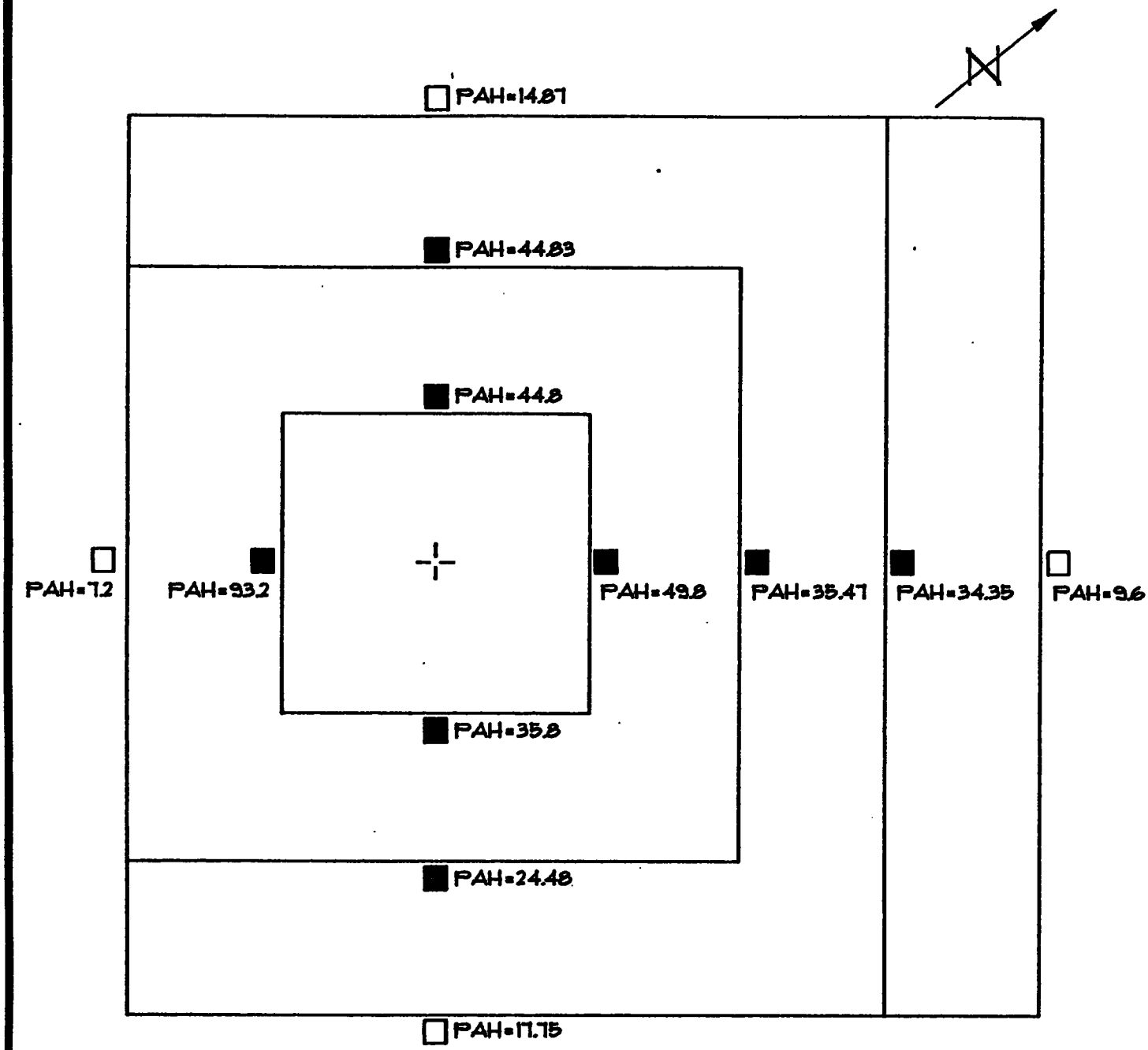
level. The northeast and southwest perimeters were subsequently verified.

Approximately 34 cubic yards of material were excavated from this location, which was backfilled with clean fill on September 29, 1989.

Location 101-17

Location 101-17 is shown on Figure 4-2. The parameter of concern at this location was PAH. This location was excavated to at least 36 inches below grade where ground water was encountered. The excavation was extended in each compass direction because perimeter verification samples displayed concentrations of PAH above the cleanup level. Each excavation side was subsequently verified.

Approximately 100 cubic yards of material were excavated from this location, which was backfilled with clean fill on September 29, 1989.



LOCATION 101-17
REMEDIATION SUMMARY

PARAMETERS OF CONCERN: PAH
EXCAVATION DEPTH: 36"
EXCAVATION VOLUME: 100 CUBIC YARDS

LEGEND
All concentrations are in parts per million unless otherwise noted.
ND=concentration not detected

-|- location of previous sampling requiring remedial action (center of original excavation)

■ verification sample above action levels

□ verification sample below action levels

TITLE

RESULTS OF ECRA CLEANUP
SOIL LOCATION - 101-17

PREPARED FOR
BECTON, DICKINSON & COMPANY
EAST RUTHERFORD, N.J.

ERM-Northeast
Environmental Resource Management

SCALE 1/5"=1'
DATE 10/89
FIGURE 4-2

139838

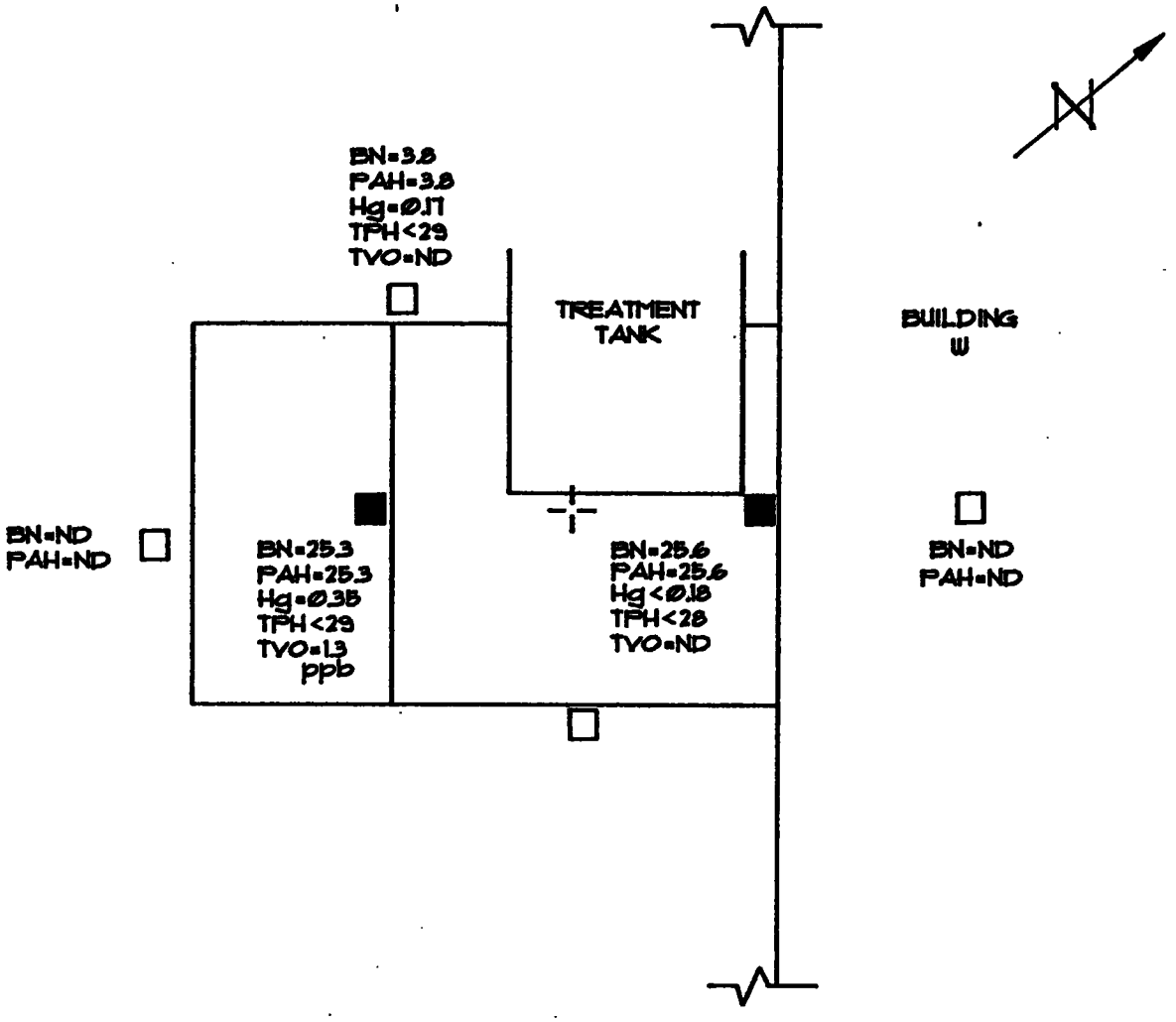
Location 223-01

The parameter of concern at location 223-01 was volatile organic compounds (VOC). This location was not excavated because ground water was present just beneath the asphalt surface. The accumulated ground water was pumped to the holding tank from the low lying location, but ground water immediately recharged, making excavation impossible.

Location 225-01

Location 225-01 is shown on Figure 4-3. The parameters of concern at this location were base-neutral organic compounds (BN), mercury, PAH, TPH, and volatile organic compounds. This location was excavated to at least 51 inches below grade where a verification sample displayed concentrations of all parameters of concern to be below cleanup levels.

The excavation was extended northwestward because a perimeter verification sample displayed levels of BN above the cleanup level. A sample collected on the northeast face of the excavation displayed a concentration of PAH above the cleanup level. The excavation was not extended, however,



LOCATION 225-01
REMEDIATION SUMMARY

PARAMETERS OF CONCERN: BN, PAH, Hg, TPH, TVO
EXCAVATION DEPTH: 51"
EXCAVATION VOLUME: 23.6 CUBIC YARDS

LEGEND
All concentrations are in parts per million unless otherwise noted.
ND=concentration not detected

—— X —— X —— X B-D Iron Fence

location of previous sampling requiring remedial action (center of original excavation)

■ verification sample above action levels

□ verification sample below action levels

TITLE
RESULTS OF ECRA CLEANUP
SOIL LOCATION - 225-01

PREPARED FOR
BECTON, DICKINSON & COMPANY
EAST RUTHERFORD, N.J.

ERM-Northeast
Environmental Resource Management

SCALE 1/5"=1'
DATE 10/89
FIGURE 4-3

139839

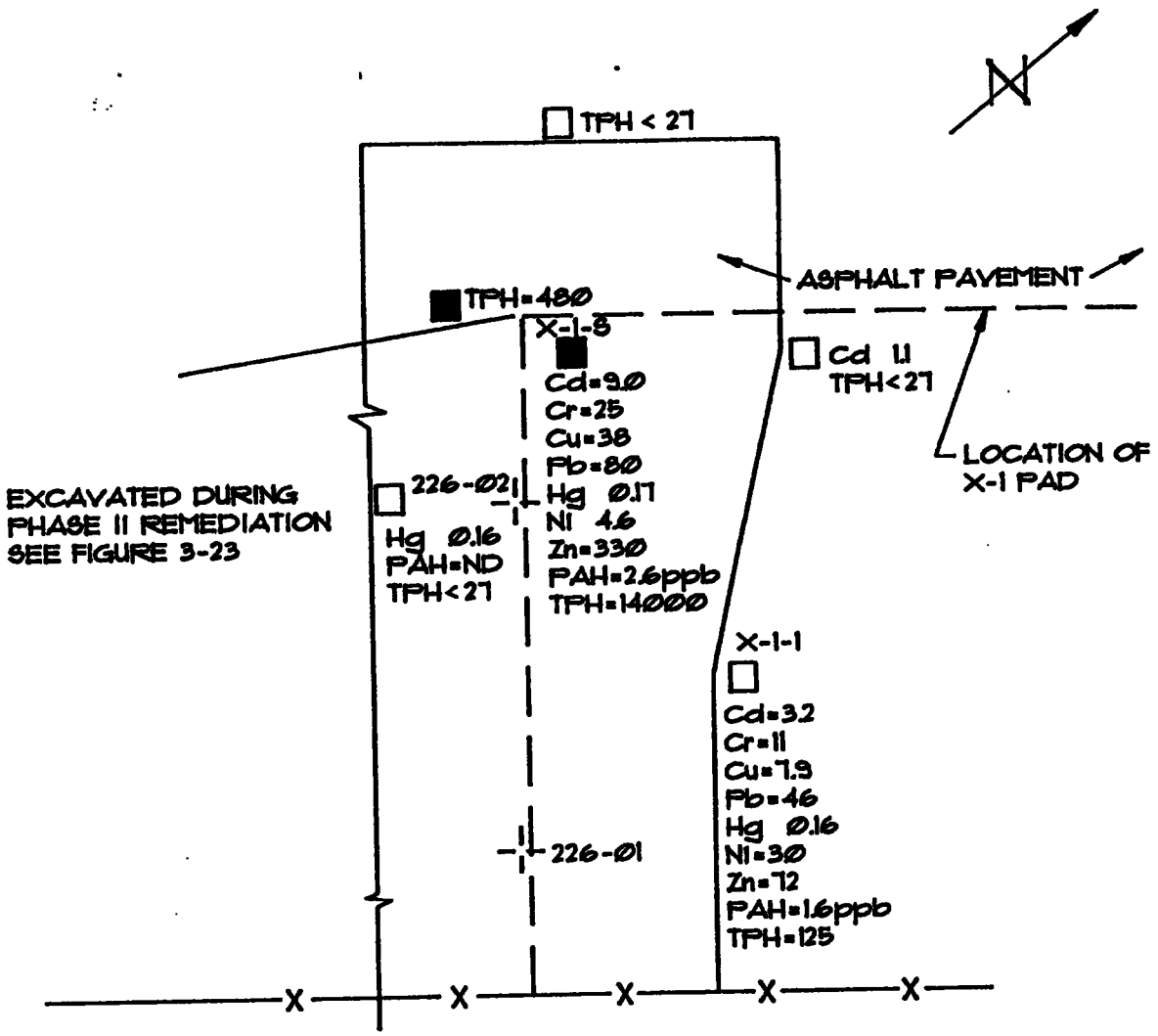
since the Building W foundation wall was located at this face, and was deeper than the excavation. Further, a perimeter verification sample collected on other side of the foundation wall (below the Building W slab) displayed a concentration of PAH below the cleanup level.

Approximately 24 cubic yards of material were removed from this location, which was backfilled with clean fill on September 29, 1989.

Location 226-01 and 226-02

Locations 226-01 and 226-02 are shown on Figure 4-4. The parameters of concern at both of these locations were mercury, PAH, and TPH. These locations were excavated together to at least 18 inches below grade, and are part of the excavation that also included 226-03 and 226-05. The excavation was extended on the north corner because a perimeter verification sample displayed a concentration of TPH above the cleanup level. The north corner was subsequently verified.

Approximately 26 cubic yards of material were excavated from these locations, which were backfilled with clean fill on October 5, 1989.



LOCATIONS 226-01, 226-02
REMEDIATION SUMMARY

PARAMETERS OF CONCERN: Hg, PAH, TPH
EXCAVATION DEPTH: 18"
EXCAVATION VOLUME: 25.5 CUBIC YARDS

LEGEND
All concentrations are in parts per million unless otherwise noted.
ND=concentration not detected

X X X B-D Iron Fence

location of previous sampling requiring remedial action (center of original excavation)

■ verification sample above action levels

□ verification sample below action levels

TITLE

RESULTS OF ECRA CLEANUP
SOIL LOCATION - 226-01, 226-02

PREPARED FOR
BECTON, DICKINSON & COMPANY
EAST RUTHERFORD, N.J.

ERM-Northeast
Environmental Resources Management

SCALE 1/5"=1'
DATE 10/89
FIGURE 4-4

139839

Location 226-04A

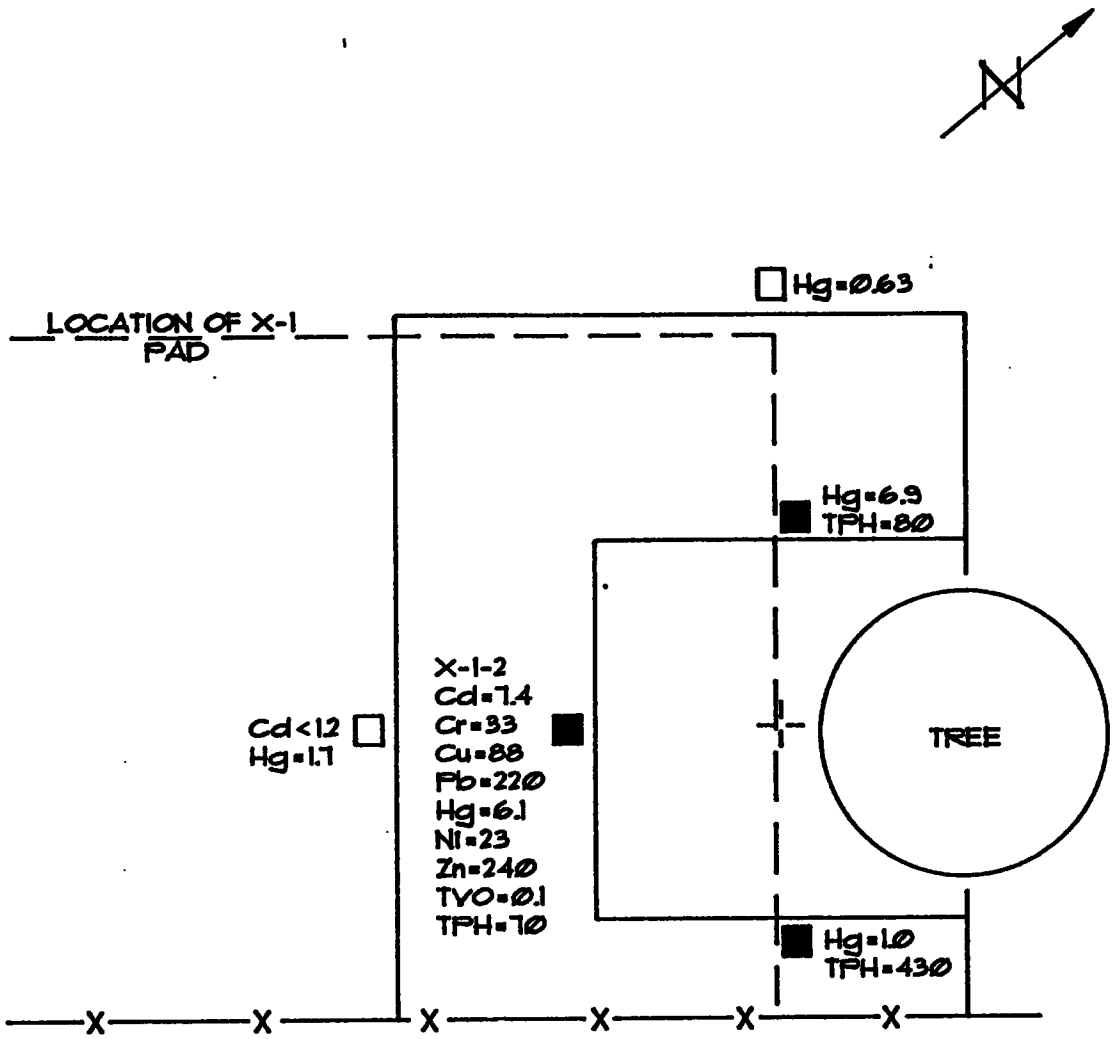
Location 226-04A is shown on Figure 4-5. The parameters of concern at this location were mercury and TPH. This location was excavated to at least 21 inches below grade, where a verification sample displayed concentrations of mercury and PAH below cleanup levels.

The excavation was extended northwestward and southwestward because perimeter verification samples displayed concentrations of mercury above cleanup levels. The excavation was also extended southeastward because a perimeter verification sample displayed a concentration of TPH above the cleanup level. These sides were subsequently verified.

Approximately 19 cubic yards of material were excavated from this location, which was backfilled with clean fill on September 29, 1989.

Location 227-03

Location 227-03 is shown on Figure 4-12, presented in Section 4.4. Sample 227-03 was collected in the area subsequently identified as requiring excavation to remove



LOCATION 226-04(A)
REMEDIATION SUMMARY

PARAMETERS OF CONCERN: Hg, TPH
EXCAVATION DEPTH: 21"
EXCAVATION VOLUME: 19.4 CUBIC YARDS

LEGEND
All concentrations are in parts per million unless otherwise noted.
ND=concentration not detected

X X X B-D Iron Fence

location of previous sampling requiring remedial action (center of original excavation)

■ verification sample above action levels

□ verification sample below action levels

TITLE

RESULTS OF ECRA CLEANUP
SOIL LOCATION - 226-04(A)

PREPARED FOR
BECTON, DICKINSON & COMPANY
EAST RUTHERFORD, N.J.

ERM-Northeast
Environmental Resources Management

SCALE 1/5"=1'
DATE 10/89
FIGURE 4-5

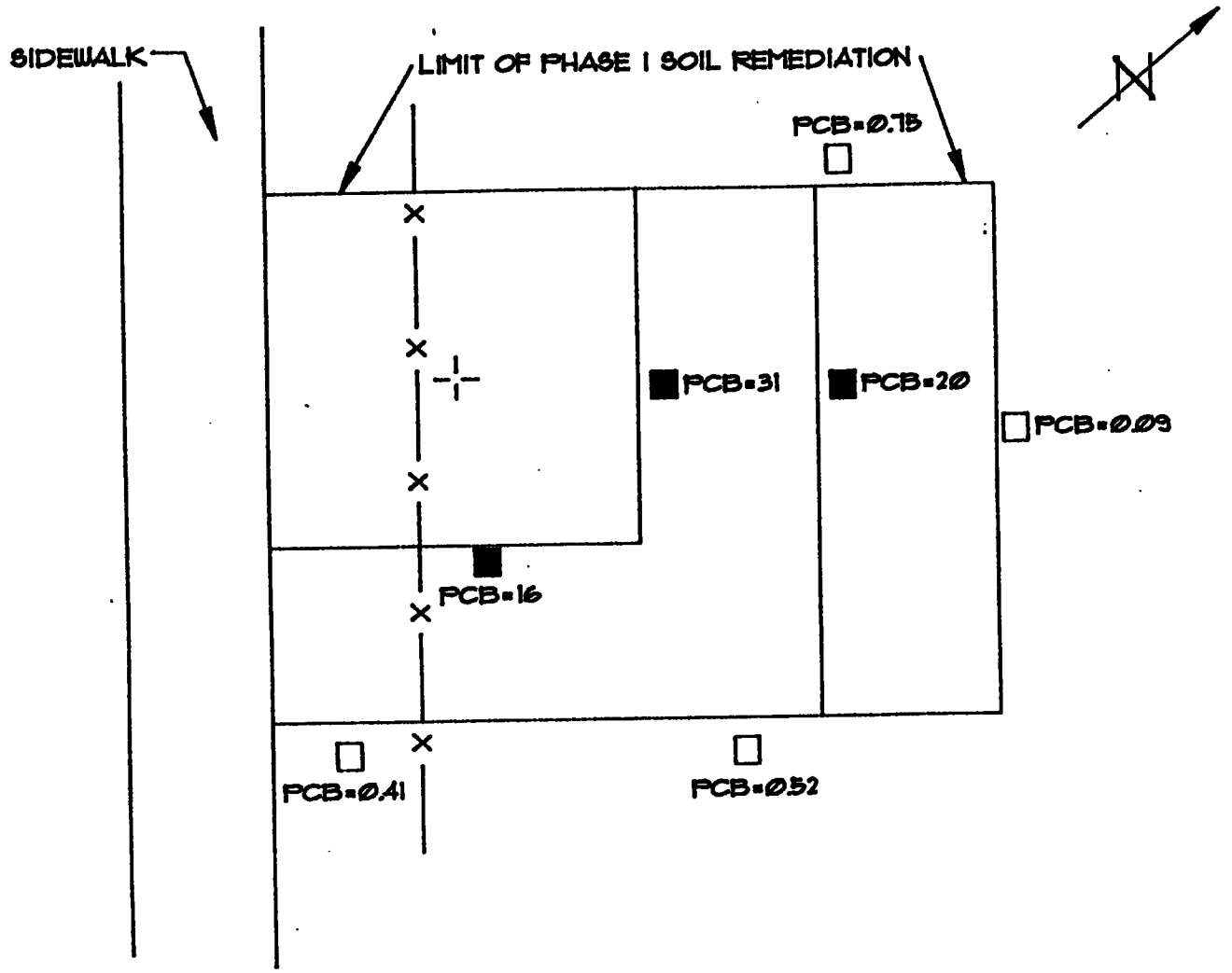
139839

buried asbestos tile. Location 227-03 was identified as requiring remedial cleanup in the RAP due to TPH. The entire area shown on Figure 4-12 (including location 227-03) was excavated to the depth of ground water during the asbestos abatement described in Section 4.4.

Location 229-PX5

Location 229-PX5 is shown on Figure 4-6. The parameter of concern at this location was polychlorinated biphenyls (PCB). This location was excavated to at least 24 inches below grade, where ground water was encountered. The excavation was extended northeastward and southeastward because perimeter verification samples displayed concentrations of PCBs above cleanup levels. The northeast and southeast sides were subsequently verified.

Approximately 22 cubic yards of material were excavated from this location, which was backfilled with clean fill on September 29, 1989.



LOCATION 229-Px5
REMEDIATION SUMMARY

PARAMETER OF CONCERN: PCB
EXCAVATION DEPTH: 24"
EXCAVATION VOLUME: 22.2 CUBIC YARDS

LEGEND
All concentrations are in parts per million unless otherwise noted.
ND=concentration not detected

—— X —— X —— X B-D Iron Fence

location of previous sampling requiring remedial action (center of original excavation)

■ verification sample above action levels

□ verification sample below action levels

TITLE

RESULTS OF ECRA CLEANUP
SOIL LOCATION - 229-Px5

PREPARED FOR
BECTON, DICKINSON & COMPANY
EAST RUTHERFORD, N.J.

ERM-Northeast
Environmental Resources Management

SCALE 1/5"=1'
DATE 10/89
FIGURE 4-6

Location 240-01, 240-02, 240-03

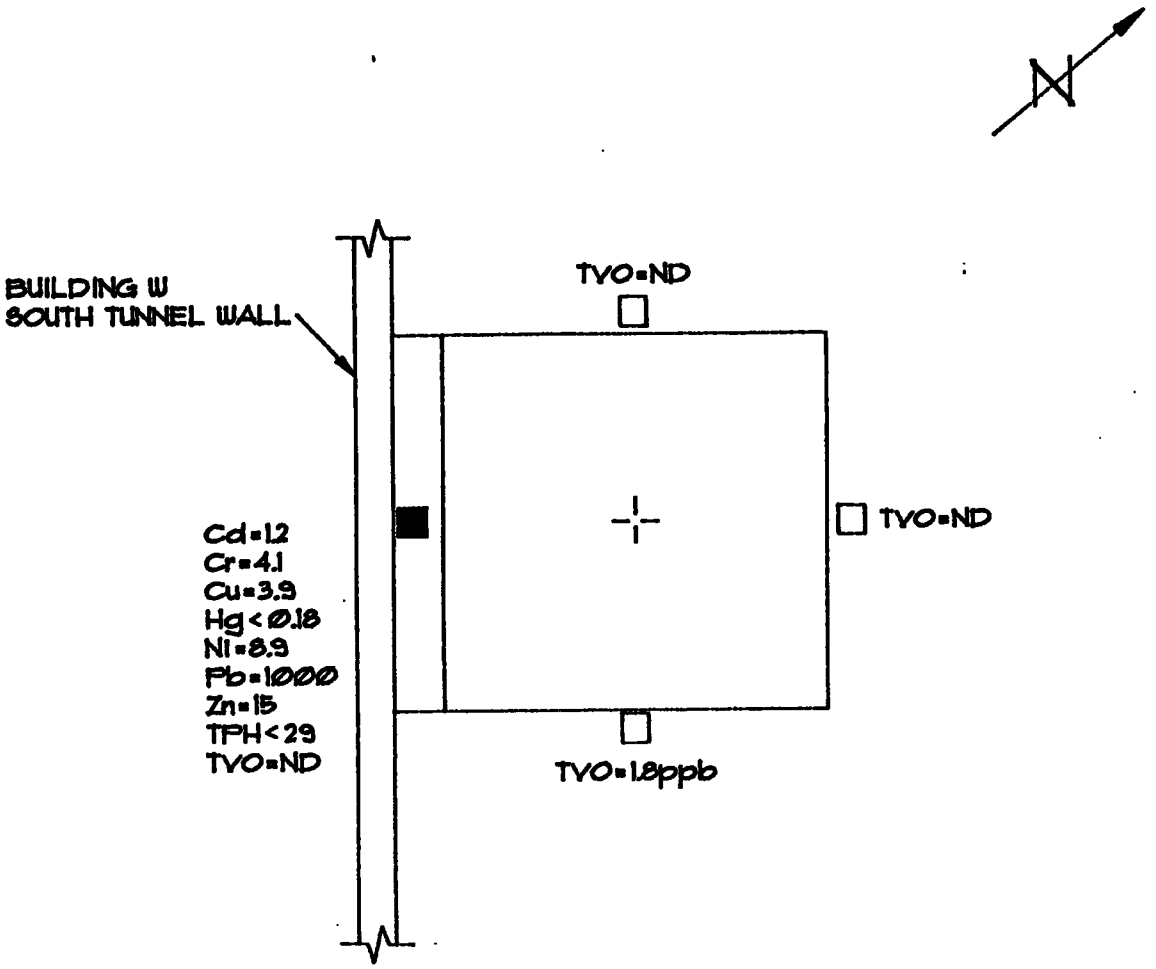
Locations 240-01, 240-02, 240-03 are shown on Figure 4-7. The parameter of concern at these locations was TPH. These locations were excavated to at least 12 inches below grade, where ground water was encountered.

While excavating these three separate locations, oil-stained soil was observed under the concrete pad. The entire area of soil shown on Figure 4-8 was conservatively removed.

Approximately 35 cubic yards of material were excavated from this location.

Location 2-W-07

Location 2-W-07 is shown on Figure 4-8. The parameter of concern at this location was volatile organic compounds (VOC). This location was excavated to at least 36 inches below the bottom of the Building W floor slab, where a verification sample displayed concentrations of VOC below the cleanup level. All perimeter verification samples also displayed concentrations of VOC below cleanup levels.



LOCATION 2-W-07
REMEDIATION SUMMARY

PARAMETERS OF CONCERN: TVO
EXCAVATION DEPTH: 36"
EXCAVATION VOLUME: 11.7 CUBIC YARDS

LEGEND
All concentrations are in parts per million unless otherwise noted.
ND=concentration not detected

-|- location of previous sampling requiring remedial action (center of original excavation)

■ verification sample above action levels

□ verification sample below action levels

TITLE

RESULTS OF ECRA CLEANUP
SOIL LOCATION - 2-W-07

PREPARED FOR
BECTON, DICKINSON & COMPANY
EAST RUTHERFORD, N.J.

ERM-Northeast
Environmental Resources Management

SCALE 1/5"=1'
DATE 10/89
FIGURE 4-8

139839

Approximately 12 cubic yards of material were excavated from this location and placed in the New Jersey hazardous waste soil stockpile.

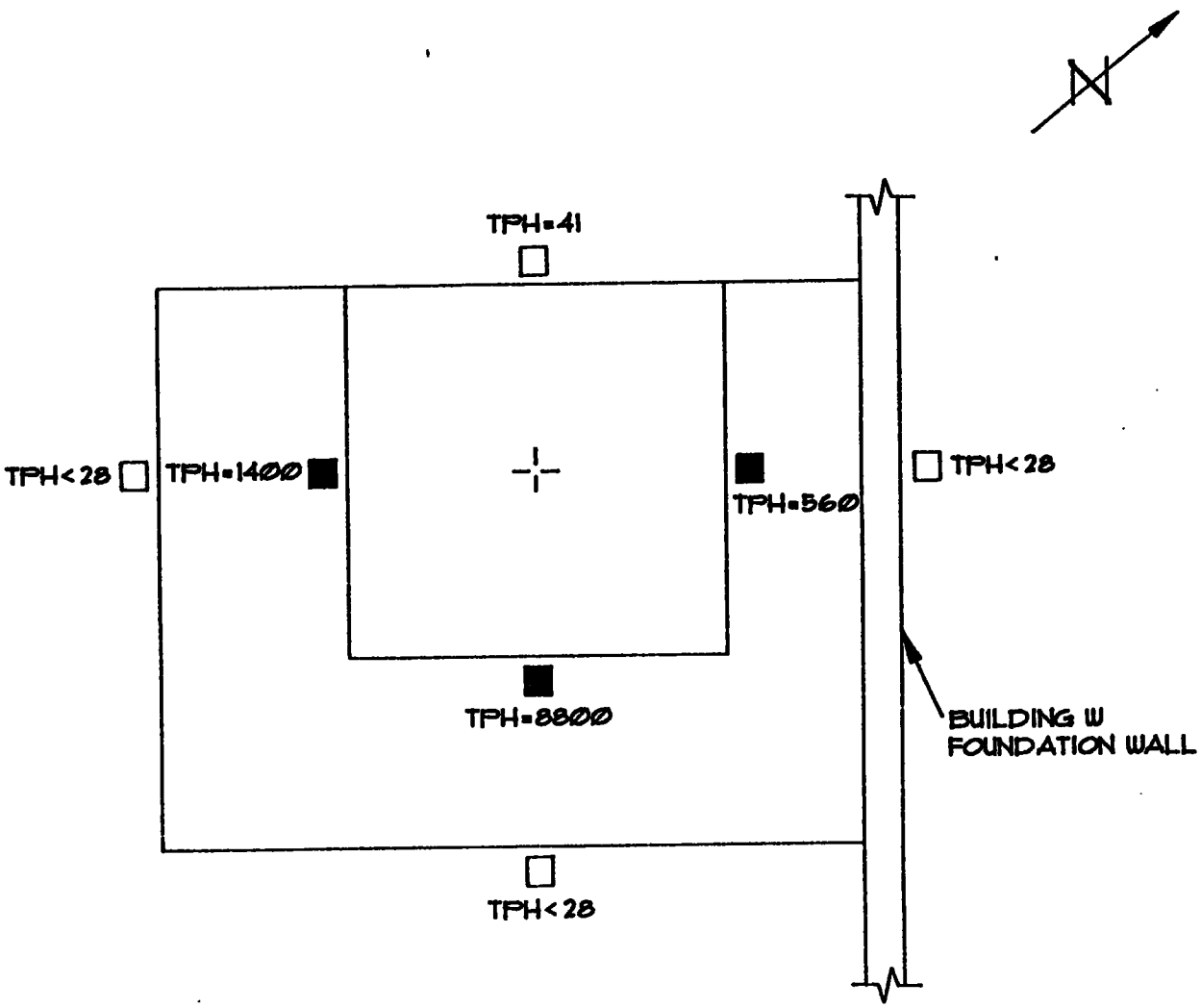
Location 2-W-12

Location 2-W-12 is shown in Figure 4-9. The parameter of concern at this location was TPH. This location was excavated to at least 18 inches below the bottom of the Building W floor slab. The excavation was extended northeastward and southeastward because perimeter verification samples displayed concentrations of TPH above the cleanup level. The northeast and southeast sides were subsequently verified.

Approximately 17 cubic yards of material were excavated from this location.

Location 2-W-20

Location 2-W-20 is shown on Figure 4-10. The parameter of concern at this location was TPH. This location was excavated to at least 24 inches below the bottom of the Building W floor slab. The excavation was extended



LOCATION 2-W-12
REMEDIATION SUMMARY

PARAMETERS OF CONCERN: TPH
EXCAVATION DEPTH: 18"
EXCAVATION VOLUME: 16.6 CUBIC YARDS

LEGEND
All concentrations are in parts per million unless otherwise noted.
ND=concentration not detected

location of previous sampling requiring remedial action (center of original excavation)

verification sample above action levels

verification sample below action levels

TITLE

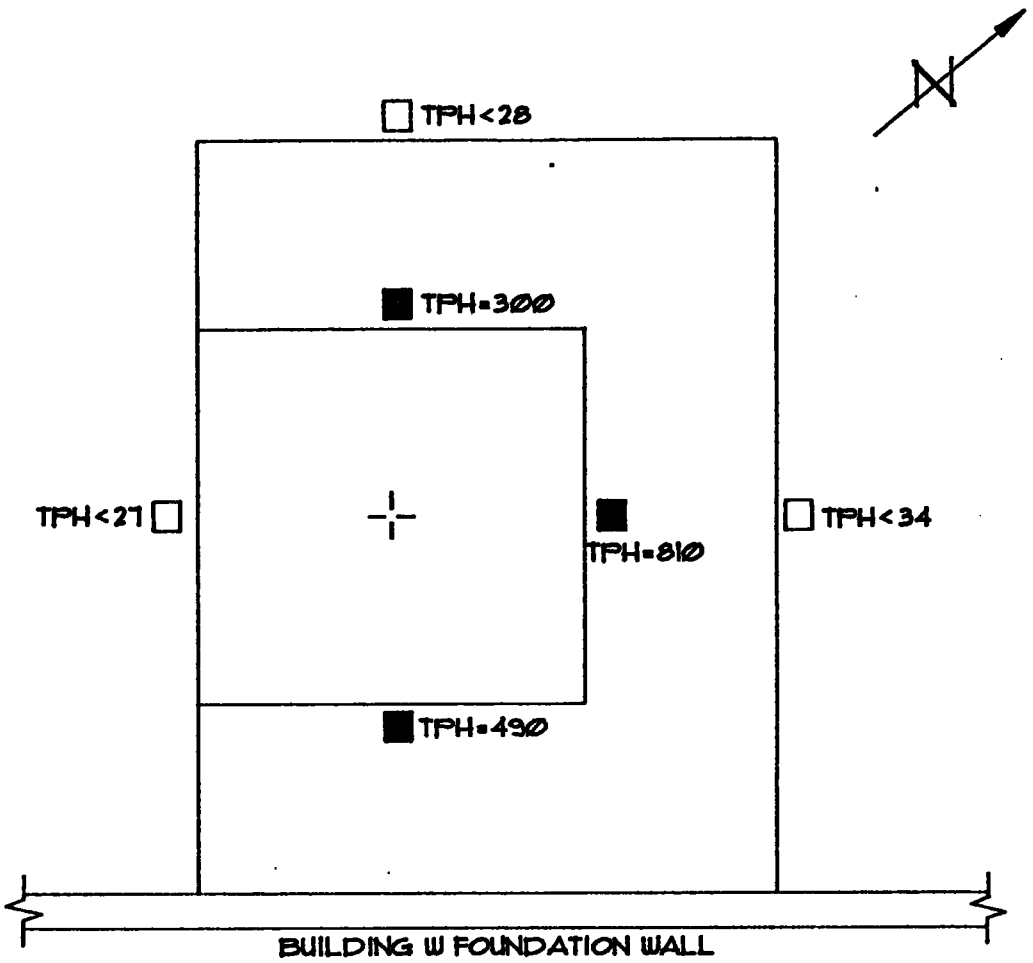
RESULTS OF ECRA CLEANUP
SOIL LOCATION - 2-W-12

PREPARED FOR
BECTON, DICKINSON & COMPANY
EAST RUTHERFORD, N.J.

ERM-Northeast
Environmental Resources Management

SCALE 1/5"=1'
DATE 10/89
FIGURE 4-9

139839



LOCATION 2-W-20

REMEDIATION SUMMARY

PARAMETERS OF CONCERN: TPH
EXCAVATION DEPTH: 24"
EXCAVATION VOLUME: 222 CUBIC YARDS

LEGEND

All concentrations are in parts per million unless otherwise noted.
ND=concentration not detected

- location of previous sampling requiring remedial action (center of original excavation)
- ■ verification sample above action levels
- □ verification sample below action levels

TITLE

RESULTS OF ECRA CLEANUP
SOIL LOCATION - 2-W-20

PREPARED FOR
BECTON, DICKINSON & COMPANY
EAST RUTHERFORD, N.J.

ERM-Northeast
Environmental Resources Management

SCALE 1/5"=1'
DATE 10/89
FIGURE 4-10

139839

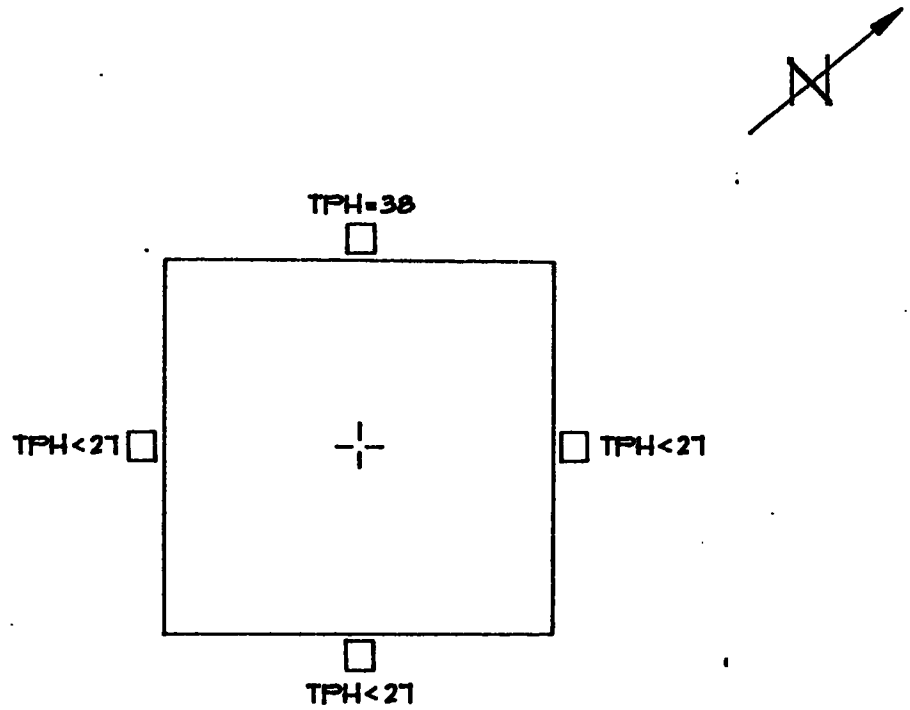
northeastward, northwestward and southeastward because perimeter verification samples displayed concentrations of TPH above the cleanup level. The northeast and southeast sides were subsequently verified. The excavation was extended northwestward to the building's foundation wall.

Approximately 22 cubic yards of material were excavated from this location.

Location 2-W-22

Location 2-W-22 is shown on Figure 4-11. The parameter of concern at this location was TPH. This location was excavated to at least 24 inches below the bottom of the Building W floor slab. All perimeter verification samples displayed concentrations of TPH below the cleanup level.

Approximately 7 cubic yards of material were excavated from this location.



LOCATION 2-W-22
REMEDIATION SUMMARY

PARAMETERS OF CONCERN: TPH
EXCAVATION DEPTH: 24"
EXCAVATION VOLUME: 7.4 CUBIC YARDS

LEGEND
All concentrations are in parts per million unless otherwise noted.
ND = concentration not detected

-|- location of previous sampling requiring remedial action (center of original excavation)

■ verification sample above action levels

□ verification sample below action levels

TITLE

RESULTS OF ECRA CLEANUP
SOIL LOCATION - 2-W-22

PREPARED FOR
BECTON, DICKINSON & COMPANY
EAST RUTHERFORD, N.J.

ERM-Northeast
Environmental Resources Management

SCALE 1/5"=1'
DATE 10/89
FIGURE 4-11

139639

4.1.2 Backfill of Locations 240-01, 240-02, 240-03, 2-W-07, 2-W-12, 2-W-20, and 2-W-22

Excavations at locations 240-01, 240-02, 240-03, 2-W-07, 2-W-12, 2-W-20 and 2-W-22 were backfilled with demolition debris consisting of small pieces of the concrete floor slabs and soil underlying the floor slabs of Buildings W and L. Sampling of the soil beneath the slabs of Buildings W and L has indicated that soil underlying the slabs is not contaminated. Further, the concrete floor slab had been thoroughly decontaminated.

4.2 Additional Investigation Beneath Building Floor Slabs

While samples had been previously collected beneath the floor slabs of Buildings L and W (results presented in RAP), additional samples were collected beneath the concrete floor slabs of Buildings G-1, L, W, X and X-1 in July and August, 1989. These additional samples were collected to conservatively ensure the complete characterization of soil quality beneath building slabs. The following paragraphs summarize the additional sampling results. Laboratory data reporting sheets for all samples discussed in the following sections are included in Appendix B-3.

Building W

Figure 3-27, previously presented, shows the locations of all borings advanced through the Building W floor slab. From previous investigations, locations 2-W-07 and 2-W-12 were identified as requiring remedial cleanup and were remediated during Phase III Soil Remediation. Samples 2-W-20 through 2-W-28 were collected below the bottom of the Building W floor slab and analyzed for total petroleum hydrocarbons (TPH), cadmium (Cd), chromium (Cr), copper (Cu), lead (Pb), mercury (Hg), nickel (Ni), and zinc (Zn). Sample locations were based upon previous use, such as the location of formerly used floor drains. In addition, samples 2-W-26, 2-W-27 and 2-W-28 were analyzed for volatile organic compounds (VOC). Locations 2-W-20 and 2-W-22 displayed concentrations of TPH of 2900 parts per million (ppm) and 3200 ppm, respectively. These areas were remediated during Phase III Soil Remediation. All other sample analyses showed contaminant concentrations to be less than the cleanup levels.

Building L

Figure 3-28, previously presented, shows the locations of all borings advanced through the Building L floor slab. Locations 2-L-10, 2-L-11, 2-L-12, and 2-L-13 were sampled during a previous

investigation. Samples were collected at locations 2-L-20, 2-L-21 and 2-L-22 at a depth of 0 to 6 inches below the bottom of the floor slab and analyzed for Cd, Cr, Cu, Pb, Hg, Ni, Zn, TPH, and VOCs. The sample at location 2-L-21 displayed a TPH concentration of 180 ppm. This concentration is below the cleanup level for TPH. All other sample analyses were less than the RCLS.

Building X-1

Three samples were collected beneath the slab of Building X-1. Samples X-1-1 and X-1-2 were collected as verification samples for excavations at locations 226-01 and 226-02, and location 226-04A, respectively. Sample X-1-S was collected from 0 to 6 inches below the bottom of the Building X-1 sump. All samples were analyzed for Cd, Cr, Cu, Hg, Pb, Ni, Zn, TPH and VOCs.

Sample X-1-2 displayed concentrations of cadmium and mercury above the cleanup levels (7.4 parts per million (ppm) and 6.1 ppm, respectively). Sample X-1-2 displayed concentrations of cadmium and TPH above the cleanup levels (9.0 ppm and 14,000 ppm, respectively). The excavation at location 226-02 was extended to include location X-1-S and the excavation at location 226-04A was extended to include location X-1-2. Figures 4-4 and 4-5, previously presented, show the extent of the excavations at the

Building X-1 slab. Further sampling provided verification of these soil excavations.

Building G-1

Figure 4-12 (presented in Section 4.4) shows the location of sample G-1-1 collected from 0 to 6 inches below the bottom of the Building G-1 floor slab and analyzed for Cd, Cr, Cu, Hg, Pb, Ni, Zn, TPH and VOCs. Sample G-1-1 displayed a concentration of cadmium (9.8 ppm) above the cleanup level. The entire area shown in Figure 4-12 was excavated to the depth of ground water during the asbestos abatement described in Section 4.4.

Building X

Figure 4-12 (presented in Section 4.4) shows the location of sample GRX-4 collected from 0 to 6 inches below the bottom of the Building X floor slab and analyzed for Cd, Cr, Cu, Hg, Pb, Ni, Zn and TPH. All laboratory results were below the site cleanup levels.

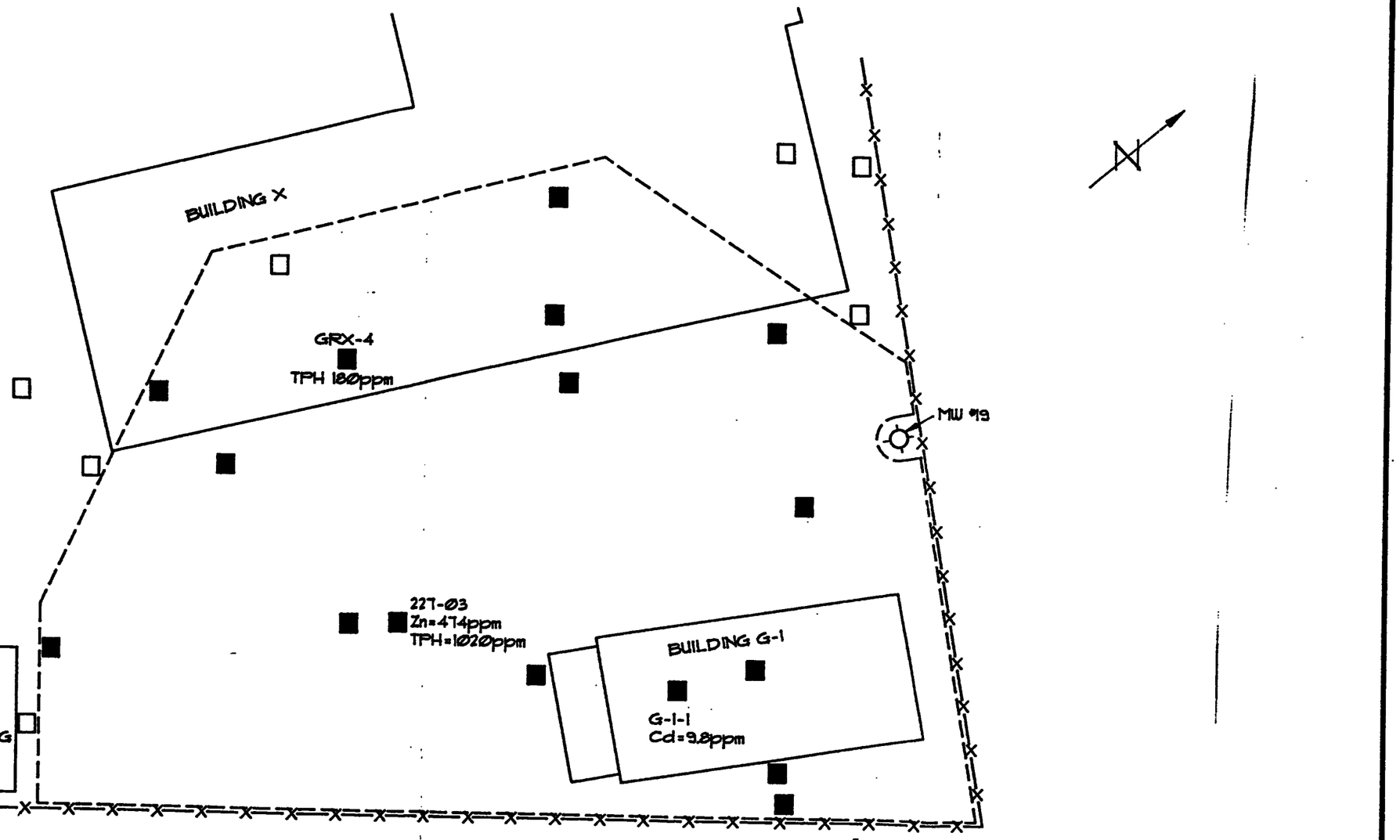
4.3 Contaminated Concrete Removal

The building decontamination activities implemented in the former electroplating area of Building W are described in Section 3.3.2.3 of this report. These activities included the scabbling of the concrete floor slab in the area to remove the contaminated top of the slab. Further, concrete chip samples were collected and analyzed to verify the effectiveness of the decontamination. This sampling identified areas of the floor slab requiring removal and disposal. These areas are indicated on Figure 3-27, previously presented.

V. Ottilio & Sons, Inc., the demolition contractor, broke the concrete slab into pieces that SES could manipulate. The areal extent of the concrete floor slab that was removed is indicated on Figure 3-27. The contaminated concrete was stockpiled on-site for subsequent disposal.

4.4 Buried Asbestos Remediation

Buried asbestos tile was identified in the area shown on Figure 4-12 during the investigative phase of the project. Subsequently, numerous borings were advanced through the asphalt pavement between Buildings X and G-1, around Building G-1 and



TITLE

RESULTS OF ECRA CLEANUP
BURIED ASBESTOS LOCATION

PREPARED FOR

BECTON, DICKINSON & COMPANY
EAST RUTHERFORD, N.J.

ERM-Northeast
Environmental Resources Management

SCALE 1/16"-1'
DATE 10/89
FIGURE 4-12

149926

through the concrete floor slabs of Buildings G-1 and X. Figure 4-12 delineates the area where asbestos tile had been identified.

QAR performed asbestos remediation from September 18 to October 2, 1989. QAR excavated soil and asbestos tile to the depth of ground water (three feet below grade). This depth will easily be three feet below the final grade elevation subsequent to FRB development. The areal extent of the excavation is indicated on Figure 4-12. The asbestos tile was loaded directly into plastic-lined dump trailers, the liners were wrapped around the material and secured and the trailer was covered with a tarpaulin prior to leaving the site. The asbestos tile and soil was transported to Grand Central Landfill in Penn Argyl, Pennsylvania, an industrial waste and asbestos landfill.

5.0 WORK REMAINING TO BE COMPLETED

Currently, the work remaining to be completed includes the disposal of contaminated soil and concrete that has been excavated and stockpiled on-site and the disposal of waste generated during building decontamination activities currently stored in containers.

At the conclusion of Phase III of the ECRA site remediation program, the following waste materials were stockpiled on-site awaiting disposal site acceptance:

- o approximately 110 cubic yards of hazardous waste soil
- o approximately 75 cubic yards of contaminated concrete
- o 4 roll-off containers A, B, C and D
- o 8 drums
- o 3 roll-off containers of stormwater solids

Subsequently, on October 16, 1989, CECOS transported roll-off Container A to the Chemical Waste Management, Inc. facility in Emelle, Alabama. On November 15, 1989, CECOS transported the 8 drums to the same facility. The hazardous waste manifests that accompanied these shipments are presented in Appendix C-3.

Presently, B-D has applied to the appropriate disposal sites (through SES) for disposal acceptance of the hazardous waste soil, contaminated concrete and the stormwater solids. Acceptance for all waste streams is anticipated by the end of November. As soon as acceptance is received, SES will mobilize the appropriate work force to complete the work in a timely fashion.

APPENDICES - VOLUME I OF II

APPENDICES A, B-1 AND B-2
VERIFICATION REPORT FOR
ECRA SITE REMEDIATION
PARCEL NOS. 1 AND 2
ECRA CASE NOS. 87573 AND 87574
BECTON, DICKINSON AND COMPANY

NOVEMBER 1989

APPENDIX A

PREVIOUS DOCUMENTATION SUBMISSIONS

ERM-Northeast

DOCUMENTATION LETTER DATED MARCH 2, 1989
AND REPORT ENTITLED
REMEDIAL ACTIVITIES DOCUMENTATION REPORT -
BUILDING DECONTAMINATION AND SOIL EXCAVATION
PRIOR TO BUILDING S, J-K AND O DEMOLITION

SEP 01 1989

Becton Dickinson and Company
One Becton Drive
Franklin Lakes, New Jersey 07417-1880

(201) 848-6800

March 2, 1989

BECTON DICKINSON

Mr. Joe Goliszewski
Section Chief
New Jersey Department of
Environmental Protection
5th Floor
401 East State Street
Trenton, NJ 08625

Re: ECRA Case Nos. 87573
and 87574

Dear Mr. Goliszewski:

This letter summarizes the ECRA site remediation activities implemented to date at Becton, Dickinson and Company's (B-D) East Rutherford, New Jersey plant site. B-D's initial ECRA submission divided the site into six Parcels (Nos. 1 through 6) each being a separate ECRA case. A Soil and Ground Water Remedial Action Plan (RAP) and a Building Decontamination Plan (DP) was submitted in July 1988 for Parcels 1, 2 and 3. These plans (RAP and DP) have been approved by Mr. Joseph R. Fallon of the NJDEP Site Evaluation Element on November 1, 1988. Enclosed is a copy of the approval letter. B-D is currently implementing ECRA site remediation activities in Parcels 1 and 2.

Becton, Dickinson and Company will demolish all structures in Parcels 1 and 2 prior to the scheduled property transfer in October, 1989. Building demolition will be accomplished in two phases. Buildings S, J-K and Q will be demolished during the Phase I demolition scheduled for March, 1989. The remaining buildings in Parcels 1 and 2 will be demolished during Phase II which is scheduled for August and September, 1989.

In order to address environmental issues impacted by the Phase I demolition, B-D has implemented the RAP and DP as it pertains to Buildings S, J-K and Q and soil conditions immediately surrounding the buildings. The following site remediation activities were implemented from October, 1988 through February, 1989 in preparation for the Phase I building demolition:

- Removal and disposal of electrical transformers. Excavation and disposal of transformer mounting pad and contaminated soil - Area 29

- Soil Excavation on southwest side of Building S - Open Area No. 4

- Soil excavation on northeast side of Building Q - Area 102

- Decontamination of Building S:

  - collection and disposal of hazardous substances
  - asbestos abatement
  - decontamination of building structures and equipment

- Decontamination of Building Q:

  - collection and disposal of hazardous substances
  - asbestos abatement
  - decontamination of building structures and equipment
  - decontamination and abandonment of cesspool

ERM-Northeast, our environmental consultants, has been overseeing environmental affairs at our East Rutherford plant site and has prepared the enclosed report entitled Remedial Activities Documentation Report - Building Decontamination and Soil Excavation Prior to Building S, J-K and Q Demolition. This report details site remediation work completed at the site and presents a chronological listing of milestone events in the implementation of the RAP and DP.

B-D has also implemented the ground water remediation program as presented in the RAP. The following ground water remediation activities have been initiated:

- Completion of the pilot ground water treatability study. A report on the results of the treatability study will be submitted under a separate cover.

- Initiation of the preliminary engineering design of full-scale ground water recovery and treatment systems.

- Conceptual approval has been obtained from the Bergen County Utilities Authority for accepting the ground water treatment plant discharge.

Breakdowns of waste generation/disposal and costs are provided in Tables 1 and 2. Table 1 provides a breakdown of the amount of waste materials removed and/or disposed of during site remediation to date. Table 2 provides the approximate costs of each remedial activity and is broken down by category; i.e., consulting/ management, laboratory services and remediation contractors and disposal.

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TABLE 1

WASTE GENERATED/DISPOSED

Material	Amount	Disposal Site
Drill cuttings	145 tons	Breitenstine Landfill Waynesburg, Ohio
Area 29 - Former Transformer Area		
o Transformer oil		UNISON
o Transformer carcass	2	General Electric Philadelphia, PA
o Soil and concrete pad (PCB)	50 cu. yds.	CECOS International Inc. Landfill Niagara Falls, NY
Open Area No. 4		
- Location 24-03 o Soil (PCB, Pb, Zn, PAH)	10 cu. yds.	CECOS International Inc. Landfill
- Location 24-04 o Soil (Cu, Pb, Zn)	10 cu. yds.	Stockpiled on-site
- Location 24-05 o Soil (Pb, Zn)	10 cu. yds.	Stockpiled on-site
- Location 24-02 o Soil (Cr, TPH)	8 cu. yds.	Stockpiled on-site
Area 102 - Northeast of Building Q		
o Soil (Hg, Pb, Zn, PAH)	70 cu. yds.	Stockpiled on-site
o Liquid from cesspool	500 gallons	Treated at pilot ground water treatment plant
o Sludge from cesspool	180 gallons (3 drums)	Stored on-site
Building S		
o Lab Drain Pipe	110 pounds (2 drums)	Stored on-site

TABLE 1 (CONTINUED)

Material	Amount	Disposal Site
Building S		
o Stained floor tile	710 pounds (4 drums)	Stored on-site
o Lead plates and pellets	30 sq. ft. of 5/8 in. plate (cut) and 250 lbs. pellets (3 drums)	Stored on-site
o Lab glassware	600 pounds (3 drums)	Recycled off-site
o Disposable syringes	20 pounds (2-3 cubic foot boxes)	Disposed of by B-D in disintegrator
o Lab-packed chemicals	3-3 cu. ft. boxes 2 sealed 5-gal. carboys, 1 5-gal. safety can	Stored on-site
o Batteries	3 car batteries 3 emergency lighting stations	Stored on-site
o Oil drained from compressor, solidified with vermiculite	20 pounds (1 drum)	Stored on-site
o Water from sump in LINAC Building	240 gals. (4 drums)	Stored on-site
o Water and solids from bottom of sump in LINAC Building	120 gals. (2 drums)	Stored on-site
o Mercury, glass tube and reservoir from disassembled barometer	Hg - 1/3 litre	Stored on-site
Building O (Kelly Building)		
o Floor scarification sweepings	1 drum	Stored on-site

TABLE 2

ESTIMATED COST OF REMEDIAL ACTIVITIES
CONDUCTED IN PARCELS 1 AND 2
THROUGH FEBRUARY, 1989

Category	Estimated Cost
Consulting/Management	$132,000.00
Laboratory Services	$ 48,000.00
Remediation Contractors and Disposal	$458,000.00
Estimated Total Cost	$638,000.00

This letter and attached report is intended to bring you up-to-date on all ECRA remediation activities completed at our East Rutherford facility. Subsequent progress reports will be sent to you or your designate on a monthly basis.

If you should have any questions or require additional information, please do not hesitate to contact Mr. Ted Tideman located at our East Rutherford plant (201/460-2932), Mr. Randolph White from ERM-Northeast (516/349-0050) or me.

Very truly yours,

Glenn Barbi
Corporate Manager/
Environmental Control

Enclosure

ERM-Northeast

PHASE I REMEDIAL ACTIVITIES DOCUMENTATION REPORT

APPENDIX A

ERM-Northeast

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APPENDIX A

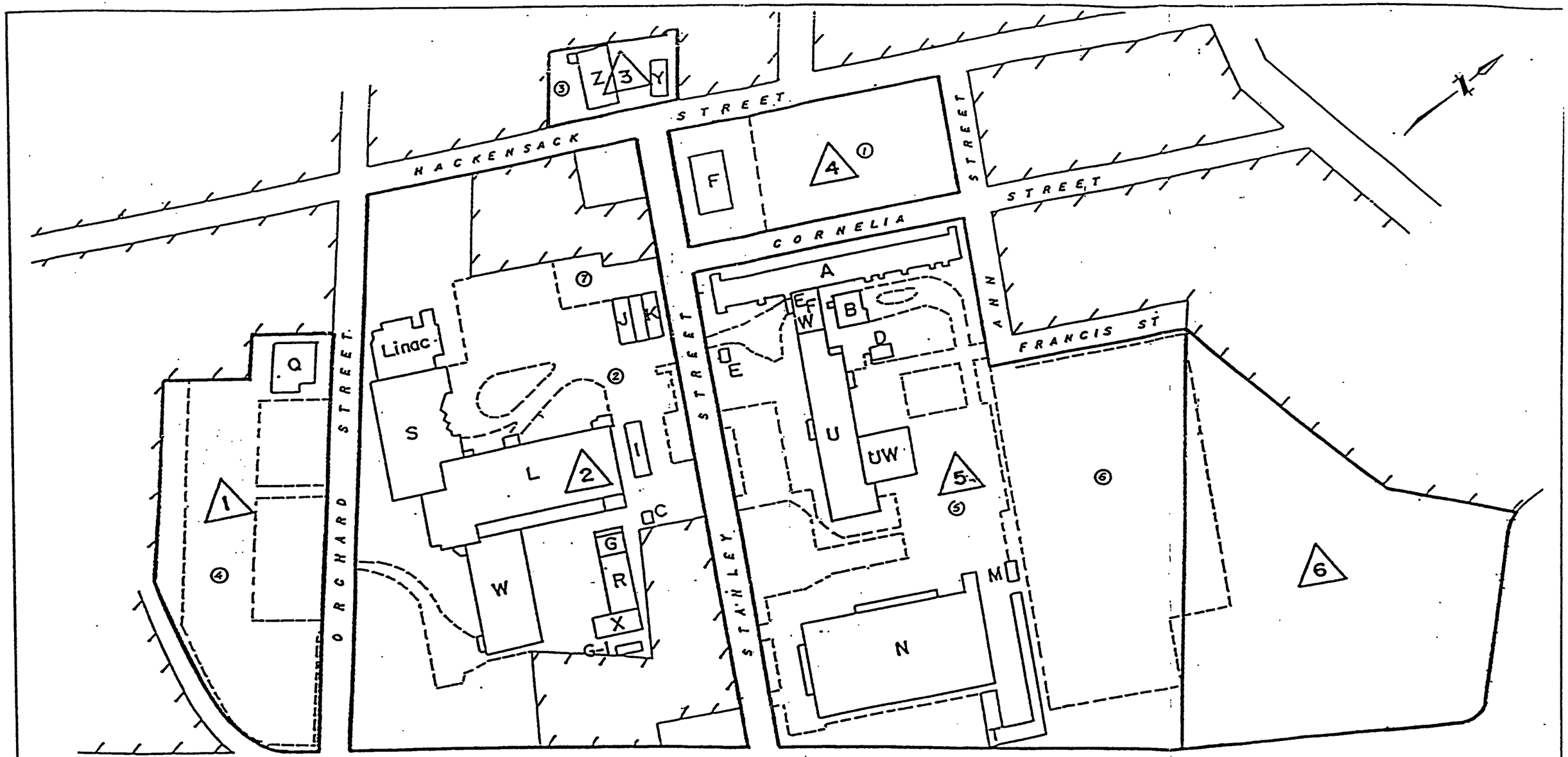
1.0 INTRODUCTION

Becton, Dickinson and Company (B-D) owns and operates a medical apparatus manufacturing and assembly plant in the borough of East Rutherford, Bergen County, New Jersey. Due to the planned cessation of operations in 1990, B-D has initiated the New Jersey Department of Environmental Protection (NJDEP) Environmental Cleanup and Responsibility Act (ECRA) process at the East Rutherford plant. Figure 1-1 provides a plan of the B-D East Rutherford plant site, identifying the six parcels and the building designations at the site.

B-D plans to demolish Buildings S (and the adjoining LINAC building), and J-K located in Parcel No. 2 and Building Q (Kelly Building) located in Parcel No. 1 in March, 1989. In preparation for demolition, B-D has implemented both the Soil and Ground Water Remedial Action Plan for soil remediation and the Building Decontamination Plan for Parcel Nos. 1 and 2. The NJDEP has formally approved both plans.

1.1 Building Decontamination

The Building Decontamination Plan for Parcel Nos. 1 and 2 was implemented in Building S, J-K and Building Q (see Figure 1-1) to



SCALE: 1" = 165'±

LEGEND

D BUILDING

① PARKING LOT NUMBERS

PROPERTY NOT OWNED BY B-D

FIGURE 1-1
SITE PLAN
PARCEL DESIGNATIONS

BECTON, DICKINSON & Co.
EAST RUTHERFORD, N.J.

ERM-Northeast

ensure that no hazardous material was present in the demolition debris. Building decontamination was performed in three steps.

Initially, B-D had previously vacated the buildings and removed most equipment and substances. Afterwards, all hazardous substances remaining in the buildings were collected and sorted into compatible groups. B-D subsequently disposed of the substances collected in this step.

The next step was asbestos abatement. Asbestos containing materials were removed from Building S, J-K and Building Q. A videotape of asbestos abatement activities was made for documentation.

Finally, building decontamination was implemented. Building decontamination tasks included: washing or removing stained areas, decontaminating remaining equipment and fixtures by draining fluids and washing, and collecting and removing residual wastes. A videotape documenting the condition of Buildings S and Q after building decontamination was made.

1.2 Soil Excavation

The Soil and Ground Water Remedial Action Plan was implemented as a precautionary measure to ensure that contaminated soils would not be impacted by demolition activities. Access to Building S and Building Q for demolition activities is to be gained via Orchard Street. Using data obtained in previous environmental investigations, the areas between Orchard Street and the buildings were identified as requiring remedial action. Before demolition began, the soil in locations identified as requiring remedial action was excavated and disposed of as outlined in the remedial action plan, and the excavations were backfilled with certified clean soil. The entire area was then covered with crushed stone or an additional lift of clean fill to act as a construction mat. A videotape documenting the condition of the backfilled excavations was made.

1.3 Verification of the Soil Remediation Effectiveness

In areas where soil was excavated, samples were collected and analyzed to verify the effectiveness of remediation as required by the Soil and Ground Water Remedial Action Plan for Parcels 1 and 2. All samples collected were analyzed by EnviroTest Laboratories, Inc. of Newburgh, New York.

The NJDEP has certified EnviroTest Laboratories to conduct all priority pollutant analyses. EnviroTest's certification number is 73507. EnviroTest used EPA approved methodologies to analyze all samples.

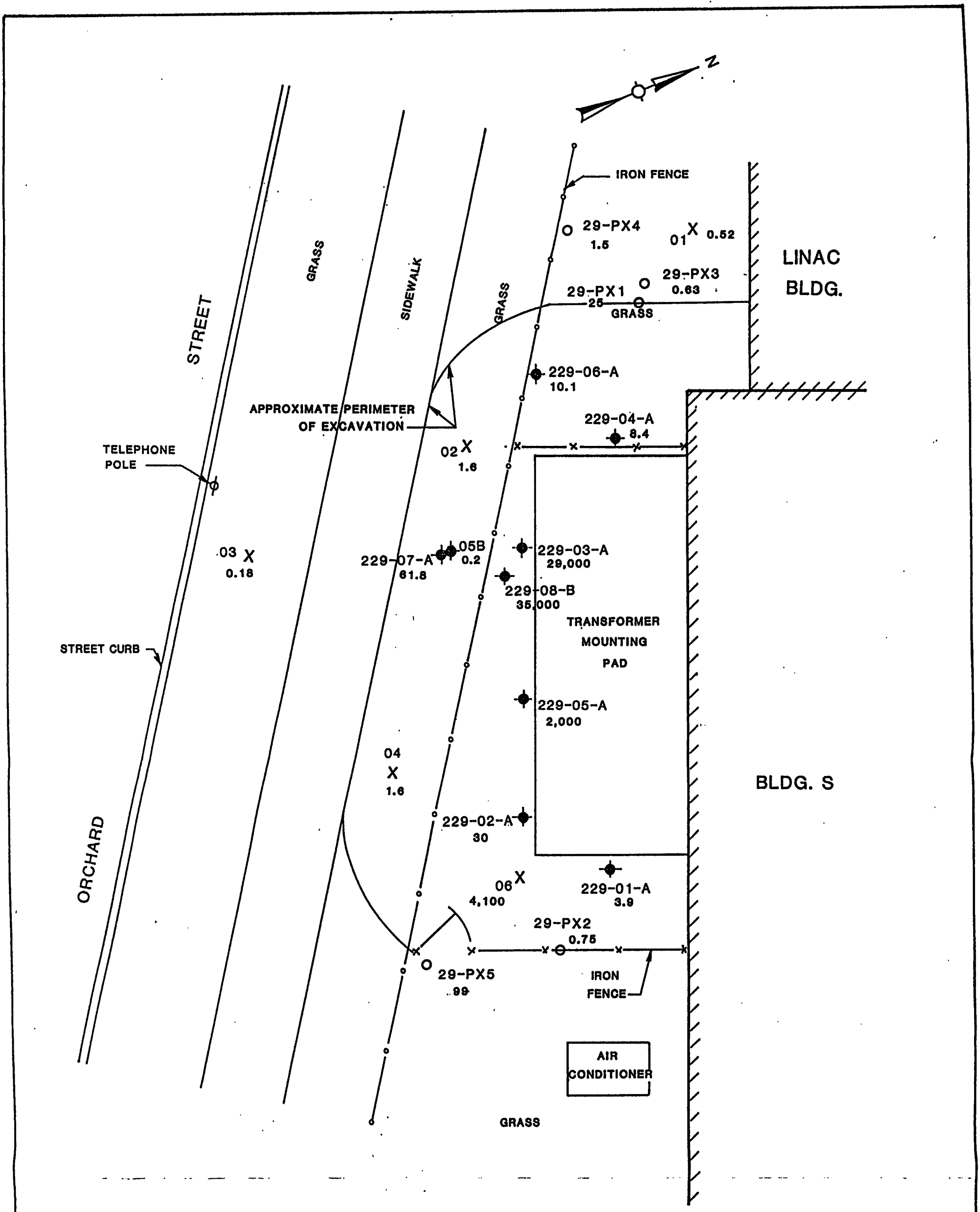
Laboratory data reporting sheets for all sampling discussed in the following sections are kept on file at ERM-Northeast and are available for review upon request.

2.0 MILESTONE EVENTS

This section presents important events in the implementation of the building decontamination and soil excavation programs. Milestone events are listed in chronological order.

2.1 Transformer Retrofill and Removal

August 10, 1988 - UNISON Transformer Services, Inc. performed retrofill activities at transformer H220966 (T-9) located outside of the southwestern corner of Building S. Figure 2-1 shows the former location of the transformer. The liquid and solid wastes collected during the retrofill operation were shipped under hazardous waste manifest to UNISON's Greenville, South Carolina warehouse. The materials were then consolidated and transported to an EPA-permitted destruction facility. The carcass of the transformer was subsequently classified as a non-PCB transformer as per EPA 40 CFR 761 and disposed of by B-D. The hazardous waste manifest accompanying the transformer carcasses is presented in Appendix A.



LEGEND

- ⊕ – SOIL SAMPLING LOCATION
- X PRE-POST-EXCAVATION SAMPLE
- O POST EXCAVATION SAMPLE

ALL CONCENTRATIONS ARE OF PCBS IN PARTS PER MILLION

TITLE

FORMER TRANSFORMER AREA

PREPARED FOR
BECTON DICKINSON & CO.
EAST RUTHERFORD, N.J.

ERM-Northeast
Environmental Resources Management

SCALE 1/4" = 1'-0"
DATE

FIGURE 2-1

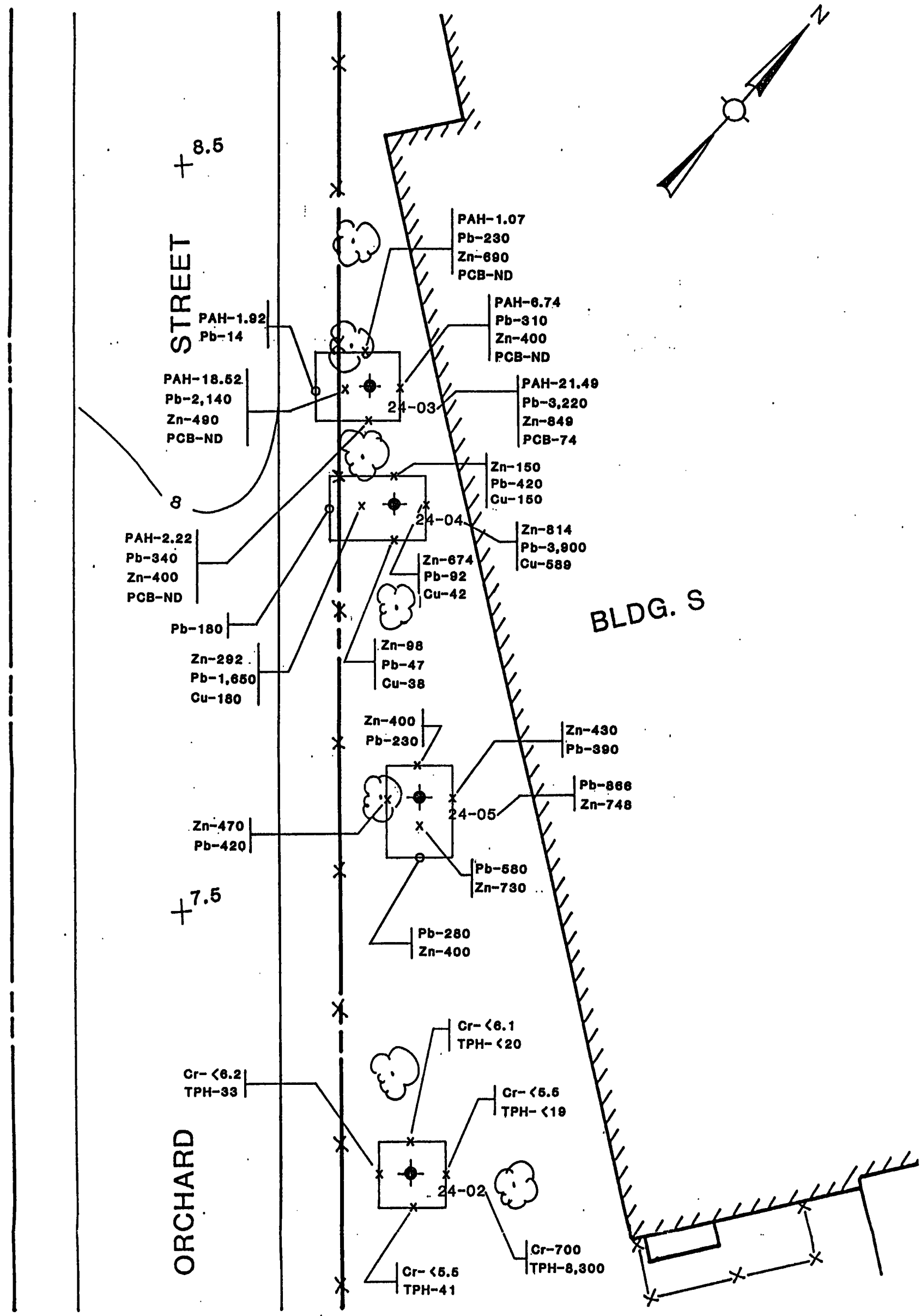
2.2 Pre-Post-Excavation Sampling

2.2.1 Open Area No. 4

August 25, 1988 - Prior to the implementation of soil excavation activities south of Building S, four soil samples were collected around each location where remedial action was required in open area no. 4. These pre-post-excavation samples were collected at locations specified by Section 6.4.1 of the Remedial Action Plan, Parcels No. 1 and 2 prior to the actual excavation. Figure 2-2 presents the locations and analytical results of the pre-post-excavation samples and the location and analytical results of the sample that indicated the need for remedial action in open area No. 4.

2.2.2 Former Transformer Area

August 31, 1988 - Pre-post excavation samples were collected in the former transformer location. Samples were collected as a composite of soils from 0 to 6 inches deep. The locations and analytical results of the pre-post-excavation samples are presented on Figure 2-1.



LEGEND

- SAMPLE LOCATION
- X PRE-POST-EXCAVATION SAMPLE LOCATION
- O POST-EXCAVATION SAMPLE LOCATION

ALL CONCENTRATIONS IN PARTS PER MILLION

TITLE

OPEN AREA NO. 4

PREPARED FOR

BECTON DICKINSON & CO.
EAST RUTHERFORD, N.J.

ERM-Northeast
Environmental Resources Management

SCALE 1"=20'

FIGURE 7-2

7-6

2.3 Heating, Ventilation and Air Conditioning Decommissioning

September 15, 1988 - Astro Air Conditioning and Heating decommissioned all heating, ventilating and air conditioning units on Building S. Astro removed all small capacitors from the associated electrical equipment and drained all oil and refrigerant from the systems. Astro removed all compressors from the buildings but one. All capacitors were classified as "small capacitors" as per 40 CFR 761.3 and were disposed of as municipal solid waste as per section 761.60.

2.4 Collection of Hazardous Substances

October 14, 1988 - CECOS International, Inc. performed the first step of Building S and LINAC building decontamination, the collection of hazardous substances. These materials were sorted into compatible groups for subsequent disposal by Becton, Dickinson and Company.

2.5 Asbestos Abatement

October 24, 1988 - Quality Asbestos Removal, Inc. (QAR) began asbestos abatement work in Building S and LINAC building. In this second phase of building decontamination, QAR removed asbestos

containing insulating material from overhead piping and asbestos containing tile from the floor. All asbestos containing material was disposed of at a permitted off-site disposal facility. Asbestos abatement was 95% completed in late November, 1988. Figure 2-3 presents a floor plan of Building S and the LINAC building and the amount of floor tile containing asbestos removed from the various rooms. The remaining 5% of asbestos abatement will be completed during demolition of the building due to its current inaccessibility.

2.6 Soil Excavation

2.6.1 Former Transformer Area

October 25, 1988 - CECOS International, Inc. began excavation of soil contaminated with polychlorinated biphenyls (PCBs) at the former transformer area. Figure 2-1 presents the approximate perimeter of the excavation and the locations and analytical results of the samples collected during the initial environmental investigation, the pre-post-excavation samples and the post excavation samples. The transformer pad was removed and the excavation was extended to the depth of the ground water (2 to 2.5 feet). Four roll-off containers were filled with 15 cubic yards of PCB contaminated soil

DWG. NO.

SH.____ OF____

NO.	REVISION	DATE

22'-6"

N

Q.C. LAB 473 SF S-31A

S-31B Q.C. 234 SF

DISP. SPINAL & RADIOLOGY 4,497 SF + ZONE A S-28

ACM-30% 5,389 sq.ft.

TRAY PAK 450 SF S-32

462 SF

& FEMALE TOILETS

AIR LOCK

ACM-1% 50 sq.ft.

S-34 AISLE

ROBE ROOM 250 SF S-28

A 1

ACM-30%, 35% 282 sq.ft.

PUMP RM 175 SF

OFFICE 346 SF S-29

TRAY PAK STG. 225 SF

SPARE PARTS 84 SF

MISC. S

ACM-1% 612 sq.ft.

S-24

AISLE 507 SF

AMC-1% 1,224 sq.ft.

STORAGE 657 SF S-25

STG. & DOCK 390 SF S-25

S-26 97 SF

SPINAL & RADIOLOGY CASE PACK 795 SF

ACM-30% 1574 sq.ft.

S-14B LAB 132 SF

S-14A

PRE-CONDITION ROOM 251 SF S-15

S-16

GMP LAB S-8 270 SF

LAB STG. S-7 186 SF

S-13 QUARANTINE 1429 SF

ACM-30% 286 sq.ft.

S-12 AISLE 313 SF

S-6C

S-6B RECEIVING 344 SF

S-6A OFFICE 185 SF

S-5

ACM-30% 425 sq.ft.

STERILIZATION 2384 SF + S-12

STERILIZER 246 SF

MEDIA LAB 198 SF S-18

S-19 DOCK 300 SF

STG. 180 SF

PUMP ROOM 144 SF

S-20 LINAC 580 SF S-21

CONSOLE 248 SF S-22

BLDG. 'L'

VEST.

MFG.	16,956
STERILIZATION	3,453
FACILITIES	1,012
TOTAL	21,421 SF

SH.____ OF____

TOLERANCE UNLESS OTHERWISE SPECIFIED: ± ON DECIMAL DIMENSIONS: ± ON FRACTIONAL DIMENSIONS.

THE SUBJECT OF THIS DRAWING IS SUBMITTED IN CONFIDENCE AND IT AND THE DRAWING WILL AND SHALL REMAIN THE PROPERTY OF BECTON, DICKINSON AND COMPANY, AND ARE NOT TO BE USED WITHOUT ITS WRITTEN PERMISSION AND APPROVAL.
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BREAK ALL SHARP CORNERS
DO NOT SCALE DWGS.

BECTON, DICKINSON & CO.
RUTHERFORD, N.J.

RUTHERFORD PLANT ENGINEERING

FLOOR PLAN - BUILDING "S" & LINAC BUILDING

FIGURE 2-3

PART DWG. NO.	SCALE	DATE	DWG. NO.
	1"=20'	4-19-85	R.E.B.-16s
DRAWN BY	CHECKED	APPROVED	SH.____ OF____
Wm. Mare			

(including soil from location 24-03, see next section) and subsequently transported by Environmental Transport Group to the CECOS International Inc. hazardous waste landfill in Niagara Falls, New York on November 7, 1988. The hazardous waste manifests accompanying the waste are provided in Appendix A. The excavation was backfilled with certified clean fill on October 27, 1988.

The elevated concentration of PCBs observed in post-excavation sample 29-PX5 (see Figure 2-1) indicates the need to extend the excavation in that direction. This work will be completed along with the remainder of the soil remediation work scheduled for late spring 1989.

2.6.2 Open Area No. 4

October 28, 1988 - Excavation began in open area no. 4. Figure 2-2, a plan view of the area, shows the approximate perimeter of the four excavations, and the locations and analytical results of the samples collected during the initial environmental investigation, the pre-post excavation samples and the post excavation samples.

2.6.2.1 Location 24-03

Approximately 10 cubic yards of PCB contaminated soil was removed from location 24-03 and placed in a roll-off container that was transported to the CECOS International, Inc. hazardous waste landfill with three other roll-offs on November 7, 1988. The hazardous waste manifests were previously presented in Appendix A. The excavation was extended southwestward (see Figure 2-2) because a pre-post-excavation sample displayed concentrations of lead and polynuclear aromatic hydrocarbons above acceptable levels. The excavation at location 24-03 was backfilled with clean fill on October 31, 1988.

2.6.2.2 Location 24-04

October 31, 1988 - Approximately 10 cubic yards of soil contaminated with copper, lead and zinc were removed from location 24-04. This soil was stockpiled on polyethylene sheeting on the B-D site until approval to dispose of the soil at a landfill was gained. The excavation was extended southwestward (see Figure 2-2) because a pre-post-excavation sample displayed a

concentration of lead above acceptable levels. The excavation at location 24-04 was backfilled with clean fill on October 31, 1988.

2.6.2.3 Location 24-05

October 31, 1988 - Approximately 10 cubic yards of soil contaminated with lead and zinc were removed from location 24-05 and stockpiled at the location previously mentioned. The excavation was extended southeastward (see Figure 2-2) because a pre-post-excavation sample displayed concentrations of lead and zinc above acceptable levels. The excavation at location 24-05 was backfilled with clean fill on November 1, 1988.

2.6.2.4 Location 24-02

November 1, 1988 - Approximately eight cubic yards of soil contaminated with chromium and total petroleum hydrocarbons were removed from location 24-02 (see Figure 2-2) and stockpiled at the location previously mentioned. The excavation was backfilled with clean fill on November 1, 1988.

2.7 Disposal of Drilling Cuttings

November 28, 1988 to December 12, 1988 - Associated Chemical and Environmental Services (ACES) and Inland Pollution Services, Inc. (IPSI) emptied drilling cuttings from 55 gallon drums, stabilized the material with cement kiln dust and arranged for transportation to a permitted off-site disposal facility. The cuttings had been generated during the installation of monitoring wells and soil borings associated with the site investigations. After analyzing their contents, 383 drums were emptied and 145 tons of material were transported to Breitenstine Landfill in Waynesburg, Ohio. The empty drums were taken from the site by Kingsland Drum and Barrel Company for reconditioning.

The material was shipped under manifest for tracking purposes only. The manifests are presented in Appendix A.

2.8 Soil Sampling at Building Q (Kelly Building)

December 29, 1988 - Soil samples were collected both inside and outside Building Q.

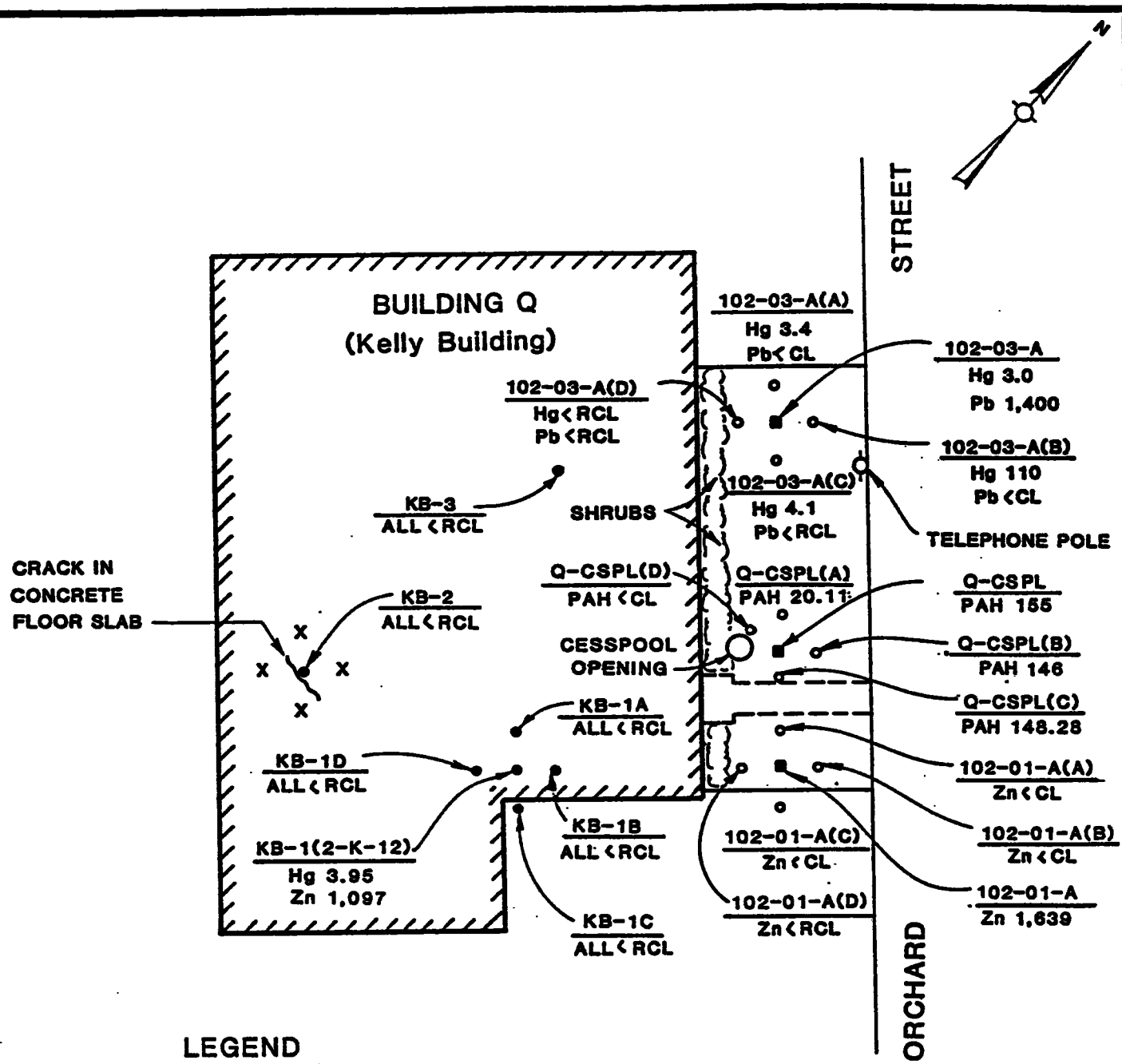
Four samples collected beneath the floor slab of Building Q were pre-post excavation samples and two were "further

investigation" samples (FI) as defined in the Remedial Action Plan for Parcels 1 and 2. The FI sampling was required to determine the quality of soil beneath the floor slab. All sampling will be described below.

Building Boring Samples

Samples were collected from 0 to 6 inches below the concrete floor slab of Building Q at the locations shown on Figure 2-4. Sample KB-1 (2-K-12) was collected during the previous site investigation and was found to exhibit levels of contamination that require excavation. Four pre-post-excavation samples were collected around sample KB-1. Samples KB-1A through KB-1D were analyzed for the contaminants of concern in sample KB-1.

Samples KB-2 and KB-3 were collected to further characterize the quality of soil below the floor slab. The boring for sample KB-2 was installed next to a crack located in a low point of the floor slab. This location was judged to be most susceptible to contamination. Sample KB-2 was analyzed for priority pollutants +40 and total petroleum hydrocarbons (TPH). Pre-post-excavation samples were collected around sample KB-2 and archived for future analysis if necessary. Sample KB-3 was collected to characterize soils at the western end of the building. Sample KB-3 was analyzed



LEGEND

- ● SOIL SAMPLE COLLECTED FROM 0-6" BELOW FLOOR SLAB
- X ARCHIVED SOIL SAMPLE COLLECTED FROM 0-6" BELOW FLOOR SLAB
- ■ SOIL SAMPLE COLLECTED DURING PREVIOUS SITE INVESTIGATION
- o PRE-POST-EXCAVATION SAMPLE COLLECTED FROM 9-15' BELOW GRADE

RCL ECRA'S RECOMMENDED CLEANUP LEVEL

CL CLEANUP LEVEL - ESTABLISHED IN RAP FOR PARCELS 1 & 2

ALL CONCENTRATIONS IN PPM

TITLE

SOIL SAMPLING AT BUILDING Q (KELLY BUILDING)

PREPARED FOR
BECTON, DICKINSON & CO.
EAST RUTHERFORD, N.J.

ERM-Northeast
Environmental Resources Management

SCALE 1"=20'
DATE
FIGURE 2-4

139838

for heavy metals (Cd, Cr, Cu, Hg, Pb, Ni and Zn), polynuclear aromatic hydrocarbons and TPH.

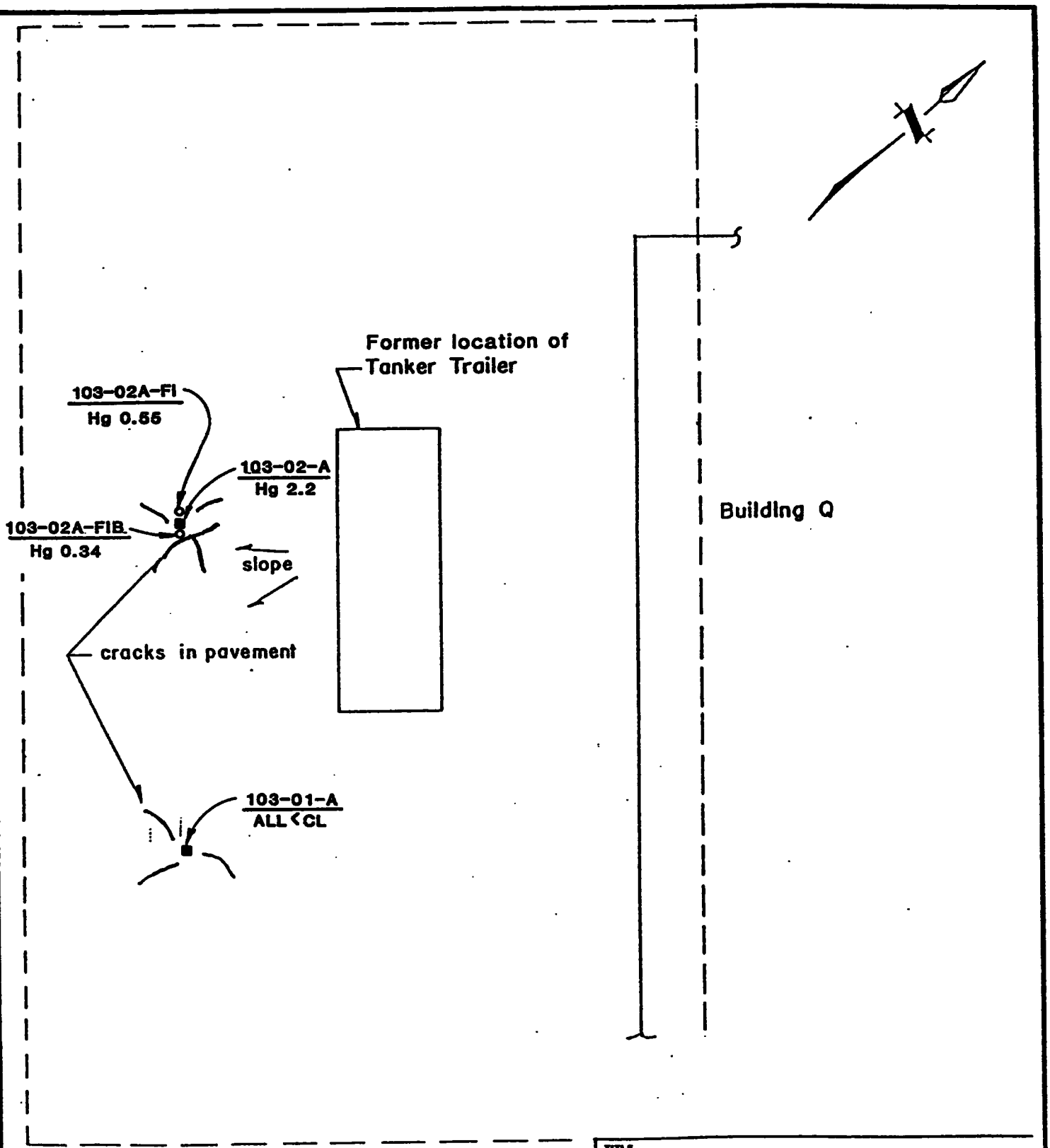
Analytical results of samples collected from beneath the floor slab of Building Q are presented on Figure 2-4.

Sampling Outside Building Q

Sampling was conducted in two areas outside of Building Q. Pre-post-excavation samples were collected around three sample locations identified as requiring remedial action in the Remedial Action Plan for Parcels 1 and 2 (RAP). A sample and a duplicate were collected from an area identified as requiring further investigation in the RAP. The sampling locations are presented in Figures 2-4 and 2-5 respectively.

The four pre-post-excavation samples surrounding each location requiring remedial action were collected to delineate the extent of contamination prior to excavation. Figure 2-4 presents the analyses results as well as the concentrations of contaminants that indicated the need for remedial action.

Figure 2-5 presents the analyses results for the samples collected to verify the concentration of mercury at sample location



SCALE: .09375" (3/32") = 1'-0"

LEGEND

- ■ SOIL SAMPLE COLLECTED DURING PREVIOUS SITE INVESTIGATION
- o "FURTHER INVESTIGATION" SAMPLE AS DEFINED IN REMEDIAL ACTION PLAN

ALL CONCENTRATIONS IN PPM

TITLE

FIGURE 2-5

PREPARED FOR

BECTON, DICKINSON & Co.
EAST RUTHERFORD, N.J.

ERM-Northeast
Environmental Resources Management

SCALE Shown
DATE

FIGURE

103-02-A. The two "further investigation" samples at that location were collected at the same depth (4 to 10 inches) as the previous sample (103-02-A).

2.9 Building Decontamination: Building S and Building Q

January 3-17, 1989 - During this time, building decontamination was completed in Building S and Building Q.

Decontamination activities in Building S began on January 3 and were completed on January 9, 1989. These activities included removing floor stains, removing drain pipes from laboratory sinks and collecting and removing residual wastes such as lead shot identified in the LINAC building. Decontamination activities in Building Q (Kelly Building) were completed on January 17, 1989. These activities included removing floor stains and draining compressors. B-D removed all substances and equipment from Building Q. Approximately 60 lineal feet of asbestos containing pipe insulation was removed in early January 1989 by Quality Asbestos Removal.

Table 3-1 of the Building Decontamination Plan for Parcel Nos. 1 and 2 presented a list of materials, equipment and other building features identified as possibly requiring decontamination action.

This list was compiled during an investigation of each building in Parcel Nos. 1 and 2 conducted in the summer of 1988. Prior to beginning decontamination work, an in-depth investigation of Building S, the LINAC Building and Building Q was conducted to determine which items listed in Table 3-1 required decontamination. Table 2-1, presented in this report, duplicates a portion of Table 3-1 and indicates whether decontamination action was required for each concern listed. The specific action taken is listed in the "Action" column. If no decontamination was required, "NDR" is listed in the "Action" column.

2.10 Soil Excavation: Building Q

January 11-19, 1989 - Excavation at Building Q began on January 11 and was completed on January 19, 1989. Figure 2-6 presents the areal extent of the excavations. The excavations extended to the depth of ground water (2 to 2.5 feet).

Prior to excavation at location Q-CSPL, all liquids and sludge in the adjacent cesspool were pumped out. The location of the cesspool opening is indicated on Figure 2-4. The sludge was pumped into 55-gallon drums for subsequent disposal. The liquid was disposed of, after being analyzed, at the pilot ground water treatment plant on-site at that time. During excavation, the

TABLE 3-1
SUMMARY OF REQUIRED DECONTAMINATION PLAN ACTIVITIES AND COMPLETED REMEDIAL ACTIONS

Parcel No.	Building Designation	Potentially Hazardous Raw Materials and Wastes	Action	Equipment	Action	Building Features	Action	Miscellaneous
1	9 (Kelly) Office Area	- Bottles of reagents	- Removed			- Natural gas system	-NDR	
						- Stm PV&F	-NDR	
						- Lab hood	- Removed	
						- HVAC duct system	-NDR	
	12 (Kelly) R&D Area & Compressor Room	- Reagents & cans of oil, grease, gas cylinders	- Removed	- Rooftop unit heaters	- NDR	- Dust collector system	-NDR	
				- Two compressors	- Removed	- Floors stained, oily residue near compressor,	- Removed	
				- Dry type transformers	- NDR			
				- One 480V transformer	- Removed	- Heavy chemical residue on floor	- Removed	
				- Electric panelboard	- NDR			
				- Encapsulated distribution transformer	- Removed	- HVAC	-NDR	
				- Plastic tank	- Removed			
	10 (Kelly) Machine Area & Storage Area	- Reagents in cabinet, some oils and solvents	- Removed	- Abandoned & dismantled exhaust duct work	- NDR	- HVAC duct work	- NDR	
		- Therm plastic materials 100 lb bags	- Removed	- Rubber mill (2)	- Removed	- Floor has oily residue near rubber mills,	- Removed	
		- Release & curing reagents	- Removed	- Rooftop unit heaters	- NDR	- Staining in machine & storage areas	- Removed	
		- Halogenated rubber & plastic reagents	- Removed	- Lab fume hood with filter and exhaust duct system	- Removed			
		- 55 gal drums of oil	- Removed					
	18 (Kelly) Exterior of Building					- Concrete pad for transformer stained	- NDR	- Transformer Removed No leakage detected
	18 Building & Pump House			- Pumps & heat exchangers	- NDR			
				- Oxygen tank	- Removed			
2	5-1	- Lead shot on floor & in sump	- Removed	- Conveyor	- Frame left in building	- Sump (lead shot)	- lead shot removed	
				- Electron beam generating equipment	- Removed	- HVAC duct work	- NDR	
						- Floor (lead shot)	- lead shot removed	
						- PVEF Stm	- NDR	
						- PVEF (hydraulic system)	- NDR	
						- Lead walls & door	- Door removed	- No lead walls
	5-2 (LINAC Console)	- 5 gal 0.2N NA OH	- Removed	- Conveyor system & electric motor	- NDR	- HVAC AHU w/ blower	- NDR	
		- Boxes of glassware	- Removed			- PVEF Steam	- NDR	
		- LP gas tank under stairs	- Removed			- Floor drain	- NDR	
		- Bottles of reagents	- Removed			- PVEF for oil metering system	- Removed	
						- Floor stains & residue	- Removed	
	5-1, 2nd Floor	- Lead shot in low area	- Removed	- Blower unit	- NDR	- Floor oil stains	- Removed	
		- Jugs (3) 5 gal. reagents	- Removed	- Dismantled conveyor	- Removed	- Low area (sump like)	- lead shot removed	

TABLE 2-1
SUMMARY OF REQUIRED DECONTAMINATION PLAN ACTIVITIES AND COMPLETED REMEDIAL ACTIONS

Parcel No.	Building Designation	Potentially Hazardous Raw Materials and Wastes	Action	Equipment	Action	Building Features	Area	Miscellaneous
		- 15 ammonium oxalate		- system		- HVAC units (AHU's 1-4)	- NDF	
		- Helium gas cylinder	- Removed	- Electric motors (loose)	- Removed	- Floor stains	- Remained	
	18-2, 2nd Floor	- Freon gas cylinder	- Removed	- Package chiller unit	- Removed	- Floor drain at chiller unit	- NDF	
		- Ethylene oxide cartridges (boxes)	- Removed	- compressor & exchanger				
				- Condensate pump	- NDF	- PVDF steam	- NDF	
		- Lecture bottles	- Removed			- HVAC-AHU (1)	- NDF	
		- 4 gas cylinders	- Removed			- Floor stains	- Remained	
	18-3, Pump Room			- Cooling tower outside door	- NDR	- Oil stained floor	- Cleaned	
				- Water heater (1)	- NDR	- PVDF hot water system	- NDF	
				- Compressor (2)	- Drained	- PVDF fuel system to	- Removed	
				- Chilled water pumps (4)	- NDR	electrical generator		
				- Electric generator set (1)	- NDR			
2								
	18-4	- One gal jug - unknown	- Removed	- Fume hood with filter	- Removed	- HVAC system ducts above hung ceiling	- NDF	
	18-5, Lab	- Jugs - cleaning soaps micro & other sanitizing chemicals	- Removed	- Sink	- Removed	- Floor access plate near sink	- NDF	
				- Sinks	- Drain pipe removed	- Metal cans for sinks, capped drain under sink to old septic system	- Sink drains removed	
				- Oven	- NDR			
				- Sterilizer	- NDR			
						- HVAC ducts above hung ceiling	- NDF	
						- Utility piping	- NDF	
						- Sink drains	- Removed	
	18-6A, Lab Area			- Fume hood	- Removed	- Natural gas-piping	- NDF	
						- HVAC system ducts above	- NDF	
	18-6B, Office	- Jar calcium nitrate	- Removed			- HVAC system ducts above hung ceiling	- NDF	
	18-6C, Office					- HVAC system ducts above hung ceiling	- NDF	
	18-7, Lab Storage & Restrooms Dismantled			- Controlled Enviro Room (portable)	- Removed	- HVAC-AHU (1)	- NDF	
						- HVAC duct work	- NDF	
				- Electric switch gear power panel	- NDR	- PVDF steam	- NDF	
	18-8, BMF Lab	- Small jars reagents, oils	- Removed	- Bench sink	- Removed	- Roof drain piping with	- NDF	

TABLE 2-1

SUMMARY OF REQUIRED DECONTAMINATION PLAN ACTIVITIES AND COMPLETED REMEDIAL ACTIONS

Parcel No.	Building Designation	Potentially Hazardous Raw Materials and Wastes	Action	Equipment	Action	Building Features	Action	Miscellaneous
						clean connection		
						- Gas piping systems	-NDF	
						- HVAC systems above hung	-NDR	
						ceilings		
	IS-F, Office					- HVAC system above hung	-NDR	
						ceiling		
	IS-10 A & B, Office	- Chemical reagents	- Removed			- HVAC system above hung	-NDR	
						ceiling		
	IS-11, Test Room					- HVAC system above hung	-NDR	
						ceiling		
	IS-12, Sterilization Area/ Storage and Aisle			- Portable skid mounted sterilizer with blower	- Removed	- PVDF steam	-NDR	
						- HVAC duct system for AHU's (3)	-NDR	
						- Roof drain with clean out	-NDR	
	IS-13, Quarantine	- Safety can	- Removed	- Small equipment for labs	- Removed	- HVAC duct system	-NDF	
		- Cans (1 gal) of paint	- Removed	& autos		- AHU (1) no ACM	-NDF	
		- Cans of unknowns	- Removed					
	IS-14 A & B, Lab	- Jars, bottles & jugs of reagents & cleaners	- Removed	- Lab sink with built-in sump with pump	- Removed	- HVAC duct system above hung ceiling	-NDR	
						- Wall mounted HTS system	- Removed	
						- Natural gas piping to both A & B rooms	-NDR	
	IS-15, Pre-Condition			- Modine unit heater	- NDR	- Natural gas piping to unit heater	-NDF	
						- PVDF steam and wall mounted hot water heating system	-NDR	
						- HVAC duct above ceiling	-NDF	
	IS-16, Aisle							
	IS-17, Sterilization (Auto Clave)			- Auto clave	- Removed	- HVAC ducts	- NDF	
				- Water heater	- NDR	- Floor drains	- NDF	

TABLE 2-1
SUMMARY OF REQUIRED DECONTAMINATION PLAN ACTIVITIES AND COMPLETED REMEDIAL ACTIONS

Parcel No.	Building Designation	Potentially Hazardous Raw Materials and Wastes	Action	Equipment	Action	Building Features	Action	Miscellaneous
				- Pumps	- NDR	- PV&F steam	- NDR	
				- Heating pump	- NDR	- Natural gas piping system	- NDR	
						- Oil stains on floor	- No staining observed	
	18-18, Storage (Old Media Lab)	- Bottles of chemicals	- Removed	- DI water equipment	- Removed	- Floor drain	- NDR	
						- HVAC system above hung ceiling	- NDR	
	18-19, Loading Dock			- Modine unit heater	- NDR	- Floor drain	- NDR	
						- HVAC system above hung ceiling	- NDR	
	18-20, Blister Seal					- Floors have minor stains	- Removed	
						- PV&F steam	- NDR	
						- Wall heating units & above hung ceiling	- NDR	
						- Roof drain with clean out	- NDR	
						- STM condensate line	- NDR	
						- Roof drain stub up	- NDR	
	18-21, 22 & 23	- (2) 5 gal buckets of hydraulic oil	- Removed			- HVAC above hung ceiling	- NDR	
		- (1) jar 500 ml cyclohexanone	- Removed			- PV&F steam above hung ceilings	- NDR	
						- HVAC above hung ceiling	- NDR	
						- Natural gas piping	- NDR	
						- Floors have minor staining	- Removed	
	18-24	- 55 gal drums	- Removed			- PV&F steam to wall heating units	- NDR	
						- PV&F above hung ceiling	- NDR	
						- HVAC above hung ceiling	- NDR	
						- Floors minor staining	- Removed	
	18-25, Loading Dock	- 55 gal drums	- Removed	- Modine unit heaters PVP'S with Stm PV&F	- NDR	- PV&F steam system across ceiling	- NDR	
		- Nitrogen gas cylinder	- Removed			- Floors have oily residue stains at trash compactor	- Cleaned	
	18-26, G.C. Dock Office			- Fume hood	- Removed	- Natural gas lines	- NDR	
						- Roof drain	- NDR	
						- Condensate line to roof drain stub up	- NDR	
						- Floors stained	- Removed	

TABLE E-1
SUMMARY OF REQUIRED DECONTAMINATION PLAN ACTIVITIES AND COMPLETED REMEDIAL ACTIONS

Parcel No.	Building Designation	Potentially Hazardous Raw Materials and Wastes	Action	Equipment	Action	Building Features	Action	Miscellaneous
	IS-27					|- Stn PVBF above hung ceiling	- NDR	
						|- Sink & drain	- Removed	
						|- Roof drain with clean out	- NDR	
						|- HVAC duct system above hung ceiling	- NDR	
	IS-28					|- 3 drains above floor level	- Removed	
						|- PVBF steam to wall heating units	- NDR	
						|- PVBF steam above ceiling	- NDR	
						|- HVAC above hung ceiling	- NDR	
	IS-29, Office					|- HVAC above hung ceiling	- NDR	
						|- Stn PVBF above hung ceiling	- NDR	
	IS-30			|- Two fume hoods	- Removed	|- Roof drain with clean out connection	- NDR	
						|- HVAC above hung ceiling	- NDR	
						|- Stn PVBF above hung ceiling	- NDR	
	IS-31 A & B, Lab	|- Lab reagents	- Removed	|- Spectrophotometer fume hood	|-Removed inside transite ACM panels	|- HVAC above drop ceiling	- NDR	
		|- Hydrogen gas cylinder	- Removed			|- Stn PVBF above drop ceiling	- NDR	
						|- Floors are stained	- Removed	
						|- Sink drains	- Removed	
						|- STM heat wall units	- NDR	
						|- Natural gas piping	- NDR	
	IS-32 Custodial Storage Room	|- 5 gal buckets & cleaning supplies	- Removed			|- HVAC above drop ceiling	- NDR	
						|- Stn PVBF above drop ceiling	- NDR	
						|- Floors are stained	- Removed	
						|- Wall heating units	- NDR	
						|- Natural gas piping	- NDR	
						|- HVAC ducts in room enroute through window	- NDR	
	IS-33, Mens/Womens Restrooms							
	IS-33 Janitor Closet					|- Stn PVBF above drop ceiling	- NDR	
	IS-34, Coat Rack Room					|- HVAC above drop ceiling	- NDR	
						|- HVAC above drop ceiling	- NDR	

PHASE I HAZARDOUS WASTE MANIFESTS
FOR PCB-CONTAMINATED SOIL
(SEE APPENDIX C-1)

PHASE I HAZARDOUS WASTE MANIFESTS
FOR DRILLING CUTTINGS
(SEE APPENDIX C-1)

PHASE I NON-HAZARDOUS SOIL
MANIFEST FORMS
(SEE APPENDIX C-1)

ERM-Northeast

MARCH, 1989 MONTHLY UPDATE LETTER

Becton Dickinson and Company
One Becton Drive
Franklin Lakes, New Jersey 07417-1880

(201) 848-6800

April 20, 1989

BECTON DICKINSON

Mr. Joseph Goliszewski
Section Chief
New Jersey Department of
Environmental Protection
5th Floor
401 East State Street
Trenton, NJ 08625

Re: ECRA Case Nos. 87573
and 87574

Dear Mr. Goliszewski:

This letter summarizes the ECRA site remediation activities implemented during the month of March, 1989 at Becton, Dickinson and Company's (B-D) East Rutherford plant site. An initial progress report describing site remediation activities implemented from October, 1988 through February, 1989 was sent to you in early March, 1989.

The following site remediation activities were implemented during March, 1989:

- Disposal of stockpiled soil excavated from Open Area No. 4 and Area 102 (see initial progress report)
- Additional soil excavation at Area 102
- Excavation of contaminated soil from under the floor slab of Building Q (Kelly Building)
- Collection of samples at areas identified as requiring further investigation

The following paragraphs provide the milestone dates and a brief description of the activities listed above.

March 7, 1989 - Approximately 90 cubic yards of stockpiled soil from previous site remediation excavations was removed from the site and transported to the CECOS International, Inc. landfill in Niagara Falls, New York. The non-hazardous waste manifests used to document the transport and disposal of the soil are attached.

March 6, 1989 - Approximately 10 cubic yards of soil was excavated from the northeast side of Building Q (Area 102) and

stockpiled on-site for subsequent disposal. The additional excavation was required because a post-excavation sample collected after the initial excavation exhibited a concentration of mercury above the cleanup level.

March 6, 1989 - Approximately eight cubic yards of soil was excavated from beneath the floor slab of Building Q and stockpiled on-site for subsequent disposal. The location (2-K-12) was identified as requiring remedial action during the building boring program conducted in February, 1988. B-D's demolition contractor demolished Building Q to the floor slab. The floor slab was broken into pieces small enough for B-D's environmental contractor to manipulate. The concrete directly above the 10 foot by 10 foot excavation was removed with the soil for subsequent off-site disposal.

On March 28 and 30, 1989, soil samples were collected at the B-D site in all areas identified as requiring further investigation in the Soil and Ground Water Remedial Action Plan, July, 1988, for Parcel Nos. 1 and 2. Further, samples were collected in Area 27 to delineate the areal and vertical extent of the buried asbestos contamination.

Table 1 presents a summary of remedial activities conducted at the site in March, 1989. The table lists the amount of waste handled, the disposal site or staging area and the estimated cost of each remedial activity.

If you have any questions or require additional information, please do not hesitate to contact Mr. Ted Tideman of our East Rutherford plant (201) 460-2932, Mr. Randolph White of ERM-Northeast (516) 349-0050 or me.

Very truly yours,

Glenn Barbi
Corporate Manager/Environmental Control

TABLE 1

Task	Amount	Disposal Site	Cost
Disposal of stockpiled soil	90 yd^3	CECOS Int'l., Inc. Landfill, Niagara Falls, NY	$25,900
Excavation At Area 102	10 yd^3	Stockpiled on-site	$ 1,500
Excavation at Location 2-K-12	8 yd^3	Stockpiled on-site	$ 1,500
Sampling at Further Investigation (FI) areas and Area 27	19 samples	---	$ 9,000

ERM-Northeast

LETTER DATED APRIL 20, 1989
REQUESTING MODIFICATION TO THE
REMEDIAL CLEANUP PLAN

April 20, 1989

Mr. Joseph Goliszewski
Section Chief
New Jersey Department of Environmental Protection
5th Floor
401 East State Street
Trenton, NJ 08625

Re: ECRA Case Nos. 87573,
87574 and 87575

Dear Mr. Goliszewski:

This letter is a formal request to modify the approved remedial action plans (RAP) for Parcel Nos. 1, 2 and 3 at Becton, Dickinson and Company's (B-D) facility located in East Rutherford, Bergen County. This letter also presents a proposal to use soil excavated during the installation of a ground water recovery system trench as backfill during soil remediation at the plant site. As you discussed in your conversation with Bennett Leff of ERM-Northeast, our environmental consultants, the RAP modifications apply to remedial classification of some locations, excavation procedures and project schedule. The requested modifications and proposed backfill approval procedures follow.

A. Requested Modification to the Soil and Ground Water Remedial Action Plan, July 1988 (Parcel Nos. 1 and 2)

1) The following changes to Table 6-1, Remedial Classification of Soils on pages 6-2 through 6-7 are requested. These changes are based upon a further evaluation of data, site conditions and site development plans of the Federal Reserve Bank of New York.

- Change the remedial designation of location 101-03 from FI to RA
- Change the remedial designation of location 101-12 from NA to RA
- Change the remedial designation of location 101-17 from FI to RA
- Change the remedial designation of location 29-09 from NA to RA
- Change the remedial designation of location 23-04 from NA to RA
- Change the remedial designation of location 23-05 from NA to RA
- Change the remedial designation of location 23-07 from NA to RA

- o Change the remedial designation of location 226-05(1) from NA to RA

2) Additional sampling and analyses of locations with a remedial designation of FI have been completed as specified in Section 6.1.2, Sampling and Analysis Plan for Areas Requiring Further Investigation. The following locations have been changed from remedial designation FI to NA.

101-18	222-02
29-08	227-01
29-11	227-05
29-12	228-02
222-02	228-03
29-12	228-04

At all of the above locations, contaminant levels were either less than the ECRA RCLs or were less than the appropriate soil remedial action criteria.

Location 103-02 was changed from remedial designation FI to NA as previously presented in Section 2.8 of the report entitled Documentation Report - Building Decontamination and Soil Excavation Prior to Building S and Building Q Demolition, February, 1989.

3) In Section 6.3.1 of the RAP, Access Control, the interim contamination reduction zone (ICRZ) is described as an area covered with heavy-duty polyethylene. The modification requested is to describe the ICRZ as an area covered with either heavy-duty polyethylene or woven geo-textile fabric.

4) On page 6-16 of the Access Control section, the equipment decontamination to take place within the long-term contamination reduction zone (CRZ) is described as being accomplished using a powered steam system (steam jenny). The modification requested is that the equipment decontamination be accomplished using the steam jenny when wet conditions prevail at the site, and a dry decontamination system when dry conditions prevail. Dry decontamination will consist of brushing or scraping residual soils from exposed equipment surfaces and wiping the exposed surfaces with rags and a detergent solution as required. The contaminated rags will be disposed of in the same manner as contaminated soil.

5) In Section 6.3.2 of the RAP, Excavation Procedures, the procedure for extending each excavation to a depth of 1 foot

below the depth of the sample that indicated the need for remedial action is presented. The modification requested is that the excavation will extend 1 foot below the depth of said sample or to the depth of ground water, whichever is less.

6) On page 6-19 of the Excavation Procedures section, the procedure for loading excavated soil, sufficiently characterized for disposal purposes, directly into trucks is presented. The modification requested is for the sentence to read that excavated material may be loaded directly into trucks or may be stockpiled on-site prior to off-site disposal.

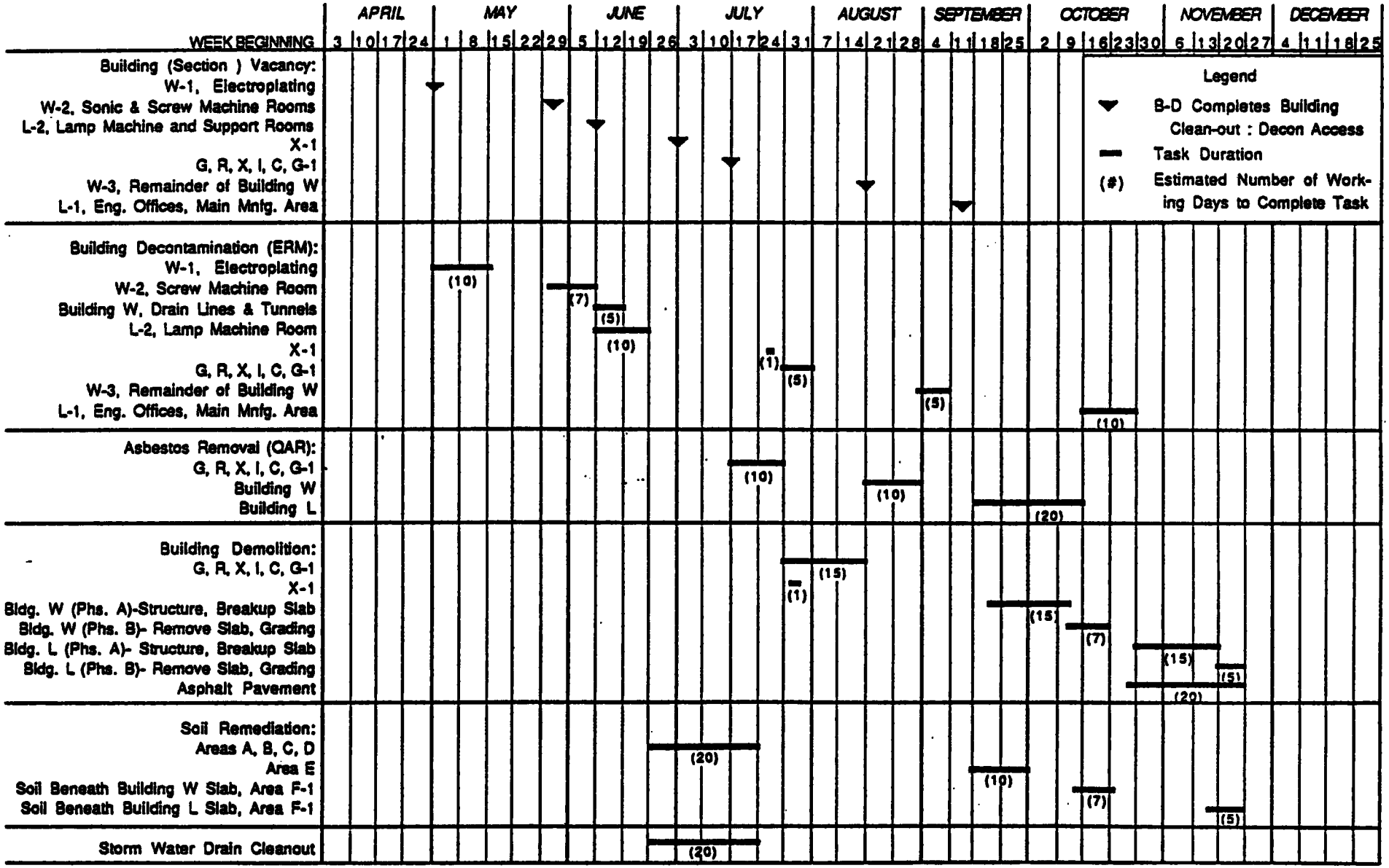
7) In Section 6.3.2 of the RAP, the following addition is requested: Where soil to be excavated is located under asphaltic pavement, the pavement will be removed and stockpiled for later disposal. The base course material will be left with contaminated soil for excavation and off-site disposal.

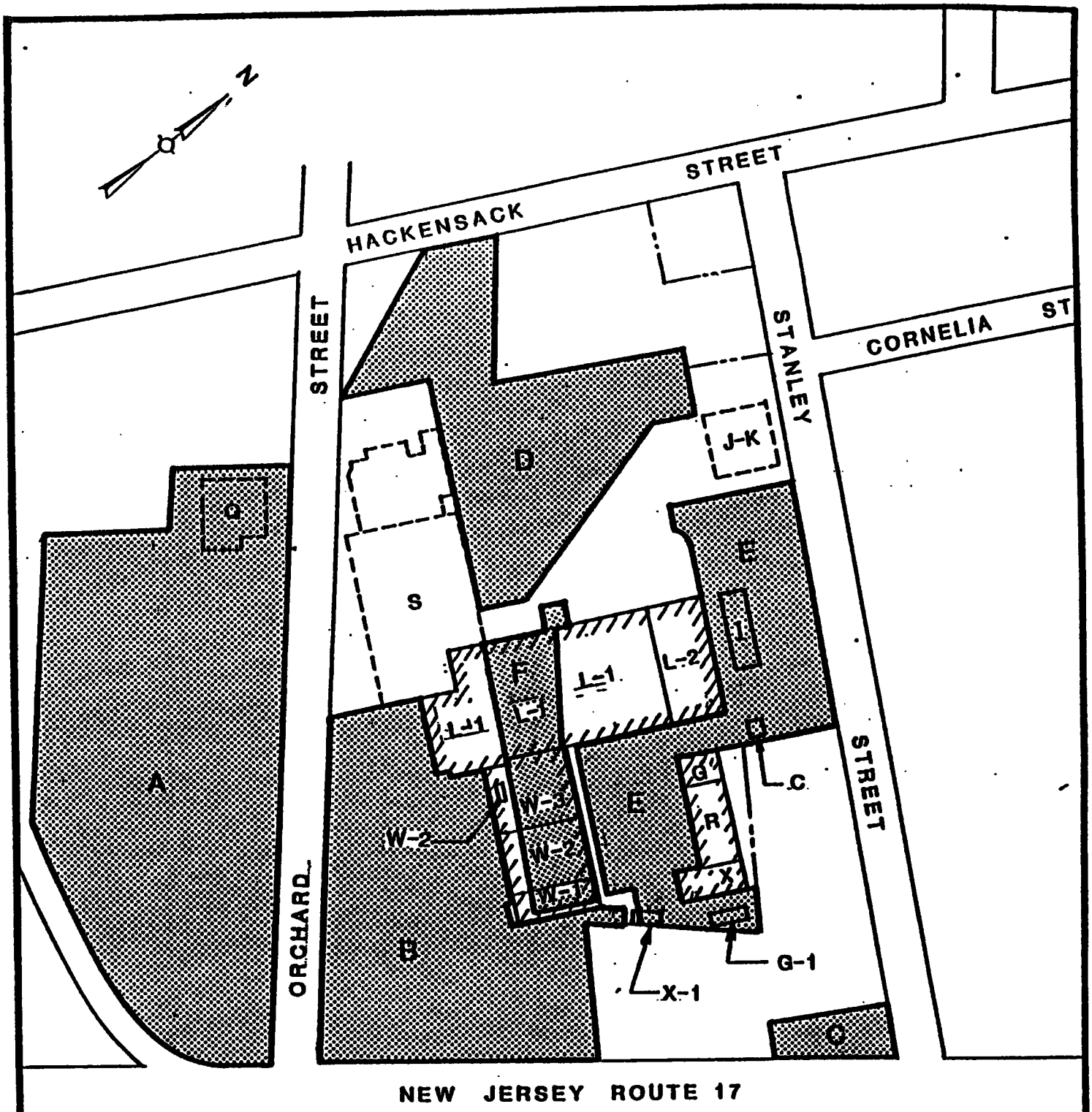
8) In Section 6.4.1 of the RAP, Post-Excavation Sampling and Analysis, the first sentence asserts that upon completion of the initial soil excavation, soil samples will be collected and analyzed to confirm the removal of contaminated soil. The modification requested is to collect and analyze these post-excavation soil samples either upon completion of or prior to excavation. By collecting samples prior to excavation, the extent of contamination can be delineated before the contractor begins work. This will improve the efficiency of the soil remediation effort.

9) The soil remediation schedule presented in the Remedial Action Plan for Parcel Nos. 1 and 2 was based upon the projected schedule of cessation of plant manufacturing activities and the subsequent building demolition. A more definitive plant closing and building demolition schedule has been prepared at this time. In order to coordinate ECRA site remediation activities with the remainder of the site closing activities, it was determined that soil remediation needed to be accomplished in a series of phases. Figure 1 enclosed provides the most up-to-date schedule of soil remediation, storm water drain cleanout and building decontamination activities planned in Parcels 1 and 2. Figure 2 provides a schematic site plan identifying both the different areas of soil remediation and the building sections for decontamination referred to on the schedule. B-D is currently using this

FIGURE 1 - SCHEDULE OF SITE REMEDIATION AND BUILDING DEMOLITION ACTIVITIES

BECTON, DICKINSON AND COMPANY - EAST RUTHERFORD, NEW JERSEY





W BLDG.

W-1 Electroplating
W-2 Brass Components Mfg. and Sonic Clean
W-3 Canula Mfg.

L BLDG.

L-1 Eng. Offices and Canula/Glass Barrel Mfg.
L-2 Lamp Machine Room

TITLE

Designation of Building Decontamination and Soil Remediation Areas

PREPARED FOR

Becton, Dickinson & Co.

ERM-Northeast
Environmental Resources Management

SCALE 1"=165'
DATE

FIGURE 2

133839

schedule for planning purposes to ensure that all site remediation and building demolition activities are completed by December 31, 1989.

B. Proposed Procedures to Use Excavated Trench Soil as Backfill

The following paragraphs provide a description of the excavated soil pile proposed for use as backfill, and a sampling and analysis plan to determine the suitability of the soil as backfill.

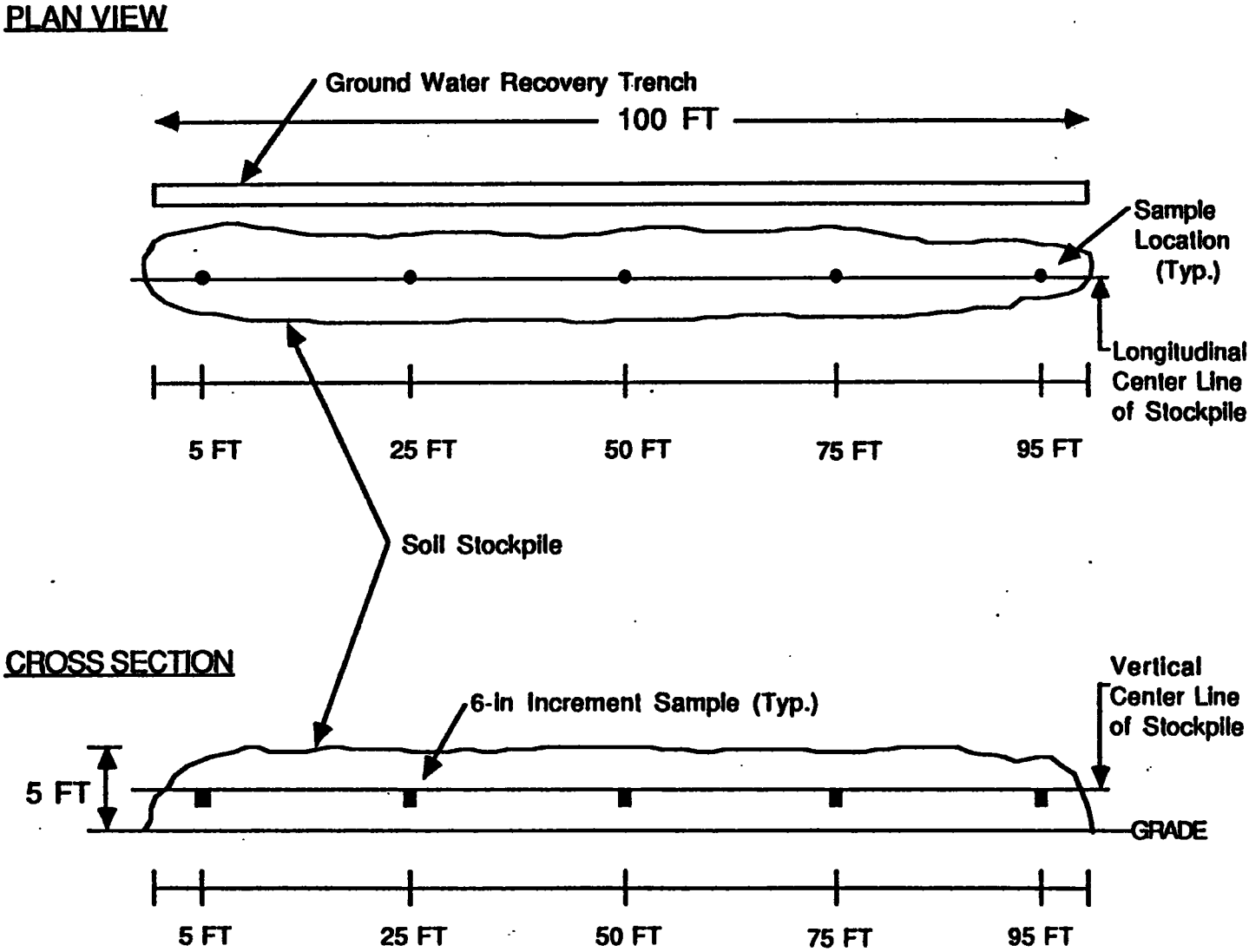
Soil excavated during trench construction was placed directly adjacent to the trench in an approximately one hundred foot long stockpile. The stockpile was placed on top of and is covered with plastic. The height and width of the pile vary, but its average height and width is approximately 5 feet and 10 feet respectively. Figure 3 provides a plan view and cross-section of the trench.

We propose to collect five samples (six-inch vertical increments) along the length of the soil pile. Proposed sampling locations are presented on Figure 3. All samples will be analyzed by an NJDEP approved laboratory for cadmium, chromium, copper, lead, mercury, nickel, zinc, total petroleum hydrocarbons, polychlorinated biphenyls and pH. In addition, two samples (at 25 and 75 feet - see Figure 3) will be analyzed for polynuclear aromatic compounds. Sample collection, maintenance and analysis procedures will be performed in accordance with those procedures presented in Section 2.0 of ECRA Environmental Assessment Program, Parcel No. 2 of January, 1988.

Soil having concentrations of the analytical parameters that are below ECRA's recommended cleanup levels (RCLs) will be deemed suitable for use as fill material on-site. Soil with concentrations above the RCLs will be treated accordingly.

Messrs. Randolph White and Bennett Leff of ERM-Northeast, our environmental consultants, have discussed these RAP modifications and the proposed sampling plan with Mr. Mark Yannett of the NJDEP. If you have any questions or require clarification, please contact them at (516) 349-0050.

FIGURE 3
PROPOSED SAMPLING LOCATIONS
GROUND WATER RECOVERY TRENCH SOIL STOCKPILE



Your timely response to these requests will be greatly appreciated. We are currently preparing soil remediation bid and contract documents and would like to include these modifications.

Very truly yours,

Glenn Barbi
Becton, Dickinson and Company
Corporate Manager of
Environmental Affairs

cc: B. Hector
T. Tideman
R. White, ERM-NE
M. Yannett, NJDEP
S. Urbanic, NJDEP

ERM-Northeast

APRIL, 1989 MONTHLY UPDATE LETTER

10626

ERM-Northeast

88 Sunnyside Boulevard • Suite 104 • Plainview, New York 11803 • (516) 349-0050 • Telefax (516) 349-7734
375 Bridgeport Avenue • Shelton, Connecticut 06484 • (203) 929-8687 • Telefax (203) 926-0897

Reply to: Plainview

May 2, 1989

Mr. Joseph Goliszewski
Section Chief
New Jersey Dept. of
Environmental Protection
5th Floor
401 East State Street
Trenton, NJ 08625

Re: ECRA Case Nos. 87573 and 87574
Becton, Dickinson and Company, East Rutherford, New Jersey

Dear Mr. Goliszewski:

The following items summarize ECRA site remediation activities implemented during the month of April, 1989 at Becton, Dickinson and Company's (B-D) East Rutherford plant site:

- Buried Asbestos Delineation - Several soil borings were advanced to delineate the extent of buried asbestos-containing material (transite board). Samples were collected from the borings and are currently being analyzed. The results of these analyses will allow the preparation of costs estimates and a defined remedial approach.

- Soil and Storm Water Drainage System Remediation - Technical specifications and documents have been prepared and are undergoing final review. These documents will be sent to bidding contractors in mid-May.

- Building Decontamination - ERM-Northeast and CECOS International personnel conducted a site visit on 4/19/89 to discuss the scope of building decontamination required prior to building demolition. Contract negotiations with CECOS for this work are being completed. Building decontamination is tentatively scheduled to begin on May 27, 1989.

- Building Decontamination - Samples of concrete in the electroplating room and drain residues were collected for lab analysis during the 4/19/89 site visit. The results of these analyses will be used to guide building decontamination efforts.

- Ground Water Remediation - Ground water modeling of the area surrounding the ground water recovery (pilot) trench has been completed. Flow rates (trench yield) for the full scale recovery and treatment system have been shown to be less than originally projected. Preliminary design of the ground water collection and treatment plant is being completed.

If you have any questions or require clarification, please do not hesitate to give me a call.

Very truly yours,

Randolph White, P.E.
Project Manager

RW/cmg
cc: G. Barbi
T. Tideman
M. Yannett, NJDEP
S. Urbanic, NJDEP

ERM-Northeast

MAY, 1989 MONTHLY UPDATE LETTER

Plainview

June 22, 1989

Mr. Joseph Goliszewski
Section Chief
New Jersey Department of Environmental Protection
5th Floor
401 East State Street
Trenton, NJ 08625

Re: ECRA Case Nos. 87573, 87574 Becton, Dickinson and Company, East Rutherford, New Jersey

Dear Mr. Goliszewski:

The following items summarize ECRA site remediation activities during the month of May, 1989 at Becton, Dickinson and Company's East Rutherford plant site:

o Soil and Storm Water Drainage System Remediation

- Technical specifications and documents were finalized. These documents were sent to six prospective contractors on May 26, 1989. Award of the contract is tentatively scheduled for the last week in June.

o Building Decontamination

- Contract negotiations with CECOS International, Inc. were finalized. CECOS began building decontamination work on June 20, 1989.

o Ground Water Remediation

- A report detailing the results of the pilot ground water recovery and treatment project was completed. The report will be delivered to the NJDEP on June 27, 1989.

- Hydraulic analysis of the piping connecting the ground water recovery trenches and the treatment plant was completed.

- Sizing of the interconnecting piping was finalized.
- The first iteration of the final design of the recovery trenches was completed.
- Ground water treatment criteria and modeling efforts were completed.
- Alternative treatment plant locations were being evaluated. Finalization of the location is expected by the end of June.
- Final design of the ground water treatment plant began.
- Process and instrumentation drawings for the treatment plant was 70 percent completed.

If you have any questions or require clarification, please do not hesitate to call me.

Very truly yours,

Randolph White, P.E.
Project Manager

RW/cmg
cc: G. Barbi
T. Tideman
M. Yannett - NJDEP
S. Urbanic - NJDEP

ERM-Northeast

JUNE, 1989 MONTHLY UPDATE LETTER

ERM-Northeast

Suite 104 • 88 Sunnyside Boulevard • Plainview, New York 11803 • (516) 349-0050

July 24, 1989

Mr. Joseph Goliszewski
Section Chief
New Jersey Department of Environmental Protection
5th Floor
401 East State Street
Trenton, NJ 08625

Re: ECRA Case Nos. 87573, 87574, Becton, Dickinson and Company, East Rutherford, New Jersey

Dear Mr. Goliszewski:

The following items summarize ECRA site remediation activities during the month of June, 1989 at Becton, Dickinson and Company's East Rutherford plant site:

- o Building Decontamination

- CECOS International, Inc. began building decontamination work in Building W on June 20, 1989. This work was still in progress on June 30, 1989. Work completed by June 30 included:

  - o Removal of process duct work in the electroplating area
  - o Removal of wood flooring in the electroplating area
  - o Scarification of stained floor throughout Building W
  - o Collection of concrete chip samples to determine the extent of concrete contamination in the electroplating area and in the soniclean room
  - o Removal of stained floor tile in Building W
  - o Removal of stained portions of the wall separating the electroplating area from the rest of Building W

- Removal of PVC pipe that carried treated electroplating fluids to the sanitary sewer.

- Soil and Storm Water Drainage System Remediation

  - On June 16, 19 and 27, 1989, borings were advanced through the floor slabs of Buildings W and GRX in order to collect samples. These samples were collected under Building W to typify the quality of soil there and under Building GRX to both typify soil quality and to further delineate the areal and vertical extent of the buried asbestos tile.

  - From June 21 through June 27, 1989, verification samples were collected around the areas requiring excavation. These samples were collected prior to excavation at the locations specified in the approved cleanup plan.

  - On June 30, 1989, a pre-award meeting was held at the East Rutherford site. Details of the remediation contract were negotiated between B-D and Sevenson Environmental Services, Inc.

- Ground Water Remediation

  - Ground water treatment plant location was finalized

  - Soil borings were advanced and geotechnical analyses were conducted to obtain data for the design of the treatment plant foundation

  - Design of the treatment plant foundation began

  - Preliminary treatment plant layout was completed utilizing the existing Building T with a new structure added

  - Purchase orders were initiated for major long lead time equipment for the treatment plant

  - Design of the ground water recovery trenches was completed

- Ground water recovery trench construction bid specifications was completed and is currently under review

- Six ground water monitoring wells were abandoned

If you have any questions or require clarification, please do not hesitate to call me.

Very truly yours,

Randolph White/BAL

Randolph White, P.E.
Project Manager

RW/cmg
cc: G. Barbi
T. Tideman
M. Yannett - NJDEP
S. Urbanic - NJDEP

ERM-Northeast

JULY, 1989 MONTHLY UPDATE LETTER

ERM-Northeast

Suite 106 • 88 Sunnyside Boulevard • Plainview, New York 11803 • (516) 349-0050 • Telefax (516) 349-7734

August 11, 1989

Mr. Joseph Goliszewski
Section Chief
New Jersey Department of
Environmental Protection
Fifth Floor
401 East State Street
Trenton, New Jersey 08625

Re: ECRA Case Nos. 87573, 87574
Becton, Dickinson & Company
East Rutherford, New Jersey

Dear Mr. Goliszewski:

The following items summarize ECRA site remediation activities during the month of July, 1989 at Becton, Dickinson and Company's East Rutherford plant site:

- Building Decontamination

- CECOS International, Inc. completed building decontamination work in Building W on July 3 and 5 and completed building decontamination work in Buildings GRX, X-1 and G-1 from July 17 through 19. Work completed in Building W in July included:

  - Steam cleaning of floor pits in Building W. Wash water was collected for subsequent disposal.

  - Clean-out of both tunnels under Building W. Sediments in the tunnels were collected for subsequent disposal.

  - Scarification of floor stains in Building W. Solids generated during this process were collected for subsequent disposal.

  Work completed in Building GRX, X-1 and G-1 included:

  - Scarification of floor stains in Buildings G, X-1 and G-1. Solids generated were collected for disposal.

- Removal of oily staining from the tile floor of Building X by washing with a detergent solution. Wash waters were collected for disposal.

- Building decontamination has been completed site-wide and demolition of Buildings I, GRX, X-1, G-1 and the B-D owned residences began August 1.

- <u>Soil and Storm Water Drainage System Remediation</u>

- VSI Technologies, Inc. of Baltimore, MD began work on the clean-out of the storm water drainage system. This work was still in progress on July 31. Work completed by VSI in July included:

  - Clean-out of each catch basin and open trench site-wide. Sediments and liquids were collected for subsequent disposal.

  - Clean-out of piping connecting catch basins over the majority of the site. Wash water was collected for disposal.

  - Disposal of approximately 16,000 gallons of wash water at the Dupont Wastewater Treatment Facility in Deepwater, NJ as non-hazardous liquid waste.

  - Solids collected during the storm water drainage system remediation are stockpiled on-site in roll-offs for subsequent disposal.

- Sevenson Environmental Services (SES) Inc. began soil remediation work on July 18 and finished Phase I of the soil remediation on July 28. Work completed by SES in July included:

  - Excavation and backfill of 23 of the 38 areas requiring remediation.

  - Stockpiling of all excavated soil on-site for subsequent disposal.

- o The remaining 15 areas requiring remediation will be excavated and backfilled during Phase II set to begin in mid-September.

- On July 31, borings were advanced through the floor slab of Building L in order to collect samples. Samples were collected under Building L to typify the quality of soil there.

o <u>Ground Water Remediation</u>

- Work involving the ground water treatment plant completed during July included:

  - o Finalizing the arrangement of equipment within the treatment plant building.

  - o Starting the equipment specifications.

  - o Processing of purchase orders for major long lead time equipment for the treatment plant by Becton, Dickinson & Company.

  - o 90% completion of the building caissons and concrete work design.

  - o Starting the electrical design work.

- On July 17 through 19 the majority of wells requiring abandonment were abandoned in accordance with NJAC 7:9 9.7.

- On July 31 the abandonment of the deep former production well began.

In September, 1989, a report will be submitted to the NJDEP summarizing all ECRA site remediation activities at the East Rutherford plant site. This report will include the quantities of materials disposed of, the disposal sites and costs.

If you have any questions or require clarification, please do not hesitate to call me.

Very truly yours,

Randolph White/BL

Randolph White, P.E.
Project Manager

BL/pak
cc: Glenn Barbi
Ted Tideman
M. Yannett
S. Urbanic

APPENDIX B

LABORATORY ANALYSIS DATA SHEETS

APPENDIX B-1

PHASE I DATA

ERM-Northeast

OPEN AREA 4

LOCATION 24-02

EnviroTest
Laboratories Inc.

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

LAB#: 67920-001 DATE REC'D: 88/08/29 DATE COLL'D: 88/08/25 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-23 B - D 24-02p

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :		BOD-S :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
TS :		Cr :	<6.1 mg/kg dry	Se :	
VS :		Co :		Ag :	
TDS :		Cu :		Na :	
SS :		Au :		Tl :	
% SOL :	82%	Fe :		Sn :	
G & O :		Pb :		Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	
As :		Hg :		THM :	
Ba :		Mo :		TOC :	
Be :		Ni :			
Cd :		Pd :			

Remarks:

Ronald A. Bayer
Laboratory Director 9-7-88

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Plainview, New York

Project #186.23
Samples Received 8/29/88

Lab. No.	Sample ID	TPH (mg/kg)
67920-001	24-02P	<20
67920-002	24-02Q	<19
67920-003	24-02R	41
67920-004	24-02S	33

For EnviroTest Laboratories, Inc.

Ronald A. Bayer
President

9/12/88

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 1255C
(914) 562-0890

LAB#: 67920-002 DATE REC'D: 88/08/29 DATE COLL'D: 88/08/25 STATUS: Close
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-23 B - D 24-02Q

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :		BOD-S :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
TS :		Cr :	<5.5 mg/kg dry	Se :	
VS :		Co :		Ag :	
TDS :		Cu :		Na :	
SS :		Au :		Tl :	
% SOL :	90%	Fe :		Sn :	
G & O :		Pb :		Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	
As :		Hg :		THM :	
Ba :		Mo :		TOC :	
Be :		Ni :			
Cd :		Pd :			

Remarks:

Ronald A. Bayer
Laboratory Director 9-7-88

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Plainview, New York

Project #186.23
Samples Received 8/29/88

Lab. No.	Sample ID	TPH (mg/kg)
67920-001	24-02P	<20
67920-002	24-02Q	<19
67920-003	24-02R	41
67920-004	24-02S	33

For EnviroTest Laboratories, Inc.

Ronald A. Bayer
President

9/12/88

EnviroTest Laboratories Inc.

315 Fullerton Avenu
Newburgh, NY 125
(914) 562-0890

LAB#: 67920-003 DATE REC'D: 88/08/29 DATE COLL'D: 88/08/25 STATUS: Clo
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-23 B - D 24-02R

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :		BOD-S :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
TS :		Cr :	<5.5 mg/kg dry	Se :	
VS :		Co :		Ag :	
TDS :		Cu :		Na :	
SS :		Au :		Tl :	
% SOL :	90%	Fe :		Sn :	
G & O :		Pb :		Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	
As :		Hg :		THM :	
Ba :		Mo :		TOC :	
Be :		Ni :			
Cd :		Pd :			

Remarks:

Ronald A. Bayer
Laboratory Director 9-7-88

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Plainview, New York

Project #186.23
Samples Received 8/29/88

Lab. No.	Sample ID	TPH (mg/kg)
67920-001	24-02P	<20
67920-002	24-02Q	<19
67920-003	24-02R	41
67920-004	24-02S	33

For EnviroTest Laboratories, Inc.

Ronald A. Bayer
President

9/12/88

EnviroTest Laboratories Inc.

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

LAB#: 67920-004 DATE REC'D: 88/08/29 DATE COLL'D: 88/08/25 STATUS: Close
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-23 B - D 24-02S

REPORT TO: same
BILL TO: same

T COLI	:	Cr+6	:	COD	:
F COLI	:	Phenol	:	HARD-T	:
SPC	:	CN	:	Ca Hard	:
F	:	B	:	SO3	:
NO3	:	Br	:	Cl	:
NO2	:	Color	:	Alk	:
T-PO4	:	Odor	:	BOD-Inf	:
O-PO4	:	Turb	:	BOD-Eff	:
SO4	:	pH	:	BOD-S	:
MBAS	:	LI	:	TSS-Inf	:
SiO2	:	Cond	:	TSS-Eff	:
H2S	:	NH3-T	:	MLSS	:
NH3-C	:	TKN	:	MLVSS	:
VSS	:	Ca	:	K	:
TS	:	Cr	: <6.2 mg/kg dry	Se	:
VS	:	Co	:	Ag	:
TDS	:	Cu	:	Na	:
SS	:	Au	:	Tl	:
% SOL	: 81%	Fe	:	Sn	:
G & O	:	Pb	:	Ti	:
Al	:	Mg	:	V	:
Sb	:	Mn	:	Zn	:
As	:	Hg	:	THM	:
Ba	:	Mo	:	TOC	:
Be	:	Ni	:		
Cd	:	Pd	:		

Remarks:

Ronald A. Bayer
Laboratory Director 9-7-88

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Plainview, New York

Project #186.23
Samples Received 8/29/88

Lab. No.	Sample ID	TPH (mg/kg)
67920-001	24-02P	<20
67920-002	24-02Q	<19
67920-003	24-02R	41
67920-004	24-02S	33

For EnviroTest Laboratories, Inc.

Ronald A. Bayer
President

9/12/88

OPEN AREA 4

LOCATION 24-03

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 1255(
(914) 562-0890

LAB#: 67920-006 DATE REC'D: 88/08/29 DATE COLL'D: 88/08/25 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-23 B - D 24-03P-2

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :		BOD-S :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
TS :		Cr :		Se :	
VS :		Co :		Ag :	
TDS :		Cu :		Na :	
SS :		Au :		Tl :	
% SOL :	80%	Fe :		Sn :	
G & O :		Pb :	230	Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	690
As :		Hg :		THM :	
Ba :		Mo :		TOC :	
Be :		Ni :			
Cd :		Pd :			

Remarks: All results in mg/kg dry weight.

Ronald A. Bayer
Laboratory Director 9/9/88

LAB # 67920-006

Client: ERM Northeast

Spl Location: Project #186.23
24-03P-2

Spl Coll'd: 8/25/88

Sample Rec'd: 8/29/88

EPA Method 608 PCBs GC/EC

COMPOUND	RESULTS Sample Concen. ug/kg	MDL ug/kg	BLANK Conc.
1) PCB-1242	ND	2500	ND
2) PCB-1254	ND	2500	ND
3) PCB-1221	ND	2500	ND
4) PCB-1232	ND	2500	ND
5) PCB-1248	ND	2500	ND
6) PCB-1260	ND	2500	ND
7) PCB-1016	ND	2500	ND

For EnviroTest Laboratories, Inc.

Ronald A. Bayer
President

9/7/88

LAB # 67920-005

Client: ERM Northeast

Spl Location: Project #186.23
24-03P-1

Spl Coll'd: 8/25/88

Sample Rec'd: 8/29/88

EPA SW846 Method 8100 Polynuclear Aromatics GC/MS

COMPOUND	RESULTS Sample Concen. ug/kg	MDL ug/kg	BLANK Conc. ug/l
1) Acenaphtnene	ND	880	ND
2) Acenaphthylene	ND	880	ND
3) Anthracene	ND	880	ND
4) Benzo(a)anthracene	BMDL	880	ND
5) Benzo(a)pyrene	ND	880	ND
6) Benzo(b)fluoranthene	ND	880	ND
7) Benzo(j)fluoranthene	ND	880	ND
8) Benzo(k)fluoranthene	ND	880	ND
9) Benzo(ghi)perylene	ND	880	ND
10) Chrysene	BMDL	880	ND
11) Dibenz(a,h)acridine	ND	880	ND
12) Dibenz(a,j)acridine	ND	880	ND
13) Dibenzo(a,h)anthracene	ND	880	ND
14) 7H-Dibenzo(c,g)carbazole	ND	880	ND
15) Dibenzo(a,e)pyrene	ND	880	ND
16) Dibenzo(a,h)pyrene	ND	880	ND
17) Dibenzo(a,j)pyrene	ND	880	ND
18) Fluoranthene	1070	880	ND
19) Fluorene	ND	880	ND
20) Indeno(1,2,3-cd)pyrene	ND	880	ND
21) 3-Methylcholanthrene	ND	880	ND
22) Naphthalene	ND	880	ND
23) Phenanthrene	BMDL	880	ND
24) Pyrene	BMDL	880	ND

For EnviroTest Laboratories, Inc.

Ronald A. Bayer
President

9/7/88

EnviroTest Laboratories Inc.

315 Fullerton Avenu
Newburgh, NY 125
(914) 562-0890

LAB#: 67920-008 DATE REC'D: 88/08/29 DATE COLL'D: 88/08/25 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-23 B - D 24-030-2

REPORT TO: same
BILL TO: same

T COLI	:	Cr+6	:	COD	:
F COLI	:	Phenol	:	HARD-T	:
SPC	:	CN	:	Ca Hard	:
F	:	B	:	SO3	:
NO3	:	Br	:	Cl	:
NO2	:	Color	:	Alk	:
T-PO4	:	Odor	:	BOD-Inf	:
O-PO4	:	Turb	:	BOD-Eff	:
SO4	:	pH	:	BOD-S	:
MBAS	:	LI	:	TSS-Inf	:
SiO2	:	Cond	:	TSS-Eff	:
H2S	:	NH3-T	:	MLSS	:
NH3-C	:	TKN	:	MLVSS	:
VSS	:	Ca	:	K	:
TS	:	Cr	:	Se	:
VS	:	Co	:	Ag	:
TDS	:	Cu	:	Na	:
SS	:	Au	:	Tl	:
% SOL	: 77%	Fe	:	Sn	:
G & O	:	Pb	: 310	Ti	:
Al	:	Mg	:	V	:
Sb	:	Mn	:	Zn	: 400
As	:	Hg	:	THM	:
Ba	:	Mo	:	TOC	:
Be	:	Ni	:		
Cd	:	Pd	:		

Remarks: All results in mg/kg dry weight.

Ronald A. Bayer
Laboratory Director 9/9/88

LAB # 67920-008

Client: ERM Northeast

Spl Location: Project #186.23
24-03Q-2

Spl Coll'd: 8/25/88

Sample Rec'd: 8/29/88

EPA Method 608 PCBs GC/EC

COMPOUND	RESULTS Sample Concen. ug/kg	MDL ug/kg	BLANK Conc.
1) PCB-1242	ND	870	ND
2) PCB-1254	ND	870	ND
3) PCB-1221	ND	870	ND
4) PCB-1232	ND	870	ND
5) PCB-1248	ND	870	ND
6) PCB-1260	ND	870	ND
7) PCB-1016	ND	870	ND

For EnviroTest Laboratories, Inc.

Ronald A. Bayer
President

9/7/88

LAB # 67920-007

Client: ERM Northeast

Spl Location: Project #186.23
24-03Q-1

Spl Coll'd: 8/25/88

Sample Rec'd: 8/29/88

EPA SW846 Method 8100 Polynuclear Aromatics GC/MS

	RESULTS		BLANK
COMPOUND	Sample Concen. ug/kg	MDL ug/kg	Conc. ug/l
1) Acenaphtnene	ND	770	ND
2) Acenaphthylene	ND	770	ND
3) Anthracene	ND	770	ND
4) Benzo(a)anthracene	800	770	ND
5) Benzo(a)pyrene	BMDL	770	ND
6) Benzo(b)fluoranthene	800	770	ND
7) Benzo(j)fluoranthene	ND	770	ND
8) Benzo(k)fluoranthene	ND	770	ND
9) Benzo(ghi)perylene	BMDL	770	ND
10) Chrysene	990	770	ND
11) Dibenz(a,h)acridine	ND	770	ND
12) Dibenz(a,j)acridine	ND	770	ND
13) Dibenzo(a,h)anthracene	ND	770	ND
14) 7H-Dibenzo(c,g)carbazole	ND	770	ND
15) Dibenzo(a,e)pyrene	ND	770	ND
16) Dibenzo(a,h)pyrene	ND	770	ND
17) Dibenzo(a,j)pyrene	ND	770	ND
18) Fluoranthene	1990	770	ND
19) Fluorene	ND	770	ND
20) Indeno(1,2,3-cd)pyrene	BMDL	770	ND
21) 3-Methylcholanthrene	ND	770	ND
22) Naphthalene	ND	770	ND
23) Phenanthrene	930	770	ND
24) Pyrene	1230	770	ND

For EnviroTest Laboratories, Inc.

Ronald A. Bayer
President

9/7/88

EnviroTest Laboratories Inc.

315 Fullerton Aver
Newburgh, NY 12
(914) 562-0890

LAB#: 67920-010 DATE REC'D: 88/08/29 DATE COLL'D: 88/08/25 STATUS: Close
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-23 B - D 24-03R-2

REPORT TO: same
BILL TO: same

T COLI		Cr+6		COD	
F COLI		Phenol		HARD-T	
SPC		CN		Ca Hard	
F		B		SO3	
NO3		Br		Cl	
NO2		Color		Alk	
T-PO4		Odor		BOD-Inf	
O-PO4		Turb		BOD-Eff	
SO4		pH		BOD-S	
MBAS		LI		TSS-Inf	
SiO2		Cond		TSS-Eff	
H2S		NH3-T		MLSS	
NH3-C		TKN		MLVSS	
VSS		Ca		K	
TS		Cr		Se	
VS		Co		Ag	
TDS		Cu		Na	
SS		Au		Tl	
% SOL	87%	Fe		Sn	
G & O		Pb	340	Ti	
Al		Mg		V	
Sb		Mn		Zn	400
As		Hg		THM	
Ba		Mo		TOC	
Be		Ni			
Cd		Pd			

Remarks: All results in mg/kg dry weight.

Ronald A. Bayer
Laboratory Director 9/9/88

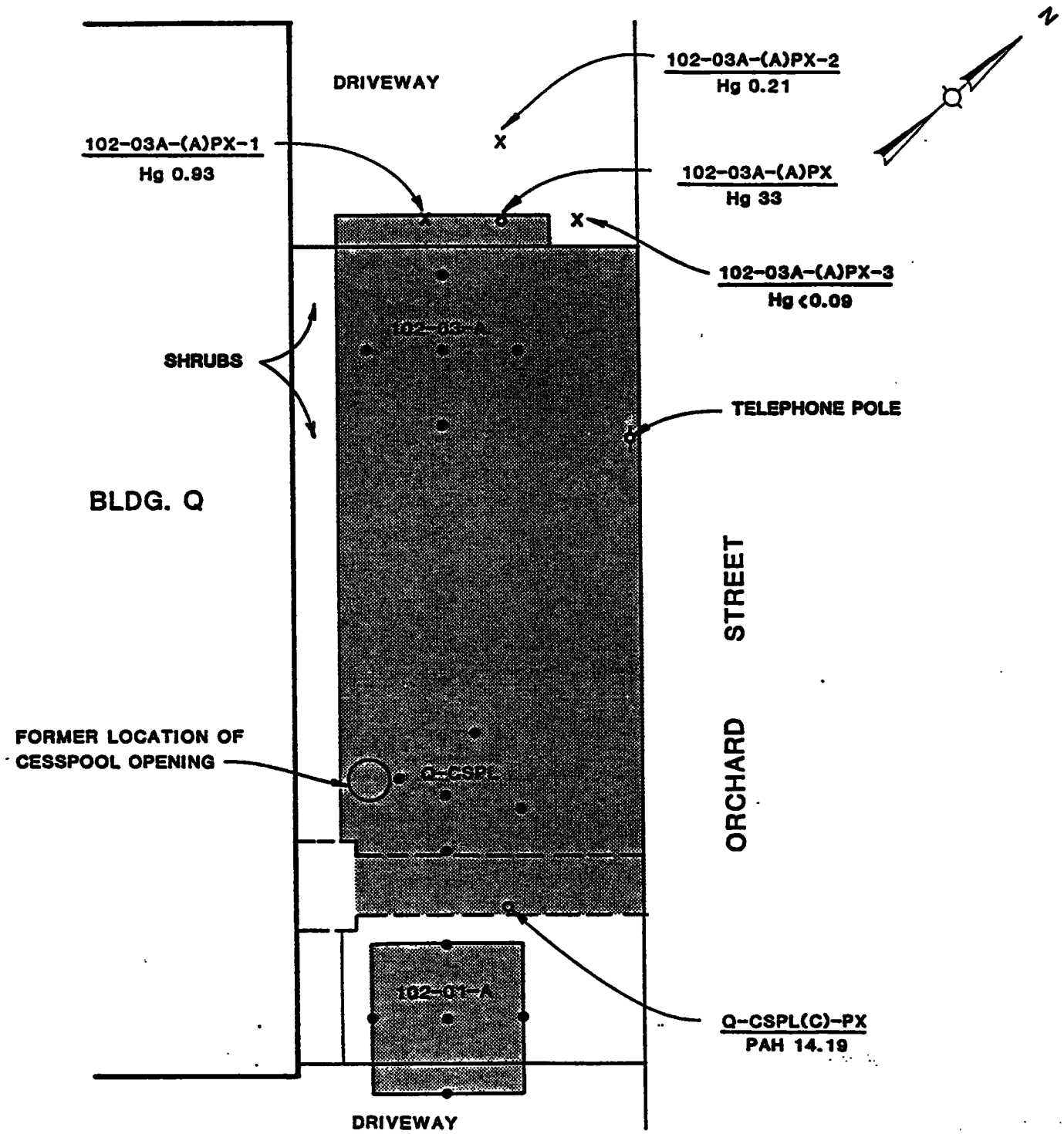
cesspool was crushed with a backhoe bucket and then the cesspool was filled with clean fill.

After the excavation was completed, two post-excavation samples were collected at the locations shown on Figure 2-6. Sample 102-03A-(A)PX was analyzed for the contaminant of concern found in sample 102-03-A(A) (Hg) and sample Q-CSPL(C)-PX was analyzed for the contaminants of concern found in sample Q-CSPL (PAH). The results of the analyses are presented on Figure 2-6. The concentration of mercury in sample 102-03A-(A)PX indicated the need to continue the excavation northwestward.

The excavation was backfilled with clean fill. An additional six inches of clean fill was placed over the entire area to act as a construction mat during demolition activities.

2.11 Additional Soil Sampling at Building Q (Kelly Building)

January 30, 1989 - Three samples (102-03A-(A)PX-1,-2 and -3) were collected at the locations indicated on Figure 2-6 and analyzed for mercury. These samples were collected to determine the extent of additional excavation required due to the elevated concentration of mercury identified at sample location 102-03A-(A)PX (Figure 2-6). The sample analyses results are presented on Figure 2-6.



LEGEND

- ● SAMPLING LOCATION
- o POST EXCAVATION SAMPLING LOCATION - 1/12/89
- X PRE-POST EXCAVATION SAMPLING LOCATION - 1/30/89
- AREA EXCAVATED TO THE DEPTH OF GROUNDWATER

ALL CONCENTRATIONS IN PPM

TITLE

FIGURE 2-6

PREPARED FOR

BECTON, DICKINSON & CO.
EAST RUTHERFORD, N.J.

ERM-Northeast
Environmental Resources Management

SCALE 1"=10'
DATE
FIGURE

ERM-Northeast

PHASE I REMEDIAL ACTIVITIES DOCUMENTATION REPORT

APPENDIX A

PHASE I HAZARDOUS WASTE MANIFEST
FOR TRANSFORMER CARCASSES
(SEE APPENDIX C-1)

LAB # 67920-010

Client: ERM Northeast

Spl Location: Project #186.23 24-03R-2

Spl Coll'd: 8/25/88

Sample Rec'd: 8/29/88

EPA Method 608 PCBs GC/EC

COMPOUND	RESULTS Sample Concen. ug/kg	MDL ug/kg	BLANK Conc.
1) PCB-1242	ND	770	ND
2) PCB-1254	ND	770	ND
3) PCB-1221	ND	770	ND
4) PCB-1232	ND	770	ND
5) PCB-1248	ND	770	ND
6) PCB-1260	ND	770	ND
7) PCB-1016	ND	770	ND

For EnviroTest Laboratories, Inc.

Ronald A. Bayer
President

9/7/88

LAB # 67920-009

Client: ERM Northeast

Spl Location: Project #186.23
24-03R-1

Spl Coll'd: 8/25/88

Sample Rec'd: 8/29/88

EPA SW846 Method 8100 Polynuclear Aromatics GC/MS

	COMPOUND	RESULTS Sample Concen. ug/kg	MDL ug/kg	BLANK Conc. ug/l
1)	Acenaphtnene	ND	750	ND
2)	Acenaphthylene	ND	750	ND
3)	Anthracene	ND	750	ND
4)	Benzo(a)anthracene	BMDL	750	ND
5)	Benzo(a)pyrene	BMDL	750	ND
6)	Benzo(b)fluoranthene	BMDL	750	ND
7)	Benzo(j)fluoranthene	ND	750	ND
8)	Benzo(k)fluoranthene	ND	750	ND
9)	Benzo(ghi)perylene	ND	750	ND
10)	Chrysene	BMDL	750	ND
11)	Dibenz(a,h)acridine	ND	750	ND
12)	Dibenz(a,j)acridine	ND	750	ND
13)	Dibenzo(a,h)anthracene	ND	750	ND
14)	7H-Dibenzo(c,g)carbazole	ND	750	ND
15)	Dibenzo(a,e)pyrene	ND	750	ND
16)	Dibenzo(a,h)pyrene	ND	750	ND
17)	Dibenzo(a,j)pyrene	ND	750	ND
18)	Fluoranthene	1280	750	ND
19)	Fluorene	ND	750	ND
20)	Indeno(1,2,3-cd)pyrene	ND	750	ND
21)	3-Methylcholanthrene	ND	750	ND
22)	Naphthalene	ND	750	ND
23)	Phenanthrene	BMDL	750	ND
24)	Pyrene	940	750	ND

For EnviroTest Laboratories, Inc.

Ronald A. Bayer
President

9/7/88

EnviroTest Laboratories Inc.

315 Fullerton Avenu
Newburgh, NY 125
(914) 562-0890

LAB#: 67920-012 DATE REC'D: 88/08/29 DATE COLL'D: 88/08/25 STATUS: Close
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-23 B - D 24-03S-2

REPORT TO: same
BILL TO: same

T COLI		Cr+6		COD	
F COLI		Phenol		HARD-T	
SPC		CN		Ca Hard	
F		B		SO3	
NO3		Br		Cl	
NO2		Color		Alk	
T-PO4		Odor		BOD-Inf	
O-PO4		Turb		BOD-Eff	
SO4		pH		BOD-S	
MBAS		LI		TSS-Inf	
SiO2		Cond		TSS-Eff	
H2S		NH3-T		MLSS	
NH3-C		TKN		MLVSS	
VSS		Ca		K	
TS		Cr		Se	
VS		Co		Ag	
TDS		Cu		Na	
SS		Au		Tl	
% SOL	70%	Fe		Sn	
G & O		Pb	2140	Ti	
Al		Mg		V	
Sb		Mn		Zn	490
As		Hg		THM	
Ba		Mo		TOC	
Be		Ni			
Cd		Pd			

Remarks: All results in mg/kg dry weight.

Ronald A. Bayer
Laboratory Director 9/9/88

LAB # 67920-012

Client: ERM Northeast

Spl Location: Project #186.23
24-03S-2

Spl Coll'd: 8/25/88

Sample Rec'd: 8/29/88

EPA Method 608 PCBs GC/EC

COMPOUND	RESULTS Sample Concen. ug/kg	MDL ug/kg	BLANK Conc.
1) PCB-1242	ND	960	ND
2) PCB-1254	ND	960	ND
3) PCB-1221	ND	960	ND
4) PCB-1232	ND	960	ND
5) PCB-1248	ND	960	ND
6) PCB-1260	ND	960	ND
7) PCB-1016	ND	960	ND

For EnviroTest Laboratories, Inc.

Ronald A. Bayer
President

9/7/88

LAB # 67920-011

Client: ERM Northeast

Spl Location: Project #186.23
24-03S-1

Spl Coll'd: 8/25/88

Sample Rec'd: 8/29/88

EPA SW846 Method 8100 Polynuclear Aromatics GC/MS

	COMPOUND	RESULTS Sample Concen. ug/kg	MDL ug/kg	BLANK Conc. ug/l
1)	Acenaphtnene	ND	900	ND
2)	Acenaphthylene	ND	900	ND
3)	Anthracene	BMDL	900	ND
4)	Benzo(a)anthracene	1650	900	ND
5)	Benzo(a)pyrene	1640	900	ND
6)	Benzo(b)fluoranthene	1850	900	ND
7)	Benzo(j)fluoranthene	ND	900	ND
8)	Benzo(k)fluoranthene	1730	900	ND
9)	Benzo(ghi)perylene	980	900	ND
10)	Chrysene	1880	900	ND
11)	Dibenz(a,h)acridine	ND	900	ND
12)	Dibenz(a,j)acridine	ND	900	ND
13)	Dibenzo(a,h)anthracene	ND	900	ND
14)	7H-Dibenzo(c,g)carbazole	ND	900	ND
15)	Dibenzo(a,e)pyrene	ND	900	ND
16)	Dibenzo(a,h)pyrene	ND	900	ND
17)	Dibenzo(a,j)pyrene	ND	900	ND
18)	Fluoranthene	3730	900	ND
19)	Fluorene	ND	900	ND
20)	Indeno(1,2,3-cd)pyrene	BMDL	900	ND
21)	3-Methylcholanthrene	ND	900	ND
22)	Naphthalene	ND	900	ND
23)	Phenanthrene	2600	900	ND
24)	Pyrene	2460	900	ND

For EnviroTest Laboratories, Inc.

Ronald A. Bayer
President

9/7/88

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 1255(
(914) 562-0890
Fax (914) 562-0841

LAB#: 69930-001 DATE REC'D: 88/10/31 DATE COLL'D: 88/10/28 STATUS: Clos
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: B - D #186-23 24-03PX

REPORT TO: same
BILL TO: same

T COLI		Cr+6		COD	
F COLI		Phenol		HARD-T	
SPC		CN		Ca Hard	
F		B		SO3	
NO3		Br		Cl	
NO2		Color		Alk	
T-PO4		Odor		BOD-Inf	
O-PO4		Turb		BOD-Eff	
SO4		pH		BOD-S	
MBAS		LI		TSS-Inf	
SiO2		Cond		TSS-Eff	
H2S		NH3-T		MLSS	
NH3-C		TKN		MLVSS	
VSS		Ca		K	
TS		Cr		Se	
VS		Co		Ag	
TDS		Cu		Na	
SS		Au		Tl	
% SOL	88%	Fe		Sn	
G & O		Pb	14 mg/kg dry	Ti	
Al		Mg		V	
Sb		Mn		Zn	
As		Hg		THM	
Ba		Mo		TOC	
Be		Ni			
Cd		Pd			

Remarks:

Ronald A. Bayer
Laboratory Director 11/9/88

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Client Name: ERM Northeast

Lab Number: 69930-001

Project Name: #186-23, BD

Date Collected: 10/28/88

Sample Location: 24-03 PX

Date Received: 10/31/88

Matrix: Soil

Date Extracted: 11/1/88

Method: EPA 625

Date Analyzed: 11/3/88

CAS NO.	COMPOUND	ug/kg	Qualifier
91-20-3	Naphthalene	380	U
208-96-8	Acenaphthylene	380	U
83-32-9	Acenaphthene	380	U
86-73-7	Fluorene	380	U
85-01-8	Phenanthrene	300	J
120-12-7	Anthracene	380	U
206-44-0	Fluoranthene	430	
128-00-0	Pyrene	330	J
56-55-3	Benzo(a)anthracene	180	J
218-01-9	Chrysene	180	J
205-99-2	Benzo(b)fluoranthene	380	U
207-08-9	Benzo(k)fluoranthene	180	J
50-32-8	Benzo(a)pyrene	140	J
193-39-5	Indeno(1,2,3-cd)pyrene	180	J
53-70-3	Dibenzo(a,h)anthracene	380	U
191-24-2	Benzo(g,h,i)perylene	380	U

ERM-Northeast

OPEN AREA 4

LOCATION 24-04

EnviroTest Laboratories Inc.

315 Fullerton Avenu
Newburgh, NY 125
(914) 562-0890

LAB#: 67920-013 DATE REC'D: 88/08/29 DATE COLL'D: 88/08/25 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-23 B - D 24-04P

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :		BOD-S :	
MBAS :		L.I :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
TS :		Cr :		Se :	
VS :		Co :		Ag :	
TDS :		Cu :	150	Na :	
SS :		Au :		Tl :	
% SOL :	92%	Fe :		Sn :	
G & O :		Pb :	420	Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	150
As :		Hg :		THM :	
Ba :		Mo :		TOC :	
Be :		Ni :			
Cd :		Pd :			

Remarks: All results in mg/kg dry weight.

Ronald A. Bayer
Laboratory Director 9/9/88

EnviroTest Laboratories Inc.

315 Fullerton Avenu
Newburgh, NY 125
(914) 562-0890

LAB#: 67920-014 DATE REC'D: 88/08/29 DATE COLL'D: 88/08/25 STATUS: Clo
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #1886-23 B - D 24-04Q-1

REPORT TO: same
BILL TO: same

T COLI	:	Cr+6	:	COD	:
F COLI	:	Phenol	:	HARD-T	:
SPC	:	CN	:	Ca Hard	:
F	:	B	:	SO3	:
NO3	:	Br	:	Cl	:
NO2	:	Color	:	Alk	:
T-PO4	:	Odor	:	BOD-Inf	:
O-PO4	:	Turb	:	BOD-Eff	:
SO4	:	pH	:	BOD-S	:
MBAS	:	LI	:	TSS-Inf	:
SiO2	:	Cond	:	TSS-Eff	:
H2S	:	NH3-T	:	MLSS	:
NH3-C	:	TKN	:	MLVSS	:
VSS	:	Ca	:	K	:
TS	:	Cr	:	Se	:
VS	:	Co	:	Ag	:
TDS	:	Cu	:	Na	:
SS	:	Au	:	Tl	:
% SOL	: 89%	Fe	:	Sn	:
G & O	:	Pb	:	Ti	:
Al	:	Mg	:	V	:
Sb	:	Mn	:	Zn	: 674 mg/kg dry
As	:	Hg	:	THM	:
Ba	:	Mo	:	TOC	:
Be	:	Ni	:		
Cd	:	Pd	:		

Remarks:

Ronald A. Bayer
Laboratory Director 9-7-88

EnviroTest Laboratories Inc.

315 Fullerton Avenu
Newburgh, NY 125
(914) 562-0890

LAB#: 67920-015 DATE REC'D: 88/08/29 DATE COLL'D: 88/08/25 STATUS: Close
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-23 B - D 24-04Q-2

REPORT TO: same
BILL TO: same

T COLI		Cr+6		COD	
F COLI		Phenol		HARD-T	
SPC		CN		Ca Hard	
F		B		SO3	
NO3		Br		Cl	
NO2		Color		Alk	
T-PO4		Odor		BOD-Inf	
O-PO4		Turb		BOD-Eff	
SO4		pH		BOD-S	
MBAS		LI		TSS-Inf	
SiO2		Cond		TSS-Eff	
H2S		NH3-T		MLSS	
NH3-C		TKN		MLVSS	
VSS		Ca		K	
TS		Cr		Se	
VS		Co		Ag	
TDS		Cu	42	Na	
SS		Au		Tl	
% SOL	93%	Fe		Sn	
G & O		Pb	92	Ti	
Al		Mg		V	
Sb		Mn		Zn	
As		Hg		THM	
Ba		Mo		TOC	
Be		Ni			
Cd		Pd			

Remarks: All results in mg/kg dry weight.

Ronald A. Bayer
Laboratory Director 9/9/88

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 125[illegible]
(914) 562-0890

LAB#: 67920-016 DATE REC'D: 88/08/29 DATE COLL'D: 88/08/25 STATUS: Clos
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-23 B - D 24-04R-1

REPORT TO: same
BILL TO: same

T COLI	:	Cr+6	:	COD	:
F COLI	:	Phenol	:	HARD-T	:
SPC	:	CN	:	Ca Hard	:
F	:	B	:	SO3	:
NO3	:	Br	:	Cl	:
NO2	:	Color	:	Alk	:
T-PO4	:	Odor	:	BOD-Inf	:
O-PO4	:	Turb	:	BOD-Eff	:
SO4	:	pH	:	BOD-S	:
MBAS	:	LI	:	TSS-Inf	:
SiO2	:	Cond	:	TSS-Eff	:
H2S	:	NH3-T	:	MLSS	:
NH3-C	:	TKN	:	MLVSS	:
VSS	:	Ca	:	K	:
TS	:	Cr	:	Se	:
VS	:	Co	:	Ag	:
TDS	:	Cu	:	Na	:
SS	:	Au	:	Tl	:
% SOL	: 92%	Fe	:	Sn	:
G & O	:	Pb	:	Ti	:
Al	:	Mg	:	V	:
Sb	:	Mn	:	Zn	: 98 mg/kg dry
As	:	Hg	:	THM	:
Ba	:	Mo	:	TOC	:
Be	:	Ni	:		
Cd	:	Pd	:		

Remarks:

Ronald A. Bayer
Laboratory Director 9-7-88

EnviroTest Laboratories Inc.

315 Fullerton Avenu
Newburgh, NY 125
(914) 562-0890

LAB#: 67920-017 DATE REC'D: 88/08/29 DATE COLL'D: 88/08/25 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL. LOCATION: #186-12 B - D 24-04R-1

REPORT TO: same
BILL TO: same

T COLI	:	Cr+6	:	COD	:
F COLI	:	Phenol	:	HARD-T	:
SPC	:	CN	:	Ca Hard	:
F	:	B	:	SO3	:
NO3	:	Br	:	Cl	:
NO2	:	Color	:	Alk	:
T-PO4	:	Odor	:	BOD-Inf	:
O-PO4	:	Turb	:	BOD-Eff	:
SO4	:	pH	:	BOD-S	:
MBAS	:	LI	:	TSS-Inf	:
SiO2	:	Cond	:	TSS-Eff	:
H2S	:	NH3-T	:	MLSS	:
NH3-C	:	TKN	:	MLVSS	:
VSS	:	Ca	:	K	:
TS	:	Cr	:	Se	:
VS	:	Co	:	Ag	:
TDS	:	Cu	: 38	Na	:
SS	:	Au	:	Tl	:
% SOL	: 91%	Fe	:	Sn	:
G & O	:	Pb	: 47	Ti	:
Al	:	Mg	:	V	:
Sb	:	Mn	:	Zn	:
As	:	Hg	:	THM	:
Ba	:	Mo	:	TOC	:
Be	:	Ni	:		
Cd	:	Pd	:		

Remarks: All results in mg/kg dry weight.

Ronald A. Bayer
Laboratory Director 9/9/88

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 1255
(914) 562-0890

LAB#: 67920-018 DATE REC'D: 88/08/29 DATE COLL'D: 88/08/25 STATUS: Clos
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-12 B - D 24-04S-1

REPORT TO: same
BILL TO: same

T COLI	:	Cr+6	:	COD	:
F COLI	:	Phenol	:	HARD-T	:
SPC	:	CN	:	Ca Hard	:
F	:	B	:	SO3	:
NO3	:	Br	:	Cl	:
NO2	:	Color	:	Alk	:
T-PO4	:	Odor	:	BOD-Inf	:
O-PO4	:	Turb	:	BOD-Eff	:
SO4	:	pH	:	BOD-S	:
MBAS	:	LI	:	TSS-Inf	:
SiO2	:	Cond	:	TSS-Eff	:
H2S	:	NH3-T	:	MLSS	:
NH3-C	:	TKN	:	MLVSS	:
VSS	:	Ca	:	K	:
TS	:	Cr	:	Se	:
VS	:	Co	:	Ag	:
TDS	:	Cu	:	Na	:
SS	:	Au	:	Tl	:
% SOL	: 89%	Fe	:	Sn	:
G & O	:	Pb	:	Ti	:
Al	:	Mg	:	V	:
Sb	:	Mn	:	Zn	: 292 mg/kg dry
As	:	Hg	:	THM	:
Ba	:	Mo	:	TOC	:
Be	:	Ni	:		
Cd	:	Pd	:		

Remarks:

Ronald A. Bayer
Laboratory Director 9-7-88

EnviroTest Laboratories Inc.

315 Fullerton Avenu
Newburgh, NY 125
(914) 562-0890

LAB#: 67920-019 DATE REC'D: 88/08/29 DATE COLL'D: 88/08/25 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-23 B - D 24-04S-2

REPORT TO: same
BILL TO: same

T COLI	:	Cr+6	:	COD	:
F COLI	:	Phenol	:	HARD-T	:
SPC	:	CN	:	Ca Hard	:
F	:	B	:	SO3	:
NO3	:	Br	:	Cl	:
NO2	:	Color	:	Alk	:
T-PO4	:	Odor	:	BOD-Inf	:
O-PO4	:	Turb	:	BOD-Eff	:
SO4	:	pH	:	BOD-S	:
MBAS	:	LI	:	TSS-Inf	:
SiO2	:	Cond	:	TSS-Eff	:
H2S	:	NH3-T	:	MLSS	:
NH3-C	:	TKN	:	MLVSS	:
VSS	:	Ca	:	K	:
TS	:	Cr	:	Se	:
VS	:	Co	:	Ag	:
TDS	:	Cu	: 180	Na	:
SS	:	Au	:	Tl	:
% SOL	: 79%	Fe	:	Sn	:
G & O	:	Pb	: 1650	Ti	:
Al	:	Mg	:	V	:
Sb	:	Mn	:	Zn	:
As	:	Hg	:	THM	:
Ba	:	Mo	:	TOC	:
Be	:	Ni	:		
Cd	:	Pd	:		

Remarks: All results in mg/kg dry weight.

Ronald A. Bayer
Laboratory Director 9/9/88

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 69967-001 DATE REC'D: 88/11/01 DATE COLL'D: 88/10/31 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: B - D #186-23 24-04PX

REPORT TO: same
BILL TO: same

T COLI	:		Cr+6	:		COD	:
F COLI	:		Phenol	:		HARD-T	:
SPC	:		CN	:		Ca Hard	:
F	:		B	:		SO3	:
NO3	:		Br	:		Cl	:
NO2	:		Color	:		Alk	:
T-PO4	:		Odor	:		BOD-Inf	:
O-PO4	:		Turb	:		BOD-Eff	:
SO4	:		pH	:		BOD-S	:
MBAS	:		LI	:		TSS-Inf	:
SiO2	:		Cond	:		TSS-Eff	:
H2S	:		NH3-T	:		MLSS	:
NH3-C	:		TKN	:		MLVSS	:
VSS	:		Ca	:		K	:
TS	:		Cr	:		Se	:
VS	:		Co	:		Ag	:
TDS	:		Cu	:		Na	:
SS	:		Au	:		Tl	:
% SOL	:	89	Fe	:		Sn	:
G & O	:		Pb	:	180 mg/kg dry	Ti	:
Al	:		Mg	:		V	:
Sb	:		Mn	:		Zn	:
As	:		Hg	:		THM	:
Ba	:		Mo	:		TOC	:
Be	:		Ni	:			
Cd	:		Pd	:			

Remarks:

Ronald A. Bayer
Laboratory Director 11/9/88

OPEN AREA 4

LOCATION 24-05

EnviroTest Laboratories Inc.

315 Fullerton Avenu
Newburgh, NY 125
(914) 562-0890

LAB#: 67920-020 DATE REC'D: 88/08/29 DATE COLL'D: 88/08/25 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-12 B - D 24-05P

REPORT TO: same
BILL TO: same

T COLI	:	Cr+6	:	COD	:
F COLI	:	Phenol	:	HARD-T	:
SPC	:	CN	:	Ca Hard	:
F	:	B	:	SO3	:
NO3	:	Br	:	Cl	:
NO2	:	Color	:	Alk	:
T-PO4	:	Odor	:	BOD-Inf	:
O-PO4	:	Turb	:	BOD-Eff	:
SO4	:	pH	:	BOD-S	:
MBAS	:	LI	:	TSS-Inf	:
SiO2	:	Cond	:	TSS-Eff	:
H2S	:	NH3-T	:	MLSS	:
NH3-C	:	TKN	:	MLVSS	:
VSS	:	Ca	:	K	:
TS	:	Cr	:	Se	:
VS	:	Co	:	Ag	:
TDS	:	Cu	:	Na	:
SS	:	Au	:	Tl	:
% SOL	: 82%	Fe	:	Sn	:
G & O	:	Pb	: 400	Ti	:
Al	:	Mg	:	V	:
Sb	:	Mn	:	Zn	: 230
As	:	Hg	:	THM	:
Ba	:	Mo	:	TOC	:
Be	:	Ni	:		
Cd	:	Pd	:		

Remarks: All results in mg/kg dry weight.

Ronald A. Bayer
Laboratory Director 9/9/88

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 1255
(914) 562-0890

LAB#: 67920-021 DATE REC'D: 88/08/29 DATE COLL'D: 88/08/25 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-23 B - D 24-05Q

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :		BOD-S :	
MBAS :		L.I :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
TS :		Cr :		Se :	
VS :		Co :		Ag :	
TDS :		Cu :		Na :	
SS :		Au :		Tl :	
% SOL :	87%	Fe :		Sn :	
G & O :		Pb :	430	Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	390
As :		Hg :		THM :	
Ba :		Mo :		TOC :	
Be :		Ni :			
Cd :		Pd :			

Remarks: All results in mg/kg dry weight.

Ronald A. Bayer
Laboratory Director 9/9/88

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 1255(
(914) 562-0890

LAB#: 67920-022 DATE REC'D: 88/08/29 DATE COLL'D: 88/08/25 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-23 B - D 24-05R

REPORT TO: same
BILL TO: same

T COLI		Cr+6		COD	
F COLI		Phenol		HARD-T	
SPC		CN		Ca Hard	
F		B		SO3	
NO3		Br		Cl	
NO2		Color		Alk	
T-PO4		Odor		BOD-Inf	
O-PO4		Turb		BOD-Eff	
SO4		pH		BOD-S	
MBAS		L.I		TSS-Inf	
SiO2		Cond		TSS-Eff	
H2S		NH3-T		ML.SS	
NH3-C		TKN		MLVSS	
VSS		Ca		K	
TS		Cr		Se	
VS		Co		Ag	
TDS		Cu		Na	
SS		Au		Tl	
% SOL	85%	Fe		Sn	
G & O		Pb	580	Ti	
Al		Mg		V	
Sb		Mn		Zn	730
As		Hg		THM	
Ba		Mo		TOC	
Be		Ni			
Cd		Pd			

Remarks: All results in mg/kg dry weight.

Ronald A. Bayer
Laboratory Director 9/9/88

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 69967-002 DATE REC'D: 88/11/01 DATE COLL'D: 88/10/31 STATUS: Clos
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: B - D #186-23 24-05PX

REPORT TO: same
BILL TO: same

T COLI		Cr+6		COD	
F COLI		Phenol		HARD-T	
SPC		CN		Ca Hard	
F		B		SO3	
NO3		Br		Cl	
NO2		Color		Alk	
T-PO4		Odor		BOD-Inf	
O-PO4		Turb		BOD-Eff	
SO4		pH		BOD-S	
MBAS		LI		TSS-Inf	
SiO2		Cond		TSS-Eff	
H2S		NH3-T		MLSS	
NH3-C		TKN		MLVSS	
VSS		Ca		K	
TS		Cr		Se	
VS		Co		Ag	
TDS		Cu		Na	
SS		Au		Tl	
% SOL	83	Fe		Sn	
G & O		Pb	280	Ti	
Al		Mg		V	
Sb		Mn		Zn	400
As		Hg		THM	
Ba		Mo		TOC	
Be		Ni			
Cd		Pd			

Remarks: All results in mg/kg dry weight.

Ronald A. Baver
Laboratory Director 11/14/88

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 1255(
(914) 562-0890

LAB#: 67920-023 DATE REC'D: 88/08/29 DATE COLL'D: 88/08/25 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-23 B - D 24-05S

REPORT TO: same
BILL TO: same

T COLI		Cr+6		COD	
F COLI		Phenol		HARD-T	
SPC		CN		Ca Hard	
F		B		SO3	
NO3		Br		Cl	
NO2		Color		Alk	
T-PO4		Odor		BOD-Inf	
O-PO4		Turb		BOD-Eff	
SO4		pH		BOD-S	
MBAS		LI		TSS-Inf	
SiO2		Cond		TSS-Eff	
H2S		NH3-T		MLSS	
NH3-C		TKN		MLVSS	
VSS		Ca		K	
TS		Cr		Se	
VS		Co		Ag	
TDS		Cu		Na	
SS		Au		Tl	
% SOL	78%	Fe		Sn	
G & O		Pb	470	Ti	
Al		Mg		V	
Sb		Mn		Zn	420
As		Hg		THM	
Ba		Mo		TOC	
Be		Ni			
Cd		Pd			

Remarks: All results in mg/kg dry weight.

Ronald A. Bayer
Laboratory Director 9/9/88

AREA 29

FORMER TRANSFORMER AREA

LAB # 68034-001

Client: ERM Northeast

Spl Location: Project #186.23 PCB-01

Spl Coll'd: 8/31/88

Sample Rec'd: 9/1/88

EPA Method 608 PCBs GC/EC

COMPOUND	RESULTS Sample Concen. ug/kg	MDL ug/kg	BLANK Conc.
1) PCB-1242	ND	170	ND
2) PCB-1254	ND	170	ND
3) PCB-1221	ND	170	ND
4) PCB-1232	ND	170	ND
5) PCB-1248	ND	170	ND
6) PCB-1260	ND	170	ND
7) PCB-1016	520	170	ND

For EnviroTest Laboratories, Inc.

Ronald A. Bayer
President

9/1/88

LAB # 68034-002

Client: ERM Northeast

Spl Location: Project #186.23 PCB-02

Spl Coll'd: 8/31/88

Sample Rec'd: 9/1/88

EPA Method 608 PCBs GC/EC

COMPOUND	RESULTS Sample Concen. ug/kg	MDL ug/kg	BLANK Conc.
1) PCB-1242	ND	170	ND
2) PCB-1254	ND	170	ND
3) PCB-1221	ND	170	ND
4) PCB-1232	ND	170	ND
5) PCB-1248	ND	170	ND
6) PCB-1260	ND	170	ND
7) PCB-1016	1600	170	ND

For EnviroTest Laboratories, Inc.

Ronald A. Bayer
President

9/1/88

LAB # 68034-003

Client: ERM Northeast

Spl Location: Project #186.23
PCB-03

Spl Coll'd: 8/31/88

Sample Rec'd: 9/1/88

EPA Method 608 PCBs GC/EC

COMPOUND	RESULTS Sample Concen. ug/kg	MDL ug/kg	BLANK Conc.
1) PCB-1242	ND	100	ND
2) PCB-1254	ND	100	ND
3) PCB-1221	ND	100	ND
4) PCB-1232	ND	100	ND
5) PCB-1248	ND	100	ND
6) PCB-1260	ND	100	ND
7) PCB-1016	180	100	ND

For EnviroTest Laboratories, Inc.

Ronald A. Bayer
President

9/1/88

LAB # 68034-004

Client: ERM Northeast

Spl Location: Project #186.23
PCB-04

Spl Coll'd: 8/31/88

Sample Rec'd: 9/1/88

EPA Method 608 PCBs GC/EC

COMPOUND	RESULTS Sample Concen. ug/kg	MDL ug/kg	BLANK Conc.
1) PCB-1242	ND	170	ND
2) PCB-1254	ND	170	ND
3) PCB-1221	ND	170	ND
4) PCB-1232	ND	170	ND
5) PCB-1248	ND	170	ND
6) PCB-1260	ND	170	ND
7) PCB-1016	1600	170	ND

For EnviroTest Laboratories, Inc.

Ronald A. Bayer
President

9/1/88

LAB # 68034-005

Client: ERM Northeast

Spl Location: Project #186.23
PCB-05B

Spl Coll'd: 8/31/88

Sample Rec'd: 9/1/88

EPA Method 608 PCBs GC/EC

COMPOUND	RESULTS Sample Concen. ug/kg	MDL ug/kg	BLANK Conc.
1) PCB-1242	ND	170	ND
2) PCB-1254	ND	170	ND
3) PCB-1221	ND	170	ND
4) PCB-1232	ND	170	ND
5) PCB-1248	ND	170	ND
6) PCB-1260	ND	170	ND
7) PCB-1016	.200	170	ND

For EnviroTest Laboratories, Inc.

Ronald A. Bayer
President

9/1/88

LAB # 68034-006

Client: ERM Northeast

Spl Location: Project #186.23 PCB-06

Spl Coll'd: 8/31/88

Sample Rec'd: 9/1/88

EPA Method 608 PCBs GC/EC

COMPOUND	RESULTS Sample Concen. µg/kg	MDL µg/kg	BLANK Conc.
1) PCB-1242	ND	670	ND
2) PCB-1254	ND	670	ND
3) PCB-1221	ND	670	ND
4) PCB-1232	ND	670	ND
5) PCB-1248	ND	670	ND
6) PCB-1260	ND	670	ND
7) PCB-1016	4100	670	ND

For EnviroTest Laboratories, Inc.

Ronald A. Bayer
President

9/1/88

PCB ORGANICS ANALYSIS DATA SHEET

Client Name: ERM Northeast

Lab Number: 69844-001

Project Name: #186-23

Date Collected: 10/26/88

Sample Location: 29-PX1

Date Received: 10/27/88

Matrix: Soil

Date Extracted: 10/27/88

Method: EPA 608

Date Analyzed: 10/27/88

CAS NO.	COMPOUND	ug/kg	Qualifier
12674-11-2	Arochlor-1016	910	U
11104-28-2	Arochlor-1221	910	U
11141-16-5	Arochlor-1232	910	U
53469-21-9	Arochlor-1242	910	U
12672-29-6	Arochlor-1248	910	U
11097-69-1	Arochlor-1254	910	U
11096-82-5	Arochlor-1260	750	J

PCB ORGANICS ANALYSIS DATA SHEET

Client Name: ERM Northeast

Lab Number: 69844-002

Project Name: #186-23

Date Collected: 10/26/88

Sample Location: 29-PX2

Date Received: 10/27/88

Matrix: Soil

Date Extracted: 10/27/88

Method: EPA 608

Date Analyzed: 10/27/88

CAS NO.	COMPOUND	mg/kg	Qualifier
12674-11-2	Arochlor-1016	12	U
11104-28-2	Arochlor-1221	12	U
11141-16-5	Arochlor-1232	12	U
53469-21-9	Arochlor-1242	12	U
12672-29-6	Arochlor-1248	12	U
11097-69-1	Arochlor-1254	12	U
11096-82-5	Arochlor-1260	25	

PCB ORGANICS ANALYSIS DATA SHEET

Client Name: ERM Northeast

Project Name: #186-23

Sample Location: 29-PX-3

Matrix: Soil

Method: EPA 608

Lab Number: 70210-001

Date Collected: 11/4/88

Date Received: 11/8/88

Date Extracted: 11/8/88

Date Analyzed: 11/10/88

Report Date: 11/21/88

CAS NO.	COMPOUND	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
12674-11-2	Arochlor-1016	260		U
11104-28-2	Arochlor-1221	260		U
11141-16-5	Arochlor-1232	260		U
53469-21-9	Arochlor-1242	260		U
12672-29-6	Arochlor-1248	260		U
11097-69-1	Arochlor-1254	260		U
11096-82-5	Arochlor-1260	260	630	

PCB ORGANICS ANALYSIS DATA SHEET

Client Name: ERM Northeast

Project Name: #186-23

Sample Location: 29-PX-4

Matrix: Soil

Method: EPA 608

Lab Number: 70210-002

Date Collected: 11/4/88

Date Received: 11/8/88

Date Extracted: 11/8/88

Date Analyzed: 11/10/88

Report Date: 11/21/88

CAS NO.	COMPOUND	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
12674-11-2	Arochlor-1016	810		U
11104-28-2	Arochlor-1221	810		U
11141-16-5	Arochlor-1232	810		U
53469-21-9	Arochlor-1242	810		U
12672-29-6	Arochlor-1248	810		U
11097-69-1	Arochlor-1254	810		U
11096-82-5	Arochlor-1260	810	1500	

PCB ORGANICS ANALYSIS DATA SHEET

Client Name: ERM Northeast

Project Name: #186-23

Sample Location: 29-PX-5

Matrix: Soil

Method: EPA 608

Lab Number: 70210-003

Date Collected: 11/4/88

Date Received: 11/8/88

Date Extracted: 11/8/88

Date Analyzed: 11/10/88

Report Date: 11/21/88

CAS NO.	COMPOUND	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
12674-11-2	Arochlor-1016	50,000		U
11104-28-2	Arochlor-1221	50,000		U
11141-16-5	Arochlor-1232	50,000		U
53469-21-9	Arochlor-1242	50,000		U
12672-29-6	Arochlor-1248	50,000		U
11097-69-1	Arochlor-1254	50,000		U
11096-82-5	Arochlor-1260	50,000	99,000	

LAB # 68099-001

Client: ERM Northeast

Spl Location: Project #186.23 WT-01

Spl Coll'd: 9/1/88

Sample Rec'd: 9/2/88

EPA Method 608 PCBs GC/EC

COMPOUND	RESULTS Sample Concen. ug/wipe	MDL ug/wipe	BLANK Conc.
1) PCB-1242	ND	5.0	ND
2) PCB-1254	ND	5.0	ND
3) PCB-1221	ND	5.0	ND
4) PCB-1232	ND	5.0	ND
5) PCB-1248	ND	5.0	ND
6) PCB-1260	ND	5.0	ND
7) PCB-1016	13	5.0	ND

For EnviroTest Laboratories, Inc.

Ronald A. Bayer
President

9/14/88

LAB # 68099-002

Client: ERM Northeast

Spl Location: Project #186.23 WT-02

Spl Coll'd: 9/1/88

Sample Rec'd: 9/2/88

EPA Method 608 PCBs GC/EC

COMPOUND	RESULTS Sample Concen. ug/wipe	MDL ug/wipe	BLANK Conc.
1) PCB-1242	ND	18	ND
2) PCB-1254	ND	18	ND
3) PCB-1221	ND	18	ND
4) PCB-1232	ND	18	ND
5) PCB-1248	ND	18	ND
6) PCB-1260	ND	18	ND
7) PCB-1016	52	18	ND

For EnviroTest Laboratories, Inc.

Ronald A. Bayer
President

9/14/88

ERM-Northeast

AREA 102

LOCATION 102-01A

EnviroTest Laboratories Inc.

315 Fullerton Ave
Newburgh, NY 12
(914) 562-0890
Fax (914) 562-084

LAB#: 71731-001 DATE REC'D: 88/12/31 DATE COLL'D: 88/12/30 STATUS: Cl
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-23 Bldg. Q 102-01A A

REPORT TO: same
BILL TO: same

T COLI	:	Cr+6	:	COD	:
F COLI	:	Phenol	:	HARD-T	:
SPC	:	CN	:	Ca Hard	:
F	:	B	:	SO3	:
NO3	:	Br	:	Cl	:
NO2	:	Color	:	Alk	:
T-PO4	:	Odor	:	BOD-Inf	:
O-PO4	:	Turb	:	BOD-Eff	:
SO4	:	pH	:	BOD-S	:
MBAS	:	LI	:	TSS-Inf	:
SiO2	:	Cond	:	TSS-Eff	:
H2S	:	NH3-T	:	MLSS	:
NH3-C	:	TKN	:	MLVSS	:
VSS	:	Ca	:	K	:
TS	:	Cr	:	Se	:
VS	:	Co	:	Ag	:
TDS	:	Cu	:	Na	:
SS	:	Au	:	Tl	:
% SOL	: 78%	Fe	:	Sn	:
G & O	:	Pb	:	Ti	:
Al	:	Mg	:	V	:
Sb	:	Mn	:	Zn	: 690 mg/kg dry
As	:	Hg	:	THM	:
Ba	:	Mo	:	TOC	:
Be	:	Ni	:		
Cd	:	Pd	:		

Remarks:

Ronald A. Bayer
Laboratory Director 1/9/89

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 71731-002 DATE REC'D: 88/12/31 DATE COLL'D: 88/12/30 STATUS: Clos
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-23 Bldg. Q 102-01A B

REPORT TO: same
BILL TO: same

T COLI	:	Cr+6	:	COD	:
F COLI	:	Phenol	:	HARD-T	:
SPC	:	CN	:	Ca Hard	:
F	:	B	:	SO3	:
NO3	:	Br	:	Cl	:
NO2	:	Color	:	Alk	:
T-PO4	:	Odor	:	BOD-Inf	:
O-PO4	:	Turb	:	BOD-Eff	:
SO4	:	pH	:	BOD-S	:
MBAS	:	LI	:	TSS-Inf	:
SiO2	:	Cond	:	TSS-Eff	:
H2S	:	NH3-T	:	MLSS	:
NH3-C	:	TKN	:	MLVSS	:
VSS	:	Ca	:	K	:
TS	:	Cr	:	Se	:
VS	:	Co	:	Ag	:
TDS	:	Cu	:	Na	:
SS	:	Au	:	Tl	:
% SOL	: 78%	Fe	:	Sn	:
G & O	:	Pb	:	Ti	:
Al	:	Mg	:	V	:
Sb	:	Mn	:	Zn	: 540 mg/kg dry
As	:	Hg	:	THM	:
Ba	:	Mo	:	TOC	:
Be	:	Ni	:		
Cd	:	Pd	:		

Remarks:

Ronald A. Baver
Laboratory Director 1/9/89

EnviroTest Laboratories Inc.

315 Fullerton Aven
Newburgh, NY 125
(914) 562-0890
Fax (914) 562-0841

LAB#: 71731-003 DATE REC'D: 88/12/31 DATE COLL'D: 88/12/30 STATUS: Clo
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-23 Bldg. Q 102-01A C

REPORT TO: same
BILL TO: same

T COLI	:	Cr+6	:	COD	:
F COLI	:	Phenol	:	HARD-T	:
SPC	:	CN	:	Ca Hard	:
F	:	B	:	SO3	:
NO3	:	Br	:	Cl	:
NO2	:	Color	:	Alk	:
T-PO4	:	Odor	:	BOD-Inf	:
O-PO4	:	Turb	:	BOD-Eff	:
SO4	:	pH	:	BOD-S	:
MBAS	:	LI	:	TSS-Inf	:
SiO2	:	Cond	:	TSS-Eff	:
H2S	:	NH3-T	:	MLSS	:
NH3-C	:	TKN	:	MLVSS	:
VSS	:	Ca	:	K	:
TS	:	Cr	:	Se	:
VS	:	Co	:	Ag	:
TDS	:	Cu	:	Na	:
SS	:	Au	:	Tl	:
% SOL	: 82%	Fe	:	Sn	:
G & O	:	Pb	:	Ti	:
Al	:	Mg	:	V	:
Sb	:	Mn	:	Zn	: 490 mg/kg dry
As	:	Hg	:	THM	:
Ba	:	Mo	:	TOC	:
Be	:	Ni	:		
Cd	:	Pd	:		

Remarks:

Ronald A. Bayer
Laboratory Director 1/9/89

EnviroTest Laboratories Inc.

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LAB#: 71731-004 DATE REC'D: 88/12/31 DATE COLL'D: 88/12/30 STATUS: Clos
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-23 Bldg. Q 102-01A D

REPORT TO: same
BILL TO: same

T COLI	:	Cr+6	:	COD	:
F COLI	:	Phenol	:	HARD-T	:
SPC	:	CN	:	Ca Hard	:
F	:	B	:	SO3	:
NO3	:	Br	:	Cl	:
NO2	:	Color	:	Alk	:
T-PO4	:	Odor	:	BOD-Inf	:
O-PO4	:	Turb	:	BOD-Eff	:
SO4	:	pH	:	BOD-S	:
MBAS	:	LI	:	TSS-Inf	:
SiO2	:	Cond	:	TSS-Eff	:
H2S	:	NH3-T	:	MLSS	:
NH3-C	:	TKN	:	MLVSS	:
VSS	:	Ca	:	K	:
TS	:	Cr	:	Se	:
VS	:	Co	:	Ag	:
TDS	:	Cu	:	Na	:
SS	:	Au	:	Tl	:
% SOL	: 84%	Fe	:	Sn	:
G & O	:	Pb	:	Ti	:
Al	:	Mg	:	V	:
Sb	:	Mn	:	Zn	: 170 mg/kg dry
As	:	Hg	:	THM	:
Ba	:	Mo	:	TOC	:
Be	:	Ni	:		
Cd	:	Pd	:		

Remarks:

Ronald A. Bayer
Laboratory Director 1/9/89

ERM-Northeast

AREA 102

LOCATION 102-03A

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 71731-005 DATE REC'D: 89/12/31 DATE COLL'D: 89/12/30 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #136-23 Bldg. Q 102-03A A

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :		BOD-S :	
MBAS :		Ll :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
TS :		Cr :		Se :	
VS :		Co :		Ag :	
TDS :		Cu :		Na :	
SS :		Au :		Tl :	
% SOL :	80%	Fe :		Sn :	
G & O :		Pb :	430	Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	
As :		Hg :	3.4	THM :	
Ba :		Mo :		TOC :	
Be :		Ni :			
Cd :		Pd :			

Remarks: All results in mg/kg dry weight.

Ronald A. Bayer
Laboratory Director 1-12-89

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 72060-002 DATE REC'D: 89/01/13 DATE COLL D: 89/01/13 STATUS: close
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-23 102-03A-(A)PX

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
F :		H :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :		BOD-S :	
MBAS :		Li :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
TS :		Cr :		Se :	
VS :		Co :		Ag :	
TDS :		Cu :		Na :	
SS :		Au :		Tl :	
% SOL :	80%	Fe :		Sn :	
O & G :		Pb :		Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	
As :		Hg :	33 mg/kg dry	THM :	
Ba :		Mo :		TOC :	
Be :		Ni :			
Cd :		Pd :			

Remarks:

Ronald A. Bayer
Laboratory Director 1/20/89

EnviroTest Laboratories Inc.
315 Fullerton Aven
Newburgh, NY 125
(914) 562-0890
Fax (914) 562-0841

LAB#: 72674-001 DATE REC'D: 89/02/01 DATE COLL'D: 89/01/30 STATUS: Clo
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 102-03A-(A)PX-1

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :		BOD-% :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
TS :		Cr :		Se :	
VS :		Co :		Ag :	
TDS :		Cu :		Na :	
SS :		Au :		Tl :	
% SOL :	86%	Fe :		Sn :	
O & O :		Pb :		Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	
As :		Hg :	0.93 mg/kg dry	THM :	
Ba :		Mo :		TOC :	
Be :		Ni :			
Cd :		Pd :			

Remarks:

Ronald A. Bayer
Laboratory Director 2/6/89

EnviroTest Laboratories Inc.
315 Fullerton Aver
Newburgh, NY 12
(914) 562-0890
Fax (914) 562-0841

LAB#: 72674-002 DATE REC'D: 89/02/01 DATE COLL'D: 89/01/30 STATUS: Clo
LNAME: ERM - Northeast FNAME:
STREET:
CITY: STATE: ZIP:
SPL LOCATION: #186-26 102-03A-(A)PX-2

REPORT TO: same
BILL TO: same

T COLI	:	Cr+6	:		COD	:	
F COLI	:	Phenol	:		HARD-T	:	
SPC	:	CN	:		Ca Hard	:	
F	:	B	:		SO3	:	
NO3	:	Br	:		Cl	:	
NO2	:	Color	:		Alk	:	
T-PO4	:	Odor	:		BOD-Inf	:	
O-PO4	:	Turb	:		BOD-Eff	:	
SO4	:	pH	:		BOD-S	:	
MBAS	:	LI	:		TSS-Inf	:	
SiO2	:	Cond	:		TSS-Eff	:	
H2S	:	NH3-I	:		MLSS	:	
NH3-C	:	TKN	:		MLVSS	:	
VSS	:	Ca	:		K	:	
TS	:	Cr	:		Se	:	
VS	:	Co	:		Ag	:	
TDS	:	Cu	:		Na	:	
SS	:	Au	:		Tl	:	
% SOL	: 93%	Fe	:		Sn	:	
G & O	:	Pb	:		Ti	:	
Al	:	Mg	:		V	:	
Sb	:	Mn	:		Zn	:	
As	:	Hg	: 0.21 mg/kg dry		THM	:	
Ba	:	Mo	:		TOC	:	
Be	:	Ni	:				
Cd	:	Pd	:				

Remarks:

Ronald A. Bayer
Laboratory Director 2/6/89

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LAB#: 72674-003 DATE REC'D: 89/02/01 DATE COLL'D: 89/02/01 STATUS: Close
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 102-03A(A)PX-3

REPORT TO: same
BILL TO: same

T COLI			Cr+6			COD	
F COLI			Phenol			HARD-T	
SPC			CN			Ca Hard	
F			B			SO3	
NO3			Br			Cl	
NO2			Color			Alk	
T-PO4			Odor			BOD-Inf	
O-PO4			Turb			BOD-Eff	
SO4			pH			BOD-S	
MBAS			Ll			TSS-Inf	
SiO2			Cond			TSS-Eff	
H2S			NH3-T			MLSS	
NH3-C			TKN			MLVSS	
VSS			Ca			K	
TS			Cr			Se	
VS			Co			Ag	
TDS			Cu			Na	
SS			Au			Tl	
% SOL	90%		Fe			Sn	
G & O			Pb			Ti	
Al			Mg			V	
Sb			Mn			Zn	
As			Hg	<0.09	mg/kg dry	THM	
Ba			Mo			TOC	
Be			Ni				
Cd			Pd				

Remarks:

Ronald A. Bayer
Laboratory Director 2/6/89

EnviroTest Laboratories Inc.

315 Fullerton Avenu
Newburgh, NY 125
(914) 562-0890
Fax (914) 562-0841

LAB#: 71731-006 DATE REC'D: 88/12/31 DATE COLL'D: 88/12/30 STATUS: Close
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-23 Bldg. O 102-03A B

REPORT TO: sme
BILL TO: same

T COLI	:	Cr+6	:	COD	:
F COLI	:	Phenol	:	HARD-T	:
SPC	:	CN	:	Ca Hard	:
F	:	B	:	SO3	:
NO3	:	Br	:	Cl	:
NO2	:	Color	:	Alk	:
T-PO4	:	Odor	:	BOD-Inf	:
O-PO4	:	Turb	:	BOD-Eff	:
SO4	:	pH	:	BOD-S	:
MBAS	:	LI	:	TSS-Inf	:
SiO2	:	Cond	:	TSS-Eff	:
H2S	:	NH3-T	:	MLSS	:
NH3-C	:	TKN	:	MLVSS	:
VSS	:	Ca	:	K	:
TS	:	Cr	:	Se	:
VS	:	Co	:	Ag	:
TDS	:	Cu	:	Na	:
SS	:	Au	:	Tl	:
% SOL	: 77%	Fe	:	Sn	:
G & O	:	Pb	: 420	Ti	:
Al	:	Mg	:	V	:
Sb	:	Mn	:	Zn	:
As	:	Hg	: 110	THM	:
Ba	:	Mo	:	TOC	:
Be	:	Ni	:		
Cd	:	Pd	:		

Remarks: All results in mg/kg dry weight.

Ronald A. Bayer
Laboratory Director 1-12-89

EnviroTest Laboratories Inc.

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Newburgh, NY 12550
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Fax (914) 562-0841

LAB#: 71731-007 DATE REC'D: 88/12/31 DATE COLL'D: 88/12/30 STATUS: Closed
LNAME: ERM -- Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-23 Bldg. Q 102-03A C

REPORT TO: same
BILL TO: same

T COLI	:	Cr+6	:	COD	:
F COLI	:	Phenol	:	HARD-T	:
SPC	:	CN	:	Ca Hard	:
F	:	B	:	SO3	:
NO3	:	Br	:	Cl	:
NO2	:	Color	:	Alk	:
T-PO4	:	Odor	:	BOD-Inf	:
O-PO4	:	Turb	:	BOD-Eff	:
SO4	:	pH	:	BOD-S	:
MBAS	:	LI	:	TSS-Inf	:
SiO2	:	Cond	:	TSS-Eff	:
H2S	:	NH3-T	:	MLSS	:
NH3-C	:	TKN	:	MLVSS	:
VSS	:	Ca	:	K	:
TS	:	Cr	:	Se	:
VS	:	Co	:	Ag	:
TDS	:	Cu	:	Na	:
SS	:	Au	:	Tl	:
% SOL	: 81%	Fe	:	Sn	:
G & O	:	Pb	: 220	Ti	:
Al	:	Mg	:	V	:
Sb	:	Mn	:	Zn	:
As	:	Hg	: 4.1	THM	:
Ba	:	Mo	:	TOC	:
Be	:	Ni	:		
Cd	:	Pd	:		

Remarks: All results in mg/kg dry weight.

Ronald A. Bayer
Laboratory Director 1-12-89

EnviroTest Laboratories Inc.

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Newburgh, NY 12550
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Fax (914) 562-0841

LAB#: 71731-008 DATE REC'D: 88/12/31 DATE COLL'D: 88/12/30 STATUS: Clos
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-23 Bldg. Q 102-03A D

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :		BOD-S :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
TS :		Cr :		Se :	
VS :		Co :		Ag :	
TDS :		Cu :		Na :	
SS :		Au :		Tl :	
% SOL :	88%	Fe :		Sn :	
G & O :		Pb :	40	Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	
As :		Hg :	0.39	THM :	
Ba :		Mo :		TOC :	
Be :		Ni :			
Cd :		Pd :			

Remarks: All results in mg/kg dry weight.

Ronald A. Bayer
Laboratory Director 1/9/89

ERM-Northeast

AREA KB-1

BENEATH BUILDING Q SLAB

EnviroTest Laboratories Inc.

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Newburgh, NY 1255
(914) 562-0890
Fax (914) 562-0841

LAB#: 71731-013 DATE REC'D: 88/12/31 DATE COLL'D: 88/12/30 STATUS: Clos
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-23 Bldg. Q KB-1A

REPORT TO: same
BILL TO: same

T COLI	:	Cr+6	:	COD	:
F COLI	:	Phenol	:	HARD-T	:
SPC	:	CN	:	Ca Hard	:
F	:	B	:	SO3	:
NO3	:	Br	:	Cl	:
NO2	:	Color	:	Alk	:
T-PO4	:	Odor	:	BOD-Inf	:
O-PO4	:	Turb	:	BOD-Eff	:
SO4	:	pH	:	BOD-S	:
MBAS	:	LI	:	TSS-Inf	:
SiO2	:	Cond	:	TSS-Eff	:
H2S	:	NH3-T	:	MLSS	:
NH3-C	:	TKN	:	MLVSS	:
VSS	:	Ca	:	K	:
TS	:	Cr	:	Se	:
VS	:	Co	:	Ag	:
TDS	:	Cu	:	Na	:
SS	:	Au	:	Tl	:
% SOL	: 84%	Fe	:	Sn	:
G & O	:	Pb	:	Ti	:
Al	:	Mg	:	V	:
Sb	:	Mn	:	Zn	: 9.8
As	:	Hg	: <0.10	THM	:
Ba	:	Mo	:	TOC	:
Be	:	Ni	:		
Cd	:	Pd	:		

Remarks: All results in mg/kg dry weight.

Ronald A. Bayer
Laboratory Director 1/9/89

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Client Name: ERM Northeast

Project Name: #186-23

Sample Location: KB-1A

Matrix: Soil

Method: EPA 625

Lab Number: 71731-013

Date Collected: 12/30/88

Date Received: 12/31/88

Date Extracted: 1/3/89

Date Analyzed: 1/6/89

Report Date: 1/10/89

CAS NO.	COMPOUND	Detection Limit ug/kg	Conc. ug/kg	Qualifier
91-20-3	Naphthalene	400		U
208-96-8	Acenaphthylene	400		U
83-32-9	Acenaphthene	400		U
86-73-7	Fluorene	400		U
85-01-8	Phenanthrene	400		U
120-12-7	Anthracene	400		U
206-44-0	Fluoranthene	400		U
128-00-0	Pyrene	400		U
56-55-3	Benzo(a)anthracene	400		U
218-01-9	Chrysene	400		U
205-99-2	Benzo(b)fluoranthene	400		U
207-08-9	Benzo(k)fluoranthene	400		U
50-32-8	Benzo(a)pyrene	400		U
193-39-5	Indeno(1,2,3-cd)pyrene	400		U
53-70-3	Dibenzo(a,h)anthracene	400		U
191-24-2	Benzo(g,h,i)perylene	400		U

EnviroTest Laboratories Inc.

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Newburgh, NY 12550
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Fax (914) 562-0841

LAB#: 71731-014 DATE REC'D: 88/12/31 DATE COLL'D: 88/12/30 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-23 Bldg. Q KB-1B

REPORT TO: same
BILL TO: same

T COLI	:	Cr+6	:	COD	:
F COLI	:	Phenol	:	HARD-T	:
SPC	:	CN	:	Ca Hard	:
F	:	B	:	SO3	:
NO3	:	Br	:	Cl	:
NO2	:	Color	:	Alk	:
T-PO4	:	Odor	:	BOD-Inf	:
O-PO4	:	Turb	:	BOD-Eff	:
SO4	:	pH	:	BOD-S	:
MBAS	:	LI	:	TSS-Inf	:
SiO2	:	Cond	:	TSS-Eff	:
H2S	:	NH3-T	:	MLSS	:
NH3-C	:	TKN	:	MLVSS	:
VSS	:	Ca	:	K	:
TS	:	Cr	:	Se	:
VS	:	Co	:	Ag	:
TDS	:	Cu	:	Na	:
SS	:	Au	:	Tl	:
% SOL	: 88%	Fe	:	Sn	:
G & O	:	Pb	:	Ti	:
Al	:	Mg	:	V	:
Sb	:	Mn	:	Zn	: 12
As	:	Hg	: <0.09	THM	:
Ba	:	Mo	:	TOC	:
Be	:	Ni	:		
Cd	:	Pd	:		

Remarks: All results in mg/kg dry weight.

Ronald A. Bayer
Laboratory Director 1/9/89

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Client Name: ERM Northeast

Project Name: #186-23

Sample Location: KB-1B

Matrix: Soil

Method: EPA 625

Lab Number: 71731-014

Date Collected: 12/30/88

Date Received: 12/31/88

Date Extracted: 1/3/89

Date Analyzed: 1/6/89

Report Date: 1/10/89

CAS NO.	COMPOUND	Detection Limit ug/kg	Conc. ug/kg	Qualifier
91-20-3	Naphthalene	380		U
208-96-8	Acenaphthylene	380		U
83-32-9	Acenaphthene	380		U
86-73-7	Fluorene	380		U
85-01-8	Phenanthrene	380		U
120-12-7	Anthracene	380		U
206-44-0	Fluoranthene	380		U
128-00-0	Pyrene	380		U
56-55-3	Benzo(a)anthracene	380		U
218-01-9	Chrysene	380		U
205-99-2	Benzo(b)fluoranthene	380		U
207-08-9	Benzo(k)fluoranthene	380		U
50-32-8	Benzo(a)pyrene	380		U
193-39-5	Indeno(1,2,3-cd)pyrene	380		U
53-70-3	Dibenzo(a,h)anthracene	380		U
191-24-2	Benzo(g,h,i)perylene	380		U

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 71731-015 DATE REC'D: 88/12/31 DATE COLL'D: 88/12/30 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-23 Bldg. Q KB-1C

REPORT TO: same
BILL TO: same

T COLI		Cr+6		COD	
F COLI		Phenol		HARD-T	
SPC		CN		Ca Hard	
F		B		SO3	
NO3		Br		Cl	
NO2		Color		Alk	
T-PO4		Odor		BOD-Inf	
O-PO4		Turb		BOD-Eff	
SO4		pH		BOD-S	
MBAS		LI		TSS-Inf	
SiO2		Cond		TSS-Eff	
H2S		NH3-T		MLSS	
NH3-C		TKN		MLVSS	
VSS		Ca		K	
TS		Cr		Se	
VS		Co		Ag	
TDS		Cu		Na	
SS		Au		Tl	
% SOL	90%	Fe		Sn	
G & O		Pb		Ti	
Al		Mg		V	
Sb		Mn		Zn	67
As		Hg	0.69	THM	
Ba		Mo		TOC	
Be		Ni			
Cd		Pd			

Remarks: All results in mg/kg dry weight.

Ronald A. Baver
Laboratory Director 1/9/89

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Client Name: ERM Northeast

Project Name: #186-23

Sample Location: KB-1C

Matrix: Soil

Method: EPA 625

Lab Number: 71731-015

Date Collected: 12/30/88

Date Received: 12/31/88

Date Extracted: 1/3/89

Date Analyzed: 1/10/89

Report Date: 1/10/89

CAS NO.	COMPOUND	Detection Limit ug/kg	Conc. ug/kg	Qualifier
91-20-3	Naphthalene	7400		U
208-96-8	Acenaphthylene	7400		U
83-32-9	Acenaphthene	7400		U
86-73-7	Fluorene	7400		U
85-01-8	Phenanthrene	7400		U
120-12-7	Anthracene	7400		U
206-44-0	Fluoranthene	7400		U
128-00-0	Pyrene	7400		U
56-55-3	Benzo(a)anthracene	7400		U
218-01-9	Chrysene	7400		U
205-99-2	Benzo(b)fluoranthene	7400		U
207-08-9	Benzo(k)fluoranthene	7400		U
50-32-8	Benzo(a)pyrene	7400		U
193-39-5	Indeno(1,2,3-cd)pyrene	7400		U
53-70-3	Dibenzo(a,h)anthracene	7400		U
191-24-2	Benzo(g,h,i)perylene	7400		U

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 71697-002 DATE REC'D: 88/12/30 DATE COLL'D: 88/12/29 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-23 KB-~~1B~~ 1D

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :		BOD-S :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
TS :		Cr :		Se :	
VS :		Co :		Ag :	
TDS :		Cu :		Na :	
SS :		Au :		Tl :	
% SOL :	87%	Fe :		Sn :	
G & O :		Pb :		Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	4.7
As :		Hg :	<0.09	THM :	
Ba :		Mo :		TOC :	
Be :		Ni :			
Cd :		Pd :			

Remarks: All results in mg/kg dry weight.

Ronald A. Bayer
Laboratory Director 1/9/89

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Client Name: ERM Northeast

Project Name: #186-23

Sample Location: KB-1D

Matrix: Soil

Method: EPA 625

Lab Number: 71697-002

Date Collected: 12/29/88

Date Received: 12/30/88

Date Extracted: 1/3/89

Date Analyzed: 1/5/89

Report Date: 1/9/89

CAS NO.	COMPOUND	Detection Limit ug/kg	Conc. ug/kg	Qualifier
91-20-3	Naphthalene	380		U
208-96-8	Acenaphthylene	380		U
83-32-9	Acenaphthene	380		U
86-73-7	Fluorene	380		U
85-01-8	Phenanthrene	380		U
120-12-7	Anthracene	380		U
206-44-0	Fluoranthene	380		U
128-00-0	Pyrene	380		U
56-55-3	Benzo(a)anthracene	380		U
218-01-9	Chrysene	380		U
205-99-2	Benzo(b)fluoranthene	380		U
207-08-9	Benzo(k)fluoranthene	380		U
50-32-8	Benzo(a)pyrene	380		U
193-39-5	Indeno(1,2,3-cd)pyrene	380		U
53-70-3	Dibenzo(a,h)anthracene	380		U
191-24-2	Benzo(g,h,i)perylene	380		U

LOCATION Q-CSPL

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Client Name: ERM Northeast
Lab Number: 71731-009

Project Name: #186-23
Date Collected: 12/30/88

Sample Location: QCPL (A)
Date Received: 12/31/88

Matrix: Soil
Date Extracted: 1/3/89

Method: EPA 625
Date Analyzed: 1/6/89

Report Date: 1/10/89

CAS NO.	COMPOUND	Detection Limit ug/kg	Conc. ug/kg	Qualifier
91-20-3	Naphthalene	500		U
208-96-8	Acenaphthylene	500	440	J
83-32-9	Acenaphthene	500		U
86-73-7	Fluorene	500		U
85-01-8	Phenanthrene	500	1200	
120-12-7	Anthracene	500		U
206-44-0	Fluoranthene	500	3500	
128-00-0	Pyrene	500	3000	
56-55-3	Benzo(a)anthracene	500	2300	
218-01-9	Chrysene	500	2100	
205-99-2	Benzo(b)fluoranthene	500	3300	
207-08-9	Benzo(k)fluoranthene	500	950	
50-32-8	Benzo(a)pyrene	500	2400	
193-39-5	Indeno(1,2,3-cd)pyrene	500	470	J
53-70-3	Dibenzo(a,h)anthracene	500		U
191-24-2	Benzo(g,h,i)perylene	500	450	J

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Client Name: ERM Northeast
Lab Number: 71731-010

Project Name: #186-23
Date Collected: 12/30/88

Sample Location: QCPL (B)
Date Received: 12/31/88

Matrix: Soil
Date Extracted: 1/3/89

Method: EPA 625
Date Analyzed: 1/10/89

Report Date: 1/10/89

CAS NO.	COMPOUND	Detection Limit ug/kg	Conc. ug/kg	Qualifier
91-20-3	Naphthalene	13,900		U
208-96-8	Acenaphthylene	13,900	10,300	J
83-32-9	Acenaphthene	13,900		U
86-73-7	Fluorene	13,900		U
85-01-8	Phenanthrene	13,900	2850	J
120-12-7	Anthracene	13,900	2140	J
206-44-0	Fluoranthene	13,900	10,700	J
128-00-0	Pyrene	13,900	20,490	
56-55-3	Benzo(a)anthracene	13,900		U
218-01-9	Chrysene	13,900	15,300	
205-99-2	Benzo(b)fluoranthene	13,900	14,900	
207-08-9	Benzo(k)fluoranthene	13,900	22,800	
50-32-8	Benzo(a)pyrene	13,900	17,600	
193-39-5	Indeno(1,2,3-cd)pyrene	13,900	10,800	J
53-70-3	Dibenzo(a,h)anthracene	13,900		U
191-24-2	Benzo(g,h,i)perylene	13,900	17,800	

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Client Name: ERM Northeast
Lab Number: 71731-011

Project Name: #186-23
Date Collected: 12/30/88

Sample Location: QCPL (C)
Date Received: 12/31/88

Matrix: Soil
Date Extracted: 1/3/89

Method: EPA 625
Date Analyzed: 1/10/89

Report Date: 1/10/89

CAS NO.	COMPOUND	Detection Limit ug/kg	Conc. ug/kg	Qualifier
91-20-3	Naphthalene	8300		U
208-96-8	Acenaphthylene	8300	2720	J
83-32-9	Acenaphthene	8300		U
86-73-7	Fluorene	8300	1940	J
85-01-8	Phenanthrene	8300	20,100	
120-12-7	Anthracene	8300	3570	J
206-44-0	Fluoranthene	8300	32,000	
128-00-0	Pyrene	8300	17,600	
56-55-3	Benzo(a)anthracene	8300	11,400	
218-01-9	Chrysene	8300	12,500	
205-99-2	Benzo(b)fluoranthene	8300	11,700	
207-08-9	Benzo(k)fluoranthene	8300	10,100	
50-32-8	Benzo(a)pyrene	8300	10,700	
193-39-5	Indeno(1,2,3-cd)pyrene	8300	6580	J
53-70-3	Dibenzo(a,h)anthracene	8300		U
191-24-2	Benzo(g,h,i)perylene	8300	7370	J

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Client Name: ERM Northeast

Project Name: #186-23

Sample Location: Q-CSPL(C)-PX

Matrix: Soil

Method: EPA 625

Lab Number: 72060-001

Date Collected: 1/12/89

Date Received: 1/13/89

Date Extracted: 1/16/89

Date Analyzed: 1/17/89

Report Date: 1/19/89

CAS NO.	COMPOUND	Detection Limit ug/kg	Conc. ug/kg	Qualifier
91-20-3	Naphthalene	460		U
208-96-8	Acenaphthylene	460	600	
83-32-9	Acenaphthene	460		U
86-73-7	Fluorene	460		U
85-01-8	Phenanthrene	460	870	
120-12-7	Anthracene	460	370	J
206-44-0	Fluoranthene	460	2000	
128-00-0	Pyrene	460	2500	
56-55-3	Benzo(a)anthracene	460	1600	
218-01-9	Chrysene	460	1400	
205-99-2	Benzo(b)fluoranthene	460	1900	
207-08-9	Benzo(k)fluoranthene	460	350	J
50-32-8	Benzo(a)pyrene	460	1500	
193-39-5	Indeno(1,2,3-cd)pyrene	460	500	
53-70-3	Dibenzo(a,h)anthracene	460		U
191-24-2	Benzo(g,h,i)perylene	460	600	

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Client Name: ERM Northeast
Lab Number: 71731-012

Project Name: #186-23
Date Collected: 12/30/88

Sample Location: QCPL (D)
Date Received: 12/31/88

Matrix: Soil
Date Extracted: 1/3/89

Method: EPA 625
Date Analyzed: 1/6/89

Report Date: 1/10/89

CAS NO.	COMPOUND	Detection Limit ug/kg	Conc. ug/kg	Qualifier
91-20-3	Naphthalene	380		U
208-96-8	Acenaphthylene	380	500	
83-32-9	Acenaphthene	380		U
86-73-7	Fluorene	380		U
85-01-8	Phenanthrene	380	190	J
120-12-7	Anthracene	380		U
206-44-0	Fluoranthene	380	680	
128-00-0	Pyrene	380	1100	
56-55-3	Benzo(a)anthracene	380	670	
218-01-9	Chrysene	380		U
205-99-2	Benzo(b)fluoranthene	380	1100	
207-08-9	Benzo(k)fluoranthene	380	450	
50-32-8	Benzo(a)pyrene	380	1100	
193-39-5	Indeno(1,2,3-cd)pyrene	380	260	J
53-70-3	Dibenzo(a,h)anthracene	380		U
191-24-2	Benzo(g,h,i)perylene	380	280	J

APPENDIX B-2

PHASE II DATA

LOCATION 22-02

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 77212-035 DATE REC'D: 89/06/26 DATE COLL'D: 89/06/23 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 22-02-T

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :		BOD-S :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
TS :		Cr :		Se :	
VS :		Co :		Ag :	
TDS :		Cu :		Na :	
SS :		Au :		Tl :	
% SOL :	89%	Fe :		Sn :	
G & O :		Pb :		Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	
As :		Hg :	0.35 mg/kg dry	THM :	
Ba :		Mo :		TOC :	
Be :		Ni :			
Cd :		Pd :			

Remarks:

Ronald A. Bayer
Laboratory Director 7/6/89

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Client Name: ERM Northeast

Project Name: #186-26

Sample Location: 22-02T

Matrix: Soil

Method: EPA 625

Lab Number: 77212-035

Date Collected: 6/23/89

Date Received: 6/24/89

Date Extracted: 6/26/89

Date Analyzed: 6/29/89

Report Date: 7/7/89

CAS NO.	COMPOUND	Detection Limit ug/kg	Conc. ug/kg	Qualifier
91-20-3	Naphthalene	750		U
208-96-8	Acenaphthylene	750		U
83-32-9	Acenaphthene	750		U
86-73-7	Fluorene	750		U
85-01-8	Phenanthrene	750	4700	
120-12-7	Anthracene	750	1300	
206-44-0	Fluoranthene	750	6800	
128-00-0	Pyrene	750	6600	
56-55-3	Benzo(a)anthracene	750	4200	
218-01-9	Chrysene	750	4200	
205-99-2	Benzo(b)fluoranthene	750	6500	
207-08-9	Benzo(k)fluoranthene	750	4900	
50-32-8	Benzo(a)pyrene	750	3700	
193-39-5	Indeno(1,2,3-cd)pyrene	750	1500	
53-70-3	Dibenzo(a,h)anthracene	750		U
191-24-2	Benzo(g,h,i)perylene	750	2300	

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 77212-032 DATE REC'D: 89/06/26 DATE COLL'D: 89/06/23 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 22-02-U

REPORT TO: same
BILL TO: same

T COLI		Cr+6		COD	
F COLI		Phenol		HARD-T	
SPC		CN		Ca Hard	
F		B		SO3	
NO3		Br		Cl	
NO2		Color		Alk	
T-PO4		Odor		BOD-Inf	
O-PO4		Turb		BOD-Eff	
SO4		pH		BOD-S	
MBAS		LI		TSS-Inf	
SiO2		Cond		TSS-Eff	
H2S		NH3-T		MLSS	
NH3-C		TKN		MLVSS	
VSS		Ca		K	
TS		Cr		Se	
VS		Co		Ag	
TDS		Cu		Na	
SS		Au		Tl	
% SOL	88%	Fe		Sn	
G & O		Pb		Ti	
Al		Mg		V	
Sb		Mn		Zn	
As		Hg	0.52 mg/kg dry	THM	
Ba		Mo		TOC	
Be		Ni			
Cd		Pd			

Remarks:

Ronald A. Bayer
Laboratory Director 7/6/89

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Client Name: ERM Northeast

Project Name: #186-26

Sample Location: 22-02U

Matrix: Soil

Method: EPA 625

Lab Number: 77212-032

Date Collected: 6/23/89

Date Received: 6/24/89

Date Extracted: 6/26/89

Date Analyzed: 6/29/89

Report Date: 7/7/89

CAS NO.	COMPOUND	Detection Limit ug/kg	Conc. ug/kg	Qualifier
91-20-3	Naphthalene	2100		U
208-96-8	Acenaphthylene	2100		U
83-32-9	Acenaphthene	2100		U
86-73-7	Fluorene	2100		U
85-01-8	Phenanthrene	2100		U
120-12-7	Anthracene	2100		U
206-44-0	Fluoranthene	2100	2000	J
128-00-0	Pyrene	2100	1300	J
56-55-3	Benzo(a)anthracene	2100		U
218-01-9	Chrysene	2100	1000	J
205-99-2	Benzo(b)fluoranthene	2100	1200	J
207-08-9	Benzo(k)fluoranthene	2100		U
50-32-8	Benzo(a)pyrene	2100		U
193-39-5	Indeno(1,2,3-cd)pyrene	2100		U
53-70-3	Dibenzo(a,h)anthracene	2100		U
191-24-2	Benzo(g,h,i)perylene	2100		U

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 77212-033 DATE REC'D: 89/06/26 DATE COLL'D: 89/06/23 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 22-02-V

REPORT TO: same
BILL TO: same

T COLI		Cr+6		COD	
F COLI		Phenol		HARD-T	
SPC		CN		Ca Hard	
F		B		SO3	
NO3		Br		Cl	
NO2		Color		Alk	
T-PO4		Odor		BOD-Inf	
O-PO4		Turb		BOD-Eff	
SO4		pH		BOD-S	
MBAS		LI		TSS-Inf	
SiO2		Cond		TSS-Eff	
H2S		NH3-T		MLSS	
NH3-C		TKN		MLVSS	
VSS		Ca		K	
TS		Cr		Se	
VS		Co		Ag	
TDS		Cu		Na	
SS		Au		Tl	
% SOL	87%	Fe		Sn	
G & O		Pb		Ti	
Al		Mg		V	
Sb		Mn		Zn	
As		Hg	0.64 mg/kg dry	THM	
Ba		Mo		TOC	
Be		Ni			
Cd		Pd			

Remarks:

Ronald A. Bayer
Laboratory Director 7/6/89

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Client Name: ERM Northeast

Project Name: #186-26

Sample Location: 22-02V

Matrix: Soil

Method: EPA 625

Lab Number: 77212-033

Date Collected: 6/23/89

Date Received: 6/24/89

Date Extracted: 6/26/89

Date Analyzed: 6/29/89

Report Date: 7/7/89

CAS NO.	COMPOUND	Detection Limit ug/kg	Conc. ug/kg	Qualifier
91-20-3	Naphthalene	380		U
208-96-8	Acenaphthylene	380		U
83-32-9	Acenaphthene	380		U
86-73-7	Fluorene	380		U
85-01-8	Phenanthrene	380	440	
120-12-7	Anthracene	380		U
206-44-0	Fluoranthene	380	1200	
128-00-0	Pyrene	380	920	
56-55-3	Benzo(a)anthracene	380	540	
218-01-9	Chrysene	380	540	
205-99-2	Benzo(b)fluoranthene	380	570	
207-08-9	Benzo(k)fluoranthene	380		U
50-32-8	Benzo(a)pyrene	380	510	
193-39-5	Indeno(1,2,3-cd)pyrene	380		U
53-70-3	Dibenzo(a,h)anthracene	380		U
191-24-2	Benzo(g,h,i)perylene	380		U

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 77212-034 DATE REC'D: 89/06/26 DATE COLL'D: 89/06/23 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 22-02-W

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :		BOD-S :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
TS :		Cr :		Se :	
VS :		Co :		Ag :	
TDS :		Cu :		Na :	
SS :		Au :		Tl :	
% SOL :	93%	Fe :		Sn :	
G & O :		Pb :		Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	
As :		Hg :	<0.17 mg/kg dry	THM :	
Ba :		Mo :		TOC :	
Be :		Ni :			
Cd :		Pd :			

Remarks:

Ronald A. Bayer
Laboratory Director 7/6/89

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Client Name: ERM Northeast

Project Name: #186-26

Sample Location: 22-02W

Matrix: Soil

Method: EPA 625

Lab Number: 77212-034

Date Collected: 6/23/89

Date Received: 6/24/89

Date Extracted: 6/26/89

Date Analyzed: 6/29/89

Report Date: 7/7/89

CAS NO.	COMPOUND	Detection Limit ug/kg	Conc. ug/kg	Qualifier
91-20-3	Naphthalene	360		U
208-96-8	Acenaphthylene	360		U
83-32-9	Acenaphthene	360		U
86-73-7	Fluorene	360		U
85-01-8	Phenanthrene	360	430	
120-12-7	Anthracene	360		U
206-44-0	Fluoranthene	360	680	
128-00-0	Pyrene	360	480	
56-55-3	Benzo(a)anthracene	360	270	J
218-01-9	Chrysene	360	290	J
205-99-2	Benzo(b)fluoranthene	360	240	J
207-08-9	Benzo(k)fluoranthene	360	240	J
50-32-8	Benzo(a)pyrene	360	240	J
193-39-5	Indeno(1,2,3-cd)pyrene	360		U
53-70-3	Dibenzo(a,h)anthracene	360		U
191-24-2	Benzo(g,h,i)perylene	360		U

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 78171-001 DATE REC'D: 89/07/25 DATE COLL'D: 89/07/24 STATUS: closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 22-02X

REPORT TO: same
BILL TO: same

T COLI		Cr+6		COD	
F COLI		Phenol		HARD-T	
SPC		CN		Ca Hard	
F		B		SO3	
NO3		Br		Cl	
NO2		Color		Alk	
T-PO4		Odor		BOD-Inf	
O-PO4		Turb		BOD-Eff	
SO4		pH		BOD-S	
MBAS		LI		TSS-Inf	
SiO2		Cond		TSS-Eff	
H2S		NH3-T		MLSS	
NH3-C		TKN		MLVSS	
VSS		Ca		K	
TS		Cr		Se	
VS		Co		Ag	
TDS		Cu		Na	
SS		Au		Tl	
% SOL	86%	Fe		Sn	
G & O		Pb		Ti	
Al		Mg		V	
Sb		Mn		Zn	
As		Hg	1.2 mg/kg dry	THM	
Ba		Mo		TOC	
Be		Ni			
Cd		Pd			

Remarks:

Ronald A. Bayer
Laboratory Director 7/27/89

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Client Name: ERM Northeast

Project Name: #186-26

Sample Location: 22-02X

Matrix: Soil

Method: EPA 625

Lab Number: 78171-001

Date Collected: 7/24/89

Date Received: 7/25/89

Date Extracted: 7/25/89

Date Analyzed: 7/25/89

Report Date: 7/27/89

CAS NO.	COMPOUND	Detection Limit ug/kg	Conc. ug/kg	Qualifier
91-20-3	Naphthalene	780		U
208-96-8	Acenaphthylene	780		U
83-32-9	Acenaphthene	780		U
86-73-7	Fluorene	780		U
85-01-8	Phenanthrene	780	2200	
120-12-7	Anthracene	780	560	J
206-44-0	Fluoranthene	780	2400	
128-00-0	Pyrene	780	2400	
56-55-3	Benzo(a)anthracene	780	1100	
218-01-9	Chrysene	780	1200	
205-99-2	Benzo(b)fluoranthene	780	900	
207-08-9	Benzo(k)fluoranthene	780	1100	
50-32-8	Benzo(a)pyrene	780	860	
193-39-5	Indeno(1,2,3-cd)pyrene	780	[illegible]	U
53-70-3	Dibenzo(a,h)anthracene	780		U
191-24-2	Benzo(g,h,i)perylene	780		U

LOCATION 23-04

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 77212-044 DATE REC'D: 89/06/26 DATE COLL'D: 89/06/23 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 23-04-T

REPORT TO: same
BILL TO: same

T COLI	:	Cr+6	:	COD	:
F COLI	:	Phenol	:	HARD-T	:
SPC	:	CN	:	Ca Hard	:
F	:	B	:	SO3	:
NO3	:	Br	:	Cl	:
NO2	:	Color	:	Alk	:
T-PO4	:	Odor	:	BOD-Inf	:
O-PO4	:	Turb	:	BOD-Eff	:
SO4	:	pH	:	BOD-S	:
MBAS	:	LI	:	TSS-Inf	:
SiO2	:	Cond	:	TSS-Eff	:
H2S	:	NH3-T	:	MLSS	:
NH3-C	:	TKN	:	MLVSS	:
VSS	:	Ca	:	K	:
TS	:	Cr	:	Se	:
VS	:	Co	:	Ag	:
TDS	:	Cu	:	Na	:
SS	:	Au	:	Tl	:
% SOL	: 89%	Fe	:	Sn	:
G & O	:	Pb	: 230 mg/kg dry	Ti	:
Al	:	Mg	:	V	:
Sb	:	Mn	:	Zn	:
As	:	Hg	:	THM	:
Ba	:	Mo	:	TOC	:
Be	:	Ni	:		
Cd	:	Pd	:		

Remarks:

Ronald A. Bayer
Laboratory Director 6/30/89

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Project #186-26

Sample Received 6/24/89

Lab. No.	Sample ID	TPH (mg/kg)
77212-004	26-02T	<29
77212-005	26-02V	69
77212-006	26-02W	120
77212-007	26-02U	<30
77212-012	27-12V	34
77212-013	27-12U	<28
77212-014	27-12W	40
77212-015	27-12T	4200
77212-016	27-02V	100
77212-017	27-02W	70
77212-018	27-02T	<29
77212-019	27-02U	2800
77212-020	27-08V	99
77212-021	27-08W	160
77212-022	27-08U	<29
77212-023	27-08T	<29
77212-028	25-05V	<30
77212-029	25-05U	<29
77212-030	25-05W	<30
77212-031	25-05T	<28
77212-042	101-19W	320
77212-043	101-19V	32
77212-044	23-04T	<28
77212-045	23-04W	<29

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 78146-002 DATE REC'D: 89/07/24 DATE COLL'D: 89/07/21 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 23-04U

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :		BOD-S :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
TS :		Cr :		Se :	
VS :		Co :		Ag :	
TDS :		Cu :		Na :	
SS :		Au :		Tl :	
% SOL :	81%	Fe :		Sn :	
G & O :		Pb :	170 mg/kg dry	Ti :	
Al :		Mo :		V :	
Sb :		Mn :		Zn :	
As :		Hg :		THM :	
Ba :		Mo :		TOC :	
Be :		Ni :			
Cd :		Pd :			

Remarks:

Ronald A. Baver
Laboratory Director 7/26/89

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Project #186-26

Samples Received 7/24/89

Lab. No.	Sample ID	TPH (mg/kg)
78146-001	27-02U-5	<28
78146-002	23-04U	<31
78146-008	27-09U	<33
78146-009	27-12T-5	<28
78146-010	27-12X	<29

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 77303-001 DATE REC'D: 89/06/28 DATE COLL'D: 89/06/26 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 23-04V

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :		BOD-S :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
TS :		Cr :		Se :	
VS :		Co :		Ag :	
TDS :		Cu :		Na :	
SS :		Au :		Tl :	
% SOL :	78%	Fe :		Sn :	
G & O :		Pb :	1500 mg/kg dry	Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	
As :		Hg :		THM :	
Ba :		Mo :		TOC :	
Be :		Ni :			
Cd :		Pd :			

Remarks:

Ronald A. Bayer
Laboratory Director 7/3/89

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Project #186-26

Samples Received 6/28/89

Lab. No.	Sample ID	TPH (mg/kg)
77303-001	23-04V	120
77303-006	233-01V	850
77303-007	233-01T	360
77303-008	233-01X	7410
77303-009	233-01W	440
77303-019	SS-1	<34
77303-020	SS-2	<34
77303-021	SS-3	<34
77303-022	SS-4	<33
77303-023	SS-5	<34
77303-024	225-01U	<28
77303-025	2-W-28	<27
77303-026	2-W-27	<27
77303-028	2-W-07W	<29
77303-030	2-W-26	<27

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 78146-003 DATE REC'D: 89/07/24 DATE COLL'D: 89/07/21 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 23-04V-5

REPORT TO: same
BILL TO: same

T COLI	:	Cr+6	:	COD	:
F COLI	:	Phenol	:	HARD-T	:
SPC	:	CN	:	Ca Hard	:
F	:	B	:	SO3	:
NO3	:	Br	:	Cl	:
NO2	:	Color	:	Alk	:
T-PO4	:	Odor	:	BOD-Inf	:
O-PO4	:	Turb	:	BOD-Eff	:
SO4	:	pH	:	BOD-S	:
MBAS	:	LI	:	TSS-Inf	:
SiO2	:	Cond	:	TSS-Eff	:
H2S	:	NH3-T	:	MLSS	:
NH3-C	:	TKN	:	MLVSS	:
VSS	:	Ca	:	K	:
TS	:	Cr	:	Se	:
VS	:	Co	:	Ag	:
TDS	:	Cu	:	Na	:
SS	:	Au	:	Tl	:
% SOL	: 64%	Fe	:	Sn	:
G & O	:	Pb	: 4100 mg/kg dry	Ti	:
Al	:	Mg	:	V	:
Sb	:	Mn	:	Zn	:
As	:	Hg	:	THM	:
Ba	:	Mo	:	TOC	:
Be	:	Ni	:		
Cd	:	Pd	:		

Remarks:

Ronald A. Baver
Laboratory Director 7/26/89

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 77212-045 DATE REC'D: 89/06/26 DATE COLL'D: 89/06/23 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 23-04-W

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :		BOD-S :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
TS :		Cr :		Se :	
VS :		Co :		Ag :	
TDS :		Cu :		Na :	
SS :		Au :		Tl :	
% SOL :	86%	Fe :		Sn :	
G & O :		Pb :	250 mg/kg dry	Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	
As :		Hg :		THM :	
Ba :		Mo :		TOC :	
Be :		Ni :			
Cd :		Pd :			

Remarks:

Ronald A. Bayer
Laboratory Director 6/30/89

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Project #186-26

Sample Received 6/24/89

Lab. No.	Sample ID	TPH (mg/kg)
77212-004	26-02T	<29
77212-005	26-02V	69
77212-006	26-02W	120
77212-007	26-02U	<30
77212-012	27-12V	34
77212-013	27-12U	<28
77212-014	27-12W	40
77212-015	27-12T	4200
77212-016	27-02V	100
77212-017	27-02W	70
77212-018	27-02T	<29
77212-019	27-02U	2800
77212-020	27-08V	99
77212-021	27-08W	160
77212-022	27-08U	<29
77212-023	27-08T	<29
77212-028	25-05V	<30
77212-029	25-05U	<29
77212-030	25-05W	<30
77212-031	25-05T	<28
77212-042	101-19W	320
77212-043	101-19V	32
77212-044	23-04T	<28
77212-045	23-04W	<29

LOCATION 23-05

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 77303-010 DATE REC'D: 89/06/28 DATE COLL'D: 89/06/26 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 23-05T

REPORT TO: same
BILL TO: same

T COLI			Cr+6			COD	
F COLI			Phenol			HARD-T	
SPC			CN			Ca Hard	
F			B			SO3	
NO3			Br			Cl	
NO2			Color			Alk	
T-PO4			Odor			BOD-Inf	
O-PO4			Turb			BOD-Eff	
SO4			pH			BOD-S	
MBAS			LI			TSS-Inf	
SiO2			Cond			TSS-Eff	
H2S			NH3-T			MLSS	
NH[illegible]			TKN			MLVSS	
VSS			Ca			K	
TS			Cr			Se	
VS			Co			Ag	
TDS			Cu		25 mg/kg dry	Na	
SS			Au			Tl	
% SOL	87%		Fe			Sn	
G & O			Pb			Ti	
Al			Mg			V	
Sb			Mn			Zn	
As			Hg			THM	
Ba			Mo			TOC	
Be			Ni				
Cd			Pd				

Remarks:

Ronald A. Bayer
Laboratory Director 7/6/89

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 77303-011 DATE REC'D: 89/06/28 DATE COLL'D: 89/06/26 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 23-05U

REPORT TO: same
BILL TO: same

T COLI		Cr+6		COD	
F COLI		Phenol		HARD-T	
SPC		CN		Ca Hard	
F		B		SO3	
NO3		Br		Cl	
NO2		Color		Alk	
T-PO4		Odor		BOD-Inf	
O-PO4		Turb		BOD-Eff	
SO4		pH		BOD-S	
MBAS		LI		TSS-Inf	
SiO2		Cond		TSS-Eff	
H2S		NH3-T		MLSS	
NH3-C		TKN		MLVSS	
VSS		Ca		K	
TS		Cr		Se	
VS		Co		Ag	
TDS		Cu	42 mg/kg dry	Na	
SS		Au		Tl	
% SOL	86%	Fe		Sn	
G & O		Pb		Ti	
Al		Mg		V	
Sb		Mn		Zn	
As		Hg		THM	
Ba		Mo		TOC	
Be		Ni			
Cd		Pd			

Remarks:

Ronald A. Baver
Laboratory Director 7/6/89

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 77303-012 DATE REC'D: 89/06/28 DATE COLL'D: 89/06/26 STATUS: closed
LNAME: ERM Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 23-05V

REPORT TO:
BILL TO:

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SH :		CN :		Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :		BOD-S :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
TS :		Cr :		Se :	
VS :		Co :		Ag :	
TDS :		Cu :		Na :	
SS :		Au :		Tl :	
% SOL :	88	Fe :		Sn :	
G & O :		Pb :	18 mg/kg dry	Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	
As :		Hg :		THM :	
Ba :		Mo :		TOC :	
Be :		Ni :			
Cd :		Pd :			

Remarks:

Ronald A. Bayer
Laboratory Director 7/6/89

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 77303-013 DATE REC'D: 89/06/28 DATE COLL'D: 89/06/26 STATUS: closed
LNAME: ERM Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 23-05W

REPORT TO:
BILL TO:

T COLI	:	Cr+6	:		COD	:	
F COLI	:	Phenol	:		HARD-T	:	
SPC	:	CN	:		Ca Hard	:	
F	:	B	:		SO3	:	
NO3	:	Br	:		Cl	:	
NO2	:	Color	:		Alk	:	
T-PO4	:	Odor	:		BOD-Inf	:	
O-PO4	:	Turb	:		BOD-Eff	:	
SO4	:	pH	:		BOD-S	:	
MBAS	:	LI	:		TSS-Inf	:	
SiO2	:	Cond	:		TSS-Eff	:	
H2S	:	NH3-T	:		MLSS	:	
NH3-C	:	TKN	:		MLVSS	:	
VSS	:	Ca	:		K	:	
TS	:	Cr	:		Se	:	
VS	:	Co	:		Ag	:	
TDS	:	Cu	:	43 mg/kg dry	Na	:	
SS	:	Au	:		Tl	:	
% SOL	: 88	Fe	:		Sn	:	
G & O	:	Pb	:		Ti	:	
Al	:	Mg	:		V	:	
Sb	:	Mn	:		Zn	:	
As	:	Hg	:		THM	:	
Ba	:	Mo	:		TOC	:	
Be	:	Ni	:				
Cd	:	Pd	:				

Remarks:

Ronald A. Baver
Laboratory Director 7/7/89

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 78146-004 DATE REC'D: 89/07/24 DATE COLL'D: 89/07/21 STATUS: Closed
LNAME: ERM - Northteast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 23-05X

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :		BOD-S :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
TS :		Cr :		Se :	
VS :		Co :		Ag :	
TDS :		Cu :	9.1 mg/kg dry	Na :	
SS :		Au :		Tl :	
% SOL :	90%	Fe :		Sn :	
G & O :		Pb :		Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	
As :		Hg :		THM :	
Ba :		Mo :		TOC :	
Be :		Ni :			
Cd :		Pd :			

Remarks:

Ronald A. Bayer
Laboratory Director 7/26/89

LOCATION 23-07

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 77303-002 DATE REC'D: 89/06/28 DATE COLL'D: 89/06/26 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 23-07T

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		oH :		BOD-S :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
TS :		Cr :		Se :	
VS :		Co :		Ag :	
TDS :		Cu :		Na :	
SS :		Au :		Tl :	
% SOL :	84%	Fe :		Sn :	
G & O :		Pb :	550 mg/kg dry	Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	
As :		Hg :		THM :	
Ba :		Mo :		TOC :	
Be :		Ni :			
Cd :		Pd :			

Remarks:

Ronald A. Baver
Laboratory Director 7/3/89

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 78146-005 DATE REC'D: 89/07/24 DATE COLL'D: 89/07/21 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 23-07T-5

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :		BOD-S :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
TS :		Cr :		Se :	
VS :		Co :		Ag :	
TDS :		Cu :		Na :	
SS :		Au :		Tl :	
% SOL :	85%	Fe :		Sn :	
G & O :		Pb :	240 mg/kg dry	Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	
As :		Hg :		THM :	
Ba :		Mo :		TOC :	
Be :		Ni :			
Cd :		Pd :			

Remarks:

Ronald A. Baver
Laboratory Director 7/26/89

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 77303-003 DATE REC'D: 89/06/28 DATE COLL'D: 89/06/26 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 23-07U

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :		BOD-S :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
TS :		Cr :		Se :	
VS :		Co :		Ag :	
TDS :		Cu :		Na :	
SS :		Au :		Tl :	
% SOL :	82%	Fe :		Sn :	
G & O :		Pb :	370 mg/kg dry	Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	
As :		Hg :		THM :	
Ba :		Mo :		TOC :	
Be :		Ni :			
Cd :		Pd :			

Remarks:

Ronald A. Bayer
Laboratory Director 7/3/89

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 77303-004 DATE REC'D: 89/06/28 DATE COLL'D: 89/06/26 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 23-07V

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :		BOD-S :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
TS :		Cr :		Se :	
VS :		Co :		Ag :	
TDS :		Cu :		Na :	
SS :		Au :		Tl :	
% SOL :	85%	Fe :		Sn :	
G & O :		Pb :	400 mg/kg dry	Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	
As :		Hg :		THM :	
Ba :		Mo :		TOC :	
Be :		Ni :			
Cd :		Pd :			

Remarks:

Ronald A. Bayer
Laboratory Director 7/3/89

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 77303-005 DATE REC'D: 89/06/28 DATE COLL'D: 89/06/26 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 23-07W

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :		BOD-S :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
TS :		Cr :		Se :	
VS :		Co :		Ag :	
TDS :		Cu :		Na :	
SS :		Au :		Tl :	
% SOL :	79%	Fe :		Sn :	
G & O :		Pb :	530 mg/kg dry	Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	
As :		Hg :		THM :	
Ba :		Mo :		TOC :	
Be :		Ni :			
Cd :		Pd :			

Remarks:

Ronald A. Bayer
Laboratory Director 7/3/89

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 78146-006 DATE REC'D: 89/07/24 DATE COLL'D: 89/07/21 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 23-07W-5

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :		BOD-S :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
TS :		Cr :		Se :	
VS :		Co :		Ag :	
TDS :		Cu :		Na :	
SS :		Au :		Tl :	
% SOL :	87%	Fe :		Sn :	
G & O :		Pb :	76 mg/kg dry	Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	
As :		Hg :		THM :	
Ba :		Mo :		TOC :	
Be :		Ni :			
Cd :		Pd :			

Remarks:

Ronald A. Baver
Laboratory Director 7/26/89

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 78146-007 DATE REC'D: 89/07/24 DATE COLL'D: 89/07/21 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 23-07X

REPORT TO: same
BILL TO: same

T COLI	:	Cr+6	:	COD	:
F COLI	:	Phenol	:	HARD-T	:
SPC	:	CN	:	Ca Hard	:
F	:	B	:	SO3	:
NO3	:	Br	:	Cl	:
NO2	:	Color	:	Alk	:
T-PO4	:	Odor	:	BOD-Inf	:
O-PO4	:	Turb	:	BOD-Eff	:
SO4	:	pH	:	BOD-S	:
MBAS	:	LI	:	TSS-Inf	:
SiO2	:	Cond	:	TSS-Eff	:
H2S	:	NH3-T	:	MLSS	:
NH3-C	:	TKN	:	MLVSS	:

VSS	:	Ca	:	K	:
TS	:	Cr	:	Se	:
VS	:	Co	:	Ag	:
TDS	:	Cu	:	Na	:
SS	:	Au	:	Tl	:
% SOL	: 84%	Fe	:	Sn	:
G & O	:	Pb	: 170 mg/kg dry	Ti	:
Al	:	Mg	:	V	:
Sb	:	Mn	:	Zn	:
As	:	Hg	:	THM	:
Ba	:	Mo	:	TOC	:
Be	:	Ni	:		
Cd	:	Pd	:		

Remarks:

Ronald A. Bayer
Laboratory Director 7/26/89

LOCATION 25-05

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Project #186-26

Sample Received 6/24/89

Lab. No.	Sample ID	TPH (mg/kg)
77212-004	26-02T	<29
77212-005	26-02V	69
77212-006	26-02W	120
77212-007	26-02U	<30
77212-012	27-12V	34
77212-013	27-12U	<28
77212-014	27-12W	40
77212-015	27-12T	4200
77212-016	27-02V	100
77212-017	27-02W	70
77212-018	27-02T	<29
77212-019	27-02U	2800
77212-020	27-08V	99
77212-021	27-08W	160
77212-022	27-08U	<29
77212-023	27-08T	<29
77212-028	25-05V	<30
77212-029	25-05U	<29
77212-030	25-05W	<30
77212-031	25-05T	<28
77212-042	101-19W	320
77212-043	101-19V	32
77212-044	23-04T	<28
77212-045	23-04W	<29

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Project #186-26

Sample Received 6/24/89

Lab. No.	Sample ID	TPH (mg/kg)
77212-004	26-02T	<29
77212-005	26-02V	69
77212-006	26-02W	120
77212-007	26-02U	<30
77212-012	27-12V	34
77212-013	27-12U	<28
77212-014	27-12W	40
77212-015	27-12T	4200
77212-016	27-02V	100
77212-017	27-02W	70
77212-018	27-02T	<29
77212-019	27-02U	2800
77212-020	27-08V	99
77212-021	27-08W	160
77212-022	27-08U	<29
77212-023	27-08T	<29
77212-028	25-05V	<30
77212-029	25-05U	<29
77212-030	25-05W	<30
77212-031	25-05T	<28
77212-042	101-19W	320
77212-043	101-19V	32
77212-044	23-04T	<28
77212-045	23-04W	<29

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Project #186-26

Sample Received 6/24/89

Lab. No.	Sample ID	TPH (mg/kg)
77212-004	26-02T	<29
77212-005	26-02V	69
77212-006	26-02W	120
77212-007	26-02U	<30
77212-012	27-12V	34
77212-013	27-12U	<28
77212-014	27-12W	40
77212-015	27-12T	4200
77212-016	27-02V	100
77212-017	27-02W	70
77212-018	27-02T	<29
77212-019	27-02U	2800
77212-020	27-08V	99
77212-021	27-08W	160
77212-022	27-08U	<29
77212-023	27-08T	<29
77212-028	25-05V	<30
77212-029	25-05U	<29
77212-030	25-05W	<30
77212-031	25-05T	<28
77212-042	101-19W	320
77212-043	101-19V	32
77212-044	23-04T	<28
77212-045	23-04W	<29

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Project #186-26

Sample Received 6/24/89

Lab. No.	Sample ID	TPH (mg/kg)
77212-004	26-02T	<29
77212-005	26-02V	69
77212-006	26-02W	120
77212-007	26-02U	<30
77212-012	27-12V	34
77212-013	27-12U	<28
77212-014	27-12W	40
77212-015	27-12T	4200
77212-016	27-02V	100
77212-017	27-02W	70
77212-018	27-02T	<29
77212-019	27-02U	2800
77212-020	27-08V	99
77212-021	27-08W	160
77212-022	27-08U	<29
77212-023	27-08T	<29
77212-028	25-05V	<30
77212-029	25-05U	<29
77212-030	25-05W	<30
77212-031	25-05T	<28
77212-042	101-19W	320
77212-043	101-19V	32
77212-044	23-04T	<28
77212-045	23-04W	<29

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Project #186-26

Samples Received 7/24/89

Lab. No.	Sample ID	TPH (mg/kg)
78147-008	101-19T	<28
78147-009	101-19U	<28
78147-012	25-05X	<29

LOCATION 26-02

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Project #186-26

Sample Received 6/24/89

Lab. No.	Sample ID	TPH (mg/kg)
77212-004	26-02T	<29
77212-005	26-02V	69
77212-006	26-02W	120
77212-007	26-02U	<30
77212-012	27-12V	34
77212-013	27-12U	<28
77212-014	27-12W	40
77212-015	27-12T	4200
77212-016	27-02V	100
77212-017	27-02W	70
77212-018	27-02T	<29
77212-019	27-02U	2800
77212-020	27-08V	99
77212-021	27-08W	160
77212-022	27-08U	<29
77212-023	27-08T	<29
77212-028	25-05V	<30
77212-029	25-05U	<29
77212-030	25-05W	<30
77212-031	25-05T	<28
77212-042	101-19W	320
77212-043	101-19V	32
77212-044	23-04T	<28
77212-045	23-04W	<29

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Project #186-26

Sample Received 6/24/89

Lab. No.	Sample ID	TPH (mg/kg)
77212-004	26-02T	<29
77212-005	26-02V	69
77212-006	26-02W	120
77212-007	26-02U	<30
77212-012	27-12V	34
77212-013	27-12U	<28
77212-014	27-12W	40
77212-015	27-12T	4200
77212-016	27-02V	100
77212-017	27-02W	70
77212-018	27-02T	<29
77212-019	27-02U	2800
77212-020	27-08V	99
77212-021	27-08W	160
77212-022	27-08U	<29
77212-023	27-08T	<29
77212-028	25-05V	<30
77212-029	25-05U	<29
77212-030	25-05W	<30
77212-031	25-05T	<28
77212-042	101-19W	320
77212-043	101-19V	32
77212-044	23-04T	<28
77212-045	23-04W	<29

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Project #186-26

Sample Received 6/24/89

Lab. No.	Sample ID	TPH (mg/kg)
77212-004	26-02T	<29
77212-005	26-02V	69
77212-006	26-02W	120
77212-007	26-02U	<30
77212-012	27-12V	34
77212-013	27-12U	<28
77212-014	27-12W	40
77212-015	27-12T	4200
77212-016	27-02V	100
77212-017	27-02W	70
77212-018	27-02T	<29
77212-019	27-02U	2800
77212-020	27-08V	99
77212-021	27-08W	160
77212-022	27-08U	<29
77212-023	27-08T	<29
77212-028	25-05V	<30
77212-029	25-05U	<29
77212-030	25-05W	<30
77212-031	25-05T	<28
77212-042	101-19W	320
77212-043	101-19V	32
77212-044	23-04T	<28
77212-045	23-04W	<29

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Project #186-26

Sample Received 6/24/89

Lab. No.	Sample ID	TPH (mg/kg)
77212-004	26-02T	<29
77212-005	26-02V	69
77212-006	26-02W	120
77212-007	26-02U	<30
77212-012	27-12V	34
77212-013	27-12U	<28
77212-014	27-12W	40
77212-015	27-12T	4200
77212-016	27-02V	100
77212-017	27-02W	70
77212-018	27-02T	<29
77212-019	27-02U	2800
77212-020	27-08V	99
77212-021	27-08W	160
77212-022	27-08U	<29
77212-023	27-08T	<29
77212-028	25-05V	<30
77212-029	25-05U	<29
77212-030	25-05W	<30
77212-031	25-05T	<28
77212-042	101-19W	320
77212-043	101-19V	32
77212-044	23-04T	<28
77212-045	23-04W	<29

LOCATION 26-03

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 77212-008 DATE REC'D: 89/06/26 DATE COLL'D: 89/06/22 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 26-03-T

REPORT TO: same
BILL TO: same

T COLI		Cr+6		COD	
F COLI		Phenol		HARD-T	
SPC		CN		Ca Hard	
F		B		SO3	
NO3		Br		Cl	
NO2		Color		Alk	
T-PO4		Odor		BOD-Inf	
O-PO4		Turb		BOD-Eff	
SO4		pH		BOD-S	
MBAS		LI		TSS-Inf	
SiO2		Cond		TSS-Eff	
H2S		NH3-T		MLSS	
NH3-C		TKN		MLVSS	
VSS		Ca		K	
TS		Cr		Se	
VS		Co		Ag	
TDS		Cu		Na	
SS		Au		Tl	
% SOL	86%	Fe		Sn	
G & O		Pb		Ti	
Al		Mg		V	
Sb		Mn		Zn	
As		Hg	<0.17 mg/kg dry	THM	
Ba		Mo		TOC	
Be		Ni			
Cd		Pd			

Remarks:

Ronald A. Bayer
Laboratory Director 7/5/89

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 77212-011 DATE REC'D: 89/06/26 DATE COLL'D: 89/06/22 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 26-03-U

REPORT TO: same
BILL TO: same

T COLI		Cr+6		COD	
F COLI		Phenol		HARD-T	
SPC		CN		Ca Hard	
F		B		SO3	
NO3		Br		Cl	
NO2		Color		Alk	
T-PO4		Odor		BOD-Inf	
O-PO4		Turb		BOD-Eff	
SO4		oH		BOD-S	
MBAS		LI		TSS-Inf	
SiO2		Cond		TSS-Eff	
H2S		NH3-T		MLSS	
NH3-C		TKN		MLVSS	
VSS		Ca		K	
TS		Cr		Se	
VS		Co		Ag	
TDS		Cu		Na	
SS		Au		Tl	
% SOL	87%	Fe		Sn	
G & O		Pb		Ti	
Al		Mg		V	
Sb		Mn		Zn	
As		Hg	0.38 mg/kg dry	THM	
Ba		Mo		TOC	
Be		Ni			
Cd		Pd			

Remarks:

Ronald A. Bayer
Laboratory Director 7/5/89

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 77212-010 DATE REC'D: 89/06/26 DATE COLL'D: 89/06/22 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 26-03-V

REPORT TO: same
BILL TO: same

T COLI		Cr+6		COD	
F COLI		Phenol		HARD-T	
SPC		CN		Ca Hard	
F		B		SO3	
NO3		Br		Cl	
NO2		Color		Alk	
T-PO4		Odor		BOD-Inf	
O-PO4		Turb		BOD-Eff	
SO4		pH		BOD-S	
MBAS		LI		TSS-Inf	
SiO2		Cond		TSS-Eff	
H2S		NH3-T		MLSS	
NH3-C		TKN		MLVSS	
VSS		Ca		K	
TS		Cr		Se	
VS		Co		Ag	
TDS		Cu		Na	
SS		Au		Tl	
% SOL	86%	Fe		Sn	
G & O		Pb		Ti	
Al		Mg		V	
Sb		Mn		Zn	
As		Hg	0.97 mg/kg dry	THM	
Ba		Mo		TOC	
Be		Ni			
Cd		Pd			

Remarks:

Ronald A. Bayer
Laboratory Director 7/5/89

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 77212-009 DATE REC'D: 89/06/26 DATE COLL'D: 89/06/22 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 26-03-W

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :		BOD-S :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
TS :		Cr :		Se :	
VS :		Co :		Ag :	
TDS :		Cu :		Na :	
SS :		Au :		Tl :	
% SOL :	85%	Fe :		Sn :	
G & O :		Pb :		Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	
As :		Hg :	0.42 mg/kg dry	THM :	
Ba :		Mo :		TOC :	
Be :		Ni :			
Cd :		Pd :			

Remarks:

Ronald A. Bayer
Laboratory Director 7/5/89

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 78097-001 DATE REC'D: 89/07/21 DATE COLL'D: 89/07/20 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 B - D 26-03X

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-I :	
SPC :		CN :		Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :		BOD-S :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
IS :		Cr :		Se :	
VS :		Co :		Ag :	
TDS :		Cu :		Na :	
SS :		Au :		Tl :	
% SOL :	83%	Fe :		Sn :	
G & O :		Pb :		Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	
As :		Hg :	<0.19 mg/kg drv	THM :	
Ba :		Mo :		TOC :	
Be :		Ni :			
Cd :		Pd :			

Remarks:

Ronald A. Baver
Laboratory Director 7/25/89

LOCATION 27-02

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Project #186-26

Sample Received 6/24/89

Lab. No.	Sample ID	TPH (mg/kg)
77212-004	26-02T	<29
77212-005	26-02V	69
77212-006	26-02W	120
77212-007	26-02U	<30
77212-012	27-12V	34
77212-013	27-12U	<28
77212-014	27-12W	40
77212-015	27-12T	4200
77212-016	27-02V	100
77212-017	27-02W	70
77212-018	27-02T	<29
77212-019	27-02U	2800
77212-020	27-08V	99
77212-021	27-08W	160
77212-022	27-08U	<29
77212-023	27-08T	<29
77212-028	25-05V	<30
77212-029	25-05U	<29
77212-030	25-05W	<30
77212-031	25-05T	<28
77212-042	101-19W	320
77212-043	101-19V	32
77212-044	23-04T	<28
77212-045	23-04W	<29

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Project #186-26

Sample Received 6/24/89

Lab. No.	Sample ID	TPH (mg/kg)
77212-004	26-02T	<29
77212-005	26-02V	69
77212-006	26-02W	120
77212-007	26-02U	<30
77212-012	27-12V	34
77212-013	27-12U	<28
77212-014	27-12W	40
77212-015	27-12T	4200
77212-016	27-02V	100
77212-017	27-02W	70
77212-018	27-02T	<29
77212-019	27-02U	2800
77212-020	27-08V	99
77212-021	27-08W	160
77212-022	27-08U	<29
77212-023	27-08T	<29
77212-028	25-05V	<30
77212-029	25-05U	<29
77212-030	25-05W	<30
77212-031	25-05T	<28
77212-042	101-19W	320
77212-043	101-19V	32
77212-044	23-04T	<28
77212-045	23-04W	<29

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Project #186-26

Samples Received 7/24/89

Lab. No.	Sample ID	TPH (mg/kg)
78146-001	27-02U-5	<28
78146-002	23-04U	<31
78146-008	27-09U	<33
78146-009	27-12T-5	<28
78146-010	27-12X	<29

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Project #186-26

Sample Received 6/24/89

Lab. No.	Sample ID	TPH (mg/kg)
77212-004	26-02T	<29
77212-005	26-02V	69
77212-006	26-02W	120
77212-007	26-02U	<30
77212-012	27-12V	34
77212-013	27-12U	<28
77212-014	27-12W	40
77212-015	27-12T	4200
77212-016	27-02V	100
77212-017	27-02W	70
77212-018	27-02T	<29
77212-019	27-02U	2800
77212-020	27-08V	99
77212-021	27-08W	160
77212-022	27-08U	<29
77212-023	27-08T	<29
77212-028	25-05V	<30
77212-029	25-05U	<29
77212-030	25-05W	<30
77212-031	25-05T	<28
77212-042	101-19W	320
77212-043	101-19V	32
77212-044	23-04T	<28
77212-045	23-04W	<29

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Project #186-26

Sample Received 6/24/89

Lab. No.	Sample ID	TPH (mg/kg)
77212-004	26-02T	<29
77212-005	26-02V	69
77212-006	26-02W	120
77212-007	26-02U	<30
77212-012	27-12V	34
77212-013	27-12U	<28
77212-014	27-12W	40
77212-015	27-12T	4200
77212-016	27-02V	100
77212-017	27-02W	70
77212-018	27-02T	<29
77212-019	27-02U	2800
77212-020	27-08V	99
77212-021	27-08W	160
77212-022	27-08U	<29
77212-023	27-08T	<29
77212-028	25-05V	<30
77212-029	25-05U	<29
77212-030	25-05W	<30
77212-031	25-05T	<28
77212-042	101-19W	320
77212-043	101-19V	32
77212-044	23-04T	<28
77212-045	23-04W	<29

LOCATION 27-07

NO SAMPLES WERE COLLECTED

LOCATION 27-08

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Project #186-26

Sample Received 6/24/89

Lab. No.	Sample ID	TPH (mg/kg)
77212-004	26-02T	<29
77212-005	26-02V	69
77212-006	26-02W	120
77212-007	26-02U	<30
77212-012	27-12V	34
77212-013	27-12U	<28
77212-014	27-12W	40
77212-015	27-12T	4200
77212-016	27-02V	100
77212-017	27-02W	70
77212-018	27-02T	<29
77212-019	27-02U	2800
77212-020	27-08V	99
77212-021	27-08W	160
77212-022	27-08U	<29
77212-023	27-08T	<29
77212-028	25-05V	<30
77212-029	25-05U	<29
77212-030	25-05W	<30
77212-031	25-05T	<28
77212-042	101-19W	320
77212-043	101-19V	32
77212-044	23-04T	<28
77212-045	23-04W	<29

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Project #186-26

Sample Received 6/24/89

Lab. No.	Sample ID	TPH (mg/kg)
77212-004	26-02T	<29
77212-005	26-02V	69
77212-006	26-02W	120
77212-007	26-02U	<30
77212-012	27-12V	34
77212-013	27-12U	<28
77212-014	27-12W	40
77212-015	27-12T	4200
77212-016	27-02V	100
77212-017	27-02W	70
77212-018	27-02T	<29
77212-019	27-02U	2800
77212-020	27-08V	99
77212-021	27-08W	160
77212-022	27-08U	<29
77212-023	27-08T	<29
77212-028	25-05V	<30
77212-029	25-05U	<29
77212-030	25-05W	<30
77212-031	25-05T	<28
77212-042	101-19W	320
77212-043	101-19V	32
77212-044	23-04T	<28
77212-045	23-04W	<29

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Project #186-26

Sample Received 6/24/89

Lab. No.	Sample ID	TPH (mg/kg)
77212-004	26-02T	<29
77212-005	26-02V	69
77212-006	26-02W	120
77212-007	26-02U	<30
77212-012	27-12V	34
77212-013	27-12U	<28
77212-014	27-12W	40
77212-015	27-12T	4200
77212-016	27-02V	100
77212-017	27-02W	70
77212-018	27-02T	<29
77212-019	27-02U	2800
77212-020	27-08V	99
77212-021	27-08W	160
77212-022	27-08U	<29
77212-023	27-08T	<29
77212-028	25-05V	<30
77212-029	25-05U	<29
77212-030	25-05W	<30
77212-031	25-05T	<28
77212-042	101-19W	320
77212-043	101-19V	32
77212-044	23-04T	<28
77212-045	23-04W	<29

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Project #186-26

Sample Received 6/24/89

Lab. No.	Sample ID	TPH (mg/kg)
77212-004	26-02T	<29
77212-005	26-02V	69
77212-006	26-02W	120
77212-007	26-02U	<30
77212-012	27-12V	34
77212-013	27-12U	<28
77212-014	27-12W	40
77212-015	27-12T	4200
77212-016	27-02V	100
77212-017	27-02W	70
77212-018	27-02T	<29
77212-019	27-02U	2800
77212-020	27-08V	99
77212-021	27-08W	160
77212-022	27-08U	<29
77212-023	27-08T	<29
77212-028	25-05V	<30
77212-029	25-05U	<29
77212-030	25-05W	<30
77212-031	25-05T	<28
77212-042	101-19W	320
77212-043	101-19V	32
77212-044	23-04T	<28
77212-045	23-04W	<29

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Project #186-26

Samples Received 7/21/89

Lab. No.	Sample ID	TPH (mg/kg)
78097-002	27-08X	<31
78097-003	28-05U	<27
78097-004	226-02T	480

LOCATION 27-09

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Project #186-26

Samples Received 7/24/89

Lab. No.	Sample ID	TPH (mg/kg)
78146-001	27-02U-5	<28
78146-002	23-04U	<31
78146-008	27-09U	<33
78146-009	27-12T-5	<28
78146-010	27-12X	<29

LOCATION 27-12

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Project #186-26

Sample Received 6/24/89

Lab. No.	Sample ID	TPH (mg/kg)
77212-004	26-02T	<29
77212-005	26-02V	69
77212-006	26-02W	120
77212-007	26-02U	<30
77212-012	27-12V	34
77212-013	27-12U	<28
77212-014	27-12W	40
77212-015	27-12T	4200
77212-016	27-02V	100
77212-017	27-02W	70
77212-018	27-02T	<29
77212-019	27-02U	2800
77212-020	27-08V	99
77212-021	27-08W	160
77212-022	27-08U	<29
77212-023	27-08T	<29
77212-028	25-05V	<30
77212-029	25-05U	<29
77212-030	25-05W	<30
77212-031	25-05T	<28
77212-042	101-19W	320
77212-043	101-19V	32
77212-044	23-04T	<28
77212-045	23-04W	<29

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Project #186-26

Samples Received 7/24/89

Lab. No.	Sample ID	TPH (mg/kg)
78146-001	27-02U-5	<28
78146-002	23-04U	<31
78146-008	27-09U	<33
78146-009	27-12T-5	<28
78146-010	27-12X	<29

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Project #186-26

Sample Received 6/24/89

Lab. No.	Sample ID	TPH (mg/kg)
77212-004	26-02T	<29
77212-005	26-02V	69
77212-006	26-02W	120
77212-007	26-02U	<30
77212-012	27-12V	34
77212-013	27-12U	<28
77212-014	27-12W	40
77212-015	27-12T	4200
77212-016	27-02V	100
77212-017	27-02W	70
77212-018	27-02T	<29
77212-019	27-02U	2800
77212-020	27-08V	99
77212-021	27-08W	160
77212-022	27-08U	<29
77212-023	27-08T	<29
77212-028	25-05V	<30
77212-029	25-05U	<29
77212-030	25-05W	<30
77212-031	25-05T	<28
77212-042	101-19W	320
77212-043	101-19V	32
77212-044	23-04T	<28
77212-045	23-04W	<29

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Project #186-26

Sample Received 6/24/89

Lab. No.	Sample ID	TPH (mg/kg)
77212-004	26-02T	<29
77212-005	26-02V	69
77212-006	26-02W	120
77212-007	26-02U	<30
77212-012	27-12V	34
77212-013	27-12U	<28
77212-014	27-12W	40
77212-015	27-12T	4200
77212-016	27-02V	100
77212-017	27-02W	70
77212-018	27-02T	<29
77212-019	27-02U	2800
77212-020	27-08V	99
77212-021	27-08W	160
77212-022	27-08U	<29
77212-023	27-08T	<29
77212-028	25-05V	<30
77212-029	25-05U	<29
77212-030	25-05W	<30
77212-031	25-05T	<28
77212-042	101-19W	320
77212-043	101-19V	32
77212-044	23-04T	<28
77212-045	23-04W	<29

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Project #186-26

Sample Received 6/24/89

Lab. No.	Sample ID	TPH (mg/kg)
77212-004	26-02T	<29
77212-005	26-02V	69
77212-006	26-02W	120
77212-007	26-02U	<30
77212-012	27-12V	34
77212-013	27-12U	<28
77212-014	27-12W	40
77212-015	27-12T	4200
77212-016	27-02V	100
77212-017	27-02W	70
77212-018	27-02T	<29
77212-019	27-02U	2800
77212-020	27-08V	99
77212-021	27-08W	160
77212-022	27-08U	<29
77212-023	27-08T	<29
77212-028	25-05V	<30
77212-029	25-05U	<29
77212-030	25-05W	<30
77212-031	25-05T	<28
77212-042	101-19W	320
77212-043	101-19V	32
77212-044	23-04T	<28
77212-045	23-04W	<29

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Project #186-26

Samples Received 7/24/89

Lab. No.	Sample ID	TPH (mg/kg)
78146-001	27-02U-5	<28
78146-002	23-04U	<31
78146-008	27-09U	<33
78146-009	27-12T-5	<28
78146-010	27-12X	<29

LOCATION 28-05

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Project #186-26

Samples Received 6/22/89

Lab. No.	Sample ID	TPH (mg/kg)
77128-013	225-01V	<28
77128-014	225-01W	<29
77128-018	226-03T	<28
77128-019	226-03V	71
77128-020	226-03U	270
77128-021	226-02W	<27
77128-022	28-05T	50
77128-023	28-05X	<28
77128-024	28-05V	<28
77128-025	28-05W	<28
77128-026	240-03Y	150
77128-027	240-03W	<29
77128-028	240-01W	<29
77128-029	240-01V	<28
77128-030	240-01U	220
77128-031	240-02U	<28
77128-032	240-02V	830

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Project #186-26

Samples Received 7/21/89

Lab. No.	Sample ID	TPH (mg/kg)
78097-002	27-08X	<31
78097-003	28-05U	<27
78097-004	226-02T	480

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Project #186-26

Samples Received 6/22/89

Lab. No.	Sample ID	TPH (mg/kg)
77128-013	225-01V	<28
77128-014	225-01W	<29
77128-018	226-03T	<28
77128-019	226-03V	71
77128-020	226-03U	270
77128-021	226-02W	<27
77128-022	28-05T	50
77128-023	28-05X	<28
77128-024	28-05V	<28
77128-025	28-05W	<28
77128-026	240-03Y	150
77128-027	240-03W	<29
77128-028	240-01W	<29
77128-029	240-01V	<28
77128-030	240-01U	220
77128-031	240-02U	<28
77128-032	240-02V	830

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Project #186-26

Samples Received 6/22/89

Lab. No.	Sample ID	TPH (mg/kg)
77128-013	225-01V	<28
77128-014	225-01W	<29
77128-018	226-03T	<28
77128-019	226-03V	71
77128-020	226-03U	270
77128-021	226-02W	<27
77128-022	28-05T	50
77128-023	28-05X	<28
77128-024	28-05V	<28
77128-025	28-05W	<28
77128-026	240-03Y	150
77128-027	240-03W	<29
77128-028	240-01W	<29
77128-029	240-01V	<28
77128-030	240-01U	220
77128-031	240-02U	<28
77128-032	240-02V	830

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Project #186-26

Samples Received 6/22/89

Lab. No.	Sample ID	TPH (mg/kg)
77128-013	225-01V	<28
77128-014	225-01W	<29
77128-018	226-03T	<28
77128-019	226-03V	71
77128-020	226-03U	270
77128-021	226-02W	<27
77128-022	28-05T	50
77128-023	28-05X	<28
77128-024	28-05V	<28
77128-025	28-05W	<28
77128-026	240-03Y	150
77128-027	240-03W	<29
77128-028	240-01W	<29
77128-029	240-01V	<28
77128-030	240-01U	220
77128-031	240-02U	<28
77128-032	240-02V	830

LOCATION 29-03

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 77128-003 DATE REC'D: 89/06/22 DATE COLL'D: 6/20-21 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 29-03T

REPORT TO: same
BILL TO: same

T COLI		Cr+6		COD	
F COLI		Phenol		HARD-T	
SPC		CN		Ca Hard	
F		B		SO3	
NO3		Br		Cl	
NO2		Color		Alk	
T-PO4		Odor		BOD-Inf	
O-PO4		Turb		BOD-Eff	
SO4		pH		BOD-S	
MBAS		LI		TSS-Inf	
SiO2		Cond		TSS-Eff	
H2S		NH3-T		MLSS	
NH3-C		TKN		MLVSS	
VSS		Ca		K	
TS		Cr		Se	
VS		Co		Ag	
TDS		Cu	25	Na	
SS		Au		Tl	
% SOL	88%	Fe		Sn	
G & O		Pb	48	Ti	
Al		Mg		V	
Sb		Mn		Zn	62
As		Hg	<0.17	THM	
Ba		Mo		TOC	
Be		Ni			
Cd	0.80	Pd			

Remarks: All results in mg/kg dry weight.

Ronald A. Baver
Laboratory Director 7/6/89

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 77128-002 DATE REC'D: 89/06/22 DATE COLL'D: 6/20-21 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 29-03U

REPORT TO: same
BILL TO: same

T COLI		Cr+6		COD	
F COLI		Phenol		HARD-T	
SPC		CN		Ca Hard	
F		B		SO3	
NO3		Br		Cl	
NO2		Color		Alk	
T-PO4		Odor		BOD-Inf	
O-PO4		Turb		BOD-Eff	
SO4		pH		BOD-S	
MBAS		LI		TSS-Inf	
SiO2		Cond		TSS-Eff	
H2S		NH3-T		MLSS	
NH3-C		TKN		MLVSS	
VSS		Ca		K	
TS		Cr		Se	
VS		Co		Ag	
TDS		Cu	19	Na	
SS		Au		Tl	
% SOL	88%	Fe		Sn	
G & O		Pb	41	Ti	
Al		Mg		V	
Sb		Mn		Zn	58
As		Hg	<0.19	THM	
Ba		Mo		TOC	
Be		Ni			
Cd	0.68	Pd			

Remarks: All results in mg/kg dry weight.

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Laboratory Director 7/6/89

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LAB#: 77128-004 DATE REC'D: 89/06/22 DATE COLL'D: 6/20-21 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 29-03V

REPORT TO: same
BILL TO: same

T COLI		Cr+6		COD	
F COLI		Phenol		HARD-T	
SPC		CN		Ca Hard	
F		B		SO3	
NO3		Br		Cl	
NO2		Color		Alk	
T-PO4		Odor		BOD-Inf	
O-PO4		Turb		BOD-Eff	
SO4		pH		BOD-S	
MBAS		LI		TSS-Inf	
SiO2		Cond		TSS-Eff	
H2S		NH3-T		MLSS	
NH3-C		TKN		MLVSS	
VSS		Ca		K	
TS		Cr		Se	
VS		Co		Ag	
TDS		Cu	26	Na	
SS		Au		Tl	
% SOL	87%	Fe		Sn	
G & O		Pb	57	Ti	
Al		Mg		V	
Sb		Mn		Zn	86
As		Hg	0.21	THM	
Ba		Mo		TOC	
Be		Ni			
Cd	0.92	Pd			

Remarks: All results in mg/kg dry weight.

Ronald A. Bayer
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LAB#: 77128-001 DATE REC'D: 89/06/22 DATE COLL'D: 6/20-21 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 29-03W

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :		BOD-S :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
TS :		Cr :		Se :	
VS :		Co :		Ag :	
TDS :		Cu :	32	Na :	
SS :		Au :		Tl :	
% SOL :	86%	Fe :		Sn :	
G & O :		Pb :	55	Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	41
As :		Hg :	0.26	THM :	
Ba :		Mo :		TOC :	
Be :		Ni :			
Cd :	<0.58	Pd :			

Remarks: All results in mg/kg dry weight.

Ronald A. Bayer
Laboratory Director 7/6/89

New York State Department of Health Approved

LOCATION 29-06

EnviroTest Laboratories Inc.

315 Fullerton Avenue
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Fax (914) 562-0841

LAB#: 78146-011 DATE REC'D: 89/07/24 DATE COLL'D: 89/07/21 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 29-06T

REPORT TO: same
BILL TO: same

T COLI		Cr+6		COD	
F COLI		Phenol		HARD-T	
SPC		CN		Ca Hard	
F		B		SO3	
NO3		Br		Cl	
NO2		Color		Alk	
T-PO4		Odor		BOD-Inf	
O-PO4		Turb		BOD-Eff	
SO4		pH		BOD-S	
MBAS		LI		TSS-Inf	
SiO2		Cond		TSS-Eff	
H2S		NH3-T		NLSS	
NH3-C		TKN		MLVSS	
VSS		Ca		K	
TS		Cr		Se	
VS		Co		Ag	
TDS		Cu		Na	
SS		Au		Tl	
% SOL	86%	Fe		Sn	
G & O		Pb	160	Ti	
Al		Mg		V	
Sb		Mn		Zn	130
As		Hg	1.1	THM	
Ba		Mo		TOC	
Be		Ni			
Cd		Pd			

Remarks: All results in mg/kg dry weight.

Ronald A. Baver
Laboratory Director 7/26/89

EnviroTest Laboratories Inc.

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LAB#: 78146-012 DATE REC'D: 89/07/24 DATE COLL'D: 89/07/21 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 29-06U

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :		BOD-S :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
TS :		Cr :		Se :	
VS :		Co :		Ag :	
TDS :		Cu :		Na :	
SS :		Au :		Tl :	
% SOL :	86%	Fe :		Sn :	
G & O :		Pb :	120	Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	75
As :		Hg :	0.28	THM :	
Ba :		Mo :		TOC :	
Be :		Ni :			
Cd :		Pd :			

Remarks: All results in mg/kg dry weight.

Ronald A. Bayer
Laboratory Director 7/26/89

EnviroTest Laboratories Inc.

315 Fullerton Avenue
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LAB#: 77303-018 DATE REC'D: 89/06/28 DATE COLL'D: 89/06/26 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 29-06V

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :		BOD-S :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
TS :		Cr :		Se :	
VS :		Co :		Ag :	
TDS :		Cu :		Na :	
SS :		Au :		Tl :	
% SOL :	89%	Fe :		Sn :	
G & O :		Pb :	51	Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	51
As :		Hg :	0.82	THM :	
Ba :		Mo :		TOC :	
Be :		Ni :			
Cd :		Pd :			

Remarks: All results in mg/kg drv weight.

Ronald A. Baver
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EnviroTest Laboratories Inc.

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LAB#: 77303-017 DATE REC'D: 89/06/28 DATE COLL'D: 89/06/26 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 2A-06W

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :		BOD-S :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
TS :		Cr :		Se :	
VS :		Co :		Ag :	
TDS :		Cu :		Na :	
SS :		Au :		Tl :	
% SOL :	85%	Fe :		Sn :	
G & O :		Pb :	86	Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	140
As :		Hg :	<0.20	THM :	
Ba :		Mo :		TOC :	
Be :		Ni :			
Cd :		Pd :			

Remarks: All results in mg/kg dry weight.

Ronald A. Bayer
Laboratory Director 7-7-89

LOCATION 29-09

EnviroTest Laboratories Inc.

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LAB#: 77303-014 DATE REC'D: 89/06/28 DATE COLL'D: 89/06/26 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 29-09T

REPORT TO: same
BILL TO: same

T COLI		Cr+6		COD	
F COLI		Phenol		HARD-T	
SPC		CN		Ca Hard	
F		B		SO3	
NO3		Br		Cl	
NO2		Color		Alk	
T-PO4		Odor		BOD-Inf	
O-PO4		Turb		BOD-Eff	
SO4		pH		BOD-S	
MBAS		LI		TSS-Inf	
SiO2		Cond		TSS-Eff	
H2S		NH3-T		MLSS	
NH3-C		TKN		MLVSS	
VSS		Ca		K	
TS		Cr		Se	
VS		Co		Ag	
TDS		Cu		Na	
SS		Au		Tl	
% SOL	86%	Fe		Sn	
G & O		Pb		Ti	
Al		Mg		V	
Sb		Mn		Zn	
As		Hg	<0.20 mg/kg dry	THM	
Ba		Mo		TOC	
Be		Ni			
Cd		Pd			

Remarks:

Ronald A. Baver
Laboratory Director 7-7-89

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
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LAB#: 77128-012 DATE REC'D: 89/06/22 DATE COLL'D: 6/20-21 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 29-09U

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :		BOD-S :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
TS :		Cr :		Se :	
VS :		Co :		Ag :	
TDS :		Cu :		Na :	
SS :		Au :		Tl :	
% SOL :	83%	Fe :		Sn :	
G & O :		Pb :		Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	
As :		Hg :	0.70 mg/kg dry	THM :	
Ba :		Mo :		TOC :	
Be :		Ni :			
Cd :		Pd :			

Remarks:

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LAB#: 77128-010 DATE REC'D: 89/06/22 DATE COLL'D: 6/20-21 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 29-09V

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :		BOD-S :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
TS :		Cr :		Se :	
VS :		Co :		Ag :	
TDS :		Cu :		Na :	
SS :		Au :		Tl :	
% SOL :	86%	Fe :		Sn :	
G & O :		Pb :		Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	
As :		Hg :	0.76 mg/kg dry	THM :	
Ba :		Mo :		TOC :	
Be :		Ni :			
Cd :		Pd :			

Remarks:

Ronald A. Bayer
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EnviroTest Laboratories Inc.

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LAB#: 77128-009 DATE REC'D: 89/06/22 DATE COLL'D: 6/20-21 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 29-09W

REPORT TO: same
BILL TO: same

T COLI		Cr+6		COD	
F COLI		Phenol		HARD-T	
SPC		CN		Ca Hard	
F		B		SO3	
NO3		Br		Cl	
NO2		Color		Alk	
T-PO4		Odor		BOD-Inf	
O-PO4		Turb		BOD-Eff	
SO4		pH		BOD-S	
MBAS		LI		TSS-Inf	
SiO2		Cond		TSS-Eff	
H2S		NH3-T		MLSS	
NH3-C		TKN		MLVSS	
VSS		Ca		K	
TS		Cr		Se	
VS		Co		Ag	
TDS		Cu		Na	
SS		Au		Tl	
% SOL	82%	Fe		Sn	
G & O		Pb		Ti	
Al		Mg		V	
Sb		Mn		Zn	
As		Hg	0.82 mg/kg dry	THM	
Ba		Mo		TOC	
Be		Ni			
Cd		Pd			

Remarks:

Ronald A. Bayer
Laboratory Director 7/5/89

EnviroTest Laboratories Inc.

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LAB#: 77128-011 DATE REC'D: 89/06/22 DATE COLL'D: 6/20-21 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 29-09X

REPORT TO: same
BILL TO: same

T COLI	:	Cr+6	:	COD	:
F COLI	:	Phenol	:	HARD-T	:
SPC	:	CN	:	Ca Hard	:
F	:	B	:	SO3	:
NO3	:	Br	:	Cl	:
NO2	:	Color	:	Alk	:
T-PO4	:	Odor	:	BOD-Inf	:
O-PO4	:	Turb	:	BOD-Eff	:
SO4	:	pH	:	BOD-S	:
MBAS	:	LI	:	TSS-Inf	:
SiO2	:	Cond	:	TSS-Eff	:
H2S	:	NH3-T	:	MLSS	:
NH3-C	:	TKN	:	MLVSS	:
VSS	:	Ca	:	K	:
TS	:	Cr	:	Se	:
VS	:	Co	:	Ag	:
TDS	:	Cu	:	Na	:
SS	:	Au	:	Tl	:
% SOL	: 86%	Fe	:	Sn	:
G & O	:	Pb	:	Ti	:
Al	:	Mg	:	V	:
Sb	:	Mn	:	Zn	:
As	:	Hg	: 0.67 mg/kg dry	THM	:
Ba	:	Mo	:	TOC	:
Be	:	Ni	:		
Cd	:	Pd	:		

Remarks:

Ronald A. Bayer
Laboratory Director 7/5/89

LOCATION 29-16

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 77128-007 DATE REC'D: 89/06/22 DATE COLL'D: 6/20-21 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 29-16T

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :		BOD-S :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
TS :		Cr :		Se :	
VS :		Co :		Ag :	
TDS :		Cu :		Na :	
SS :		Au :		Tl :	
% SOL :	86%	Fe :		Sn :	
G & O :		Pb :	130	Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	
As :		Hg :	1.5	THM :	
Ba :		Mo :		TOC :	
Be :		Ni :			
Cd :		Pd :			

Remarks: All results in mg/kg dry weight.

Ronald A. Bayer
Laboratory Director 7/5/89

New York State Department of Health Approved

EnviroTest Laboratories Inc.

315 Fullerton Avenue
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LAB#: 77128-006 DATE REC'D: 89/06/22 DATE COLL'D: 6/20-21 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 29-16U

REPORT TO: same
BILL TO: same

T COLI		Cr+6		COD	
F COLI		Phenol		HARD-T	
SPC		CN		Ca Hard	
F		B		SO3	
NO3		Br		Cl	
NO2		Color		Alk	
T-PO4		Odor		BOD-Inf	
O-PO4		Turb		BOD-Eff	
SO4		pH		BOD-S	
MBAS		LI		TSS-Inf	
SiO2		Cond		TSS-Eff	
H2S		NH3-T		MLSS	
NH3-C		TKN		MLVSS	
VSS		Ca		K	
TS		Cr		Se	
VS		Co		Ag	
TDS		Cu		Na	
SS		Au		Tl	
% SOL	82%	Fe		Sn	
G & O		Pb	170	Ti	
Al		Mg		V	
Sb		Mn		Zn	
As		Hg	0.94	THM	
Ba		Mo		TOC	
Be		Ni			
Cd		Pd			

Remarks: All results in mg/kg dry weight.

Ronald A. Bayer
Laboratory Director 7/5/89

EnviroTest Laboratories Inc.

315 Fullerton Avenue
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(914) 562-0890
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LAB#: 77128-008 DATE REC'D: 89/06/22 DATE COLL'D: 6/20-21 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 29-16V

REPORT TO: same
BILL TO: same

T COLI		Cr+6		COD	
F COLI		Phenol		HARD-T	
SPC		CN		Ca Hard	
F		B		SO3	
NO3		Br		Cl	
NO2		Color		Alk	
T-PO4		Odor		BOD-Inf	
O-PO4		Turb		BOD-Eff	
SO4		pH		BOD-S	
MBAS		LI		TSS-Inf	
SiO2		Cond		TSS-Eff	
H2S		NH3-T		MLSS	
NH3-C		TKN		MLVSS	
VSS		Ca		K	
TS		Cr		Se	
VS		Co		Ag	
TDS		Cu		Na	
SS		Au		Tl	
% SOL	82%	Fe		Sn	
G & O		Pb	380	Ti	
Al		Mg		V	
Sb		Mn		Zn	
As		Hg	0.71	THM	
Ba		Mo		TOC	
Be		Ni			
Cd		Pd			

Remarks: All results in mg/kg dry weight.

Ronald A. Bayer
Laboratory Director 7/5/89

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 77128-005 DATE REC'D: 89/06/22 DATE COLL'D: 6/20-21 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 29-16W

REPORT TO: same
BILL TO: same

T COLI		Cr+6		COD	
F COLI		Phenol		HARD-T	
SPC		CN		Ca Hard	
F		B		SO3	
NO3		Br		Cl	
NO2		Color		Alk	
T-PO4		Odor		BOD-Inf	
O-PO4		Turb		BOD-Eff	
SO4		pH		BOD-S	
MBAS		LI		TSS-Inf	
SiO2		Cond		TSS-Eff	
H2S		NH3-T		MLSS	
NH3-C		TKN		MLVSS	
VSS		Ca		K	
TS		Cr		Se	
VS		Co		Ag	
TDS		Cu		Na	
SS		Au		Tl	
% SOL	84%	Fe		Sn	
G & O		Pb	1600	Ti	
Al		Mg		V	
Sb		Mn		Zn	
As		Hg	0.69	THM	
Ba		Mo		TOC	
Be		Ni			
Cd		Pd			

Remarks: All results in mg/kg dry weight.

Ronald A. Bayer
Laboratory Director 7/5/89

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
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Fax (914) 562-0841

LAB#: 78147-010 DATE REC'D: 89/07/24 DATE COLL'D: 89/07/22 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 29-16W-5

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :		BOD-S :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
TS :		Cr :		Se :	
VS :		Co :		Ag :	
TDS :		Cu :		Na :	
SS :		Au :		Tl :	
% SOL :	84%	Fe :		Sn :	
G & O :		Pb :	400 mg/kg dry	Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	
As :		Hg :		THM :	
Ba :		Mo :		TOC :	
Be :		Ni :			
Cd :		Pd :			

Remarks:

Ronald A. Baver
Laboratory Director 7/26/89

New York State Department of Health Approved

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 78147-011 DATE REC'D: 89/07/24 DATE COLL'D: 89/07/22 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 29-16UD
Duplicate of W-5

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		oH :		BOD-S :	
MBAS :		L) :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
TS :		Cr :		Se :	
VS :		Co :		Ag :	
TDS :		Cu :		Na :	
SS :		Au :		Tl :	
% SOL :	78%	Fe :		Sn :	
G & O :		Pb :	460 mg/kg dry	Ti :	
Al :		Mo :		V :	
Sb :		Mn :		Zn :	
As :		Hg :		THM :	
Ba :		Mo :		TOC :	
Be :		Ni :			
Cd :		Pd :			

Remarks:

Ronald A. Baver
Laboratory Director 7/26/89

LOCATION 101-03

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Client Name: ERM Northeast

Project Name: #186-26

Sample Location: 101-03T

Matrix: Soil

Method: EPA 625

Lab Number: 78147-001

Date Collected: 7/22/89

Date Received: 7/24/89

Date Extracted: 7/24/89

Date Analyzed: 7/25/89

Report Date: 7/26/89

CAS NO.	COMPOUND	Detection Limit ug/kg	Conc. ug/kg	Qualifier
91-20-3	Naphthalene	370		U
208-96-8	Acenaphthylene	370		U
83-32-9	Acenaphthene	370		U
86-73-7	Fluorene	370		U
85-01-8	Phenanthrene	370	140	J
120-12-7	Anthracene	370		U
206-44-0	Fluoranthene	370	250	J
128-00-0	Pyrene	370	210	J
56-55-3	Benzo(a)anthracene	370	120	J
218-01-9	Chrysene	370	150	J
205-99-2	Benzo(b)fluoranthene	370		U
207-08-9	Benzo(k)fluoranthene	370		U
50-32-8	Benzo(a)pyrene	370		U
193-39-5	Indeno(1,2,3-cd)pyrene	370		U
53-70-3	Dibenzo(a,h)anthracene	370		U
191-24-2	Benzo(g,h,i)perylene	370		U

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Client Name: ERM Northeast
Lab Number: 77212-040

Project Name: #186-26
Date Collected: 6/23/89

Sample Location: 101-03U
Date Received: 6/24/89

Matrix: Soil
Date Extracted: 6/27/89

Method: EPA 625
Date Analyzed: 6/29/89

Report Date: 7/7/89

CAS NO.	COMPOUND	Detection Limit ug/kg	Conc. ug/kg	Qualifier
91-20-3	Naphthalene	12,000		U
208-96-8	Acenaphthylene	12,000		U
83-32-9	Acenaphthene	12,000		U
86-73-7	Fluorene	12,000		U
85-01-8	Phenanthrene	12,000		U
120-12-7	Anthracene	12,000		U
206-44-0	Fluoranthene	12,000		U
128-00-0	Pyrene	12,000		U
56-55-3	Benzo(a)anthracene	12,000		U
218-01-9	Chrysene	12,000		U
205-99-2	Benzo(b)fluoranthene	12,000		U
207-08-9	Benzo(k)fluoranthene	12,000		U
50-32-8	Benzo(a)pyrene	12,000		U
193-39-5	Indeno(1,2,3-cd)pyrene	12,000		U
53-70-3	Dibenzo(a,h)anthracene	12,000		U
191-24-2	Benzo(g,h,i)perylene	12,000		U

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Client Name: ERM Northeast

Project Name: #186-26

Sample Location: 101-03V

Matrix: Soil

Method: EPA 625

Lab Number: 78147-002

Date Collected: 7/22/89

Date Received: 7/24/89

Date Extracted: 7/24/89

Date Analyzed: 7/25/89

Report Date: 7/26/89

CAS NO.	COMPOUND	Detection Limit ug/kg	Conc. ug/kg	Qualifier
91-20-3	Naphthalene	390		U
208-96-8	Acenaphthylene	390		U
83-32-9	Acenaphthene	390		U
86-73-7	Fluorene	390		U
85-01-8	Phenanthrene	390		U
120-12-7	Anthracene	390		U
206-44-0	Fluoranthene	390	160	J
128-00-0	Pyrene	390	120	J
56-55-3	Benzo(a)anthracene	390	780	U
218-01-9	Chrysene	390		U
205-99-2	Benzo(b)fluoranthene	390		U
207-08-9	Benzo(k)fluoranthene	390		U
50-32-8	Benzo(a)pyrene	390		U
193-39-5	Indeno(1,2,3-cd)pyrene	390		U
53-70-3	Dibenzo(a,h)anthracene	390		U
191-24-2	Benzo(g,h,i)perylene	390		U

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Client Name: ERM Northeast

Project Name: #186-26

Sample Location: 101-03W

Matrix: Soil

Method: EPA 625

Lab Number: 78147-003

Date Collected: 7/22/89

Date Received: 7/24/89

Date Extracted: 7/24/89

Date Analyzed: 7/25/89

Report Date: 7/26/89

CAS NO.	COMPOUND	Detection Limit ug/kg	Conc. ug/kg	Qualifier
91-20-3	Naphthalene	370		U
208-96-8	Acenaphthylene	370		U
83-32-9	Acenaphthene	370		U
86-73-7	Fluorene	370	160	J
85-01-8	Phenanthrene	370	240	J
120-12-7	Anthracene	370	150	J
206-44-0	Fluoranthene	370	620	
128-00-0	Pyrene	370	520	
56-55-3	Benzo(a)anthracene	370	220	J
218-01-9	Chrysene	370	250	J
205-99-2	Benzo(b)fluoranthene	370	210	J
207-08-9	Benzo(k)fluoranthene	370		U
50-32-8	Benzo(a)pyrene	370	200	J
193-39-5	Indeno(1,2,3-cd)pyrene	370	2,5-10	U
53-70-3	Dibenzo(a,h)anthracene	370		U
191-24-2	Benzo(g,h,i)perylene	370		U

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Client Name: ERM Northeast

Project Name: #186-26

Sample Location: 101-03X

Matrix: Soil

Method: EPA 625

Lab Number: 77212-041

Date Collected: 6/23/89

Date Received: 6/24/89

Date Extracted: 6/26/89

Date Analyzed: 6/29/89

Report Date: 7/7/89

CAS NO.	COMPOUND	Detection Limit ug/kg	Conc. ug/kg	Qualifier
91-20-3	Naphthalene	370		U
208-96-8	Acenaphthylene	370		U
83-32-9	Acenaphthene	370		U
86-73-7	Fluorene	370		U
85-01-8	Phenanthrene	370		U
120-12-7	Anthracene	370		U
206-44-0	Fluoranthene	370		U
128-00-0	Pyrene	370		U
56-55-3	Benzo(a)anthracene	370		U
218-01-9	Chrysene	370		U
205-99-2	Benzo(b)fluoranthene	370		U
207-08-9	Benzo(k)fluoranthene	370		U
50-32-8	Benzo(a)pyrene	370		U
193-39-5	Indeno(1,2,3-cd)pyrene	370		U
53-70-3	Dibenzo(a,h)anthracene	370		U
191-24-2	Benzo(g,h,i)perylene	370		U

LOCATION 101-12

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 77212-024 DATE REC'D: 89/06/26 DATE COLL'D: 89/06/22 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 101-12-T

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :		BOD-S :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
TS :		Cr :		Se :	
VS :		Co :		Ag :	
TDS :		Cu :		Na :	
SS :		Au :		Tl :	
% SOL :	90%	Fe :		Sn :	
G & O :		Pb :		Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	
As :		Hg :	<0.19 mg/kg dry	THM :	
Ba :		Mo :		TOC :	
Be :		Ni :			
Cd :		Pd :			

Remarks:

Ronald A. Bayer
Laboratory Director 7/6/89

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 77212-026 DATE REC'D: 89/06/26 DATE COLL'D: 89/06/22 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 101-12-U

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :		BOD-S :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
TS :		Cr :		Se :	
VS :		Co :		Ag :	
TDS :		Cu :		Na :	
SS :		Au :		Tl :	
% SOL :	86%	Fe :		Sn :	
G & O :		Pb :		Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	
As :		Hg :	<0.20 mg/kg dry	THM :	
Ba :		Mo :		TOC :	
Be :		Ni :			
Cd :		Pd :			

Remarks:

Ronald A. Bayer
Laboratory Director 7/6/89

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 77212-027 DATE REC'D: 89/06/26 DATE COLL'D: 89/06/22 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 101-12-V

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
Sil :		pH :		BOD-S :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
TS :		Cr :		Se :	
VS :		Co :		Ag :	
TDS :		Cu :		Na :	
SS :		Au :		Tl :	
% SOL :	90%	Fe :		Sn :	
G & O :		Pb :		Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	
As :		Hg :	<0.18 mg/kg dry	THM :	
Ba :		Mo :		TOC :	
Be :		Ni :			
Cd :		Pd :			

Remarks:

Ronald A. Bayer
Laboratory Director 7/6/89

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 77212-025 DATE REC'D: 89/06/26 DATE COLL'D: 89/06/22 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 101-12-W

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :		BOD-S :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
TS :		Cr :		Se :	
VS :		Co :		Ag :	
TDS :		Cu :		Na :	
SS :		Au :		Tl :	
% SOL :	91%	Fe :		Sn :	
G & O :		Pb :		Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	
As :		Hg :	<0.18 mg/kg dry	THM :	
Ba :		Mo :		TOC :	
Be :		Ni :			
Cd :		Pd :			

Remarks:

Ronald A. Bayer
Laboratory Director 7/6/89

LOCATION 101-19

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Project #186-26

Samples Received 7/24/89

Lab. No.	Sample ID	TPH (mg/kg)
78147-008	101-19T	<28
78147-009	101-19U	<28
78147-012	25-05X	<29

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Project #186-26

Samples Received 7/24/89

Lab. No.	Sample ID	TPH (mg/kg)
78147-008	101-19T	<28
78147-009	101-19U	<28
78147-012	25-05X	<29

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Project #186-26

Sample Received 6/24/89

Lab. No.	Sample ID	TPH (mg/kg)
77212-004	26-02T	<29
77212-005	26-02V	69
77212-006	26-02W	120
77212-007	26-02U	<30
77212-012	27-12V	34
77212-013	27-12U	<28
77212-014	27-12W	40
77212-015	27-12T	4200
77212-016	27-02V	100
77212-017	27-02W	70
77212-018	27-02T	<29
77212-019	27-02U	2800
77212-020	27-08V	99
77212-021	27-08W	160
77212-022	27-08U	<29
77212-023	27-08T	<29
77212-028	25-05V	<30
77212-029	25-05U	<29
77212-030	25-05W	<30
77212-031	25-05T	<28
77212-042	101-19W	320
77212-043	101-19V	32
77212-044	23-04T	<28
77212-045	23-04W	<29

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Project #186-26

Sample Received 6/24/89

Lab. No.	Sample ID	TPH (mg/kg)
77212-004	26-02T	<29
77212-005	26-02V	69
77212-006	26-02W	120
77212-007	26-02U	<30
77212-012	27-12V	34
77212-013	27-12U	<28
77212-014	27-12W	40
77212-015	27-12T	4200
77212-016	27-02V	100
77212-017	27-02W	70
77212-018	27-02T	<29
77212-019	27-02U	2800
77212-020	27-08V	99
77212-021	27-08W	160
77212-022	27-08U	<29
77212-023	27-08T	<29
77212-028	25-05V	<30
77212-029	25-05U	<29
77212-030	25-05W	<30
77212-031	25-05T	<28
77212-042	101-19W	320
77212-043	101-19V	32
77212-044	23-04T	<28
77212-045	23-04W	<29

ERM-Northeast

LOCATION 226-03

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 77128-018 DATE REC'D: 89/06/22 DATE COLL'D: 6/20-21 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 22[illegible]-03T

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :		BOD-S :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
TS :		Cr :	3.6	Se :	
VS :		Co :		Ag :	
TDS :		Cu :	8.4	Na :	
SS :		Au :		Tl :	
% SOL :	90%	Fe :		Sn :	
G & O :		Pb :		Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	
As :		Hg :	<0.18	THM :	
Ba :		Mo :		TOC :	
Be :		Ni :	5.6		
Cd :		Pd :			

Remarks: All results in mg/kg dry weight.

Ronald A. Bayer
Laboratory Director 7/6/89

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Client Name: ERM Northeast
Lab Number: 77128-018

Project Name: #186-26
Date Collected: 6/21/89

Sample Location: 226-03T
Date Received: 6/22/89

Matrix: Soil
Date Extracted: 6/30/89

Method: EPA 625
Date Analyzed: 7/5/89

Report Date: 7/7/89

CAS NO.	COMPOUND	Detection Limit ug/kg	Conc. ug/kg	Qualifier
91-20-3	Naphthalene	370		U
208-96-8	Acenaphthylene	370		U
83-32-9	Acenaphthene	370		U
86-73-7	Fluorene	370		U
85-01-8	Phenanthrene	370		U
120-12-7	Anthracene	370		U
206-44-0	Fluoranthene	370		U
128-00-0	Pyrene	370		U
56-55-3	Benzo(a)anthracene	370		U
218-01-9	Chrysene	370		U
205-99-2	Benzo(b)fluoranthene	370		U
207-08-9	Benzo(k)fluoranthene	370		U
50-32-8	Benzo(a)pyrene	370		U
193-39-5	Indeno(1,2,3-cd)pyrene	370		U
53-70-3	Dibenzo(a,h)anthracene	370		U
191-24-2	Benzo(g,h,i)perylene	370		U

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Project #186-26

Samples Received 6/22/89

Lab. No.	Sample ID	TPH (mg/kg)
77128-013	225-01V	<28
77128-014	225-01W	<29
77128-018	226-03T	<28
77128-019	226-03V	71
77128-020	226-03U	270
77128-021	226-02W	<27
77128-022	28-05T	50
77128-023	28-05X	<28
77128-024	28-05V	<28
77128-025	28-05W	<28
77128-026	240-03Y	150
77128-027	240-03W	<29
77128-028	240-01W	<29
77128-029	240-01V	<28
77128-030	240-01U	220
77128-031	240-02U	<28
77128-032	240-02V	830

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 77128-020 DATE REC'D: 89/06/22 DATE COLL'D: 6/20-21 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 226-03U

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :		BOD-S :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
TS :		Cr :	130	Se :	
VS :		Co :		Ag :	
TDS :		Cu :	94	Na :	
SS :		Au :		Tl :	
% SOL :	87%	Fe :		Sn :	
G & O :		Pb :		Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	
As :		Hg :	1.7	THM :	
Ba :		Mo :		TOC :	
Be :		Ni :	130		
Cd :		Pd :			

Remarks: All results in mg/kg dry weight.

Ronald A. Bayer
Laboratory Director 7/6/89

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Client Name: ERM Northeast
Lab Number: 77128-020

Project Name: #186-26
Date Collected: 6/21/89

Sample Location: 226-03u
Date Received: 6/22/89

Matrix: Soil
Date Extracted: 6/30/89

Method: EPA 625
Date Analyzed: 7/5/89

Report Date: 7/7/89

CAS NO.	COMPOUND	Detection Limit ug/kg	Conc. ug/kg	Qualifier
91-20-3	Naphthalene	3800		U
208-96-8	Acenaphthylene	3800		U
83-32-9	Acenaphthene	3800		U
86-73-7	Fluorene	3800		U
85-01-8	Phenanthrene	3800		U
120-12-7	Anthracene	3800		U
206-44-0	Fluoranthene	3800		U
128-00-0	Pyrene	3800		U
56-55-3	Benzo(a)anthracene	3800		U
218-01-9	Chrysene	3800		U
205-99-2	Benzo(b)fluoranthene	3800		U
207-08-9	Benzo(k)fluoranthene	3800		U
50-32-8	Benzo(a)pyrene	3800		U
193-39-5	Indeno(1,2,3-cd)pyrene	3800		U
53-70-3	Dibenzo(a,h)anthracene	3800		U
191-24-2	Benzo(g,h,i)perylene	3800		U

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Project #186-26

Samples Received 6/22/89

Lab. No.	Sample ID	TPH (mg/kg)
77128-013	225-01V	<28
77128-014	225-01W	<29
77128-018	226-03T	<28
77128-019	226-03V	71
77128-020	226-03U	270
77128-021	226-02W	<27
77128-022	28-05T	50
77128-023	28-05X	<28
77128-024	28-05V	<28
77128-025	28-05W	<28
77128-026	240-03Y	150
77128-027	240-03W	<29
77128-028	240-01W	<29
77128-029	240-01V	<28
77128-030	240-01U	220
77128-031	240-02U	<28
77128-032	240-02V	830

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 77128-019 DATE REC'D: 89/06/22 DATE COLL'D: 6/20-21 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 226-03V

REPORT TO: same
BILL TO: same

T COLI		Cr+6		COD	
F COLI		Phenol		HARD-T	
SPC		CN		Ca Hard	
F		B		SO3	
NO3		Br		Cl	
NO2		Color		Alk	
T-PO4		Odor		BOD-Inf	
O-PO4		Turb		BOD-Eff	
SO4		pH		BOD-S	
MBAS		LI		TSS-Inf	
SiO2		Cond		TSS-Eff	
H2S		NH3-T		MLSS	
NH3-C		TKN		MLVSS	
VSS		Ca		K	
TS		Cr	22	Se	
VS		Co		Ag	
TDS		Cu	39	Na	
SS		Au		Tl	
% SOL	85%	Fe		Sn	
G & O		Pb		Ti	
Al		Mg		V	
Sb		Mn		Zn	
As		Hg	<0.19	THM	
Ba		Mo		TOC	
Be		Ni	47		
Cd		Pd			

Remarks: All results in mg/kg dry weight.

Ronald A. Baver
Laboratory Director 7/6/89

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Client Name: ERM Northeast

Project Name: #186-26

Sample Location: 226-03V

Matrix: Soil

Method: EPA 625

Lab Number: 77128-019

Date Collected: 6/21/89

Date Received: 6/22/89

Date Extracted: 6/30/89

Date Analyzed: 7/5/89

Report Date: 7/7/89

CAS NO.	COMPOUND	Detection Limit ug/kg	Conc. ug/kg	Qualifier
91-20-3	Naphthalene	3900		U
208-96-8	Acenaphthylene	3900		U
83-32-9	Acenaphthene	3900		U
86-73-7	Fluorene	3900		U
85-01-8	Phenanthrene	3900		U
120-12-7	Anthracene	3900		U
206-44-0	Fluoranthene	3900		U
128-00-0	Pyrene	3900		U
56-55-3	Benzo(a)anthracene	3900		U
218-01-9	Chrysene	3900		U
205-99-2	Benzo(b)fluoranthene	3900		U
207-08-9	Benzo(k)fluoranthene	3900		U
50-32-8	Benzo(a)pyrene	3900		U
193-39-5	Indeno(1,2,3-cd)pyrene	3900		U
53-70-3	Dibenzo(a,h)anthracene	3900		U
191-24-2	Benzo(g,h,i)perylene	3900		U

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Project #186-26

Samples Received 6/22/89

Lab. No.	Sample ID	TPH (mg/kg)
77128-013	225-01V	<28
77128-014	225-01W	<29
77128-018	226-03T	<28
77128-019	226-03V	71
77128-020	226-03U	270
77128-021	226-02W	<27
77128-022	28-05T	50
77128-023	28-05X	<28
77128-024	28-05V	<28
77128-025	28-05W	<28
77128-026	240-03Y	150
77128-027	240-03W	<29
77128-028	240-01W	<29
77128-029	240-01V	<28
77128-030	240-01U	220
77128-031	240-02U	<28
77128-032	240-02V	830

LOCATION 226-05

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 77128-017 DATE REC'D: 89/06/22 DATE COLL'D: 6/20-21 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 226-05T

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		oH :		BOD-S :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
TS :		Cr :		Se :	
VS :		Co :		Ag :	
TDS :		Cu :	38	Na :	
SS :		Au :		Tl :	
% SOL :	86%	Fe :		Sn :	
G & O :		Pb :		Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	28
As :		Hg :		THM :	
Ba :		Mo :		TOC :	
Be :		Ni :			
Cd :		Pd :			

Remarks: All results in mg/kg dry weight.

Ronald A. Bayer
Laboratory Director 7/6/89

New York State Department of Health Approved

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 77128-016 DATE REC'D: 89/06/22 DATE COLL'D: 6/20-21 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 226-05W

REPORT TO: sme
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		oH :		BOD-S :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
TS :		Cr :		Se :	
VS :		Co :		Ag :	
TDS :		Cu :	15	Na :	
SS :		Au :		Tl :	
% SOL :	92%	Fe :		Sn :	
G & O :		Pb :		Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	43
As :		Hg :		THM :	
Ba :		Mo :		TOC :	
Be :		Ni :			
Cd :		Pd :			

Remarks: All results in mg/kg dry weight.

Ronald A. Bayer
Laboratory Director 7/6/89

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 77128-015 DATE REC'D: 89/06/22 DATE COLL'D: 6/20-21 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 226-05X

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :		BOD-S :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
TS :		Cr :		Se :	
VS :		Co :		Ag :	
TDS :		Cu :	36	Na :	
SS :		Au :		Tl :	
% SOL :	89%	Fe :		Sn :	
G & O :		Pb :		Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	83
As :		Hg :		THM :	
Ba :		Mo :		TOC :	
Be :		Ni :			
Cd :		Pd :			

Remarks: All results in mg/kg dry weight.

Ronald A. Bayer
Laboratory Director 7/6/89

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Project #186-26

Samples Received 6/28/89

Lab. No.	Sample ID	TPH (mg/kg)
77303-001	23-04V	120
77303-006	233-01V	850
77303-007	233-01T	360
77303-008	233-01X	7410
77303-009	233-01W	440
77303-019	SS-1	<34
77303-020	SS-2	<34
77303-021	SS-3	<34
77303-022	SS-4	<33
77303-023	SS-5	<34
77303-024	225-01U	<28
77303-025	2-W-28	<27
77303-026	2-W-27	<27
77303-028	2-W-07W	<29
77303-030	2-W-26	<27

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Project #186-26

Samples Received 6/28/89

Lab. No.	Sample ID	TPH (mg/kg)
77303-001	23-04V	120
77303-006	233-01V	850
77303-007	233-01T	360
77303-008	233-01X	7410
77303-009	233-01W	440
77303-019	SS-1	<34
77303-020	SS-2	<34
77303-021	SS-3	<34
77303-022	SS-4	<33
77303-023	SS-5	<34
77303-024	225-01U	<28
77303-025	2-W-28	<27
77303-026	2-W-27	<27
77303-028	2-W-07W	<29
77303-030	2-W-26	<27

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Project #186-26

Samples Received 6/28/89

Lab. No.	Sample ID	TPH (mg/kg)
77303-001	23-04V	120
77303-006	233-01V	850
77303-007	233-01T	360
77303-008	233-01X	7410
77303-009	233-01W	440
77303-019	SS-1	<34
77303-020	SS-2	<34
77303-021	SS-3	<34
77303-022	SS-4	<33
77303-023	SS-5	<34
77303-024	225-01U	<28
77303-025	2-W-28	<27
77303-026	2-W-27	<27
77303-028	2-W-07W	<29
77303-030	2-W-26	<27

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Project #186-26

Samples Received 6/28/89

Lab. No.	Sample ID	TPH (mg/kg)
77303-001	23-04V	120
77303-006	233-01V	850
77303-007	233-01T	360
77303-008	233-01X	7410
77303-009	233-01W	440
77303-019	SS-1	<34
77303-020	SS-2	<34
77303-021	SS-3	<34
77303-022	SS-4	<33
77303-023	SS-5	<34
77303-024	225-01U	<28
77303-025	2-W-28	<27
77303-026	2-W-27	<27
77303-028	2-W-07W	<29
77303-030	2-W-26	<27

LOCATION 235-01

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Client Name: ERM Northeast

Project Name: #186-26

Sample Location: 235-01T

Matrix: Soil

Method: EPA 625

Lab Number: 78097-005

Date Collected: 7/20/89

Date Received: 7/21/89

Date Extracted: 7/21/89

Date Analyzed: 7/24/89

Report Date: 7/24/89

CAS NO.	COMPOUND	Detection Limit ug/kg	Conc. ug/kg	Qualifier
91-20-3	Naphthalene	410		U
208-96-8	Acenaphthylene	410		U
83-32-9	Acenaphthene	410		U
86-73-7	Fluorene	410		U
85-01-8	Phenanthrene	410	300	J
120-12-7	Anthracene	410		U
206-44-0	Fluoranthene	410	650	
128-00-0	Pyrene	410	520	
56-55-3	Benzo(a)anthracene	410	280	J
218-01-9	Chrysene	410	350	J
205-99-2	Benzo(b)fluoranthene	410	450	
207-08-9	Benzo(k)fluoranthene	410		U
50-32-8	Benzo(a)pyrene	410	250	J
193-39-5	Indeno(1,2,3-cd)pyrene	410		U
53-70-3	Dibenzo(a,h)anthracene	410		U
191-24-2	Benzo(g,h,i)perylene	410		U

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Client Name: ERM Northeast

Project Name: #186-26

Sample Location: 235-01U

Matrix: Soil

Method: EPA 625

Lab Number: 77212-001

Date Collected: 6/22/89

Date Received: 6/24/89

Date Extracted: 6/26/89

Date Analyzed: 6/29/89

Report Date: 7/7/89

CAS NO.	COMPOUND	Detection Limit ug/kg	Conc. ug/kg	Qualifier
91-20-3	Naphthalene	390		U
208-96-8	Acenaphthylene	390		U
83-32-9	Acenaphthene	390		U
86-73-7	Fluorene	390		U
85-01-8	Phenanthrene	390		U
120-12-7	Anthracene	390		U
206-44-0	Fluoranthene	390	180	J
128-00-0	Pyrene	390	170	J
56-55-3	Benzo(a)anthracene	390		U
218-01-9	Chrysene	390		U
205-99-2	Benzo(b)fluoranthene	390		U
207-08-9	Benzo(k)fluoranthene	390		U
50-32-8	Benzo(a)pyrene	390		U
193-39-5	Indeno(1,2,3-cd)pyrene	390		U
53-70-3	Dibenzo(a,h)anthracene	390		U
191-24-2	Benzo(g,h,i)perylene	390		U

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Client Name: ERM Northeast
Lab Number: 77212-002

Project Name: #186-26
Date Collected: 6/22/89

Sample Location: 235-01V
Date Received: 6/24/89

Matrix: Soil
Date Extracted: 6/26/89

Method: EPA 625
Date Analyzed: 6/29/89

Report Date: 7/7/89

CAS NO.	COMPOUND	Detection Limit ug/kg	Conc. ug/kg	Qualifier
91-20-3	Naphthalene	390		U
208-96-8	Acenaphthylene	390		U
83-32-9	Acenaphthene	390		U
86-73-7	Fluorene	390		U
85-01-8	Phenanthrene	390		U
120-12-7	Anthracene	390		U
206-44-0	Fluoranthene	390		U
128-00-0	Pyrene	390		U
56-55-3	Benzo(a)anthracene	390		U
218-01-9	Chrysene	390		U
205-99-2	Benzo(b)fluoranthene	390		U
207-08-9	Benzo(k)fluoranthene	390		U
50-32-8	Benzo(a)pyrene	390		U
193-39-5	Indeno(1,2,3-cd)pyrene	390		U
53-70-3	Dibenzo(a,h)anthracene	390		U
191-24-2	Benzo(g,h,i)perylene	390		U

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Client Name: ERM Northeast
Lab Number: 77212-003

Project Name: #186-26
Date Collected: 6/22/89

Sample Location: 235-01W
Date Received: 6/24/89

Matrix: Soil
Date Extracted: 6/26/89

Method: EPA 625
Date Analyzed: 6/29/89

Report Date: 7/7/89

CAS NO.	COMPOUND	Detection Limit ug/kg	Conc. ug/kg	Qualifier
91-20-3	Naphthalene	390		U
208-96-8	Acenaphthylene	390		U
83-32-9	Acenaphthene	390		U
86-73-7	Fluorene	390		U
85-01-8	Phenanthrene	390		U
120-12-7	Anthracene	390		U
206-44-0	Fluoranthene	390	250	J
128-00-0	Pyrene	390	180	J
56-55-3	Benzo(a)anthracene	390		U
218-01-9	Chrysene	390		U
205-99-2	Benzo(b)fluoranthene	390		U
207-08-9	Benzo(k)fluoranthene	390		U
50-32-8	Benzo(a)pyrene	390		U
193-39-5	Indeno(1,2,3-cd)pyrene	390		U
53-70-3	Dibenzo(a,h)anthracene	390		U
191-24-2	Benzo(g,h,i)perylene	390		U

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Client Name: ERM Northeast
Lab Number: 78097-006

Project Name: #186-26
Date Collected: 7/20/89

Sample Location: 235-01X
Date Received: 7/21/89

Matrix: Soil
Date Extracted: 7/21/89

Method: EPA 625
Date Analyzed: 7/24/89

Report Date: 7/24/89

CAS NO.	COMPOUND	Detection Limit ug/kg	Conc. ug/kg	Qualifier
91-20-3	Naphthalene	390		U
208-96-8	Acenaphthylene	390		U
83-32-9	Acenaphthene	390		U
86-73-7	Fluorene	390		U
85-01-8	Phenanthrene	390	380	J
120-12-7	Anthracene	390		U
206-44-0	Fluoranthene	390	890	
128-00-0	Pyrene	390	710	
56-55-3	Benzo(a)anthracene	390	400	
218-01-9	Chrysene	390	470	
205-99-2	Benzo(b)fluoranthene	390	710	
207-08-9	Benzo(k)fluoranthene	390		U
50-32-8	Benzo(a)pyrene	390	360	J
193-39-5	Indeno(1,2,3-cd)pyrene	390	390	U
53-70-3	Dibenzo(a,h)anthracene	390		U
191-24-2	Benzo(g,h,i)perylene	390		U

ERM-Northeast

PILOT GROUND WATER RECOVERY TRENCH
SOIL STOCKPILE SAMPLES

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 77303-019 DATE REC'D: 89/06/28 DATE COLL'D: 89/06/26 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 SS-1

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :	6.5	BOD-S :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
TS :		Cr :	180	Se :	
VS :		Co :		Ag :	
TDS :		Cu :	51	Na :	
SS :		Au :		Tl :	
% SOL :	74%	Fe :		Sn :	
G & O :		Pb :	35	Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	140
As :		Hg :	0.23	THM :	
Ba :		Mo :		TOC :	
Be :		Ni :	17		
Cd :	0.95	Pd :			

Remarks: All results in mg/kg dry weight.

Ronald A. Bayer
Laboratory Director 7-7-89

PCB ORGANICS ANALYSIS DATA SHEET

Client Name: ERM Northeast

Project Name: #186-26

Sample Location: SS-1

Matrix: Soil

Method: EPA 608

Lab Number: 77303-019

Date Collected: 6/26/89

Date Received: 6/28/89

Date Extracted: 6/28/89

Date Analyzed: 7/5/89

Report Date: 7/7/89

CAS NO.	COMPOUND	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
12674-11-2	Arochlor-1016	2300		U
11104-28-2	Arochlor-1221	2300		U
11141-16-5	Arochlor-1232	2300		U
53469-21-9	Arochlor-1242	2300		U
12672-29-6	Arochlor-1248	230		U
11097-69-1	Arochlor-1254	230		U
11096-82-5	Arochlor-1260	230		U

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Project #186-26

Samples Received 6/28/89

Lab. No.	Sample ID	TPH (mg/kg)
77303-001	23-04V	120
77303-006	233-01V	850
77303-007	233-01T	360
77303-008	233-01X	7410
77303-009	233-01W	440
77303-019	SS-1	<34
77303-020	SS-2	<34
77303-021	SS-3	<34
77303-022	SS-4	<33
77303-023	SS-5	<34
77303-024	225-01U	<28
77303-025	2-W-28	<27
77303-026	2-W-27	<27
77303-028	2-W-07W	<29
77303-030	2-W-26	<27

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 77303-020 DATE REC'D: 89/06/28 DATE COLL'D: 89/06/26 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 SS-2

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :	6.0	BOD-S :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
TS :		Cr :	8.0	Se :	
VS :		Co :		Ag :	
TDS :		Cu :	21	Na :	
SS :		Au :		Tl :	
% SOL :	74%	Fe :		Sn :	
G & O :		Pb :	13	Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	49
As :		Hg :	<0.20	THM :	
Ba :		Mo :		TOC :	
Be :		Ni :	20		
Cd :	<0.68	Pd :			

Remarks: All results in mg/kg dry weight.

Ronald A. Bayer
Laboratory Director 7-7-89

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Client Name: ERM Northeast

Project Name: #186-26

Sample Location: SS-2

Matrix: Soil

Method: EPA 625

Lab Number: 77303-020

Date Collected: 6/26/89

Date Received: 6/28/89

Date Extracted: 6/29/89

Date Analyzed: 7/5/89

Report Date: 7/7/89

CAS NO.	COMPOUND	Detection Limit ug/kg	Conc. ug/kg	Qualifier
91-20-3	Naphthalene	450		U
208-96-8	Acenaphthylene	450		U
83-32-9	Acenaphthene	450		U
86-73-7	Fluorene	450		U
85-01-8	Phenanthrene	450		U
120-12-7	Anthracene	450		U
206-44-0	Fluoranthene	450		U
128-00-0	Pyrene	450		U
56-55-3	Benzo(a)anthracene	450		U
218-01-9	Chrysene	450		U
205-99-2	Benzo(b)fluoranthene	450		U
207-08-9	Benzo(k)fluoranthene	450		U
50-32-8	Benzo(a)pyrene	450		U
193-39-5	Indeno(1,2,3-cd)pyrene	450		U
53-70-3	Dibenzo(a,h)anthracene	450		U
191-24-2	Benzo(g,h,i)perylene	450		U

PCB ORGANICS ANALYSIS DATA SHEET

Client Name: ERM Northeast

Project Name: #186-26

Sample Location: SS-2

Matrix: Soil

Method: EPA 608

Lab Number: 77303-020

Date Collected: 6/26/89

Date Received: 6/28/89

Date Extracted: 6/28/89

Date Analyzed: 7/5/89

Report Date: 7/7/89

CAS NO.	COMPOUND	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
12674-11-2	Arochlor-1016	23		U
11104-28-2	Arochlor-1221	23		U
11141-16-5	Arochlor-1232	23		U
53469-21-9	Arochlor-1242	23		U
12672-29-6	Arochlor-1248	23		U
11097-69-1	Arochlor-1254	23		U
11096-82-5	Arochlor-1260	23		U

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Project #186-26

Samples Received 6/28/89

Lab. No.	Sample ID	TPH (mg/kg)
77303-001	23-04V	120
77303-006	233-01V	850
77303-007	233-01T	360
77303-008	233-01X	7410
77303-009	233-01W	440
77303-019	SS-1	<34
77303-020	SS-2	<34
77303-021	SS-3	<34
77303-022	SS-4	<33
77303-023	SS-5	<34
77303-024	225-01U	<28
77303-025	2-W-28	<27
77303-026	2-W-27	<27
77303-028	2-W-07W	<29
77303-030	2-W-26	<27

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 77303-021 DATE REC'D: 89/06/28 DATE COLL'D: 89/06/26 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 SS-3

REPORT TO: same
BILL TO: same

T COLI		Cr+6		COD	
F COLI		Phenol		HARD-T	
SPC		CN		Ca Hard	
F		B		SO3	
NO3		Br		Cl	
NO2		Color		Alk	
T-PO4		Odor		BOD-Inf	
O-PO4		Turb		BOD-Eff	
SO4		pH	5.8	BOD-S	
MBAS		LI		TSS-Inf	
SiO2		Cond		TSS-Eff	
H2S		NH3-T		MLSS	
NH3-C		TKN		MLVSS	
VSS		Ca		K	
TS		Cr	9.5	Se	
VS		Co		Ag	
TDS		Cu	25	Na	
SS		Au		Tl	
% SOL	73%	Fe		Sn	
G & O		Pb	14	Ti	
Al		Mg		V	
Sb		Mn		Zn	62
As		Hg	<0.22	THM	
Ba		Mo		TOC	
Be		Ni	25		
Cd	1.6	Pd			

Remarks: All results in mg/kg dry weight.

Ronald A. Bayer
Laboratory Director 7-7-89

PCB ORGANICS ANALYSIS DATA SHEET

Client Name: ERM Northeast

Project Name: #186-26

Sample Location: SS-3

Matrix: Soil

Method: EPA 608

Lab Number: 77303-021

Date Collected: 6/26/89

Date Received: 6/28/89

Date Extracted: 6/28/89

Date Analyzed: 7/5/89

Report Date: 7/7/89

CAS NO.	COMPOUND	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
12674-11-2	Arochlor-1016	23		U
11104-28-2	Arochlor-1221	23		U
11141-16-5	Arochlor-1232	23		U
53469-21-9	Arochlor-1242	23		U
12672-29-6	Arochlor-1248	23		U
11097-69-1	Arochlor-1254	23		U
11096-82-5	Arochlor-1260	23		U

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Project #186-26

Samples Received 6/28/89

Lab. No.	Sample ID	TPH (mg/kg)
77303-001	23-04V	120
77303-006	233-01V	850
77303-007	233-01T	360
77303-008	233-01X	7410
77303-009	233-01W	440
77303-019	SS-1	<34
77303-020	SS-2	<34
77303-021	SS-3	<34
77303-022	SS-4	<33
77303-023	SS-5	<34
77303-024	225-01U	<28
77303-025	2-W-28	<27
77303-026	2-W-27	<27
77303-028	2-W-07W	<29
77303-030	2-W-26	<27

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 77303-022 DATE REC'D: 89/06/28 DATE COLL'D: 89/06/26 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 SS-4

REPORT TO: same
BILL TO: same

T COLI		Cr+6		COD	
F COLI		Phenol		HARD-T	
SPC		CN		Ca Hard	
F		B		SO3	
NO3		Br		Cl	
NO2		Color		Alk	
T-PO4		Odor		BOD-Inf	
O-PO4		Turb		BOD-Eff	
SO4		pH	5.0	BOD-S	
MBAS		LI		TSS-Inf	
SiO2		Cond		TSS-Eff	
H2S		NH3-T		MLSS	
NH3-C		TKN		MLVSS	
VSS		Ca		K	
TS		Cr	7.7	Se	
VS		Co		Ag	
TDS		Cu	29	Na	
SS		Au		Tl	
% SOL	75%	Fe		Sn	
G & O		Pb	32	Ti	
Al		Mg		V	
Sb		Mn		Zn	58
As		Hg	<0.21	THM	
Ba		Mo		TOC	
Be		Ni	23		
Cd	1.2	Pd			

Remarks: All results in mg/kg dry weight.

Ronald A. Bayer
Laboratory Director 7-7-89

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Client Name: ERM Northeast

Project Name: #186-26

Sample Location: SS-4

Matrix: Soil

Method: EPA 625

Lab Number: 77303-022

Date Collected: 6/26/89

Date Received: 6/28/89

Date Extracted: 6/29/89

Date Analyzed: 7/5/89

Report Date: 7/7/89

CAS NO.	COMPOUND	Detection Limit ug/kg	Conc. ug/kg	Qualifier
91-20-3	Naphthalene	440		U
208-96-8	Acenaphthylene	440		U
83-32-9	Acenaphthene	440		U
86-73-7	Fluorene	440		U
85-01-8	Phenanthrene	440		U
120-12-7	Anthracene	440		U
206-44-0	Fluoranthene	440		U
128-00-0	Pyrene	440		U
56-55-3	Benzo(a)anthracene	440		U
218-01-9	Chrysene	440		U
205-99-2	Benzo(b)fluoranthene	440		U
207-08-9	Benzo(k)fluoranthene	440		U
50-32-8	Benzo(a)pyrene	440		U
193-39-5	Indeno(1,2,3-cd)pyrene	440		U
53-70-3	Dibenzo(a,h)anthracene	440		U
191-24-2	Benzo(g,h,i)perylene	440		U

PCB ORGANICS ANALYSIS DATA SHEET

Client Name: ERM Northeast

Project Name: #186-26

Sample Location: SS-4

Matrix: Soil

Method: EPA 608

Lab Number: 77303-022

Date Collected: 6/26/89

Date Received: 6/28/89

Date Extracted: 6/28/89

Date Analyzed: 7/5/89

Report Date: 7/7/89

CAS NO.	COMPOUND	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
12674-11-2	Arochlor-1016	22		U
11104-28-2	Arochlor-1221	22		U
11141-16-5	Arochlor-1232	22		U
53469-21-9	Arochlor-1242	22		U
12672-29-6	Arochlor-1248	22		U
11097-69-1	Arochlor-1254	22		U
11096-82-5	Arochlor-1260	22		U

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Project #186-26

Samples Received 6/28/89

Lab. No.	Sample ID	TPH (mg/kg)
77303-001	23-04V	120
77303-006	233-01V	850
77303-007	233-01T	360
77303-008	233-01X	7410
77303-009	233-01W	440
77303-019	SS-1	<34
77303-020	SS-2	<34
77303-021	SS-3	<34
77303-022	SS-4	<33
77303-023	SS-5	<34
77303-024	225-01U	<28
77303-025	2-W-28	<27
77303-026	2-W-27	<27
77303-028	2-W-07W	<29
77303-030	2-W-26	<27

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 77303-023 DATE REC'D: 89/06/28 DATE COLL'D: 89/06/26 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 SS-5

REPORT TO: samesame
BILL TO:

T COLI		Cr+6		COD	
F COLI		Phenol		HARD-T	
SPC		CN		Ca Hard	
F		B		SO3	
NO3		Br		Cl	
NO2		Color		Alk	
T-PO4		Odor		BOD-Inf	
O-PO4		Turb		BOD-Eff	
SO4		pH	6.2	BOD-S	
MBAS		LI		TSS-Inf	
SiO2		Cond		TSS-Eff	
H2S		NH3-T		MLSS	
NH3-C		TKN		MLVSS	
VSS		Ca		K	
TS		Cr	3.7	Se	
VS		Co		Ag	
TDS		Cu	25	Na	
SS		Au		Tl	
% SOL	74%	Fe		Sn	
G & O		Pb	<6.8	Ti	
Al		Mg		V	
Sb		Mn		Zn	40
As		Hg	<0.23	THM	
Ba		Mo		TOC	
Be		Ni	14		
Cd	0.81	Pd			

Remarks: All results in mg/kg dry weight.

Ronald A. Baver
Laboratory Director 7-7-89

PCB ORGANICS ANALYSIS DATA SHEET

Client Name: ERM Northeast

Project Name: #186-26

Sample Location: SS-5

Matrix: Soil

Method: EPA 608

Lab Number: 77303-023

Date Collected: 6/26/89

Date Received: 6/28/89

Date Extracted: 6/28/89

Date Analyzed: 7/5/89

Report Date: 7/7/89

CAS NO.	COMPOUND	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
12674-11-2	Arochlor-1016	23		U
11104-28-2	Arochlor-1221	23		U
11141-16-5	Arochlor-1232	23		U
53469-21-9	Arochlor-1242	23		U
12672-29-6	Arochlor-1248	23		U
11097-69-1	Arochlor-1254	23		U
11096-82-5	Arochlor-1260	23		U

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Project #186-26

Samples Received 6/28/89

Lab. No.	Sample ID	TPH (mg/kg)
77303-001	23-04V	120
77303-006	233-01V	850
77303-007	233-01T	360
77303-008	233-01X	7410
77303-009	233-01W	440
77303-019	SS-1	<34
77303-020	SS-2	<34
77303-021	SS-3	<34
77303-022	SS-4	<33
77303-023	SS-5	<34
77303-024	225-01U	<28
77303-025	2-W-28	<27
77303-026	2-W-27	<27
77303-028	2-W-07W	<29
77303-030	2-W-26	<27

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 7/212-046 DATE REC'D: 89/06/26 DATE COLL'D: 89/06/23 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 W-1 Concrete

REPORT TO: same
BILL TO: same

T COLI:		Cr+A	:	COD	:
F COLI:		Phenol	:	HARD-T	:
SPC	:	CN	:	Ca Hard	:
F	:	B	:	SO3	:
NO3	:	Br	:	Cl	:
NO2	:	Color	:	Alk	:
T-PO4	:	Odor	:	BOD-Inf	:
O-PO4	:	Turb	:	BOD-Eff	:
SO4	:	pH	:	BOD-S	:
MBAS	:	LI	:	TSS-Inf	:
SiO2	:	Cond	:	TSS-Eff	:
H2S	:	NH3-T	:	MLSS	:
NH3-N	:	TKN	:	MLVSS	:
VSS	:	Ca	:	K	:
TS	:	Cr	: <0.01	Se	:
VS	:	Co	:	Ag	:
TDS	:	Cu	: 1.7	Na	:
SS	:	Au	:	Tl	:
% SOL	:	Fe	:	Sn	:
G & O	:	Pb	: 52 ug/l	Ti	:
Al	:	Mg	:	V	:
Sb	:	Mn	:	Zn	: 0.02
As	:	Hg	:	THM	:
Ba	:	Mo	:	TOC	:
Be	:	Ni	: <0.04		
Cd	:	Pd	:		

Remarks: All results in mg/l unless otherwise indicated. The sample was homogenized then subjected to the EP Toxicity procedure as described in the May 19, 1980 Federal Register, Vol. 45, No. 98.

Ronald A. Baver
Laboratory Director 6/29/89

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 77212-0047 DATE REC'D: 89/06/26 DATE COLL'D: 89/06/23 STATUS: Closed
LNAME: ERT - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #196-26 W 2

REPORT TO: same
BILL TO: same

T COLI	:	Cr+6	:	COD	:
F COLI	:	Phenol	:	HARD-T	:
SPC	:	CN	:	Ca Hard	:
F	:	B	:	SO3	:
NO3	:	Br	:	Cl	:
NO2	:	Color	:	Alk	:
T-PO4	:	Odor	:	BOD-Inf	:
O-PO4	:	Turb	:	BOD-Eff	:
SO4	:	pH	:	BOD-S	:
MBAS	:	Li	:	TSS-Inf	:
SiO2	:	Cond	:	TSS-Eff	:
H2S	:	NH3-T	:	MLSS	:
NH3-N	:	TKN	:	MLVSS	:
VSS	:	Ca	:	K	:
TS	:	Cr	: 0.01	Se	:
VS	:	Co	:	Ac	:
TDS	:	Cu	: 0.13	Na	:
SS	:	Au	:	Tl	:
% SOL	:	Fe	:	Sn	:
O & G	:	Pb	: 130 ug/l	Ti	:
Al	:	Mg	:	V	:
Sb	:	Mn	:	Zn	: 0.02
As	:	Hg	:	THM	:
Ba	:	Mo	:	TOC	:
Be	:	Ni	: 1.3		
Cd	:	Pd	:		

Remarks: All results in mg/l unless otherwise indicated. The sample was homogenized then subjected to the EP Toxicity procedure as described in the May 19, 1980 Federal Register, Vol. 45, No. 98.

Ronald A. Baver
Laboratory Director 6/29/89

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 77212-049 DATE REC'D: 89/06/26 DATE COLL'D: 89/06/23 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: [illegible]
SPL LOCATION: #186-26 W-3

REPORT TO: same
BILL TO: same

T COLI	:	Cr+6	:	COD	:
F COLI	:	Phenol	:	HARD-T	:
RPC	:	CN	:	Ca Hard	:
F	:	B	:	SO3	:
NO3	:	Br	:	Cl	:
NO2	:	Color	:	Alk	:
T-PO4	:	Odor	:	BOD-Inf	:
O-PO4	:	Turb	:	BOD-Eff	:
SO4	:	pH	:	BOD-S	:
MBAS	:	LT	:	TSS-Inf	:
SiO2	:	Cond	:	TSS-Eff	:
H2S	:	NH3-T	:	MLSS	:
NH3	:	TKN	:	MLVSS	:
VSS	:	Ca	:	K	:
TS	:	Cr	: 0.02	Se	:
VS	:	Co	:	Ag	:
TDS	:	Cu	: 14	Na	:
SS	:	Au	:	Tl	:
% SOL	:	Fe	:	Sn	:
G & O	:	Pb	: 330 ug/l	Ti	:
Al	:	Mg	:	V	:
Sb	:	Mn	:	Zn	: 8.8
As	:	Hg	:	THM	:
Ba	:	Mo	:	TOC	:
Be	:	Ni	: 1.3		
Cd	:	Pd	:		

Remarks: All results in mg/l unless otherwise indicated. The sample was homogenized then subjected to the EP Toxicity procedure as described in the May 19, 1980 Federal Register, Vol. 45, No. 98.

Ronald A. Bayer
Laboratory Director 6/29/89

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 77218-047 DATE REC'D: 89/06/26 DATE COLL'D: 89/06/23 STATUS: Closed
LNAME: [illegible] Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL IDENTITY: #136-26 M-4 Concrete

REPORT TO: Same
BILL TO: Same

T COLI :		Cr+6 :		COD :	
F COLI :		Phenol :		HARD-T :	
SPC :		CN :		Ca Hard :	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf :	
O-PO4 :		Turb :		BOD-Eff :	
SO4 :		pH :		BOD-S :	
MBAS :		LI :		TSS-Inf :	
SiO2 :		Cond :		TSS-Eff :	
H2S :		NH3-T :		MLSS :	
NH3-N :		TKN :		MLVSS :	
VSS :		Ca :		K :	
TS :		Cr :	<0.01	Se :	
VS :		Co :		Ag :	
TDS :		Cu :	0.06	Na :	
SS :		Au :		Tl :	
% SOL :		Fe :		Sn :	
O & G :		Pb :	34 ug/l	Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	<0.01
As :		Hg :		THM :	
Ba :		Mo :		TOC :	
Be :		Ni :	<0.04		
Cd :		Pd :			

Remarks: All results in mg/l unless otherwise indicated. The sample was homogenized then subjected to the EP Toxicity procedure as described in the Nov 19, 1980 Federal Register, Vol. 45, No. [illegible].

Ronald A. Bayer
Laboratory Director 6/29/89

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 7[illegible] DATE REC'D: 89/06/23 DATE COLL'D: 9[illegible]/23 STATUS: Closed
ENAME: SPM - Northeast ENAME:
STREET: CITY: STATE: ZIP:
S.L. LOCATION: #186-24 W-5

REPORT TO: same
BILL TO: same

T COLI:		Crts :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		Oil :		BOD-S :	
MBAS :		Cl :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3 :		NLSS :	
NH3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
TS :		Cr :	<0.01	Se :	
VS :		Co :		Ag :	
TDS :		Cu :	<0.01	Na :	
SS :		Au :		Ti :	
% SOL :		Fe :		Sn :	
G & O :		Pb :	160 ug/l	Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	<0.01
As :		Hg :		THM :	
Ba :		Mo :		TOC :	
Be :		Ni :	<0.04		
Cd :		Pd :			

Remarks: All results in mg/l unless otherwise indicated. The sample was homogenized then subjected to the EP Toxicity procedure as described in the May 19, 1980 Federal Register, Vol. 45, No. 98.

Ronald A. Bayer
Laboratory Director 6/19/89

New York State Department of Health Approved

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 77403-001 DATE REC'D: 89/06/30 DATE COLL'D: 89/06/29 STATUS: closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: W-9

REPORT TO: same
BILL TO: same

T COLI	:	Cr+6	:	COD	:
F COLI	:	Phenol	:	HARD-T	:
SPC	:	CN	:	Ca Hard	:
F	:	B	:	SO3	:
NO3	:	Br	:	Cl	:
NO2	:	Color	:	Alk	:
T-PO4	:	Odor	:	BOD-Inf	:
O-PO4	:	Turb	:	BOD-Eff	:
SO4	:	pH	:	BOD-S	:
MBAS	:	LI	:	TSS-Inf	:
SiO2	:	Cond	:	TSS-Eff	:
H2S	:	NH3-T	:	MLSS	:
NH3-C	:	TKN	:	MLVSS	:
VSS	:	Ca	:	K	:
TS	:	Cr	: <0.05	Se	:
VS	:	Co	:	Ag	:
TDS	:	Cu	: 0.03	Na	:
SS	:	Au	:	Tl	:
% SOL	:	Fe	:	Sn	:
G & O	:	Pb	: <0.05	Ti	:
Al	:	Mg	:	V	:
Sb	:	Mn	:	Zn	: 0.02
As	:	Hg	:	THM	:
Ba	:	Mo	:	TOC	:
Be	:	Ni	: 0.05		
Cd	:	Pd	:		

Remarks: All results in mg/l. The sample was homogenized then subjected to the EP Toxicity Procedure as described in the May 19, 1980 Federal Register, Vol. 45. No. 98.

Ronald A. Bayer
Laboratory Director 7/7/89

roTest
oratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

7403-002 DATE REC'D: 89/06/30 DATE COLL'D: 89/06/29 STATUS: closed
RM - Northeast FNAME:
CITY: STATE: ZIP:

ATION: W-10

O: same
TO: same

Cr+6	:	COD	:
Phenol	:	HARD-T	:
CN	:	Ca Hard	:
B	:	SO3	:
Br	:	Cl	:
Color	:	Alk	:
Odor	:	BOD-Inf	:
Turb	:	BOD-Eff	:
pH	:	BOD-S	:
LI	:	TSS-Inf	:
Cond	:	TSS-Eff	:
NH3-T	:	MLSS	:
TKN	:	MLVSS	:
Ca	:	K	:
Cr	: 20	Se	:
Co	:	Ag	:
Cu	: 0.11	Na	:
Au	:	Tl	:
Fe	:	Sn	:
Pb	: <0.05	Ti	:
Mg	:	V	:
Mn	:	Zn	: 0.04
Hg	:	THM	:
Mo	:	TOC	:
Ni	: 0.05		
Pd	:		

arks: All results in mg/l. The sample was homogenized then subjected to
Toxicity procedure as described in the May 19, 1980 Federal Register,
, No. 98.

Ronald A. Bayer
Laboratory Director 7/7/89

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 77403-003 DATE REC'D: 89/06/30 DATE COLL'D: 89/06/29 STATUS: closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: W-11

REPORT TO: same
BILL TO: same

T COLI	:	Cr+6	:	COD	:
F COLI	:	Phenol	:	HARD-T	:
SPC	:	CN	:	Ca Hard	:
F	:	B	:	SO3	:
NO3	:	Br	:	Cl	:
NO2	:	Color	:	Alk	:
T-PO4	:	Odor	:	BOD-Inf	:
O-PO4	:	Turb	:	BOD-Eff	:
SO4	:	pH	:	BOD-S	:
MBAS	:	LI	:	TSS-Inf	:
SiO2	:	Cond	:	TSS-Eff	:
H2S	:	NH3-T	:	MLSS	:
NH3-C	:	TKN	:	MLVSS	:
VSS	:	Ca	:	K	:
TS	:	Cr	: 0.32	Se	:
VS	:	Co	:	Ag	:
TDS	:	Cu	: 0.02	Na	:
SS	:	Au	:	Tl	:
% SOL	:	Fe	:	Sn	:
O & O	:	Pb	: <0.05	Ti	:
Al	:	Mg	:	V	:
Sb	:	Mn	:	Zn	: 0.05
As	:	Hg	:	THM	:
Ba	:	Mo	:	TOC	:
Be	:	Ni	: 0.05		
Cd	:	Pd	:		

Remarks: All results in mg/l. The sample was homogenized then subjected to the EP Toxicity procedure as described in the May 19, 1980 Federal Register, Vol. 45, No. 98.

Ronald A. Bayer
Laboratory Director 7/7/89

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
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LAB#: 77403-004 DATE REC'D: 89/06/30 DATE COLL'D: 89/06/29 STATUS: closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: W-12

REPORT TO: same
BILL TO: same

T COLI	:	Cr+6	:	COD	:
F COLI	:	Phenol	:	HARD-T	:
SPC	:	CN	:	Ca Hard	:
F	:	B	:	SO3	:
NO3	:	Br	:	Cl	:
NO2	:	Color	:	Alk	:
T-PO4	:	Odor	:	BOD-Inf	:
O-PO4	:	Turb	:	BOD-Eff	:
SO4	:	oH	:	BOD-S	:
MBAS	:	LI	:	TSS-Inf	:
SiO2	:	Cond	:	TSS-Eff	:
H2S	:	NH3-T	:	MLSS	:
NH3-C	:	TKN	:	MLVSS	:
VSS	:	Ca	:	K	:
TS	:	Cr	: 0.16	Se	:
VS	:	Co	:	Ag	:
TDS	:	Cu	: 0.06	Na	:
SS	:	Au	:	Tl	:
% SOL	:	Fe	:	Sn	:
G & O	:	Pb	: <0.05	Ti	:
Al	:	Mg	:	V	:
Sb	:	Mn	:	Zn	: 0.03
As	:	Hg	:	THM	:
Ba	:	Mo	:	TOC	:
Be	:	Ni	: 0.06		
Cd	:	Pd	:		

Remarks: All results in mg/l. The sample was homogenized then subjected to the EP Toxicity procedure as described in the May 19, 1980 Federal Register. Vol. 45, No. 98.

Ronald A. Bayer
Laboratory Director 7/7/89

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 77782-001 DATE REC'D: 89/07/13 DATE COLL'D: 89/07/13 STATUS: closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: B - D #186-26 W-13

REPORT TO: same
BILL TO: same

T COLI	:	Cr+6	:	COD	:
F COLI	:	Phenol	:	HARD-T	:
SPC	:	CN	:	Ca Hard	:
F	:	B	:	SO3	:
NO3	:	Br	:	Cl	:
NO2	:	Color	:	Alk	:
T-PO4	:	Odor	:	BOD-Inf	:
O-PO4	:	Turb	:	BOD-Eff	:
SO4	:	pH	:	BOD-S	:
MBAS	:	LI	:	TSS-Inf	:
SiO2	:	Cond	:	TSS-Eff	:
H2S	:	NH3-T	:	MLSS	:
NH3-C	:	TKN	:	MLVSS	:

VSS	:	Ca	:	K	:	
TS	:	Cr	: <0.05	Se	:	
VS	:	Co	:	Ag	:	
TDS	:	Cu	: <0.05	Na	:	
SS	:	Au	:	Tl	:	
% SOL	:	Fe	:	Sn	:	
G & O	:	Pb	: <0.05	Ti	:	
Al	:	Mg	:	V	:	
Sb	:	Mn	:	Zn	:	<0.05
As	:	Hg	:	THM	:	
Ba	:	Mo	:	TOC	:	
Be	:	Ni	: 0.06			
Cd	:	Pd	:			

Remarks: All results in mg/l. The sample was homogenized then subjected to the EP Toxicity procedure as described in the May 19, 1980 Federal Register. Vol. 45. No. 98.

Ronald A. Baver
Laboratory Director 7/17/89

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 77045-003 DATE REC'D: 89/06/20 DATE COLL'D: 89/06/19 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 2-W-21(CHIP)

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :		BOD-S :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
TS :		Cr :	0.42	Se :	
VS :		Co :		Ag :	
TDS :		Cu :	<0.01	Na :	
SS :		Au :		Tl :	
% SOL :	97%	Fe :		Sn :	
G & O :		Pb :	918 ug/l	Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	0.02
As :		Hg :	<0.4 ug/l	THM :	
Ba :		Mo :		TOC :	
Be :		Ni :	<0.04		
Cd :	<2.0 ug/l	Pd :			

Remarks: All results in mg/l unless otherwise indicated. The sample was homogenized then subjected to the EP Toxicity procedure as described in the May 19, 1980 Federal Register, Vol. 45, No. 98.

Ronald A. Baver
Laboratory Director 7/6/89

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Project #186-26

Samples Received 6/20/89

Lab. No.	Sample ID	TPH (mg/kg)
77045-001	2-W-20	2900
77045-002	2-W-21	27
77045-003	2-W-21 (CHIP)	1400
77045-004	2-W-24	26
77045-005	2-W-25	86
77045-006	2-W-23	56
77045-007	2-W-12X	11,000
77045-008	2-W-12W	1400
77045-009	2-W-12T	41
77045-010	2-W-12U	560
77045-011	2-W-12V	8800
77045-012	GRX-4	180
77045-013	2-W-22	3200

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 75597-002 DATE REC'D: 89/04/19 DATE COLL'D: 89/04/19 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 D - D C2

REPORT TO: same
BILL TO: same

T COLI:		Cr+A :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-In:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :		BOD-E :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		NLSS :	
NH3-L :		TKN :		MLVSS :	
VSS :		Ca :		K :	
TS :		Cr :	132	Se :	
VS :		Co :		Ag :	
TDS :		Cu :		Na :	
SS :		Au :		Tl :	
% SOL :		Fe :		Sn :	
G & O :		Pb :	<0.05	Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	
As :		Hg :		THM :	
Ba :		Mo :		TOC :	
Be :		Ni :			
Cd :		Pd :			

Remarks: All results in mg/l. The sample was homogenized then subjected to the EP Toxicity procedure as described in the May 19, 1980 Federal Register, Vol. 45, No. 98.

Ronald A. Bayer
Laboratory Director 5/18/89

New York State Department of Health Approved

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 75137-002 DATE REC'D: 89/04/21 DATE COLL'D: 89/04/21 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 C2 yellow concrete

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :	<1.0	Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :	7.0	BOD-S :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
TS :		Cr :	5500	Se :	
VS :		Co :		Ag :	
Ti :		Cu :	88	Na :	
SS :		Au :		Tl :	
% SOL :	98%	Fe :		Sn :	
G & O :		Pb :	560	Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	38
As :		Hg :	<0.07	THM :	
Ba :		Mo :		TOC :	
Be :		Ni :	130		
Cd :	<0.2	Pd :			

Remarks: All results in mg/kg dry weight.

Ronald A. Baver
Laboratory Director 5/3/89

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 75137-004 DATE REC'D: 89/04/21 DATE COLL'D: 89/04/21 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 C4 hard pan

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :	2.5	Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :	9.8	BOD-S :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
TS :		Cr :	23	Se :	
VS :		Co :		Ag :	
TDS :		Cu :	500	Na :	
SS :		Au :		Tl :	
% SOL :	93%	Fe :		Sn :	
O & O :		Pb :	46	Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	650
As :		Hg :	<0.08	THM :	
Ba :		Mo :		TOC :	
Be :		Ni :	7700		
Cd :	<0.22	Pd :			

Remarks: All results in mg/kg dry weight.

Ronald A. Baver
Laboratory Director 5/3/89

New York State Department of Health Approved

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Project #186-26

Samples Received 4/21/89

Lab. No.	Sample ID	TPH (mg/kg)
75137-001	C1	19,000
75137-002	C2	<51
75137-003	C3	38,000
75137-004	C4	<54

ERM-Northeast

BUILDING W SONICLEAN ROOM
CHIP SAMPLES

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: [illegible]052 DATE REC'D: [illegible] DATE COLL'D: 99/06/23 STATUS: Closed
CLIENT: EFM - Northeast
ATTN:
SPL LOCATION: #186-24 W-7

REPORT TO: same
BILL TO: same

T Coli:		Cr+6 :		COD :	
F Coli:		Phenol:		HARD-T:	
SPC :		CN :		Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		oil :		BOD-S :	
MBAS :		tl :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-N :		TKN :		MLVSS :	
Ash :		Ca :		K :	
TS :		Cr :	<0.01	Se :	
VS :		Co :		Ag :	
TDS :		Cu :	0.36	Na :	
SS :		Au :		Tl :	
% SOL :		Fe :		Sn :	
O & G :		Pb :	383 ug/l	Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	0.43
As :		Hg :		THM :	
Ba :		Mo :		TOC :	
Be :		Ni :	0.05		
Cd :		Pd :			

Remarks: All results in mg/l unless otherwise indicated. The sample was homogenized then subjected to the EP Toxicity procedure as described in the May 19, 1980 Federal Register, Vol. 45, No. 98.

Ronald A. Bayer
Laboratory Director 6/29/99

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: [illegible] DATE REC'D: 89/06/26 DATE COLL'D: 89/06/23 STATUS: Closed
LNAME: Site - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #1136-26 W-S

REPORT TO: same
BILL TO: same

T Coli:		Cr+6 :		COD :	
F Coli:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NOX :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :		BOD-S :	
MBAS :		Cl :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-N :		TKN :		MLVSS :	
VSS :		Ca :		K :	
TS :		Cr :	<0.01	Se :	
VS :		Co :		Ag :	
TDS :		Cu :	0.17	Na :	
SS :		Ni :		Tl :	
% SOL :		Fe :		Sn :	
O & G :		Pb :	62 ug/l	Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	0.14
As :		Hg :		THM :	
Ba :		Mo :		TOC :	
Be :		Ni :	<0.04		
Cd :		Pd :			

Remarks: All results in mg/l unless otherwise indicated. The sample was homogenized then subjected to the EP Toxicity procedure as described in the May 19, 1980 Federal Register, Vol. 45, No. 98.

Ronald A. Bayer
Laboratory Director 6/29/89

BUILDING W FLOOR PITS

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 75137-003 DATE REC'D: 89/04/21 DATE COLL'D: 89/04/21 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 C3 - dry sludge drain pit

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :	2.4	Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :	9.1	BOD-S :	
MBAS :		Ll :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
TS :		Cr :	94	Se :	
VS :		Co :		Ag :	
TDS :		Cu :	440	Na :	
SS :		Au :		Tl :	
% SOL :	99%	Fe :		Sn :	
G & O :		Pb :	550	Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	1400
As :		Hg :	24	THM :	
Ba :		Mo :		TOC :	
Be :		Ni :	130		
Cd :	1.5	Pd :			

Remarks: All results in mg/kg dry weight.

Ronald A. Baver
Laboratory Director 5/3/89

New York State Department of Health Approved

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 75597-003 DATE REC'D: 89/04/19 DATE COLL'D: 89/04/19 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 B - D C3

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :		Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :		BOD-S :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
1S :		Cr :	0.03	Se :	
VS :		Co :		Ag :	
1DS :		Cu :		Na :	
SS :		Au :		Tl :	
% SOL :		Fe :		Sn :	
G & O :		Pb :	<0.05	Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	
As :		Hg :	17 ug/l	THM :	
Ba :		Mo :		TOC :	
Be :		Ni :			
Cd :	0.006	Pd :			

Remarks: All results in mg/l unless otherwise indicated. The sample was homogenized then subjected to the EP Toxicity procedure as described in the May 19, 1980 Federal Register, Vol. 45, No. 98.

Ronald A. Bayer
Laboratory Director 5/24/89

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Project #186-26

Samples Received 4/21/89

Lab. No.	Sample ID	TPH (mg/kg)
75137-001	C1	19,000
75137-002	C2	<51
75137-003	C3	38,000
75137-004	C4	<54

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 75870-007 DATE REC'D: 89/05/13 DATE COLL'D: 89/05/12 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 FP-1

REPORT TO: same
BILL TO: same

T COLI		Cr+6		COD	
F COLI		Phenol		HARD-T	
SPC		CN	<1.0	Ca Hard	
F		B		SO3	
NO3		Br		Cl	
NO2		Color		Alk	
T-PO4		Odor		BOD-Inf	
O-PO4		Turb		BOD-Eff	
SO4		pH		BOD-S	
MBAS		LI		TSS-Inf	
SiO2		Cond		TSS-Eff	
H2S		NH3-T		MLSS	
NH3-C		TKN		MLVSS	
VSS		Ca		K	
TS		Cr	150	Se	
VS		Co		Ag	
TDS		Cu	2200	Na	
SS		Au		Tl	
% SOL	98%	Fe		Sn	
G & O		Pb	120	Ti	
Al		Mg		V	
Sb		Mn		Zn	970
As		Hg	<0.08	THM	
Ba		Mo		TOC	
Be		Ni	140		
Cd	1.1	Pd			

Remarks: All results in mg/kg dry weight.

Ronald A. Bayer
Laboratory Director 5/26/89

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client Name: ERM - Northeast

Lab Number: 75870-007

Project Name: 186-26

Date Collected: 5/12/89

Sample Location: FP-1

Date Received: 5/13/89

Matrix: H20

Date Analyzed: 5/23/89

Method: 601

Report Date: 5/31/89

CAS NO.	COMPOUND	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
74-87-3	Chloromethane	5.1		U
74-83-9	Bromomethane	5.1		U
75-71-8	Dichlorodifluoromethane	5.1		U
75-01-4	Vinyl chloride	5.1		U
75-00-3	Chloroethane	5.1		U
75-09-2	Methylene chloride	5.1		U
75-69-4	Trichlorofluoromethane	5.1		U
75-35-4	1,1-Dichloroethene	5.1		U
75-34-3	1,1-Dichloroethane	5.1		U
540-59-0	trans-1,2-Dichloroethene	5.1		U
67-66-3	Chloroform	5.1		U
107-02-2	1,2-Dichloroethane	5.1		U
71-55-6	1,1,1-Trichloroethane	5.1	320	
56-23-5	Carbon tetrachloride	5.1		U
75-27-4	Bromodichloromethane	5.1		U
78-87-5	1,2-Dichloropropane	5.1		U
10061-01-5	cis-1,3-Dichloropropene	5.1		U
79-01-6	Trichloroethene	5.1	120	
124-48-1	Dibromochloromethane	5.1		U
10061-02-6	trans-1,3-Dichloropropene	5.1		U
79-00-5	1,1,2-Trichloroethane	5.1		U
100-75-8	2-Chloroethylvinyl ether	5.1		U
75-25-2	Bromoform	5.1		U
79-34-5	1,1,2,2-Tetrachloroethane	5.1		U
127-18-4	Tetrachloroethene	5.1		U
108-90-7	Chlorobenzene	5.1		U
541-73-1	1,3-Dichlorobenzene	5.1		U
95-50-1	1,2-Dichlorobenzene	5.1		U
106-46-7	1,4-Dichlorobenzene	5.1		U

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client Name: ERM - Northeast

Project Name: 186-26

Sample Location: FP-1

Matrix: Soil

Method: EPA 602

Lab Number: 75870-007

Date Collected: 5/12/89

Date Received: 5/13/89

Date Analyzed: 5/23/89

Report Date: 5/31/89

CAS NO.	COMPOUND	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
71-43-2	Benzene	5.1		U
108-88-3	Toluene	5.1		U
108-90-7	Chlorobenzene	5.1		U
100-41-4	Ethylbenzene	5.1		U
541-73-1	1,3-Dichlorobenzene	5.1		U
95-50-1	1,2-Dichlorobenzene	5.1		U
106-46-7	1,4-Dichlorobenzene	5.1		U

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Project #186-26

Samples Received 5/13/89

Lab. No.	Sample ID	TPH (mg/kg)
75870-001	#1	4200
75870-002	#2	860
75870-003	#3	2500
75870-004	#4	<26
75870-005	#5	4500
75870-006	#6	880
75870-007	FP-1	14,000

BUILDING W TUNNELS

EnviroTest Laboratories Inc.

315 Fullerton Aver
Newburgh, NY 12
(914) 562-0890
Fax (914) 562-084

LAB#: 75870-002 DATE REC'D: 89/05/13 DATE COLL'D: 89/05/12 STATUS: cl
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 #2

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :	<1.6	Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :		BOD-S :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
TS :		Cr :	70	Se :	
VS :		Co :		Ag :	
TDS :		Cu :	16	Na :	
SS :		Au :		Tl :	
% SOL :	64%	Fe :		Sn :	
G & O :		Pb :	10	Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	15
As :		Hg :	<0.13	THM :	
Ba :		Mo :		TOC :	
Be :		Ni :	9.5		
Cd :	<0.78	Pd :			

Remarks: All results in mg/kg dry weight.

Ronald A. Bayer
Laboratory Director 5/30/89

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client Name: ERM - Northeast

Lab Number: 75870-002

Project Name: 186-26

Date Collected: 5/12/89

Sample Location: #2

Date Received: 5/13/89

Matrix: H20

Date Analyzed: 5/23/89

Method: 601

Report Date: 5/31/89

CAS NO.	COMPOUND	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
74-87-3	Chloromethane	3.1		U
74-83-9	Bromomethane	3.1		U
75-71-8	Dichlorodifluoromethane	3.1		U
75-01-4	Vinyl chloride	3.1		U
75-00-3	Chloroethane	3.1		U
75-09-2	Methylene chloride	3.1		U
75-69-4	Trichlorofluoromethane	3.1		U
75-35-4	1,1-Dichloroethene	3.1		U
75-34-3	1,1-Dichloroethane	3.1		U
540-59-0	trans-1,2-Dichloroethene	3.1		U
67-66-3	Chloroform	3.1		U
107-02-2	1,2-Dichloroethane	3.1		U
71-55-6	1,1,1-Trichloroethane	3.1	20	
56-23-5	Carbon tetrachloride	3.1		U
75-27-4	Bromodichloromethane	3.1		U
78-87-5	1,2-Dichloropropane	3.1		U
10061-01-5	cis-1,3-Dichloropropene	3.1		U
79-01-6	Trichloroethene	3.1	9.7	
124-48-1	Dibromochloromethane	3.1		U
10061-02-6	trans-1,3-Dichloropropene	3.1		U
79-00-5	1,1,2-Trichloroethane	3.1		U
100-75-8	2-Chloroethylvinyl ether	3.1		U
75-25-2	Bromoform	3.1		U
79-34-5	1,1,2,2-Tetrachloroethane	3.1		U
127-18-4	Tetrachloroethene	3.1		U
108-90-7	Chlorobenzene	3.1		U
541-73-1	1,3-Dichlorobenzene	3.1		U
95-50-1	1,2-Dichlorobenzene	3.1		U
106-46-7	1,4-Dichlorobenzene	3.1		U

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client Name: ERM - Northeast

Project Name: 186-26

Sample Location: #2

Matrix: H20

Method: EPA 602

Lab Number: 75870-002

Date Collected: 5/12/89

Date Received: 5/13/89

Date Analyzed: 5/23/89

Report Date: 5/31/89

CAS NO.	COMPOUND	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
71-43-2	Benzene	39		U
108-88-3	Toluene	39		U
100-41-4	Ethylbenzene	39		U

EnviroTest Laboratories Inc.

315 Fullerton Aver
Newburgh, NY 12
(914) 562-0890
Fax (914) 562-084

LAB#: 75870-003 DATE REC'D: 89/05/13 DATE COLL'D: 89/05/12 STATUS: Close
LNAME: ERM - northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 #3

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :	<1.9	Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :		BOD-S :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
TS :		Cr :	510	Se :	
VS :		Co :		Ag :	
TDS :		Cu :	420	Na :	
SS :		Au :		Tl :	
% SOL :	52%	Fe :		Sn :	
G & O :		Pb :	330	Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	540
As :		Hg :	0.73	THM :	
Ba :		Mo :		TOC :	
Be :		Ni :	79		
Cd :	<0.96	Pd :			

Remarks: All results in mg/kg dry weight.

Ronald A. Bayer
Laboratory Director 5/26/89

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client Name: ERM - Northeast

Lab Number: 75870-003

Project Name: 186-26

Date Collected: 5/12/89

Sample Location: #3

Date Received: 5/13/89

Matrix: H20

Date Analyzed: 5/24/89

Method: 601

Report Date: 5/31/89

CAS NO.	COMPOUND	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
74-87-3	Chloromethane	9.6		U
74-83-9	Bromomethane	9.6		U
75-71-8	Dichlorodifluoromethane	9.6		U
75-01-4	Vinyl chloride	9.6		U
75-00-3	Chloroethane	9.6		U
75-09-2	Methylene chloride	9.6		U
75-69-4	Trichlorofluoromethane	9.6		U
75-35-4	1,1-Dichloroethene	9.6	6.5	
75-34-3	1,1-Dichloroethane	9.6	690	
540-59-0	trans-1,2-Dichloroethene	9.6		U
67-66-3	Chloroform	9.6		U
107-02-2	1,2-Dichloroethane	9.6		U
71-55-6	1,1,1-Trichloroethane	9.6	5,860	
56-23-5	Carbon tetrachloride	9.6		U
75-27-4	Bromodichloromethane	9.6		U
78-87-5	1,2-Dichloropropane	9.6		U
10061-01-5	cis-1,3-Dichloropropene	9.6		U
79-01-6	Trichloroethene	9.6	21	
124-48-1	Dibromochloromethane	9.6		U
10061-02-6	trans-1,3-Dichloropropene	9.6		U
79-00-5	1,1,2-Trichloroethane	9.6		U
100-75-8	2-Chloroethylvinyl ether	9.6		U
75-25-2	Bromoform	9.6		U
79-34-5	1,1,2,2-Tetrachloroethane	9.6		U
127-18-4	Tetrachloroethene	9.6		U
108-90-7	Chlorobenzene	9.6		U
541-73-1	1,3-Dichlorobenzene	9.6		U
95-50-1	1,2-Dichlorobenzene	9.6		U
106-46-7	1,4-Dichlorobenzene	9.6		U

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client Name: ERM - Northeast

Project Name: 186-26

Sample Location: #3

Matrix: Soil

Method: EPA 602

Lab Number: 75870-003

Date Collected: 5/12/89

Date Received: 5/13/89

Date Analyzed: 5/24/89

Report Date: 5/31/89

CAS NO.	COMPOUND	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
71-43-2	Benzene	9.6		U
108-88-3	Toluene	9.6		U
108-90-7	Chlorobenzene	9.6		U
100-41-4	Ethylbenzene	9.6		U
541-73-1	1,3-Dichlorobenzene	9.6		U
95-50-1	1,2-Dichlorobenzene	9.6		U
106-46-7	1,4-Dichlorobenzene	9.6		U

EnviroTest Laboratories Inc.

315 Fullerton Avenu
Newburgh, NY 125
(914) 562-0890
Fax (914) 562-0841

LAB#: 75870-005 DATE REC'D: 89/05/13 DATE COLL'D: 89/05/12 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 #5

REPORT TO: same
BILL TO: same

T COLI		Cr+6		COD	
F COLI		Phenol		HARD-T	
SPC		CN	<1.0	Ca Hard	
F		B		SO3	
NO3		Br		Cl	
NO2		Color		Alk	
T-PO4		Odor		BOD-Inf	
O-PO4		Turb		BOD-Eff	
SO4		pH		BOD-S	
MBAS		LI		TSS-Inf	
SiO2		Cond		TSS-Eff	
H2S		NH3-T		MLSS	
NH3-C		TKN		MLVSS	
VSS		Ca		K	
TS		Cr	110	Se	
VS		Co		Ag	
TDS		Cu	180	Na	
SS		Au		Tl	
% SOL	100%	Fe		Sn	
G & O		Pb	20	Ti	
Al		Mg		V	
Sb		Mn		Zn	110
As		Hg	0.11	THM	
Ba		Mo		TOC	
Be		Ni	56		
Cd	1.5	Pd			

Remarks: All results in mg/kg dry weight.

Ronald A. Bayer
Laboratory Director 5/26/89

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 75870-006 DATE REC'D: 89/05/13 DATE COLL'D: 89/05/12 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 #6

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :	3.6	Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :		BOD-S :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
TS :		Cr :	1500	Se :	
VS :		Co :		Ag :	
TDS :		Cu :	1100	Na :	
SS :		Au :		Tl :	
% SOL :	33%	Fe :		Sn :	
G & O :		Pb :	82	Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	2600
As :		Hg :	1.7	THM :	
Ba :		Mo :		TOC :	
Be :		Ni :	1100		
Cd :	5.8	Pd :			

Remarks: All results in mg/kg dry weight.

Ronald A. Bayer
Laboratory Director 5/26/89

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Project #186-26

Samples Received 5/13/89

Lab. No.	Sample ID	TPH (mg/kg)
75870-001	#1	4200
75870-002	#2	860
75870-003	#3	2500
75870-004	#4	<26
75870-005	#5	4500
75870-006	#6	880
75870-007	FP-1	14,000

ERM-Northeast

BUILDING W TUNNEL TROUGH

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Project #186-26

Samples Received 4/21/89

Lab. No.	Sample ID	TPH (mg/kg)
75137-001	C1	19,000
75137-002	C2	<51
75137-003	C3	38,000
75137-004	C4	<54

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 75137-001 DATE REC'D: 89/04/21 DATE COLL'D: 89/04/21 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-26 C1 - tunnel trough

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :	3.0	Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :	8.0	BOD-S :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
TS :		Cr :	4000	Se :	
VS :		Co :		Ag :	
TDS :		Cu :	4300	Na :	
SS :		Au :		Tl :	
% SOL :	97%	Fe :		Sn :	
G & O :		Pb :	1200	Ti :	
Al :		Mg :		V :	
Sb :		Mn :		Zn :	1700
As :		Hg :	0.08	THM :	
Ba :		Mo :		TOC :	
Be :		Ni :	6900		
Cd :	1.2	Pd :			

Remarks: All results in mg/kg dry weight.

Ronald A. Bayer
Laboratory Director 5/3/89

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 75597-001 DATE REC'D: 89/04/19 DATE COLL'D: 89/04/19 STATUS: Closed
LNAME: EPM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #1P6-26 P - D C1

REPORT TO: same
BILL TO: same

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

Remarks: All results in mg/l. The sample was homogenized then subjected to the EP toxicity procedure as described in the May 19, 1980 Federal Register, Vol. 45, No. 98.

Ronald A. Bayer
Laboratory Director 5/18/89

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 73489-006 DATE REC'D: 89/02/28 DATE COLL'D: 89/02/27 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-23 B - D F6

REPORT TO: same
BILL TO: same

T COLI		Cr+6		COD	
F COLI		Phenol		HARD-T	
SPC		CN	<2.1	Ca Hard	
F		B		SO3	
NO3		Br		Cl	
NO2		Color		Alk	
T-PO4		Odor		BOD-Inf	
O-PO4		Turb		BOD-Eff	
SO4		pH		BOD-S	
MBAS		LI		TSS-Inf	
SiO2		Cond		TSS-Eff	
H2S		NH3-T		MLSS	
NH3-C		TKN		MLVSS	
VSS		Ca		K	
TS		Cr	250	Se	
VS		Co		Ag	8.1
TDS		Cu	150	Na	
SS		Au		Tl	<2.1
% SOL	47%	Fe		Sn	
G & O		Pb	140	Ti	
Al		Mg		V	
Sb	<11	Mn		Zn	150
As		Hg	<0.17	THM	
Ba		Mo		TOC	
Be	<1.1	Ni	120		
Cd	<0.43	Pd			

Remarks: All results in mg/kg dry weight.

Ronald A. Bayer
Laboratory Director 3/9/89

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client Name: ERM Northeast — Lab Number: 73489-006

Project Name: Becton Dickinson — Date Collected: 2/27/89

Sample Location: MW-6 — Date Received: 2/28/89

Matrix: Water — Date Analyzed: 3/2/89

Method: SW846-8240 — Report Date: 3/15/89

CAS NO.	COMPOUND	Detection Limit mg/kg	Conc. mg/kg	Data Qualifier
74-87-3	Chloromethane	21,200		U
74-83-9	Bromomethane	21,200		U
75-01-4	Vinyl chloride	21,200		U
75-00-3	Chloroethane	21,200		U
75-09-2	Methylene chloride	21,200		U
67-64-1	Acetone	21,200		U
75-15-0	Carbon disulfide	10,600		U
75-35-4	1,1-Dichloroethene	10,600		U
75-34-3	1,1-Dichloroethane	10,600		U
540-59-0	trans-1,2-Dichloroethene	10,600		U
67-66-3	Chloroform	10,600		U
107-02-2	1,2-Dichloroethane	10,600		U
78-93-3	2-Butanone	21,200		U
71-55-6	1,1,1-Trichloroethane	10,600	267,000	
56-23-5	Carbon tetrachloride	10,600		U
108-05-4	Vinyl acetate	21,200		U
75-27-4	Bromodichloromethane	10,600		U
78-87-5	1,2-Dichloropropane	10,600		U
10061-01-5	cis-1,3-Dichloropropene	10,600		U
79-01-6	Trichloroethene	10,600		U
71-43-2	Benzene	10,600		U
124-48-1	Dibromochloromethane	10,600		U
10061-02-6	trans-1,3-Dichloropropene	10,600		U
79-00-5	1,1,2-Trichloroethane	10,600		U
75-25-2	Bromoform	10,600		U
108-10-1	4-Methyl--2-pentanone	21,200		U
591-78-6	2-Hexanone	21,200		U
79-34-5	1,1,2,2-Tetrachloroethane	10,600		U
127-18-4	Tetrachloroethene	10,600		U
108-88-3	Toluene	10,600		U
108-90-7	Chlorobenzene	10,600		U
100-41-4	Ethylbenzene	10,600		U
100-42-5	Styrene	10,600		U
133-02-7	m-Xylene	10,600		U
133-02-7	o,p-Xylene	10,600		U

PCB ORGANICS ANALYSIS DATA SHEET

Client Name: ERM Northeast

Project Name: Becton Dickinson

Sample Location: F 6

Matrix: Soil

Method: EPA 608

Lab Number: 73489-006

Date Collected: 2/27/89

Date Received: 2/28/89

Date Extracted: 2/28/89

Date Analyzed: 3/6/89

Report Date: 3/10/89

CAS NO.	COMPOUND	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
12674-11-2	Arochlor-1016	3600		U
11104-28-2	Arochlor-1221	3600		U
11141-16-5	Arochlor-1232	3600		U
53469-21-9	Arochlor-1242	3600		U
12672-29-6	Arochlor-1248	2200		U
11097-69-1	Arochlor-1254	2200		U
11096-82-5	Arochlor-1260	2200		U

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Becton Dickinson

Samples Received 2/28/89

Lab. No.	Sample ID	TPH (mg/kg)
73489-001	A	<22
73489-002	B	1800
73489-003	C	1400
73489-004	D	1700
73489-005	E	7000
73489-006	F6	21,000
73489-007	G	5000
73489-008	Field Blank	0.5 mg/l

STORMWATER DRAINAGE SYSTEM

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 73489-001 DATE REC'D: 89/02/28 DATE COLL'D: 89/02/27 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-23 B - D #1

REPORT TO: same
BILL TO: same

T COLI		Cr+6		COD	
F COLI		Phenol		HARD-T	
SPC		CN	<1.3	Ca Hard	
F		B		SO3	
NO3		Br		Cl	
NO2		Color		Alk	
T-PO4		Odor		BOD-Inf	
O-PO4		Turb		BOD-Eff	
SO4		pH		BOD-S	
MBAS		LI		TSS-Inf	
SiO2		Cond		TSS-Eff	
H2S		NH3-T		MLSS	
NH3-C		TKN		MLVSS	
VSS		Ca		K	
TS		Cr	2.9	Se	
VS		Co		Ag	<1.3
TDS		Cu	9.7	Na	
SS		Au		Tl	<1.3
% SOL	77%	Fe		Sn	
G & O		Pb	7.2	Ti	
Al		Mg		V	
Sb	<6.5	Mn		Zn	20
As		Hg	0.21	THM	
Ba		Mo		TOC	
Be	<0.65	Ni	<5.2		
Cd	<0.26	Pd			

Remarks: All results in mg/kg dry weight.

Ronald A. Bayer
Laboratory Director 3/9/89

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client Name: ERM Northeast
Lab Number: 73489-001

Project Name: Becton Dickinson
Date Collected: 2/27/89

Sample Location: A1
Date Received: 2/28/89

Matrix: Soil
Date Analyzed: 3/2/89

Method: SW846-8240
Report Date: 3/15/89

CAS NO.	COMPOUND	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
74-87-3	Chloromethane	12		U
74-83-9	Bromomethane	12		U
75-01-4	Vinyl chloride	12		U
75-00-3	Chloroethane	12		U
75-09-2	Methylene chloride	12		U
67-64-1	Acetone	12		U
75-15-0	Carbon disulfide	6.1		U
75-35-4	1,1-Dichloroethene	6.1		U
75-34-3	1,1-Dichloroethane	6.1		U
540-59-0	trans-1,2-Dichloroethene	6.1		U
67-66-3	Chloroform	6.1		U
107-02-2	1,2-Dichloroethane	6.1		U
78-93-3	2-Butanone	12		U
71-55-6	1,1,1-Trichloroethane	6.1	6.9	
56-23-5	Carbon tetrachloride	6.1		U
108-05-4	Vinyl acetate	12		U
75-27-4	Bromodichloromethane	6.1		U
78-87-5	1,2-Dichloropropane	6.1		U
10061-01-5	cis-1,3-Dichloropropene	6.1		U
79-01-6	Trichloroethene	6.1		U
71-43-2	Benzene	6.1		U
124-48-1	Dibromochloromethane	6.1		U
10061-02-6	trans-1,3-Dichloropropene	6.1		U
79-00-5	1,1,2-Trichloroethane	6.1		U
75-25-2	Bromoform	6.1		U
108-10-1	4-Methyl--2-pentanone	12		U
591-78-6	2-Hexanone	12		U
79-34-5	1,1,2,2-Tetrachloroethane	6.1		U
127-18-4	Tetrachloroethene	6.1		U
108-88-3	Toluene	6.1		U
108-90-7	Chlorobenzene	6.1		U
100-41-4	Ethylbenzene	6.1		U
100-42-5	Styrene	6.1		U
133-02-7	m-Xylene	6.1		U
133-02-7	o,p-Xylene	6.1		U

PCB ORGANICS ANALYSIS DATA SHEET

Client Name: ERM Northeast

Project Name: Becton Dickinson

Sample Location: # 1

Matrix: Soil

Method: EPA 608

Lab Number: 73489-001

Date Collected: 2/27/89

Date Received: 2/28/89

Date Extracted: 2/28/89

Date Analyzed: 3/6/89

Report Date: 3/10/89

CAS NO.	COMPOUND	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
12674-11-2	Arochlor-1016	22		U
11104-28-2	Arochlor-1221	22		U
11141-16-5	Arochlor-1232	22		U
53469-21-9	Arochlor-1242	22		U
12672-29-6	Arochlor-1248	22		U
11097-69-1	Arochlor-1254	22		U
11096-82-5	Arochlor-1260	22		U

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Becton Dickinson

Samples Received 2/28/89

Lab. No.	Sample ID	TPH (mg/kg)
73489-001	A 1	<22
73489-002	B	1800
73489-003	C	1400
73489-004	D	1700
73489-005	E	7000
73489-006	F	21,000
73489-007	G	5000
73489-008	Field Blank	0.5 mg/l

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 73489-002 DATE REC'D: 89/02/28 DATE COLL'D: 89/02/27 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-23 B - D #2

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :	<1.5	Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :		BOD-S :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
TS :		Cr :	12	Se :	
VS :		Co :		Ag :	1.8
TDS :		Cu :	79	Na :	
SS :		Au :		Tl :	<1.5
% SOL :	68%	Fe :		Sn :	
G & O :		Pb :	190	Ti :	
Al :		Mg :		V :	
Sb :	<7.4	Mn :		Zn :	410
As :		Hg :	0.24	THM :	
Ba :		Mo :		TOC :	
Be :	<0.74	Ni :	9.9		
Cd :	0.68	Pd :			

Remarks: All results in mg/kg dry weight.

Ronald A. Bayer
Laboratory Director 3/9/89

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client Name: ERM Northeast — Lab Number: 73489-002

Project Name: Becton Dickinson — Date Collected: 2/27/89

Sample Location: B2 — Date Received: 2/28/89

Matrix: Soil — Date Analyzed: 3/2/89

Method: SW846-8240 — Report Date: 3/15/89

CAS NO.	COMPOUND	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
74-87-3	Chloromethane	15		U
74-83-9	Bromomethane	15		U
75-01-4	Vinyl chloride	15		U
75-00-3	Chloroethane	15		U
75-09-2	Methylene chloride	15		U
67-64-1	Acetone	15		U
75-15-0	Carbon disulfide	7.4		U
75-35-4	1,1-Dichloroethene	7.4		U
75-34-3	1,1-Dichloroethane	7.4		U
540-59-0	trans-1,2-Dichloroethene	7.4		U
67-66-3	Chloroform	7.4		U
107-02-2	1,2-Dichloroethane	7.4		U
78-93-3	2-Butanone	15		U
71-55-6	1,1,1-Trichloroethane	7.4		U
56-23-5	Carbon tetrachloride	7.4		U
108-05-4	Vinyl acetate	15		U
75-27-4	Bromodichloromethane	7.4		U
78-87-5	1,2-Dichloropropane	7.4		U
10061-01-5	cis-1,3-Dichloropropene	7.4		U
79-01-6	Trichloroethene	7.4		U
71-43-2	Benzene	7.4		U
124-48-1	Dibromochloromethane	7.4		U
10061-02-6	trans-1,3-Dichloropropene	7.4		U
79-00-5	1,1,2-Trichloroethane	7.4		U
75-25-2	Bromoform	7.4		U
108-10-1	4-Methyl--2-pentanone	15		U
591-78-6	2-Hexanone	15		U
79-34-5	1,1,2,2-Tetrachloroethane	7.4		U
127-18-4	Tetrachloroethene	7.4		U
108-88-3	Toluene	7.4		U
108-90-7	Chlorobenzene	7.4		U
100-41-4	Ethylbenzene	7.4		U
100-42-5	Styrene	7.4		U
133-02-7	m-Xylene	7.4		U
133-02-7	o,p-Xylene	7.4		U

PCB ORGANICS ANALYSIS DATA SHEET

Client Name: ERM Northeast

Project Name: Becton Dickinson

Sample Location: B 2

Matrix: Soil

Method: EPA 608

Lab Number: 73489-002

Date Collected: 2/27/89

Date Received: 2/28/89

Date Extracted: 2/28/89

Date Analyzed: 3/6/89

Report Date: 3/10/89

CAS NO.	COMPOUND	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
12674-11-2	Arochlor-1016	500		U
11104-28-2	Arochlor-1221	500		U
11141-16-5	Arochlor-1232	500		U
53469-21-9	Arochlor-1242	500		U
12672-29-6	Arochlor-1248	500		U
11097-69-1	Arochlor-1254	500		U
11096-82-5	Arochlor-1260	500		U

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Becton Dickinson

Samples Received 2/28/89

Lab. No.	Sample ID	TPH (mg/kg)
73489-001	A	<22
73489-002	B 2	1800
73489-003	C	1400
73489-004	D	1700
73489-005	E	7000
73489-006	F	21,000
73489-007	G	5000
73489-008	Field Blank	0.5 mg/l

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 73489-003 DATE REC'D: 89/02/28 DATE COLL'D: 89/02/27 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-23 B - D #3

REPORT TO: same
BILL TO: same

T COLI		Cr+6		COD	
F COLI		Phenol		HARD-T	
SPC		CN	<1.4	Ca Hard	
F		B		SO3	
NO3		Br		Cl	
NO2		Color		Alk	
T-PO4		Odor		BOD-Inf	
O-PO4		Turb		BOD-Eff	
SO4		pH		BOD-S	
MBAS		LI		TSS-Inf	
SiO2		Cond		TSS-Eff	
H2S		NH3-T		MLSS	
NH3-C		TKN		MLVSS	
VSS		Ca		K	
TS		Cr	12	Se	
VS		Co		Ag	<1.4
TDS		Cu	320	Na	
SS		Au		Tl	<1.4
% SOL	74%	Fe		Sn	
G & O		Pb	120	Ti	
Al		Mg		V	
Sb	<6.8	Mn		Zn	230
As		Hg	<0.11	THM	
Ba		Mo		TOC	
Be	<0.68	Ni	14		
Cd	0.36	Pd			

Remarks: All results in mg/kg dry weight.

Ronald A. Bayer
Laboratory Director 3/13/89

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client Name: ERM Northeast
Lab Number: 73489-003

Project Name: Becton Dickinson
Date Collected: 2/27/89

Sample Location: # 3
Date Received: 2/28/89

Matrix: Soil
Date Analyzed: 3/2/89

Method: SW846-8240
Report Date: 3/15/89

CAS NO.	COMPOUND	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
74-87-3	Chloromethane	14		U
74-83-9	Bromomethane	14		U
75-01-4	Vinyl chloride	14		U
75-00-3	Chloroethane	14		U
75-09-2	Methylene chloride	14		U
67-64-1	Acetone	14		U
75-15-0	Carbon disulfide	6.9	3.4	J
75-35-4	1,1-Dichloroethene	6.9		U
75-34-3	1,1-Dichloroethane	6.9		U
540-59-0	trans-1,2-Dichloroethene	6.9		U
67-66-3	Chloroform	6.9		U
107-02-2	1,2-Dichloroethane	6.9		U
78-93-3	2-Butanone	14		U
71-55-6	1,1,1-Trichloroethane	6.9	24	
56-23-5	Carbon tetrachloride	6.9		U
108-05-4	Vinyl acetate	14		U
75-27-4	Bromodichloromethane	6.9		U
78-87-5	1,2-Dichloropropane	6.9		U
10061-01-5	cis-1,3-Dichloropropene	6.9		U
79-01-6	Trichloroethene	6.9		U
71-43-2	Benzene	6.9	1.4	J
124-48-1	Dibromochloromethane	6.9		U
10061-02-6	trans-1,3-Dichloropropene	6.9		U
79-00-5	1,1,2-Trichloroethane	6.9		U
75-25-2	Bromoform	6.9		U
108-10-1	4-Methyl--2-pentanone	14		U
591-78-6	2-Hexanone	14		U
79-34-5	1,1,2,2-Tetrachloroethane	6.9		U
127-18-4	Tetrachloroethene	6.9		U
108-88-3	Toluene	6.9	7.1	
108-90-7	Chlorobenzene	6.9		U
100-41-4	Ethylbenzene	6.9	13	
100-42-5	Styrene	6.9		U
133-02-7	m-Xylene	6.9	22	
133-02-7	o,p-Xylene	6.9	24	

PCB ORGANICS ANALYSIS DATA SHEET

Client Name: ERM Northeast

Project Name: Becton Dickinson

Sample Location: @ 9

Matrix: Soil

Method: EPA 608

Lab Number: 73489-003

Date Collected: 2/27/89

Date Received: 2/28/89

Date Extracted: 2/28/89

Date Analyzed: 3/6/89

Report Date: 3/10/89

CAS NO.	COMPOUND	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
12674-11-2	Arochlor-1016	460		U
11104-28-2	Arochlor-1221	460		U
11141-16-5	Arochlor-1232	460		U
53469-21-9	Arochlor-1242	460		U
12672-29-6	Arochlor-1248	460		U
11097-69-1	Arochlor-1254	460		U
11096-82-5	Arochlor-1260	460		U

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Becton Dickinson

Samples Received 2/28/89

Lab. No.	Sample ID	TPH (mg/kg)
73489-001	A	<22
73489-002	B	1800
73489-003	C	1400
73489-004	D	1700
73489-005	E	7000
73489-006	F	21,000
73489-007	G	5000
73489-008	Field Blank	0.5 mg/l

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 73489-004 DATE REC'D: 89/02/28 DATE COLL'D: 89/02/27 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-23 B - D #4

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :	<1.4	Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :		BOD-S :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
TS :		Cr :	19	Se :	
VS :		Co :		Ag :	1.5
TDS :		Cu :	250	Na :	
SS :		Au :		Tl :	<1.4
% SOL :	73%	Fe :		Sn :	
G & O :		Pb :	290	Ti :	
Al :		Mg :		V :	
Sb :	<6.9	Mn :		Zn :	430
As :		Hg :	1.0	THM :	
Ba :		Mo :		TOC :	
Be :	<0.69	Ni :	19		
Cd :	0.36	Pd :			

Remarks: All results in mg/kg dry weight.

Ronald A. Bayer
Laboratory Director 3/9/89

PCB ORGANICS ANALYSIS DATA SHEET

Client Name: ERM Northeast

Project Name: Becton Dickinson

Sample Location: SB 4

Matrix: Soil

Method: EPA 608

Lab Number: 73489-004

Date Collected: 2/27/89

Date Received: 2/28/89

Date Extracted: 2/28/89

Date Analyzed: 3/6/89

Report Date: 3/10/89

CAS NO.	COMPOUND	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
12674-11-2	Arochlor-1016	1800		U
11104-28-2	Arochlor-1221	1800		U
11141-16-5	Arochlor-1232	1800		U
53469-21-9	Arochlor-1242	1800		U
12672-29-6	Arochlor-1248	1800		U
11097-69-1	Arochlor-1254	1800	2800	
11096-82-5	Arochlor-1260	1800		U

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Becton Dickinson

Samples Received 2/28/89

Lab. No.	Sample ID	TPH (mg/kg)
73489-001	A	<22
73489-002	B	1800
73489-003	C	1400
73489-004	D	1700
73489-005	E	7000
73489-006	F	21,000
73489-007	G	5000
73489-008	Field Blank	0.5 mg/l

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 73489-005 DATE REC'D: 89/02/28 DATE COLL'D: 89/02/27 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-23 B - D #5

REPORT TO: same
BILL TO: same

T COLI		Cr+6		COD	
F COLI		Phenol		HARD-T	
SPC		CN	<1.4	Ca Hard	
F		B		SO3	
NO3		Br		Cl	
NO2		Color		Alk	
T-PO4		Odor		BOD-Inf	
O-PO4		Turb		BOD-Eff	
SO4		pH		BOD-S	
MBAS		LI		TSS-Inf	
SiO2		Cond		TSS-Eff	
H2S		NH3-T		MLSS	
NH3-C		TKN		MLVSS	
VSS		Ca		K	
TS		Cr	40	Se	
VS		Co		Ag	1.5
TDS		Cu	130	Na	
SS		Au		Tl	<1.4
% SOL	72%	Fe		Sn	
G & O		Pb	220	Ti	
Al		Mg		V	
Sb	<6.9	Mn		Zn	340
As		Hg	1.2	THM	
Ba		Mo		TOC	
Be	<0.69	Ni	43		
Cd	0.72	Pd			

Remarks: All results in mg/kg dry weight.

Ronald A. Bayer
Laboratory Director 3/9/89

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client Name: ERM Northeast — Lab Number: 73489-005

Project Name: Becton Dickinson — Date Collected: 2/27/89

Sample Location: [redacted] 5 — Date Received: 2/28/89

Matrix: Soil — Date Analyzed: 3/2/89

Method: SW846-8240 — Report Date: 3/15/89

CAS NO.	COMPOUND	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
74-87-3	Chloromethane	13		U
74-83-9	Bromomethane	13		U
75-01-4	Vinyl chloride	13		U
75-00-3	Chloroethane	13		U
75-09-2	Methylene chloride	13		U
67-64-1	Acetone	13		U
75-15-0	Carbon disulfide	6.6	3.0	J
75-35-4	1,1-Dichloroethene	6.6		U
75-34-3	1,1-Dichloroethane	6.6		U
540-59-0	trans-1,2-Dichloroethene	6.6	29	
67-66-3	Chloroform	6.6		U
107-02-2	1,2-Dichloroethane	6.6		U
78-93-3	2-Butanone	13		U
71-55-6	1,1,1-Trichloroethane	6.6	650	
56-23-5	Carbon tetrachloride	6.6		U
108-05-4	Vinyl acetate	13		U
75-27-4	Bromodichloromethane	6.6		U
78-87-5	1,2-Dichloropropane	6.6		U
10061-01-5	cis-1,3-Dichloropropene	6.6		U
79-01-6	Trichloroethene	6.6	39	
71-43-2	Benzene	6.6		U
124-48-1	Dibromochloromethane	6.6		U
10061-02-6	trans-1,3-Dichloropropene	6.6		U
79-00-5	1,1,2-Trichloroethane	6.6		U
75-25-2	Bromoform	6.6		U
108-10-1	4-Methyl--2-pentanone	13		U
591-78-6	2-Hexanone	13		U
79-34-5	1,1,2,2-Tetrachloroethane	6.6		U
127-18-4	Tetrachloroethene	6.6	3.9	J
108-88-3	Toluene	6.6		U
108-90-7	Chlorobenzene	6.6		U
100-41-4	Ethylbenzene	6.6		U
100-42-5	Styrene	6.6		U
133-02-7	m-Xylene	6.6		U
133-02-7	o,p-Xylene	6.6		U

PCB ORGANICS ANALYSIS DATA SHEET

Client Name: ERM Northeast

Project Name: Becton Dickinson

Sample Location: B 5

Matrix: Soil

Method: EPA 608

Lab Number: 73489-005

Date Collected: 2/27/89

Date Received: 2/28/89

Date Extracted: 2/28/89

Date Analyzed: 3/6/89

Report Date: 3/10/89

CAS NO.	COMPOUND	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
12674-11-2	Arochlor-1016	690		U
11104-28-2	Arochlor-1221	690		U
11141-16-5	Arochlor-1232	690		U
53469-21-9	Arochlor-1242	690		U
12672-29-6	Arochlor-1248	690		U
11097-69-1	Arochlor-1254	690	960	
11096-82-5	Arochlor-1260	690		U

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Becton Dickinson

Samples Received 2/28/89

Lab. No.	Sample ID	TPH (mg/kg)
73489-001	A	<22
73489-002	B	1800
73489-003	C	1400
73489-004	D	1700
73489-005	#5	7000
73489-006	F	21,000
73489-007	G	5000
73489-008	Field Blank	0.5 mg/l

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 73489-006 DATE REC'D: 89/02/28 DATE COLL'D: 89/02/27 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-23 B - D #6

REPORT TO: same
BILL TO: same

T COLI		Cr+6		COD	
F COLI		Phenol		HARD-T	
SPC		CN	<2.1	Ca Hard	
F		B		SO3	
NO3		Br		Cl	
NO2		Color		Alk	
T-PO4		Odor		BOD-Inf	
O-PO4		Turb		BOD-Eff	
SO4		pH		BOD-S	
MBAS		LI		TSS-Inf	
SiO2		Cond		TSS-Eff	
H2S		NH3-T		MLSS	
NH3-C		TKN		MLVSS	
VSS		Ca		K	
TS		Cr	250	Se	
VS		Co		Ag	8.1
TDS		Cu	150	Na	
SS		Au		Tl	<2.1
% SOL	47%	Fe		Sn	
G & O		Pb	140	Ti	
Al		Mg		V	
Sb	<11	Mn		Zn	150
As		Hg	<0.17	THM	
Ba		Mo		TOC	
Be	<1.1	Ni	120		
Cd	<0.43	Pd			

Remarks: All results in mg/kg dry weight.

Ronald A. Bayer
Laboratory Director 3/9/89

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client Name: ERM Northeast — Lab Number: 73489-006

Project Name: Becton Dickinson — Date Collected: 2/27/89

Sample Location: F 6 — Date Received: 2/28/89

Matrix: Water — Date Analyzed: 3/2/89

Method: SW846-8240 — Report Date: 3/15/89

CAS NO.	COMPOUND	Detection Limit mg/kg	Conc. mg/kg	Data Qualifier
74-87-3	Chloromethane	21,200		U
74-83-9	Bromomethane	21,200		U
75-01-4	Vinyl chloride	21,200		U
75-00-3	Chloroethane	21,200		U
75-09-2	Methylene chloride	21,200		U
67-64-1	Acetone	21,200		U
75-15-0	Carbon disulfide	10,600		U
75-35-4	1,1-Dichloroethene	10,600		U
75-34-3	1,1-Dichloroethane	10,600		U
540-59-0	trans-1,2-Dichloroethene	10,600		U
67-66-3	Chloroform	10,600		U
107-02-2	1,2-Dichloroethane	10,600		U
78-93-3	2-Butanone	21,200		U
71-55-6	1,1,1-Trichloroethane	10,600	267,000	
56-23-5	Carbon tetrachloride	10,600		U
108-05-4	Vinyl acetate	21,200		U
75-27-4	Bromodichloromethane	10,600		U
78-87-5	1,2-Dichloropropane	10,600		U
10061-01-5	cis-1,3-Dichloropropene	10,600		U
79-01-6	Trichloroethene	10,600		U
71-43-2	Benzene	10,600		U
124-48-1	Dibromochloromethane	10,600		U
10061-02-6	trans-1,3-Dichloropropene	10,600		U
79-00-5	1,1,2-Trichloroethane	10,600		U
75-25-2	Bromoform	10,600		U
108-10-1	4-Methyl--2-pentanone	21,200		U
591-78-6	2-Hexanone	21,200		U
79-34-5	1,1,2,2-Tetrachloroethane	10,600		U
127-18-4	Tetrachloroethene	10,600		U
108-88-3	Toluene	10,600		U
108-90-7	Chlorobenzene	10,600		U
100-41-4	Ethylbenzene	10,600		U
100-42-5	Styrene	10,600		U
133-02-7	m-Xylene	10,600		U
133-02-7	o,p-Xylene	10,600		U

PCB ORGANICS ANALYSIS DATA SHEET

Client Name: ERM Northeast

Project Name: Becton Dickinson

Sample Location: F 6

Matrix: Soil

Method: EPA 608

Lab Number: 73489-006

Date Collected: 2/27/89

Date Received: 2/28/89

Date Extracted: 2/28/89

Date Analyzed: 3/6/89

Report Date: 3/10/89

CAS NO.	COMPOUND	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
12674-11-2	Arochlor-1016	3600		U
11104-28-2	Arochlor-1221	3600		U
11141-16-5	Arochlor-1232	3600		U
53469-21-9	Arochlor-1242	3600		U
12672-29-6	Arochlor-1248	2200		U
11097-69-1	Arochlor-1254	2200		U
11096-82-5	Arochlor-1260	2200		U

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Becton Dickinson

Samples Received 2/28/89

Lab. No.	Sample ID	TPH (mg/kg)
73489-001	A	<22
73489-002	B	1800
73489-003	C	1400
73489-004	D	1700
73489-005	E	7000
73489-006	F6	21,000
73489-007	G	5000
73489-008	Field Blank	0.5 mg/l

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

LAB#: 73489-007 DATE REC'D: 89/02/28 DATE COLL'D: 89/02/27 STATUS: Closed
LNAME: ERM - Northeast FNAME:
STREET: CITY: STATE: ZIP:
SPL LOCATION: #186-23 B - D #7

REPORT TO: same
BILL TO: same

T COLI:		Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	
SPC :		CN :	<1.8	Ca Hard:	
F :		B :		SO3 :	
NO3 :		Br :		Cl :	
NO2 :		Color :		Alk :	
T-PO4 :		Odor :		BOD-Inf:	
O-PO4 :		Turb :		BOD-Eff:	
SO4 :		pH :		BOD-S :	
MBAS :		LI :		TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
TS :		Cr :	36	Se :	
VS :		Co :		Ag :	10
TDS :		Cu :	240	Na :	
SS :		Au :		Tl :	<1.8
% SOL :	57%	Fe :		Sn :	
G & O :		Pb :	440	Ti :	
Al :		Mg :		V :	
Sb :	<8.8	Mn :		Zn :	530
As :		Hg :	1.2	THM :	
Ba :		Mo :		TOC :	
Be :	<0.88	Ni :	31		
Cd :	0.68	Pd :			

Remarks: All results in mg/kg dry weight.

Ronald A. Bayer
Laboratory Director 3/9/89

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client Name: ERM Northeast — Lab Number: 73489-007

Project Name: Becton Dickinson — Date Collected: 2/27/89

Sample Location: [redacted] — Date Received: 2/28/89

Matrix: Soil — Date Analyzed: 3/11/89

Method: SW846-8240 — Report Date: 3/15/89

CAS NO.	COMPOUND	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
74-87-3	Chloromethane	18		U
74-83-9	Bromomethane	18		U
75-01-4	Vinyl chloride	18		U
75-00-3	Chloroethane	18		U
75-09-2	Methylene chloride	18		U
67-64-1	Acetone	18		U
75-15-0	Carbon disulfide	8.8		U
75-35-4	1,1-Dichloroethene	8.8		U
75-34-3	1,1-Dichloroethane	8.8		U
540-59-0	trans-1,2-Dichloroethene	8.8		U
67-66-3	Chloroform	8.8		U
107-02-2	1,2-Dichloroethane	8.8		U
78-93-3	2-Butanone	18		U
71-55-6	1,1,1-Trichloroethane	8.8		U
56-23-5	Carbon tetrachloride	8.8		U
108-05-4	Vinyl acetate	18		U
75-27-4	Bromodichloromethane	8.8		U
78-87-5	1,2-Dichloropropane	8.8		U
10061-01-5	cis-1,3-Dichloropropene	8.8		U
79-01-6	Trichloroethene	8.8		U
71-43-2	Benzene	8.8		U
124-48-1	Dibromochloromethane	8.8		U
10061-02-6	trans-1,3-Dichloropropene	8.8		U
79-00-5	1,1,2-Trichloroethane	8.8		U
75-25-2	Bromoform	8.8		U
108-10-1	4-Methyl--2-pentanone	18		U
591-78-6	2-Hexanone	18		U
79-34-5	1,1,2,2-Tetrachloroethane	8.8		U
127-18-4	Tetrachloroethene	8.8		U
108-88-3	Toluene	8.8		U
108-90-7	Chlorobenzene	8.8		U
100-41-4	Ethylbenzene	8.8		U
100-42-5	Styrene	8.8		U
133-02-7	m-Xylene	8.8		U
133-02-7	o,p-Xylene	8.8		U

PCB ORGANICS ANALYSIS DATA SHEET

Client Name: ERM Northeast

Project Name: Becton Dickinson

Sample Location: [illegible]7

Matrix: Soil

Method: EPA 608

Lab Number: 73489-007

Date Collected: 2/27/89

Date Received: 2/28/89

Date Extracted: 2/28/89

Date Analyzed: 3/6/89

Report Date: 3/10/89

CAS NO.	COMPOUND	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
12674-11-2	Arochlor-1016	15,000		U
11104-28-2	Arochlor-1221	15,000		U
11141-16-5	Arochlor-1232	15,000		U
53469-21-9	Arochlor-1242	15,000		U
12672-29-6	Arochlor-1248	15,000		U
11097-69-1	Arochlor-1254	15,000	25,000	
11096-82-5	Arochlor-1260	15,000		U

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast
Becton Dickinson

Samples Received 2/28/89

Lab. No.	Sample ID	TPH (mg/kg)
73489-001	A	<22
73489-002	B	1800
73489-003	C	1400
73489-004	D	1700
73489-005	E	7000
73489-006	F	21,000
73489-007	G	5000
73489-008	Field Blank	0.5 mg/l

INORGANIC DATA SHEET

Envirotest Laboratories
Client: ERM - Northeast
Date Collected: 11/11/87
Job #: 186-12

Lab # 87/059543 - 025
Spl location: ~~232-01~~ 8
Date Received: 11/13/87

Elements Identified and Measured

Matrix: soil

Units: mg/kg

1.	Aluminum	13. Magnesium	
2.	Antimony 227	14. Manganese	
3.	Arsenic 4.5 U	15. Mercury	16
4.	Barium	16. Nickel	4925
5.	Beryllium 2.3	17. Potassium	
6.	Cadmium 4.5 U	18. Selenium	4.5 U
7.	Calcium	19. Silver	55
8.	Chromium 4940	20. Sodium	
9.	Cobalt	21. Thallium	45 U
10.	Copper 1282	22. Vanadium	
11.	Iron	23. Zinc	1027
12.	Lead 16560		
	Cyanide 59	Percent Solids 22	
	Phenol		

ICP Interelement and background corrections applied? _NO__

If yes, corrections applied before_____or after_____generation of raw data.

U = Sample analyzed results less than detection limit.

Comments: __Dates analyzed CR,CU,ZN,NI_-_11/17_____
__PB,CD_-_11/14__HG_-_11/15&16_____

Ronald A. Bayer
Laboratory Director
19 NOV., 1987

Organics Analysis Data Sheet

Client Name: ERM NORTHEAST

Date Received: November 13, 1987

Project # 186.12 Becton-Dickinson

Date Collected: November 11, 1987

Laboratory Number: 59543-025

Matrix: Soil

Sample Location: ~~232-01~~ 8

Method: SW846 - 8240

Volatile Compounds

C.A.S. Number		ug/kg	C.A.S. Number		ug/kg
74-87-3	Chloromethane	230.U	78-87-5	1,2-Dichloropropane	230.U
74-83-9	Bromomethane	230.U	10061-02-6	Trans-1,3-Dichloropropene	230.U
75-01-4	Vinyl Chloride	230.U	79-01-6	Trichloroethene	1000
75-00-3	Chloroethane	230.U	124-48-1	Dibromochloromethane	230.U
75-09-2	Methylene Chloride	230.U	79-00-5	1,1,2-Trichloroethane	230.U
67-64-1	Acetone	12,000	71-43-2	Benzene	230.U
75-15-0	Carbon Disulfide	1200	10061-01-5	cis-1,3-Dichloropropene	230.U
75-35-4	1,1-Dichloroethene	230.U	110-75-8	2-Chloroethylvinylether	230.U
75-34-3	1,1-Dichloroethane	3600	75-25-2	Bromoform	230.U
156-60-5	Trans-1,2-Dichloroethene	1000	108-10-1	4-Methyl-2-Pentanone	3600
67-66-3	Chloroform	320	591-78-6	2-Hexanone	230.U
107-02-2	1,2-Dichloroethane	230.U	127-18-4	Tetrachloroethene	860
78-93-3	2-Butanone	230.U	79-34-5	1,1,2,2-Tetrachloroethane	230.U
71-55-6	1,1,1-Trichloroethane	8400	108-88-3	Toluene	320
56-23-6	Carbon Tetrachloride	230.U	108-90-7	Chlorobenzene	230.U
108-05-4	Vinyl Acetate	230.U	100-41-4	Ethylbenzene	1800
75-27-4	Bromodichloromethane	230.U	100-42-5	Styrene	230.U
				Total Xylenes	11,000

Data Reporting Qualifiers

Value - If the result is a value greater than or equal to the detection limit, report the value.

U - Indicates compound was analyzed for but not detected. Report the minimum detection limit for the sample with the U (e.g. 10U) based on necessary concentration/dilution action (This is not necessarily the instrument detection limit). The footnote should read: U-Compound was analyzed for but not detected. The number is the minimum attainable detection limit for the sample.

J - Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed or when the mass spectral data indicated the presence of a compound that meets the identification criteria but the result is < than the specified detection limit but > than zero (e.g. 10J). If limit of detection is 10 ug/L and a conentration of 3.0 ug/L is calculated, report as 3J.

C - This flag applies to pesticide parameters where the identification has been confirmed by GC/MS. Single component pesticides >= 10 ng/uL in the final extract should be confirmed by GC/MS.

B - This flag is used when the analyte is found in the blank as well as a sample. It indicates possible/probable blank contamination and warns data the user to take appropriate action.

Other - Other specific flags and footnotes may be required to properly define the results. If used, they must be fully described and such description attached to the data summary report

ORGANICS ANALYSIS DATA SHEET

Client Name: ERM NORTHEAST

Date Received: November 13, 1987

Project # 186.12 Becton-Dickinson

Date Collected: November 11, 1987

Laboratory Number: 59543-025

Matrix: Soil

Sample Location: ~~SB2-04~~ 8

Method: SW846 - 8080

Pesticides/PCBs

C.A.S. Number		ug/kg
319-84-6	Alpha-BHC	290 U
319-87-7	Beta-BHC	290 U
319-86-8	Delta-BHC	290 U
58-89-9	Gamma-BHC (Lindane)	290 U
76-44-8	Heptachlor	290 U
309-00-2	Aldrin	290 U
1024-57-3	Heptachlor Epoxide	290 U
959-98-8	Endosulfan I	290 U
60-57-1	Dieldrin	290 U
72-55-9	4,4'-DDE	290 U
72-20-8	Endrin	290 U
33213-65-9	Endosulfan II	290 U
72-54-8	4,4'-DDD	290 U
1031-07-8	Endosulfan Sulfate	290 U
50-29-3	4,4'-DDT	290 U
72-43-5	Methoxychlor	290 U
53494-70-5	Endrin Ketone	290 U
57-74-9	Chlordane	2900 U
8001-35-2	Toxaphene	2900 U
12674-11-2	Arochlor-1016	2900 U
11104-28-2	Arochlor-1221	2900 U
11141-16-5	Arochlor-1232	2900 U
53469-21-9	Arochlor-1242	2900 U
12672-29-6	Arochlor-1248	2900 U
11097-69-1	Arochlor-1254	7800
11096-82-5	Arochlor-1260	2900 U

Ronald A. Bayer
Laboratory Director
December 28, 1987

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast

Becton-Dickinson
Project #186.12

Samples Received 11/13/87

Lab. No.	Sample ID	TPH (mg/kg)
59543-001	24-04-A	39
59543-002	24-04-B	16
59543-003	29-09-A	30
59543-004	29-09-B	27
59543-005	29-07-B	<35
59543-006	29-07-A	<30
59543-007	29-16-A	42
59543-008	29-16-B	140
59543-009	24-05-B	150
59543-010	24-05-A	41
59543-011	24-06-A	<30
59543-012	24-06-B	110
59543-013	29-06-B	110
59543-014	29-06-A	25
59543-015	29-11-B	270
59543-016	29-11-A	47
59543-017	29-08-B	73
59543-018	29-10-A	36
59543-019	29-10-B	16
59543-020	29-08-A	32
59543-021	29-12-B	<23
59543-022	29-12-A	<24
59543-023	29-13-A	<26
59543-024	29-13-B	66
59543-025	[redacted]8	35,000
59543-026	21-04-A	69
59543-027	105-01-A	57
59543-028	21-03-A	<25
59543-029	223-01-A	<31
59543-030	232-02	75,000
59543-031	21-04-B	<22
59543-033	Field Blank	<0.4 mg/l
59543-034	21-03-B	<20

#59543-003 spiked @ 3.9 mg, 79% recovery
#59543-019 spiked @ 3.9 mg, 66% recovery
#59543-028 spiked @ 3.9 mg, 95% recovery

For Envirotest Laboratories, Inc.

Ronald A. Bayer
President

11/23/87

INORGANIC DATA SHEET

Envirotest Laboratories
Client: ERM - Northeast
Date Collected: 11/11/87
Job #: Proj. #186.12 B - D

Lab # 87/059543 - 030
Spl location: ~~232-02~~ 9
Date Received: 11/13/87

Elements Identified and Measured

Matrix: soil

Units: mg/kg

1.	Aluminum:	13. Magnesium:	
2.	Antimony: 30 U	14. Manganese:	
3.	Arsenic :	15. Mercury :	6.7
4.	Barium :	16. Nickel :	326
5.	Berylium: 1.5	17. Potassium:	
6.	Cadmium : 4.5	18. Selenium :	
7.	Calcium :	19. Silver :	56
8.	Chromium: 845	20. Sodium :	
9.	Cobalt :	21. Thallium :	30 U
10.	Copper : 564	22. Vanadium :	
11.	Iron :	23. Zinc :	679
12.	Lead : 1584		
	Cyanide : 4.2	Percent Solids: 33	
	Phenol :		

ICP Interelement and background corrections applied? _NO__

If yes, corrections applied before_____or after_____generation of raw data.

U = Sample analyzed results less than detection limit.

Comments: __Dates analyzed CR,CU,ZN,NI_-_11/18_____
__PB,CD_-_11/18__HG_-_11/17&18_____

Ronald A. Bayer
Laboratory Director
30 NOV., 1987

Organics Analysis Data Sheet

Client Name: ERM NORTHEAST

Project # 186.12 Becton-Dickinson

Laboratory Number: 59543-030

Sample Location: ~~232-02~~ 9

Date Received: November 13, 1987

Date Collected: November 11, 1987

Matrix: Soil

Method: SW846 - 8240

Volatile Compounds

C.A.S. Number		ug/kg	C.A.S. Number		ug/kg
74-87-3	Chloromethane	15,000.U	78-87-5	1,2-Dichloropropane	15,000.U
74-83-9	Bromomethane	15,000.U	10061-02-6	Trans-1,3-Dichloropropene	15,000.U
75-01-4	Vinyl Chloride	15,000.U	79-01-6	Trichloroethene	1,100,000
75-00-3	Chloroethane	15,000.U	124-48-1	Dibromochloromethane	15,000.U
75-09-2	Methylene Chloride	15,000.U	79-00-5	1,1,2-Trichloroethane	15,000.U
67-64-1	Acetone	550,000	71-43-2	Benzene	15,000.U
75-15-0	Carbon Disulfide	29,000	10061-01-5	cis-1,3-Dichloropropene	15,000.U
75-35-4	1,1-Dichloroethene	2,900,000	110-75-8	2-Chloroethylvinylether	15,000.U
75-34-3	1,1-Dichloroethane	15,000.U	75-25-2	Bromoform	15,000.U
156-60-5	Trans-1,2-Dichloroethene	15,000.U	108-10-1	4-Methyl-2-Pentanone	410,000
67-66-3	Chloroform	15,000.U	591-78-6	2-Hexanone	15,000.U
107-02-2	1,2-Dichloroethane	15,000.U	127-18-4	Tetrachloroethene	15,000.U
78-93-3	2-Butanone	15,000.U	79-34-5	1,1,2,2-Tetrachloroethane	15,000.U
71-55-6	1,1,1-Trichloroethane	42,000,000	108-88-3	Toluene	15,000.U
56-23-6	Carbon Tetrachloride	15,000.U	108-90-7	Chlorobenzene	15,000.U
108-05-4	Vinyl Acetate	15,000.U	100-41-4	Ethylbenzene	24,000
75-27-4	Bromodichloromethane	15,000.U	100-42-5	Styrene	15,000.U
				Total Xylenes	15,000.U

Data Reporting Qualifiers

Value - If the result is a value greater than or equal to the detection limit, report the value.

U - Indicates compound was analyzed for but not detected. Report the minimum detection limit for the sample with the U (e.g. 10U) based on necessary concentration/dilution action (This is not necessarily the instrument detection limit). The footnote should read: U-Compound was analyzed for but not detected. The number is the minimum attainable detection limit for the sample.

J - Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed or when the mass spectral data indicated the presence of a compound that meets the identification criteria but the result is < than the specified detection limit but > than zero (e.g. 10J). If limit of detection is 10 ug/L and a conentration of 3.0 ug/L is calculated, report as 3J.

C - This flag applies to pesticide parameters where the identification has been confirmed by GC/MS. Single component pesticides >= 10 ng/uL in the final extract should be confirmed by GC/MS.

B - This flag is used when the analyte is found in the blank as well as a sample. It indicates possible/probable blank contamination and warns data the user to take appropriate action.

Other - Other specific flags and footnotes may be required to properly define the results. If used, they must be fully described and such description attached to the data summary report

ORGANICS ANALYSIS DATA SHEET

Client Name: ERM NORTHEAST

Date Received: November 13, 1987

Project # 186.12 Becton-Dickinson

Date Collected: November 11, 1987

Laboratory Number: 59543-030

Matrix: Soil

Sample Location: ~~232-02~~ 9

Method: SW846 - 8080

Pesticides/PCBs

C.A.S. Number		ug/kg
319-84-6	Alpha-BHC.	1470 U
319-87-7	Beta-BHC	1470 U
319-86-8	Delta-BHC.	1470 U
58-89-9	Gamma-BHC (Lindane). . . .	1470 U
76-44-8	Heptachlor	1470 U
309-00-2	Aldrin	1470 U
1024-57-3	Heptachlor Epoxide	1470 U
959-98-8	Endosulfan I	1470 U
60-57-1	Dieldrin	1470 U
72-55-9	4,4'-DDE	1470 U
72-20-8	Endrin	1470 U
33213-65-9	Endosulfan II.	1470 U
72-54-8	4,4'-DDD	1470 U
1031-07-8	Endosulfan Sulfate	1470 U
50-29-3	4,4'-DDT	1470 U
72-43-5	Methoxychlor	1470 U
53494-70-5	Endrin Ketone.	1470 U
57-74-9	Chlordane.	14,700 U
8001-35-2	Toxaphene.	14,700 U
12674-11-2	Arochlor-1016.	14,700 U
11104-28-2	Arochlor-1221.	14,700 U
11141-16-5	Arochlor-1232.	14,700 U
53469-21-9	Arochlor-1242.	14,700 U
12672-29-6	Arochlor-1248.	14,700 U
11097-69-1	Arochlor-1254.	57,900
11096-82-5	Arochlor-1260.	14,700 U

Ronald A. Bayer
Laboratory Director
December 28, 1987

TOTAL PETROLEUM HYDROCARBON

Method 418.1

EPH Northeast

Becton-Dickinson
Project #186.12

Samples Received 11/13.87

Lab. No.	Sample ID	TPH (mg/kg)
59543-001	24-04-A	200
59543-002	24-04-B	46
59543-003	29-09-A	130
59543-004	29-09-B	27
59543-005	29-07-B	<35
59543-006	29-07-A	<30
59543-007	29-16-A	49
59543-008	29-16-B	140
59543-009	24-05-B	150
59543-010	24-05-A	44
59543-011	24-06-A	<30
59543-012	24-06-B	110
59543-013	29-06-B	110
59543-014	29-06-A	25
59543-015	29-11-B	270
59543-016	29-11-A	47
59543-017	29-08-B	73
59543-018	29-10-A	36
59543-019	29-10-B	16
59543-020	29-08-A	32
59543-021	29-12-B	<23
59543-022	29-12-A	<24
59543-023	29-13-A	<26
59543-024	29-13-B	66
59543-025	232-01	35,000
59543-026	21-04-A	69
59543-027	105-01-A	57
59543-028	21-03-A	<25
59543-029	223-01-A	<31
59543-030	~~232-02~~ 9	75,000
59543-031	21-04-B	<22
59543-033	Field Blank	<0.4 mg/l
59543-034	21-03-B	<20

#59543-003 spiked @ 3.9 mg, 79% recovery
#59543-019 spiked @ 3.9 mg, 66% recovery
#59543-028 spiked @ 3.9 mg, 95% recovery

For EnviroTest Laboratories, Inc.

Ronald A. Beyer
President

11-23-87

Organics Analysis Data Sheet

Client Name: ERM NORTHEAST

Project # 186.12 Becton-Dickinson

Laboratory Number: 59627-020

Sample Location: ~~225-03~~ IO

Date Received: November 17, 1987

Date Collected: November 14, 1987

Matrix: Soil

Method: SW846 - 8240

Volatile Compounds

C.A.S. Number		ug/kg	C.A.S. Number		ug/kg
74-87-3	Chloromethane	14.U	78-87-5	1,2-Dichloropropane	14.U
74-83-9	Bromomethane	14.U	10061-02-6	Trans-1,3-Dichloropropene	14.U
75-01-4	Vinyl Chloride	14.U	79-01-6	Trichloroethene	190
75-00-3	Chloroethane	14.U	124-48-1	Dibromochloromethane	14.U
75-09-2	Methylene Chloride	14.U	79-00-5	1,1,2-Trichloroethane	14.U
67-64-1	Acetone	2900	71-43-2	Benzene	14.U
75-15-0	Carbon Disulfide	75	10061-01-5	cis-1,3-Dichloropropene	14.U
75-35-4	1,1-Dichloroethene	12.U	110-75-8	2-Chloroethylvinylether	14.U
75-34-3	1,1-Dichloroethane	14.U	75-25-2	Bromoform	14.U
156-60-5	Trans-1,2-Dichloroethene	1200	108-10-1	4-Methyl-2-Pentanone	14.U
67-66-3	Chloroform	14.U	591-78-6	2-Hexanone	14.U
107-02-2	1,2-Dichloroethane	14.U	127-18-4	Tetrachloroethene	14.U
78-93-3	2-Butanone	14.U	79-34-5	1,1,2,2-Tetrachloroethane	14.U
71-55-6	1,1,1-Trichloroethane	58	108-88-3	Toluene	65
56-23-6	Carbon Tetrachloride	14.U	108-90-7	Chlorobenzene	14.U
108-05-4	Vinyl Acetate	14.U	100-41-4	Ethylbenzene	14.U
75-27-4	Bromodichloromethane	14.U	100-42-5	Styrene	14.U
				Total Xylenes	130

Data Reporting Qualifiers

Value - If the result is a value greater than or equal to the detection limit, report the value.

U - Indicates compound was analyzed for but not detected. Report the minimum detection limit for the sample with the U (e.g. 10U) based on necessary concentration/dilution action (This is not necessarily the instrument detection limit). The footnote should read: U-Compound was analyzed for but not detected. The number is the minimum attainable detection limit for the sample.

J - Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed or when the mass spectral data indicated the presence of a compound that meets the identification criteria but the result is < than the specified detection limit but > than zero (e.g. 10J). If limit of detection is 10 ug/L and a conentration of 3.0 ug/L is calculated, report as 3J.

C - This flag applies to pesticide parameters where the identification has been confirmed by GC/MS. Single component pesticides >= 10 ng/uL in the final extract should be confirmed by GC/MS.

B - This flag is used when the analyte is found in the blank as well as a sample. It indicates possible/probable blank contamination and warns data the user to take appropriate action.

Other - Other specific flags and footnotes may be required to properly define the results. If used, they must be fully described and such description attached to the data summary report

TOTAL PETROLEUM HYDROCARBON

Method 418.1

ERM Northeast

Becton-Dickinson
Project #186.12

Samples Received 11/17/87

Lab. No.	Sample ID	TPH (mg/kg)
59627-001	229-06-A	38
59627-002	229-07-A	190
59627-003	229-08-B	250
59627-005	29-15-A	680
59627-006	29-15-B	27
59627-007	228-04-A	300
59627-008	228-05-A	31
59627-009	228-06-A	120
59627-010	227-04-A	370
59627-011	227-04-B	100
59627-012	105-01-B	7600
59627-013	240-01-A	7700
59627-014	240-01-B	58
59627-015	240-02-A	2700
59627-016	240-03-A	25,000
59627-017	240-04-A	59
59627-018	240-04-B	33
59627-019	240-05-A	<22
59627-020	~~223-03~~ 10	380
59627-026	Field Blank	<0.5 mg/l
59627-027	MW-T1	<0.5 mg/l
59627-028	MW-T2	<0.5 mg/l

For EnviroTest Laboratories, Inc.

Ronald A. Bayer
President 12/9/87

ERM-Northeast

VERIFICATION REPORT FOR ECRA SOIL REMEDIATION PARCEL NOS. 4 AND 5 ECRA CASE NOS. 87576 AND 87577 BECTON DICKINSON AND COMPANY EAST RUTHERFORD, BERGEN COUNTY, NEW JERSEY

JUNE, 1992

PREPARED FOR:

BECTON DICKINSON AND COMPANY
1 BECTON DRIVE
FRANKLIN LAKES, NEW JERSEY 07417-1880

PREPARED BY:

ERM-NORTHEAST
175 FROEHLICH FARM BOULEVARD
WOODBURY, NEW YORK 11797

ERM-Northeast

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2 -12	REMEDIAL ACTION LOCATION 505-06	2 -34
2 -13	REMEDIAL ACTION LOCATION 505-09	2 -35
2 -14	REMEDIAL ACTION LOCATION 506-09	2 -36
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Backfill Material Analytical Results

APPENDIX B

Letter dated January 9, 1992: transmittal of Waste Manifests to NJDEPE/DHWM/Manifest Section

Letter dated February 21, 1992: transmittal of Waste Manifests to T. Fields, NJDEPE/DHWM/BEECRA

APPENDIX C

Excavated Soil TCLP Analytical Results

1.0 INTRODUCTION

1.1 Background

Becton Dickinson and Company (B-D) owns a former manufacturing facility in the Borough of East Rutherford, Bergen County, New Jersey. B-D discontinued manufacturing operations at this facility in 1988. The location of the site is shown on the general vicinity map provided as Figure 1-1. Due to the planned cessation of operations at the site, B-D prepared and submitted an initial Environmental Cleanup Responsibility Act (ECRA) notice to the New Jersey Department of Environmental Protection (NJDEP) in June, 1987. The site was divided into six parcels (Parcel Nos. 1 through 6) each having separate tax lot and block numbers. Figure 1-2 provides a plan view of the site. Six separate ECRA submissions were made. Each submission was subsequently assigned an individual ECRA case number by the NJDEP. B-D conducted a series of comprehensive environmental investigations and made various additional ECRA submissions.

Environmental investigations of Parcel No. 1, 2 and 3 were conducted on an expedited schedule from October, 1987 through December, 1987. B-D subsequently prepared and submitted Remedial Action Plans for these three parcels in July, 1988. The Remedial Action Plans were approved by the NJDEP in October, 1988 and the soil cleanup in Parcel Nos. 1 and 2 was completed in November, 1989.

Environmental investigations were conducted in Parcel Nos. 4, 5 and 6 from February to May, 1988. Remediation of the soil in Parcel Nos. 4 and 5 was completed in December, 1991. Remediation of Parcel Nos. 6 is scheduled to be completed in 1992.

Table 1-1 provides a summary listing of the project documents previously submitted to the NJDEP.

TABLE 1-1
SUMMARY OF PROJECT DOCUMENTS PREVIOUSLY SUBMITTED TO NJDEPE

Report Title	Report Summary	Submission Date
ECRA - Sampling and Analysis Plan, Volume I Parcel Nos. 1, 2, 3, 4, 5, and 6	Presents site information for the initial ECRA notice and the Sampling and Analysis Plan common to each of the 6 parcels	June 1987
ECRA - Sampling and Analysis Plan, Volume II Parcel Nos. 1, 2, 3, 4, 5, and 6	Presents parcel specific information for the Sampling and Analysis Plan including results of the Phase-1a Preliminary Environmental Investigation. Includes the GIS and SES ECRA forms for each parcel and supporting information.	June 1987
ECRA - Supplementary Information, Volume III Parcel Nos. 5 and 6	Presents the results of the Phase 1b and 1c Preliminary Environmental Investigations conducted in Parcel Nos. 5 and 6 and amends the June 1987 Sampling and Analysis Plans.	Dec. 1987
ECRA - Environmental Assessment Program Parcels 1, 2, and 3	Presents results of the comprehensive environmental program conducted in Parcel Nos. 1, 2, and 3 along with the results of the Phase 1b and 1c preliminary environmental investigations.	Feb. 1988
Soil and Ground Water Remedial Action Plan(s) Parcel No. 3	Presents additional results of environmental investigations and procedures to remediate soil and ground water contamination in Parcel No. 3.	July 1988

TABLE 1-1 (CONTINUED)
SUMMARY OF PROJECT DOCUMENTS
PREVIOUSLY SUBMITTED TO NJDEPE

Report Title	Report Summary	Submission Date
ECRA Environmental Assessment Program Parcel Nos. 4, 5 and 6	Presents results of the comprehensive environmental program conducted in Parcel Nos. 4, 5 and 6	August 1988
Soil and Ground Water Remedial Action Plan(s) Parcel Nos. 4 and 5	Presents procedures to remediate soil and ground water contamination in Parcel Nos. 4 and 5	March 1989

BD responses to EPA Request for Information

Nos. 14

VERIFICATION REPORT FOR
ECRA SOIL REMEDIATION
PARCEL NOS. 4 AND 5
ECRA CASE NOS. 87576 AND 87577
BECTON DICKINSON AND COMPANY
EAST RUTHERFORD, BERGEN COUNTY, NEW JERSEY

JUNE, 1992

PREPARED FOR:

BECTON DICKINSON AND COMPANY
1 BECTON DRIVE
FRANKLIN LAKES, NEW JERSEY 07417-1880

PREPARED BY:

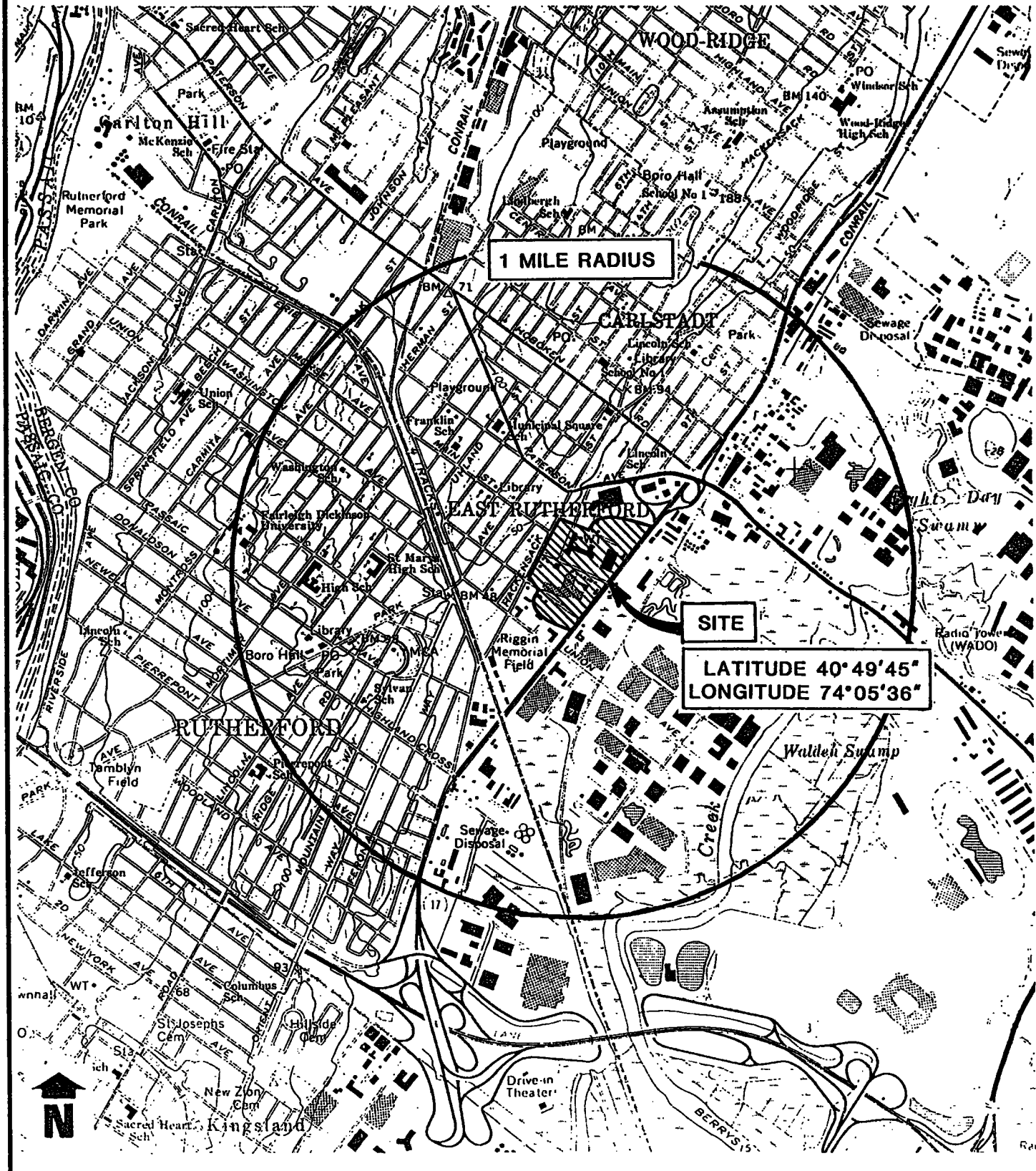
ERM-NORTHEAST
175 FROEHLICH FARM BOULEVARD
WOODBURY, NEW YORK 11797

18605001.734

FIGURE 1-1

General Vicinity Map – Becton Dickinson & Co.

East Rutherford, New Jersey

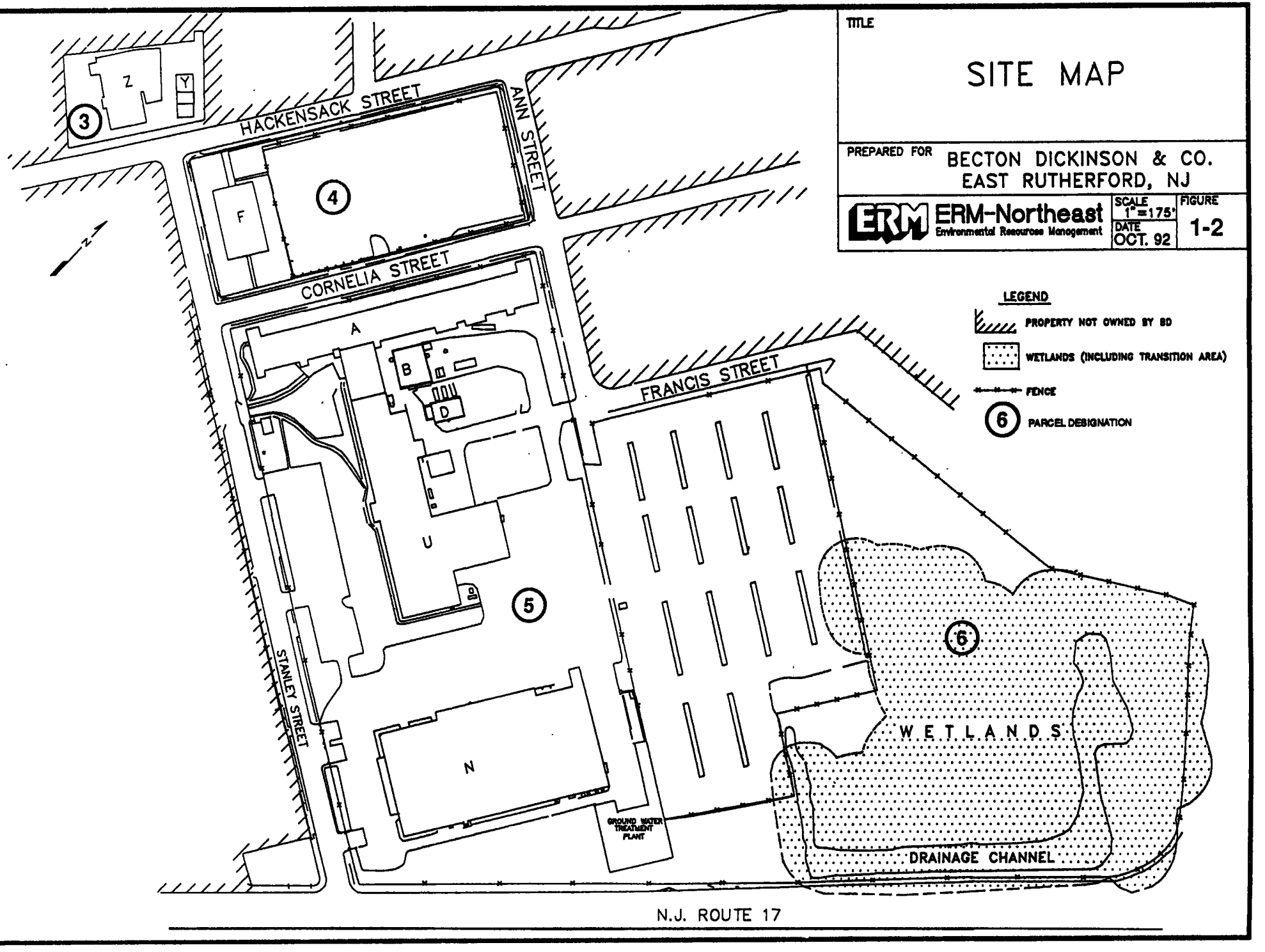


Source: Weehawken Quadrangle, N.J./N.,Y.

Scale: 1"-2000'

ERM-Northeast
Environmental Resources Management

146621


TITLE
SITE MAP
PREPARED FOR
BECTON DICKINSON & CO.
EAST RUTHERFORD, NJ
ERM-Northeast
Environmental Resources Management
SCALE 1" = 175'
DATE OCT. 92
FIGURE 1-2
LEGEND
PROPERTY NOT OWNED BY BD
WETLANDS (INCLUDING TRANSITION AREA)
FENCE
6 PARCEL DESIGNATION
HACKENSACK STREET
ANN STREET
CORNELIA STREET
FRANCIS STREET
STANLEY STREET
3
4
5
6
Z
Y
F
A
B
D
U
N
WETLANDS
DRAINAGE CHANNEL
GROUND WATER TREATMENT PLANT
N.J. ROUTE 17

1.2 Overview of Remedial Project

The Parcel Nos. 4 and 5 Soil Remedial Project was initiated on December 2 and completed as of December 13, 1991. The excavation and backfilling of the 19 Remedial Action (RA) Locations was performed by Barbella Environmental Technology, Inc. of Whitehouse, NJ. All remedial activities were supervised by ERM-Northeast. Approximately 707 cubic yards of soil was excavated and transported under NJ Hazardous Waste Manifests to American Landfill Inc. in Waynesburg, Ohio. Figure 1-3 shows the RA Locations.

Originally, two areas of concern were identified in Parcel No. 3. As a result of changes in NJDEP cleanup criteria for Petroleum Hydrocarbons and subsequent discussions with the Department, these areas were no longer of concern. Therefore, no soil remediation was conducted in Parcel No. 3.

1.3 Overview of Report

The remainder of the report is organized into the following sections:

2.0 SUMMARY OF REMEDIAL ACTION PLAN IMPLEMENTATION - This section describes remedial procedures and activities completed to date related to the soil cleanup of Parcel Nos. 4 and 5.

3.0 SUMMARY OF REMEDIAL PROJECT COSTS - This section summarizes expenditures for the remediation of soils in Parcels 4 and 5.

4.0 PROJECT TASKS REMAINING TO BE COMPLETED - This section summarizes the ECRA Project tasks remaining at the B-D East Rutherford, NJ Site.

2.0 SUMMARY OF REMEDIAL ACTION PLAN IMPLEMENTATION

2.1 Review of Remedial Action Criteria

The development of soil remedial action criteria for the BD East Rutherford site is documented in the Soil and Ground Water Remedial Action Plans for Parcel Nos. 4 and 5, March 1989. Remedial action criteria was developed for the site based upon the ECRA recommended cleanup levels (RCLs). The criteria considered the existing site conditions, the environmental setting, environmental and health based risk assessments, the toxicity and mobility of certain contaminants, surface water discharge limitations to Berry's Creek, and the permeability of soil cover anticipated after site development. Starting with NJDEP's RCLs, a series of alternative concentration limits (generally expressed as multiples of the RCLs) were considered. These criteria were then evaluated through a quantitative risk assessment to determine the health and environmental effects resulting from implementation of these alternate criteria. A final set of criteria were selected at a level that presented no adverse health or environmental affects.

The soil remedial action criteria and the methodology used to evaluate them are presented in the Soil and Ground Water Remedial Action Plan for Parcel Nos. 1 and 2 of the East Rutherford site (ERM, 1988).

2.1.1 Development of Soil Remedial Action Criteria

Remedial action criteria were developed to identify soil requiring remediation in Parcel No. 5. Criteria were developed for all contaminants identified in Parcel No. 5 soils in excess of the ECRA RCLs, except for volatile organic compounds (VOC) and non-PAH base/neutral organic compounds.

Total volatile organic compounds were detected in soil above the RCL of 1 ppm at only one location (MW-508). The only VOC identified was acetone. The QA review of the duplicate sample indicated that the result was qualitatively suspect and may have been introduced after sampling. Due to the marginal exceedance of the RCL as well as the suspect nature of the analysis, no criterion was established for acetone. In addition, because the water table is approximately two feet below surface in this area, cleanup of VOCs is being accomplished by the ground water recovery system.

At locations where the RCL for base/neutral extractable organic compounds was exceeded, polynuclear aromatic hydrocarbons (PAHs) were the chemicals reported. Therefore, a criterion was established for PAHs. The only non-PAH compounds detected in these samples were dibenzofuran and butylbenzyl phthalate. Due to the low concentrations reported (<5 ppm) and because these areas were remediated due to high levels of PAH or TPH, no criteria for these two compounds were developed.

The chemicals for which criteria were developed are listed in Table 2-1. The soil remedial action criteria are presented in Figure 2-1. These criteria, as discussed below, are dependent upon the location of the contaminated soil with respect to the ground surface and the water table. The criteria with respect to the ground surface are intended to protect site employees. The criteria with respect to the top of the water table are intended to protect ground water quality.

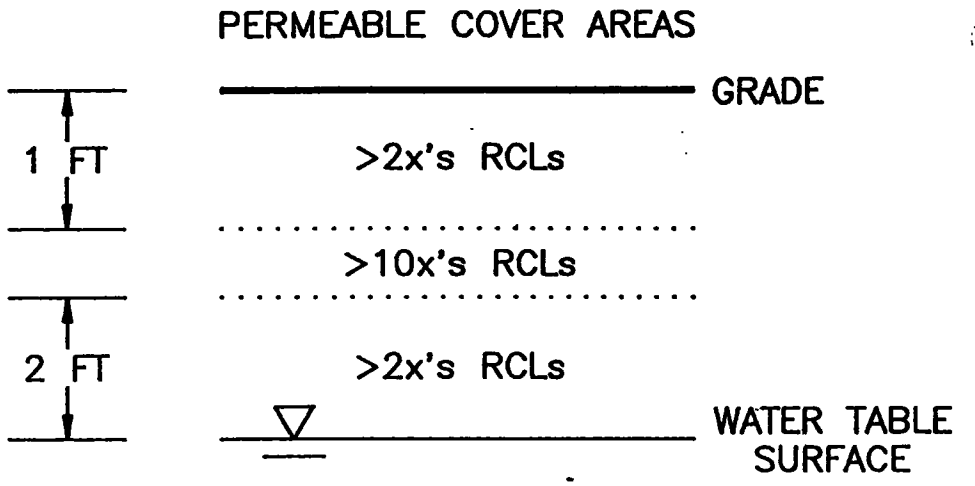
Specific criteria were developed for areas that are paved (i.e., impermeable surfaces) and those locations that will remain un-paved (i.e., permeable). In addition, special consideration was given to two contaminants of concern; mercury and PAHs.

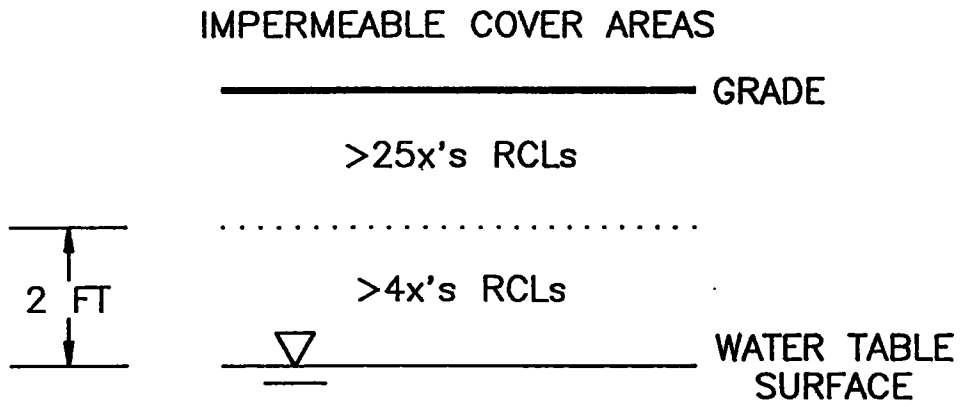
TABLE 2-1

CHEMICALS FOR WHICH SOIL REMEDIAL ACTION CRITERIA WERE DEVELOPED

Metals	RCL (ppm)
Cadmium	3
Chromium	100
Copper	170
Lead	250
Mercury	1
Nickel	100
Zinc	350
Organic Compounds	
Polynuclear Aromatic Hydrocarbons (PAHs)	5
Total Petroleum Hydrocarbons (TPH)	100

FIGURE 2-1
SOIL REMEDIAL ACTION CRITERIA
BECTON DICKINSON AND COMPANY
EAST RUTHERFORD, BERGEN COUNTY





CONTAMINANT-SPECIFIC CRITERIA

MERCURY	14	ppm *
POLYNUCLEAR AROMATIC HYDROCARBONS (PAH)	20	ppm
PETROLEUM HYDROCARBONS (PHC)	10,000	ppm *
PHC-CONTAMINATED AREAS:		
TOTAL BASE/NEUTRAL EXTRACTABLE ORGANIC COMPOUNDS	100	ppm *
TOTAL CARCINOGENIC PAH	10	ppm *
TOTAL VOLATILE ORGANIC COMPOUNDS (VOC)	10	ppm *

* = REVISED JULY, 1991

ERM-Northeast
Environmental Resources Management

REMEDACT/EM

Soil Remedial Action Criteria For Areas With Impermeable Cover

Soil that will be maintained beneath impermeable soil cover, such as buildings and paved areas, had the following remedial action criteria applied:

- Soil located in the zone between the surface and two (2) feet above the water table required remediation if the contaminant concentrations were greater than twenty-five (25) times the ECRA RCLs.

- Soil that was within two (2) feet of the ground water table required remediation if the contaminant concentrations were greater than four (4) times the ECRA RCLs.

- Soils having contaminant concentrations less than these criteria required no action.

Soil Remedial Action Criteria For Areas With Permeable Cover

Soil that will be maintained beneath permeable soil cover, such as grass covered areas, had the following remedial action criteria applied.

- Soil within one (1) foot of the ground surface required remediation if the contaminant concentrations were greater than two (2) times the ECRA RCLs.

- Soil located in the zone between one (1) foot below grade and two (2) feet above the water table required remediation if the contaminant concentrations were greater than ten (10) times the ECRA RCLs.

- Soil within two (2) feet of the water table required remediation if contaminant concentrations were greater than two (2) times the ECRA RCLS.

- Soils having contaminant concentrations less than these criteria required no action.

Soil Contaminated with Mercury

Initially, all soil having a mercury concentration greater than two (2) ppm required remediation. However, as discussed later, this requirement was revised to 14 ppm.

Soil Contaminated with Priority Pollutant Polynuclear Aromatic Hydrocarbons

All soil having priority pollutant polynuclear aromatic hydrocarbons (PAHs) at concentrations greater than 20 ppm required remedial action.

Soil Contaminated with Petroleum Hydrocarbons

The Remedial Action Plan specified that the cleanup criteria for petroleum hydrocarbons (PHC) would be a multiple of the RCL (100 ppm), as described above. However, as discussed in Section 2.1.3, the criteria for PHC-contaminated areas was revised. PHC-areas with concentrations of PHC, total Base/Neutral Extractable Organic Compounds, total Carcinogenic PAHs, or total VOCs exceeding the criteria listed in Figure 2-1, required remedial action.

2.1.2 Risk Assessment of Proposed Criteria

The remedial criteria developed for the BD site were subjected to a quantitative risk assessment to ensure that no adverse impacts to human health or the environment would result from implementation of a cleanup plan on that basis.

The risk assessment was performed in accordance with the U.S. EPA Superfund Public Health Evaluation Manual (U.S. EPA, 1986) and the Draft NJDEP Risk Assessment Guidelines (1986). The steps followed in performing the risk assessment were:

- preparation of toxicity and environmental profiles,
- identification of potential exposure routes and receptors;
- estimation of exposure point concentrations of the chemicals of concern;
- comparison of exposure point concentrations to relevant and applicable standards; and
- risk characterization.

In order to evaluate risk, the routes through which receptors could potentially be exposed to contamination from the site following remediation were identified. Potential receptors included the general public (nearest residences, industrial and commercial establishments, etc.) and landscaper and other employees at the site.

The risk assessment determined that potential exposure to humans and the environment following remediation could occur through only three routes. First, contamination in ground water underlying the site could migrate off-site to Berry's Creek. Second, contamination in site soils could leach to ground water and migrate off-site to Berry's Creek. Third, site employees could potentially be exposed to soil

contaminants through direct contact with soil at the site.

On the basis of the risk assessment, no unacceptable risks to human health or the environment are expected following remediation of the site using the remedial action criteria. Post-remedial concentrations of site soil and ground water contaminants at Berry's creek, using very conservative models, were predicted to be at or below the National Primary Drinking Water Standards or other health-based drinking water standards. The projected concentrations also meet the NJDEP Surface Water Quality Standards for SE2 waters, and FW2 waters for chemicals for which no SE2 standard exists. Projected exposures to site workers due to contact with site soils, again using conservative assumptions, also essentially meet or are below the relevant acceptable intakes.

2.1.3 Revisions to Remedial Action Plan

The approved Remedial Action Plan (RAP) specified that verification end-point soil samples would be taken at each Remedial Action (RA) location after the soil was excavated. However, in letters to DEP dated February 8 and March 7, 1991, ERM proposed to conduct the end-point sampling before the soil was excavated. This was intended to expedite the remedial project by obtaining disposal acceptance before work began and by avoiding delays of the excavation work caused by waiting for analytical results. The results of the delineation sampling were submitted to DEP with the March 7 letter. During a meeting on May 7, 1991, DEP gave authorization to BD to use the delineation sampling results in place of post-excavation verification data.

In a letter dated March 25, 1991, DEP identified changes in the site cleanup criteria and directed BD to re-evaluate the RAP accordingly. Tessie Fields of

DEP/DHWM/BEECRA identified additional criteria for VOCs and petroleum hydrocarbons (PHC) during phone conversations on March 27 and April 19, 1991 with the ERM engineer. Using this criteria, ERM re-evaluated the results of the delineation sampling investigation and proposed in a letter dated June 6, 1991 that five PHC-contaminated areas did not require remedial action. DEP's letter of July 6, 1991 gave approval for no further action in these five areas.

The revised cleanup criteria was discussed during the May 7, 1991 meeting and subsequent telephone conversations. As a result, in a letter dated July 30, 1991, DEP authorized implementation of the original cleanup criteria from the RAP and approved 14 ppm as the remedial criteria for mercury. Figure 2-1 includes the revised cleanup criteria.

2.2 Delineation Sampling Procedures and Results

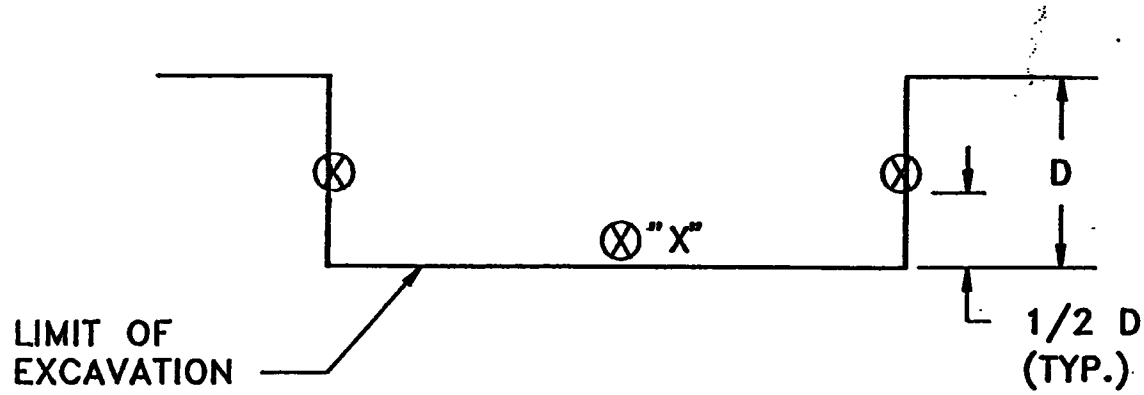
Prior to initiating the soil remedial project, a borehole sampling investigation was conducted of all 19 Remedial Action (RA) locations to completely delineate the horizontal and vertical extent of the contamination. As outlined in ERM's letter to NJDEPE, dated February 8, 1991, the objectives of this sampling effort were to establish the limits of excavation at each location and determine the volume of soil for disposal. Conducting the "end-point" sampling before soil excavation expedited the project schedule considerably. Acceptance for disposal was obtained from the landfill in advance of the project. In addition, repetitive re-sampling and re-excavation of RA locations was avoided.

The delineation sampling was conducted from December 1990 to July 1991 by ERM-Northeast. The drilling subcontractor for this project was Aquifer Drilling and Testing of Long Island City, NY and the samples were analyzed by Laboratory Resources, Inc. of Westwood, NJ (New Jersey Certification number 02046). All sampling activities and

procedures were documented by ERM-Northeast field personnel.

At each RA location, soil samples were taken to establish the horizontal and vertical limits of the volume to be excavated. The original "X-samples" (e.g., 401-03-X) were the samples taken previously during the initial Site Investigations that identified the locations of contamination. During the delineation sampling, all sample locations were referenced from the original X-sample location. As shown in Figure 2-2, the excavation depth was delineated by the samples denoted as "X1, X2 etc.", taken at 1-foot intervals (eg: X1,X2,X3, etc). Perimeter samples, which are designated T, U, V and W, were taken at a depth equal to one-half the excavation depth. These perimeter samples were taken at 5-foot increments (e.g., T,T5,T10, etc.) laterally from the original "X-sample" location. The analytical results of each sample were compared to the remedial action criteria to determine if the next incremental sample was needed. In accordance with the Remedial Action Plan, sampling at each location was advanced until the limits of the contamination were delineated, or ground water, buildings, property lines, or adjoining RA-excavation areas were encountered. A summary of the "clean" end-point sample data is provided in Table 2-2. The Tier II-format laboratory reports for all of the Parcel Nos. 3,4 and 5 delineation samples were submitted to NJDEPE in February, 1992.

All delineation sampling and analysis was conducted in accordance with Tier II protocol and the requirements of the approved Sampling Analysis Plan, Environmental Assessment Report and Remedial Action Plan (RAP). Quality assurance procedures were followed during all activities of the sampling investigation. Duplicate and Field Blank samples (designated "D" and "FB", respectively) were prepared each day sampling was performed. In addition, matrix spike and matrix spike duplicate samples were prepared and analyzed by the laboratory.



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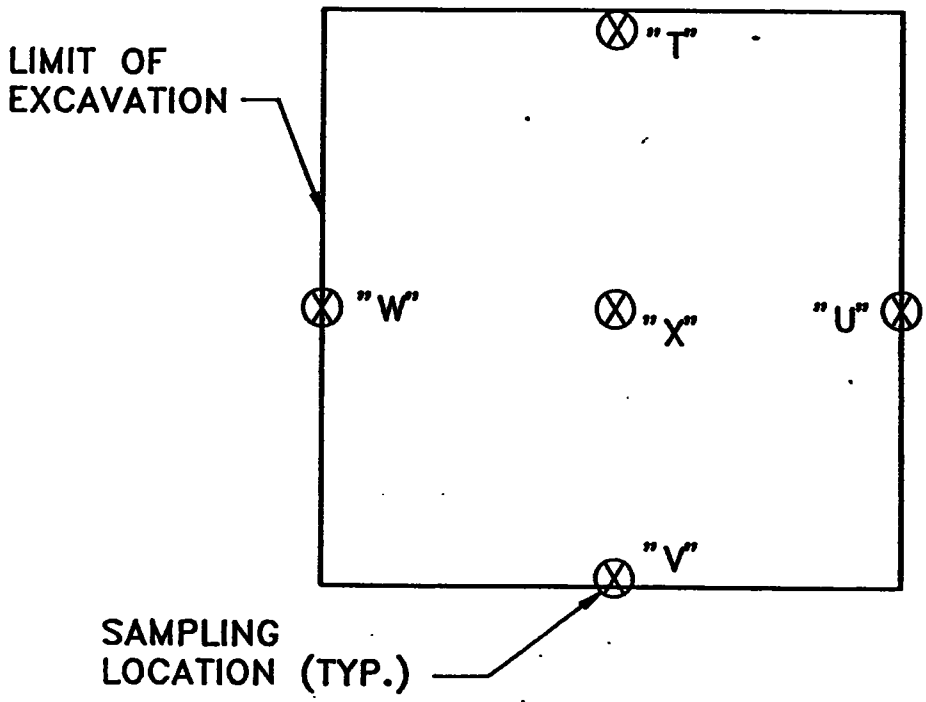


PLAN VIEW

TITLE

TYPICAL "RA" EXCAVATION

PREPARED FOR
BECTON DICKINSON & COMPANY
EAST RUTHERFORD, N.J.

ERM-Northeast
Environmental Resources Management

SCALE NONE | FIGURE 2-2

DATE 11/91

EM/SP BDRA

TABLE 2-2
SOIL DELINEATION SAMPLING RESULTS
PARCEL NOS. 4 AND 5
BECTON DICKINSON AND COMPANY
EAST RUTHERFORD, BERGEN COUNTY

LOCATION:	SAMPLE DEPTH:	CONCENTRATIONS OF PARAMETERS OF CONCERN (ppm) Cr	Cu	Hg	Pb	Zn	TPH	BN	PAH	CaPAH	VOC
401-03-T	3.0 ft.								0.506J	0.289J	
401-03-U	3.0 ft.								2.219J	0.267J	
401-03-V	3.0 ft.								0.046J	N.D.	
401-03-VD	3.0 ft.								0.123J	0.038J	
401-03-W	3.0 ft.							N.D.	N.D.	N.D.	
401-03-WD	3.0 ft.							N.D.	N.D.	N.D.	
401-03-X1	6.0 ft.								2.601J	0.772	
501-07-T	1.5 ft.	213		6.98	326	125					
501-07-U	1.5 ft.	29.8		0.747	251	138					
501-07-V	1.5 ft.	39.5		4.79	97.7	46.5					
501-07-W	1.5 ft.	639		11.7	245	1500					
501-07-X2	3.0 ft.	13.2		0.0500	<10.8	25.9					
501-09-T	3.0 ft.			10.7							
501-09-T5		SAMPLING TERMINATED DUE TO BUILDING LOCATION									
501-09-U		SAMPLING TERMINATED DUE TO BUILDING LOCATION									
501-09-V10	3.0 ft.			2.64							
501-09-V15		SAMPLING TERMINATED DUE TO RETAINING WALL									
501-09-W	3.0 ft.			10.9							
501-09-W5	3.0 ft.			5.70							
501-09-W10	3.0 ft.			1.71							
501-09-X4	6.0 ft.			0.138							
501-09-X5	7.0 ft.			0.162							
502-01-T	1.25 ft.		14.9	2.74					7.397J	2.773J	
502-01-T5	1.25 ft.			0.509							
502-01-U5	1.25 ft.			1.91					4.787J	1.684J	
502-01-U10	1.25 ft.			0.904							
502-01-V	1.25 ft.		24.1	1.17					6.619J	2.598J	
502-01-V5	1.25 ft.			5.33							
502-01-W5	1.25 ft.			0.743					9.072J	3.221J	
502-01-X2	2.5 ft.		77.9	1.47					0.243J	N.D.	

TABLE 2-2 (CONTINUED)

LOCATION:	SAMPLE DEPTH:	CONCENTRATIONS OF PARAMETERS OF CONCERN (ppm) Cr	Cu	Hg	Pb	Zn	TPH	BN	PAH	CaPAH	VOC
502A-01-T	1.25 ft.			0.616			392	2.7 J,B	1.145J	0.201J	
502A-01-U	1.25 ft.			0.652			110	0.52 J,B	0.054J	0.054J	
502A-01-V	1.25 ft.			1.63			<28.1	25.2 J,B	19.510J	11.497J	
502A-01-W	1.25 ft.			1.14			93	17.4 J,B	10.904J	7.589J	
502A-01-XB	2.0 ft.										0.281 B
502A-01-X2	2.5 ft.			0.479			48.6	4.1 J,B	0.839J	0.518J	
502A-02-T	3.0 ft.			2.05			<27.0				
502A-02-T5		SAMPLING TERMINATED DUE TO LOCATION 502A-01									
502A-02-U	3.0 ft.			0.245			<27.9				
502A-02-V	3.0 ft.			1.2			87.9				
502A-02-W	3.0 ft.			1.46			<31.2				
502A-02-X1	4.0 ft.			5.65			<28.7				
502A-02-X2	5.0 ft.			4.42			<26.9				
502A-02-X3	6.0 ft.			9.97,							
503-03-T5		SAMPLING TERMINATED DUE TO BUILDING LOCATION									
503-03-U		SAMPLING TERMINATED DUE TO LOCATION 503-03B									
503-03-V		SAMPLING TERMINATED DUE TO LOCATION 503-03B									
503-03-W	0.75 ft.						33.4				
503-03-X1	1.5 ft.						65				
503-03-X1A	1.0 ft.							22.4 J,B		N.D.	
503-03-X1D	1.5 ft.						73.2				
503-03-X2	2.5 ft.						70.7				
503-03-XB	2.0 ft.										0.204 J,B
503-03-BW5	0.75 ft.						78.7				
505-02-T	1.25 ft.							6.25	1.350J	0.620J	
505-02-U	1.25 ft.							3.31	N.D.	N.D.	
505-02-V	1.25 ft.							5.72	1.12J	N.D.	
505-02-W	1.25 ft.							10.53	4.81J	1.720J	
505-02-X1	2.5 ft.							1.276J,B	0.919J	0.136	
505-06-T	1.0 ft.			1.88							
505-06-U	1.0 ft.			5.78							
505-06-U5	1.0 ft.			0.294							
505-06-V5	1.0 ft.			0.737							
505-06-W	1.0 ft.			0.551							
505-06-X	1.0 ft.			9.32							
505-06-X1	2.0 ft.			0.108							
505-06-X2	3.0 ft.			0.438							

TABLE 2-2 (CONTINUED)

LOCATION:	SAMPLE DEPTH:	CONCENTRATIONS OF PARAMETERS OF CONCERN (ppm) Cr	Cu	Hg	Pb	Zn	TPH	BN	PAH	CaPAH	VOC
505-09-T	2.0 ft.			3.04							
505-09-T5	2.0 ft.			4.22							
505-09-T10	2.0 ft.			9.16							
505-09-T15	2.0 ft.			6.05							
505-09-T20	2.0 ft.			6.84							
505-09-T25	2.0 ft.			2.09							
505-09-T30	2.0 ft.			0.67							
505-09-U	2.0 ft.			1.2							
505-09-U10	2.0 ft.			5.39							
505-09-U10D	2.0 ft.			6.66							
505-09-U15	2.0 ft.			3.45							
505-09-U20		SAMPLING TERMINATED DUE TO BUILDING LOCATION									
505-09-V	2.0 ft.			2.58							
505-09-V5	2.0 ft.			6.45							
505-09-V10	2.0 ft.			1.99							
505-09-V15	2.0 ft.			1.63							
505-09-W	2.0 ft.			3.72							
505-09-W5	2.0 ft.			0.611							
505-09-X	2.5 ft.			8.83							
505-09-X1	4.0 ft.	SAMPLING TERMINATED DUE TO GROUNDWATER									
506-09-T	2.0 ft.		11	0.18							
506-09-U	2.0 ft.		31	0.37							
506-09-U10	2.0 ft.		68	2.1							
506-09-V10	2.0 ft.	SAMPLING TERMINATED DUE TO BUILDING LOCATION									
506-09-W	2.0 ft.		70	0.66							
506-09-X1	4.0 ft.	SAMPLING TERMINATED DUE TO GROUNDWATER									
507-22-T	1.25 ft.			0.309							
507-22-UU	1.25 ft.			3.71							
507-22-V	1.25 ft.			3.85							
507-22-V5	1.25 ft.			13.7							
507-22-V10	1.25 ft.			7.88							
507-22-V10D	1.25 ft.			7.37							
507-22-V15	1.25 ft.			12.7							
507-22-V20	1.25 ft.			3.44							
507-22-V20D	1.25 ft.			3.61							
507-22-V40	1.25 ft.			0.807							
507-22-W	1.25 ft.			1.88							
507-22-WW	1.25 ft.			0.488							
507-22-X	2.0 ft.			5.17							
507-22-X1	2.5 ft.	SAMPLING TERMINATED DUE TO GROUNDWATER									

TABLE 2-2 (CONTINUED)

LOCATION:	SAMPLE DEPTH	CONCENTRATIONS OF PARAMETERS OF CONCERN (ppm) Cr	Cu	Hg	Pb	Zn	TPH	BN	PAH	CaPAH	VOC
508F-03-T	3.0 ft.			3.84							
508F-03-T5	3.0 ft.			5.02							
508F-03-T10	3.0 ft.			1.82							
508F-03-U	3.0 ft.			1.93							
508F-03-U5	3.0 ft.			5.15							
508F-03-U10	3.0 ft.			7.92							
508F-03-U15	3.0 ft.			4.16							
508F-03-U15D	3.0 ft.			5.67							
508F-03-U25	3.0 ft.			1.8							
508F-03-U30	3.0 ft.			4.2							
508F-03-V10		SAMPLING TERMINATED DUE TO BUILDING LOCATION									
508F-03-W35	3.0 ft.			1.5							
508F-03-W10V	3.0 ft.			0.681							
508F-03-W25V	3.0 ft.			3.2							
508F-03-X3	6.0 ft.	SAMPLING TERMINATED DUE TO GROUNDWATER									
511-01-T10	0.75 ft.						36.2				
511-01-U5	0.75 ft.						61.4				
511-01-U10	0.75 ft.						<29.5				
511-01-V		SAMPLING TERMINATED DUE TO LOCATION 511-02									
511-01-W10	0.75 ft.						349				
511-01-W10D	0.75 ft.						202				
511-01-X1	1.5 ft.	SAMPLING TERMINATED DUE TO GROUNDWATER									
511-02-T		SAMPLING TERMINATED DUE TO LOCATION 511-01									
511-02-U		SAMPLING TERMINATED DUE TO LOCATION 511-04									
511-02-V5	0.75 ft.						73.9				
511-02-W5	0.75 ft.						62.4				
511-02-X1	1.5 ft.	SAMPLING TERMINATED DUE TO GROUNDWATER									
511-04-T5		SAMPLING TERMINATED DUE TO LOCATION 511-01									
511-04-U	.75 ft.						177				
511-04-V	.75 ft.						260				
511-04-W5	.75 ft.	SAMPLING TERMINATED DUE TO LOCATION 511-02									
511-04-X1	1.5 ft.	SAMPLING TERMINATED DUE TO GROUNDWATER									
511-04-X1A	1.0 ft.							13.7 J,B		1.75 J	0.002 J,B
MW-507-T5	1.75 ft.							0.37	0.370J	N.D.	
MW-507-T10	1.75 ft.								N.D.	N.D.	
MW-507-U	1.75 ft.							N.D.	N.D.	N.D.	
MW-507-V	1.75 ft.							2.76	2.760J	N.D.	
MW-507-W		SAMPLING TERMINATED DUE TO PROPERTY LINE									
MW-507-X1	3.5 ft.	SAMPLING TERMINATED DUE TO GROUNDWATER									

TABLE 2-2 (CONTINUED)

LOCATION:	SAMPLE DEPTH	CONCENTRATIONS OF PARAMETERS OF CONCERN (ppm) Cr	Cu	Hg	Pb	Zn	TPH	BN	PAH	CaPAH	VOC
SP-9-T	0.75 ft.		192	1.66							
SP-9-U15	0.75 ft.			2.21							
SP-9-U20	0.75 ft.			1.85							
SP-9-UV	0.75 ft.		72.2	10.1							
SP-9-V5	0.75 ft.		86.5	0.20							
SP-9-W	0.75 ft.		111	0.476							
SP-9-X1	1.5 ft.	SAMPLING TERMINATED DUE TO GROUNDWATER									

NOTES:

Values are only given for parameter(s) of concern sampled for at each location.

N.D.= Non-Detectable

J= Estimated value; one or more of the chemical constituents meets the identification criteria but the concentration is less than the specified detection limit.

B= One or more of the chemical constituents were identified in QA/QC blank sample.

Field blanks were prepared on each day of sampling and were analyzed for all the same parameters as those analyzed for the soil samples collected that day. Each field blank was prepared by collecting laboratory-prepared blank water poured over decontaminated field sampling equipment.

Soil samples were collected with stainless steel split-spoon samplers and stainless steel spoons. In paved areas (ie: concrete or asphalt surfaces), a small hole was made through the pavement with a hand tool (eg: pick-axe) or electric-powered "jack-hammer". The broken pavement and sub-base materials (usually gravel) were removed and a decontaminated split-spoon sampler was then driven, by hand-held sledge hammer, to the appropriate depth. The split soon sampler was then removed and opened. The soil sample was taken from the sampler with a decontaminated spoon and placed in a laboratory-prepared sample jar. In order to prepare a duplicate sample, the soil was first placed in a clean stainless steel bowl and mixed thoroughly before being divided into tow separate samples and placed in sample jars.

Each soil sample was visually examined by the ERM field engineer and a description (eg: color, geologic characteristics, moisture content, etc.) was documented in the field log, along with the sample location and depth. The information on the sample jar label and recorded in the field log included the sample date, time, identification number, engineering company name (ERM-Northeast), project number, field engineer's name and analytical parameters. This information was also recorded on the chain-of-custody form that accompanied the sample from the time the sample was obtained until it was received by the laboratory.

All soil samples, duplicate sample and field blank samples were placed in a "cooler" with ice and taken to the on-site ground water treatment plant where they were then placed in a refrigerator. At the end of each day, the samples were transported in sealed coolers

to the laboratory by a courier provided by the lab. Any samples that were not immediately shipped to the lab (ie: held awaiting analytical results of previous samples) were stored in the refrigerator in the on-site treatment plant. Custody of the stored samples was ensured because only ERM-personnel have access to the treatment plant.

Each piece of sampling equipment was decontaminated prior to each use. The specific decontamination procedures performed depended on the chemical parameters that the sample was to be analyzed for. The decontamination procedures used during the delineation sampling investigation are as follows:

1. Soap Wash and Water Rinse

   Sampling equipment was washed with tap water and laboratory detergent, and scrubbed with a brush. The equipment was then rinsed with tap water.

2. Solvent Rinse

   Reagent grade acetone was used to clean sampling devices used for taking samples analyzed for organic compounds. Equipment used for samples analyzed for metals were rinsed with a 10% solution of nitric acid.

3. Final Rinse

   All sampling equipment was rinsed with bottled distilled water as a final decontamination step.

2.3 Soil Remedial Procedures

The first phase of the Parcel Nos. 4 and 5 Soil Remedial Project involved marking the boundaries of the areas to be excavated. The "X-sample" location for each RA location was identified by ERM engineers using survey maps that were generated during the initial site investigations. As explained in Section 2.2, the original X-sample locations were used as the reference points for the RA locations. Each X-location was marked with a wooden stake and orange paint. The results of the delineation sampling were then used to define the limits (i.e., perimeter and depth) of each excavation site. Flagging, stakes and/or orange paint were used to establish excavation boundaries.

Barbella Environmental Technology Inc., (BET) the remedial contractor, mobilized on site in late November, 1991, and under the supervision of ERM, began preparations for the soil removal work. BET's preparatory tasks included establishing work zones, decontamination areas and stock-pile areas. Each of the nine work zones were comprised of one or more RA-excavation sites, and were enclosed with bright orange fencing and warning signs. Within the work zones, plastic sheeting was placed on the ground next to the excavation area(s), and decontamination areas were assembled. A stockpile area for fill material was fenced and lined with plastic sheeting and geotextile fabric. Figure 2-3 is the Soil Remedial Project Site Plan.

In paved areas, the concrete or asphalt surface was cut along the excavation boundary with a power saw. In un-paved areas, the above-ground portion of trees and large shrubs were cut and removed. In accordance with the soil erosion control plan prepared by ERM, stormwater drains were covered with geotextile fabric and sand bags.

Project activities were limited to one Work Zone at a time. The RA locations were excavated with a back-hoe or, at some locations as discussed below, hand shovels. All

excavated soil and materials were removed from each RA location and placed directly into plastic-lined dump trucks for transport to the landfill. Surficial and subsurface material such as asphalt pavement, tree roots, and abandoned underground pipes were removed and disposed of with the excavated soil. Plastic sheeting was placed on the ground surface between the excavation area and the transport truck to contain spilled material. Excavating at each location was continued until contamination limits, ground water or property boundaries were encountered. Information and special procedures for specific RA locations are discussed below. The individual RA excavation sites are shown on Figures 2-4 through 2-20.

Location 501-09

Excavation of this RA area was particularly difficult due to its location directly in front of the facility's main entrance. Originally, the project specifications required the removal of a portion of the front walkway as part of the excavation, and detouring pedestrian traffic to an alternate building entrance. Significant disruption of site operations were anticipated during this work. However, before initiating the remedial work, BD, the field engineer and the contractor's representative conceived an alternate plan by which the soil was excavated from under the walk by tunneling with hand shovels. To ensure that sufficient soil was removed, the extent of this excavation was increased by approximately 15 percent.

Location 502A-02

During excavation of this location, an underground concrete conduit and pipe support were encountered and left in place. As a result, the amount of soil excavated in this area was reduced from the originally expected 15 cubic yards to 13 cubic yards.

Location 505-06

This RA location was delineated using the original cleanup criteria for mercury (i.e., 2 ppm). When the mercury remedial criteria was changed to 14 ppm (see Section 2.1.3), this area was reduced by more than 50 percent. Figure 2-12 shows the locations of the original delineation samples.

Location 506-09

Due to the close proximity of this location to Building U-W, the southeast end of this excavation was sloped to protect the building foundation from collapse. In addition, the project cleanup plan specified that this location would be excavated to a depth of ground water, which was deeper than anticipated. As a result, the volume of excavated soil increased to 49 cubic yards.

Location 507-22

As previously discussed, the revision of the mercury cleanup criteria caused a reduction in the area of some RA locations, such as Location 507-22. However, due to a depressed ground water level, the volume of excavated soil was greater than expected at this location.

Location 508F-03

Due to the change of the remedial criteria for mercury, two portions of this area did not required excavation. During removal of the soil from this location, three underground pipes (electrical conduits and a steam pipe) were exposed and left in place.

Location 511

Due to their close proximity, RA locations 511-01, -02 and -04 were excavated together as one area. As shown in Figure 2-4, the depth of this excavation extended down to ground water, which varied from 4 feet (at the northwest and southeast ends) to approximately 6 feet (in the middle of the excavation). The depth of this excavation was significantly greater than originally anticipated. Soil in Area 511-01 was carefully removed from around an underground natural gas supply pipe which remains in use. During the remedial work at this location, soil with significant petroleum hydrocarbon contamination was observed and removed. In addition, subsurface concrete supports (for two underground storage tanks formerly at this location) were removed with the contaminated soil.

Location MW-507

This excavation was deeper than originally anticipated due to the lower water table. In compliance with the Remedial Action Plan, the southwest end of this excavation was terminated at the property boundary line.

Location MW-508

The depth and volume of this excavation exceeded expectations due to the low ground water level. During soil removal work, a storm drain pipe and concrete support were uncovered and were not removed. Excavation of this location along its southeast and southwest sides ended at the property boundary.

Location SP-9

As shown in Figure 2-20, a portion of this location did not require removal due to the revision of the cleanup criteria.

When excavation of an RA Location was completed, the ERM engineer recorded the dimensions, volume of soil excavated, and types of materials encountered. The excavation was immediately backfilled with clean fill material supplied by Blue Circle Raia, Inc. of Hackensack, NJ. A laboratory report on the analysis of a fill material sample is provided in Appendix A. The excavated areas were surveyed by Lippincott Engineering Associates of Riverside, NJ. Soil transport and disposal procedures are discussed in Section 2.4. Table 2-3 summarizes the Parcel Nos. 4 and 5 Soil Remedial Project. Figures 2-21 through 2-23 present post-excavation soil quality.

2.4 Contaminated Soil Disposal Procedures

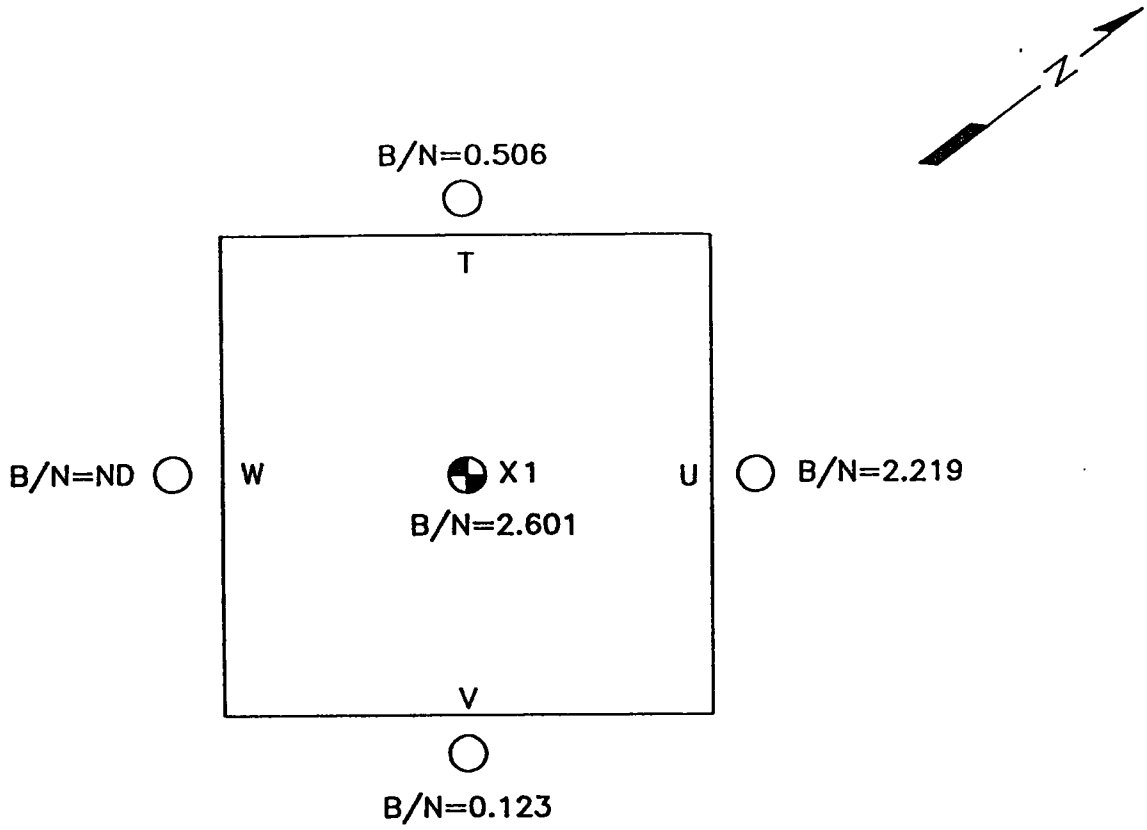
When each dump truck was filled with excavated material, the load was completely covered with a plastic tarp for transport. The ERM engineer completed New Jersey Hazardous Waste and Landfill Non-hazardous Waste manifests for each shipment. Each manifest was signed by the truck driver and BD's Corporate Environmental Coordinator, Ted Tideman. The manifests were submitted to NJDEPE, Division of Hazardous Management (DHWM), Manifest Section in early January, 1992 (see transmittal letter dated January 9, 1992, in Appendix B). Photocopies of the manifests were sent to Tessie Fields, NJDEPE, DHWM, BEECRA on February 21, 1992 (see February 21, 1992 transmittal letter in Appendix B).

TABLE 2–3
SUMMARY OF PARCEL NOS. 4 AND 5 SOIL REMEDIAL PROJECT
BECTON DICKINSON AND COMPANY
EAST RUTHERFORD, BERGEN COUNTY, NJ

LOCATION	EXCAVATED SOIL VOLUME, CU. YDS.	EXCAVATION DEPTH, FT.	PARAMETERS OF CONCERN
401–03	22	6	B/N
501–07	11	3	Cr,Hg,Pb & Zn
501–09	51	6	Hg
502A–01	9	2.5	Hg, TPH & B/N
502A–02	13	4	Hg & TPH
502–01	19	2.5	Cu, Hg & B/N
503–03	8	1.5	TPH
505–02	9	2.5	B/N
505–06	4	1	Hg
505–09	9	2.5	Hg
506–09	49	6.5(GW)	Cu & Hg
507–22	27	3.5(GW)	Hg
508F–03	173	5.5(GW)	Hg
511–01,02,04	169	4–6 (GW)	TPH
MW–507	30	5.5(GW)	B/N
MW–508	76	5.5(GW)	B/N
SP–9	28	2.5(GW)	Cu & Hg
TOTAL	707		

The excavated soil was classified as a New Jersey Hazardous Waste, Classification No. X725, due to petroleum hydrocarbon contamination. However, for shipment out of state, the waste was classified as non-hazardous. Before the soil was excavated, in-situ soil samples were collected at each excavation site, with one grab sample obtained for every 25 cubic yards. A total of 28 grab samples were collected and composited into three samples (WC-Z1, WC-Z2 and WC-Z3) which were sent to Laboratory Resources, Inc. for TCLP analysis. The analytical results indicated that the soil was not a RCRA Hazardous Waste. A copy of the TCLP analytical results is provided in Appendix C.

All 707 cubic yards of excavated soil and material were shipped for disposal to American Landfill, Inc. in Waynesburg, Ohio.



REMEDIAL ACTION SUMMARY

PARAMETERS OF CONCERN: BASE NEUTRAL EXTRACTABLE ORGANIC COMPOUNDS (B/N)

EXCAVATION DEPTH: 6 FT.

EXCAVATION VOLUME: 22 CU.YDS.

SURFACE: ASPHALT PAVED

LEGEND

7.25 ○	LOCATION OF END-POINT VERIFICATION SAMPLE BELOW REMEDIAL ACTION CRITERIA AND CONCENTRATION(S) OF PARAMETER(S) OF CONCERN IN PPM.
◒	LOCATION OF EXCAVATION BASE SAMPLE
▭	LIMITS OF EXCAVATION AREA
ND	NOT DETECTED
GW	AREA WAS EXCAVATED TO GROUND WATER
T,U,V,W,X	SAMPLE IDENTIFICATION CODE

TITLE

REMEDIAL ACTION
LOCATION 401-03

PREPARED FOR
BECTON DICKINSON & CO.
EAST RUTHERFORD, NJ

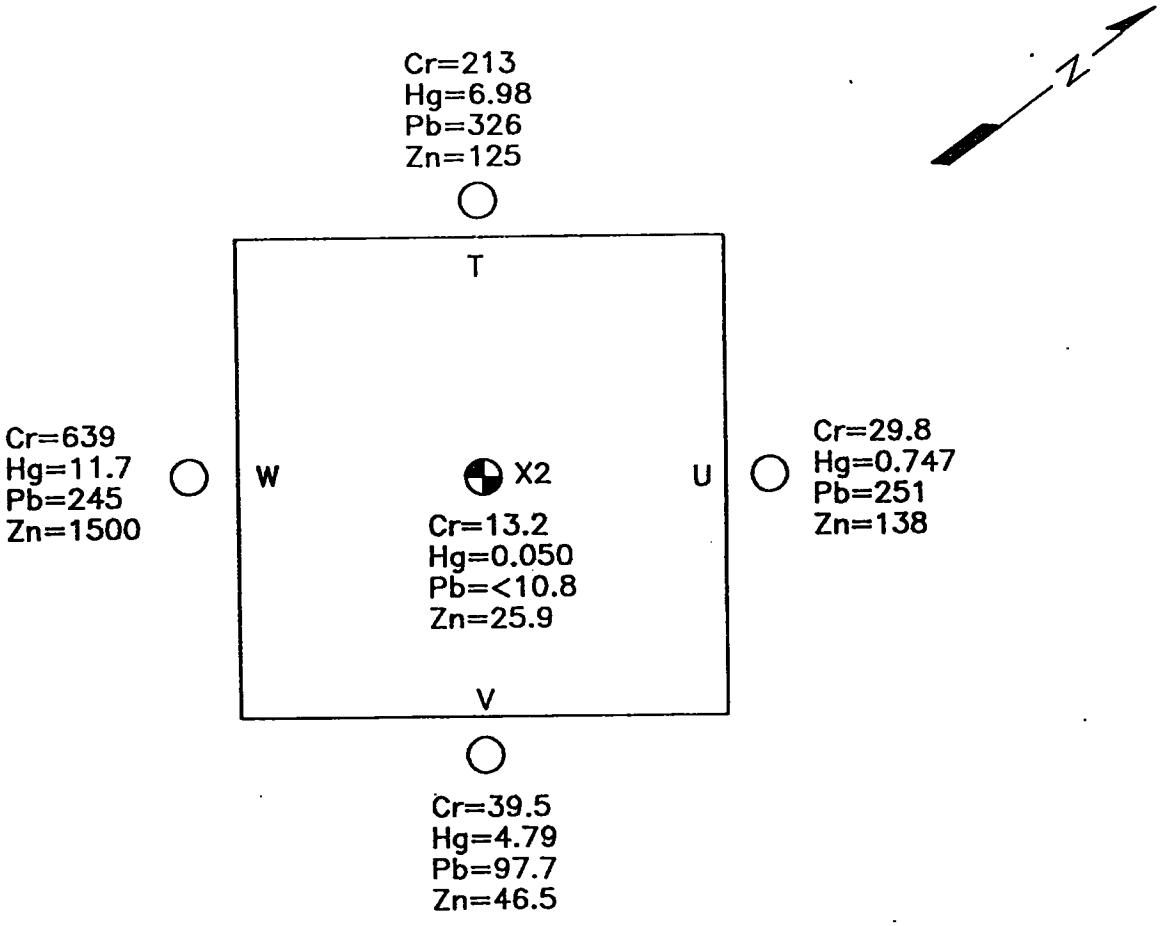
ERM-Northeast
Environmental Resources Management

SCALE 1"=4'

DATE 6/1992

FIGURE 2-4

BD-PP2.DWG SP



REMEDIAL ACTION SUMMARY

PARAMETERS OF CONCERN: Cr,Hg,Pb & Zn

EXCAVATION DEPTH: 3 FT.

EXCAVATION VOLUME: 11 CU.YDS.

SURFACE: SOIL

LEGEND

7.25 ○	LOCATION OF END-POINT VERIFICATION SAMPLE BELOW REMEDIAL ACTION CRITERIA AND CONCENTRATION(S) OF PARAMETER(S) OF CONCERN IN PPM.
◕	LOCATION OF EXCAVATION BASE SAMPLE
▭	LIMITS OF EXCAVATION AREA
ND	NOT DETECTED
GW	AREA WAS EXCAVATED TO GROUND WATER
T,U,V,W,X	SAMPLE IDENTIFICATION CODE

TITLE

REMEDIAL ACTION
LOCATION 501-07

PREPARED FOR
BECTON DICKINSON & CO.
EAST RUTHERFORD, NJ

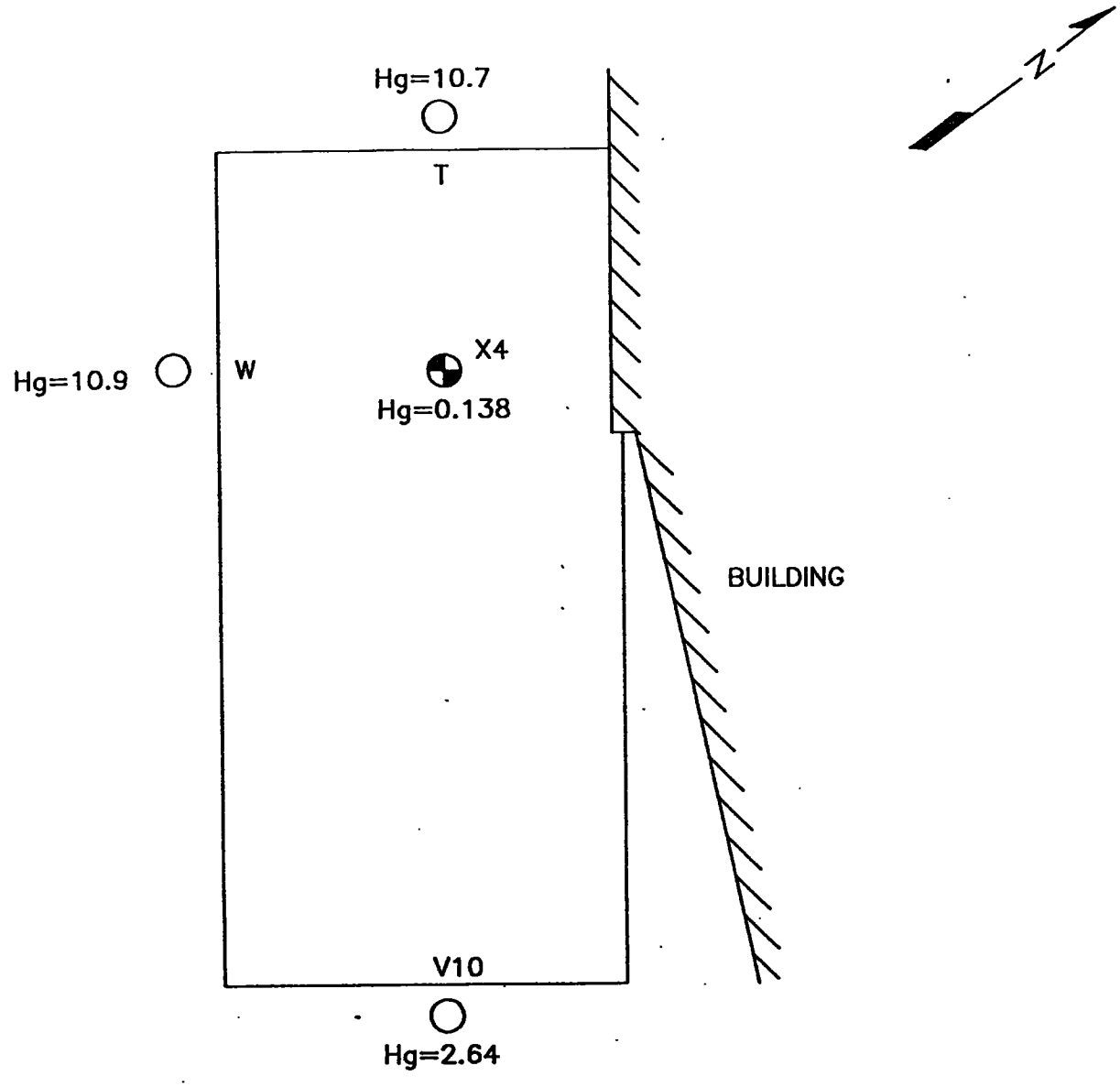
ERM-Northeast
Environmental Resources Management

SCALE 1"=4'

DATE 6/1992

FIGURE 2-5

BD-PP5.DWG SP



REMEDIAL ACTION SUMMARY

PARAMETERS OF CONCERN: Hg

EXCAVATION DEPTH: 6 FT.

EXCAVATION VOLUME: 51 CU.YDS.

SURFACE: SOIL

LEGEND

7.25 ○	LOCATION OF END-POINT VERIFICATION SAMPLE BELOW REMEDIAL ACTION CRITERIA AND CONCENTRATION(S) OF PARAMETER(S) OF CONCERN IN PPM.
◒	LOCATION OF EXCAVATION BASE SAMPLE
▭	LIMITS OF EXCAVATION AREA
ND	NOT DETECTED
GW	AREA WAS EXCAVATED TO GROUND WATER
T,U,V,W,X	SAMPLE IDENTIFICATION CODE

TITLE

REMEDIAL ACTION
LOCATION 501-09

PREPARED FOR
BECTON DICKINSON & CO.
EAST RUTHERFORD, NJ

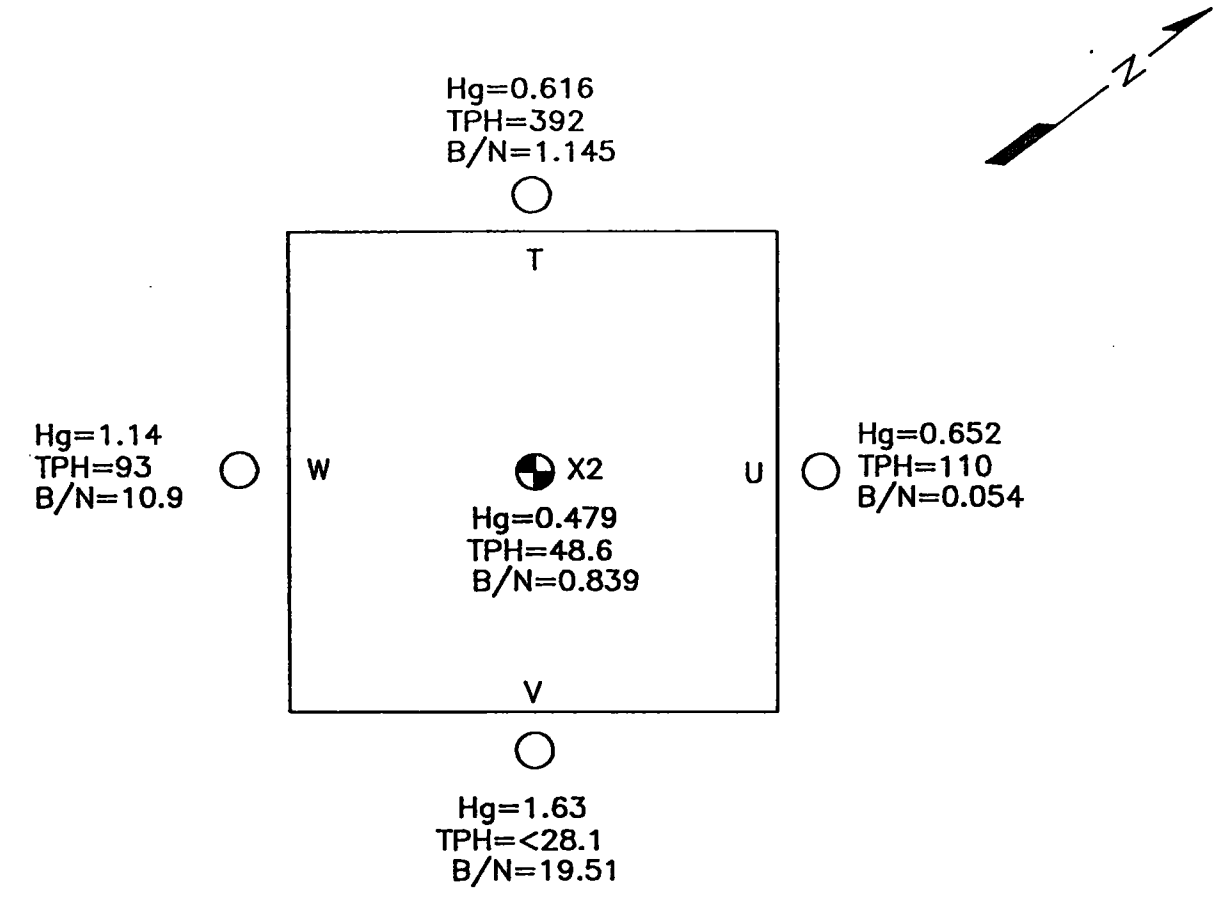
ERM-Northeast
Environmental Resources Management

SCALE 1"=4'

DATE 6/1992

FIGURE 2-6

BD-PP8.DWG SP



REMEDIAL ACTION SUMMARY

PARAMETERS OF CONCERN: Hg, TPH & BASE NEUTRAL EXTRACTABLE ORGANIC COMPOUNDS (B/N)

EXCAVATION DEPTH: 2.5 FT.

EXCAVATION VOLUME: 9 CU.YDS.

SURFACE: ASPHALT PAVED

LEGEND

7.25 ○	LOCATION OF END-POINT VERIFICATION SAMPLE BELOW REMEDIAL ACTION CRITERIA AND CONCENTRATION(S) OF PARAMETER(S) OF CONCERN IN PPM.
◔	LOCATION OF EXCAVATION BASE SAMPLE
▭	LIMITS OF EXCAVATION AREA
ND	NOT DETECTED
GW	AREA WAS EXCAVATED TO GROUND WATER
T,U,V,W,X	SAMPLE IDENTIFICATION CODE

TITLE

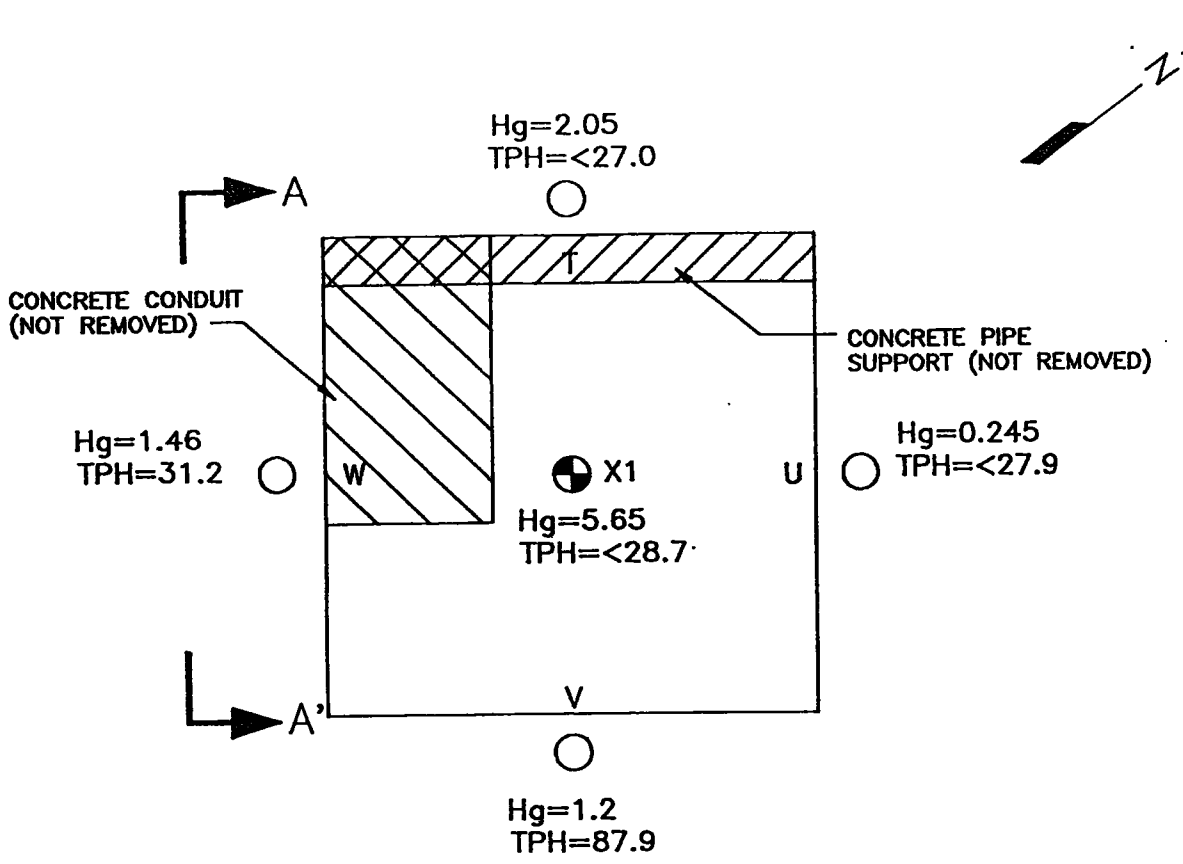
REMEDIAL ACTION
LOCATION 502A-01

PREPARED FOR
BECTON DICKINSON & CO.
EAST RUTHERFORD, NJ

ERM-Northeast
Environmental Resources Management

SCALE 1"=4'
DATE 6/1992
FIGURE 2-7

BD-PP3.DWG SP



REMEDIAL ACTION SUMMARY

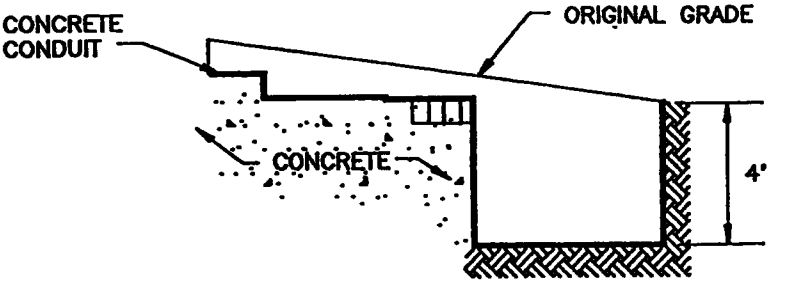
PARAMETERS OF CONCERN: Hg & TPH

EXCAVATION DEPTH: 4 FT.

EXCAVATION VOLUME: 13 CU.YDS.

SURFACE: SOIL & ASPHALT PAVED

EXCAVATION CROSS SECTION A–A'



SECTION A–A

LEGEND

7.25 ○	LOCATION OF END–POINT VERIFICATION SAMPLE BELOW REMEDIAL ACTION CRITERIA AND CONCENTRATION(S) OF PARAMETER(S) OF CONCERN IN PPM.
◓	LOCATION OF EXCAVATION BASE SAMPLE
▭	LIMITS OF EXCAVATION AREA
ND	NOT DETECTED
GW	AREA WAS EXCAVATED TO GROUND WATER
T,U,V,W,X	SAMPLE IDENTIFICATION CODE

TITLE

REMEDIAL ACTION
LOCATION 502A–02

PREPARED FOR
BECTON DICKINSON & CO.
EAST RUTHERFORD, NJ

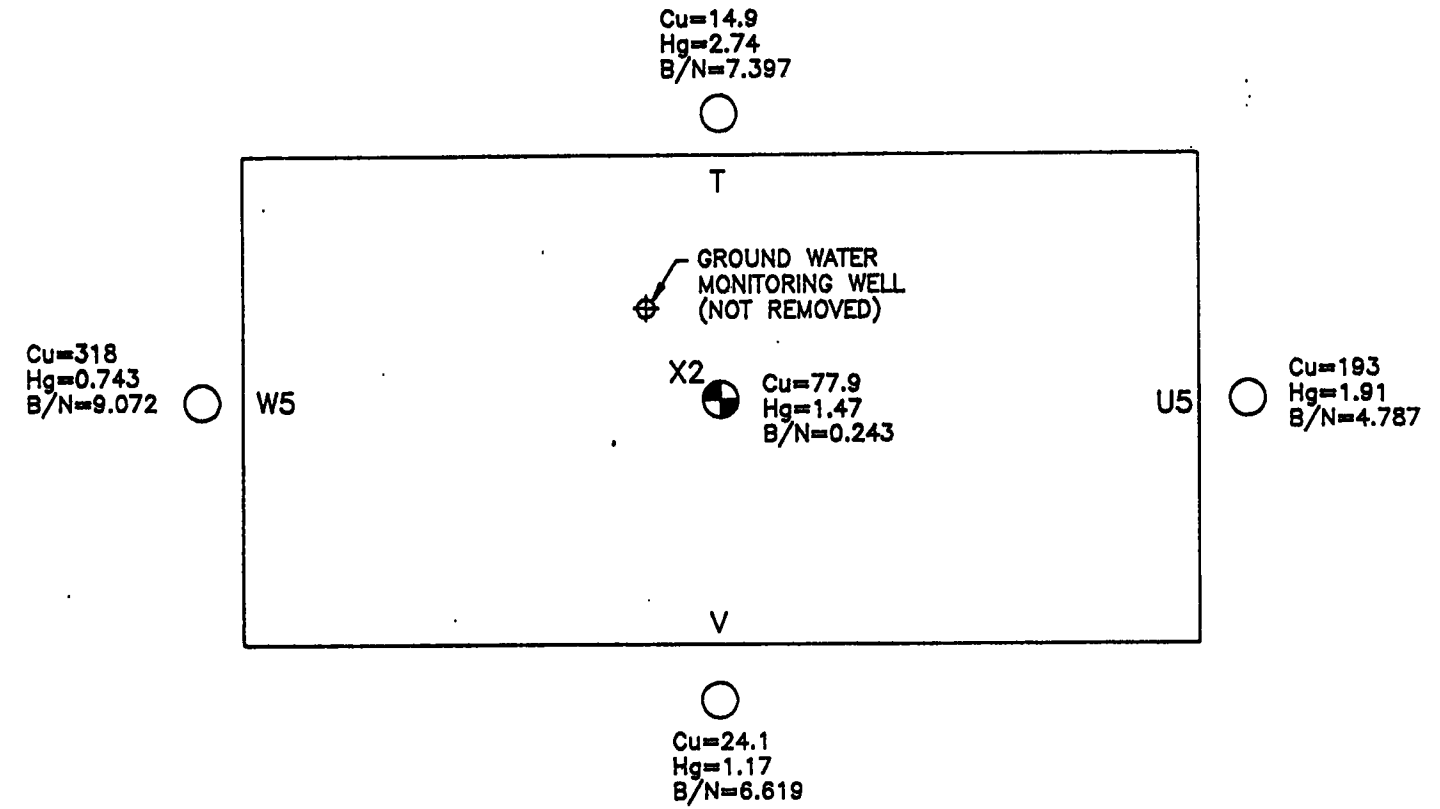
ERM ERM-Northeast Environmental Resources Management

SCALE 1"=4'

DATE 6/1992

FIGURE 2-8

BD–PP4 SP/EM



LEGEND

7.25 ○	LOCATION OF END-POINT VERIFICATION SAMPLE BELOW REMEDIAL ACTION CRITERIA AND CONCENTRATION(S) OF PARAMETER(S) OF CONCERN IN PPM.
◒	LOCATION OF EXCAVATION BASE SAMPLE
▭	LIMITS OF EXCAVATION AREA
ND	NOT DETECTED
GW	AREA WAS EXCAVATED TO GROUND WATER
T,U,V,W,X	SAMPLE IDENTIFICATION CODE

REMEDIAL ACTION SUMMARY

PARAMETERS OF CONCERN: Cu,Hg & BASE NEUTRAL EXTRACTABLE ORGANIC COMPOUNDS (B/N)

EXCAVATION DEPTH: 2.5 FT.

EXCAVATION VOLUME: 19 CU.YDS.

SURFACE: SOIL

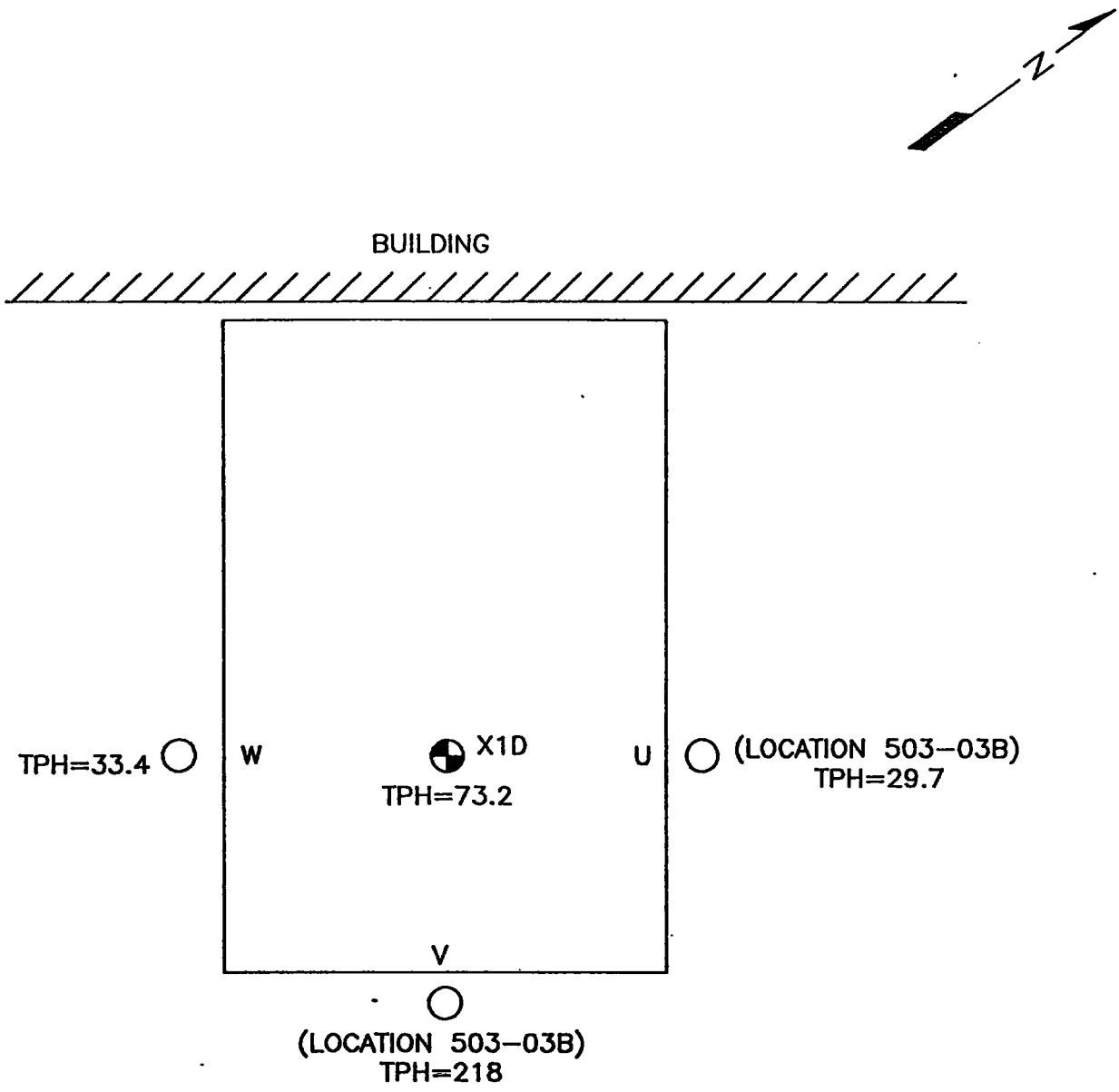
TITLE

REMEDIAL ACTION
LOCATION 502-01

PREPARED FOR
BECTON DICKINSON & CO.
EAST RUTHERFORD, NJ

ERM-Northeast
Environmental Resources Management

SCALE 1"=4'
DATE 6/1992
FIGURE 2-9



REMEDIAL ACTION SUMMARY

PARAMETERS OF CONCERN: TPH

EXCAVATION DEPTH: 1.5 FT.

EXCAVATION VOLUME: 8 CU.YDS.

SURFACE: SOIL

LEGEND

7.25 ○	LOCATION OF END-POINT VERIFICATION SAMPLE BELOW REMEDIAL ACTION CRITERIA AND CONCENTRATION(S) OF PARAMETER(S) OF CONCERN IN PPM.
◔	LOCATION OF EXCAVATION BASE SAMPLE
▭	LIMITS OF EXCAVATION AREA
ND	NOT DETECTED
GW	AREA WAS EXCAVATED TO GROUND WATER
T,U,V,W,X	SAMPLE IDENTIFICATION CODE

TITLE

REMEDIAL ACTION
LOCATION 503-03

PREPARED FOR
BECTON DICKINSON & CO.
EAST RUTHERFORD, NJ

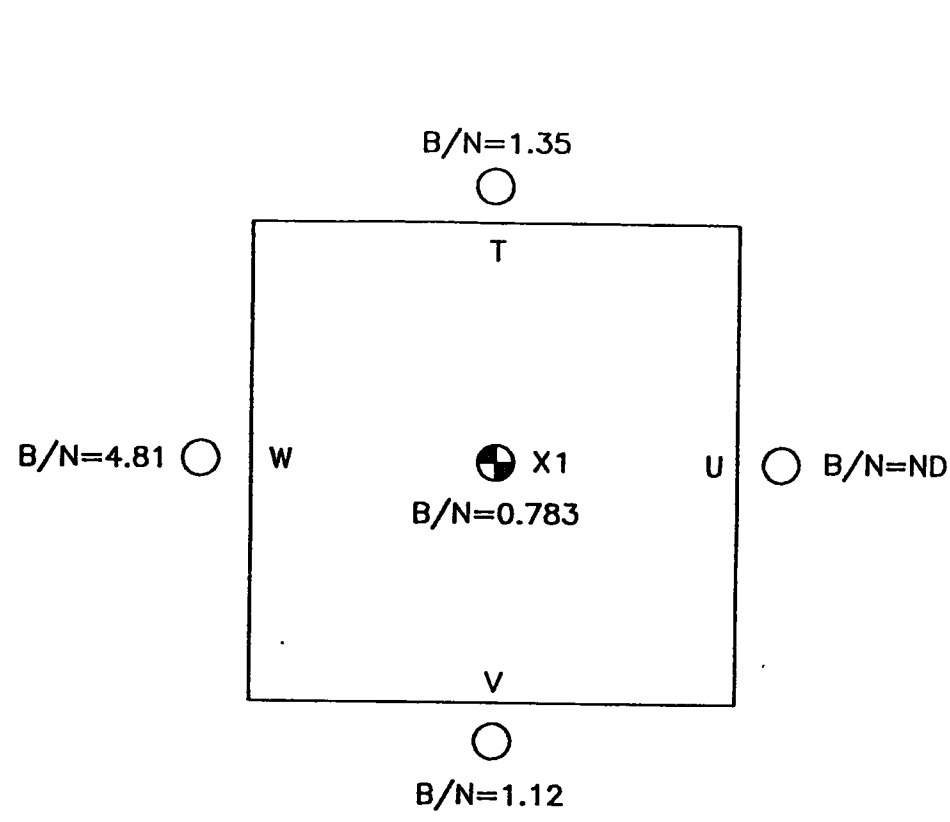
ERM ERM-Northeast
Environmental Resources Management

SCALE 1"=4'

DATE 6/1992

FIGURE 2-10

BD-PP9.DWG SP



REMEDIAL ACTION SUMMARY

PARAMETERS OF CONCERN: BASE NEUTRAL EXTRACTABLE ORGANIC COMPOUNDS (B/N)

EXCAVATION DEPTH: 2.5 FT.

EXCAVATION VOLUME: 9 CU.YDS.

SURFACE: SOIL

LEGEND

7.25 ○	LOCATION OF END-POINT VERIFICATION SAMPLE BELOW REMEDIAL ACTION CRITERIA AND CONCENTRATION(S) OF PARAMETER(S) OF CONCERN IN PPM.
◕	LOCATION OF EXCAVATION BASE SAMPLE
▭	LIMITS OF EXCAVATION AREA
ND	NOT DETECTED
GW	AREA WAS EXCAVATED TO GROUND WATER
T,U,V,W,X	SAMPLE IDENTIFICATION CODE

TITLE

REMEDIAL ACTION
LOCATION 505-02

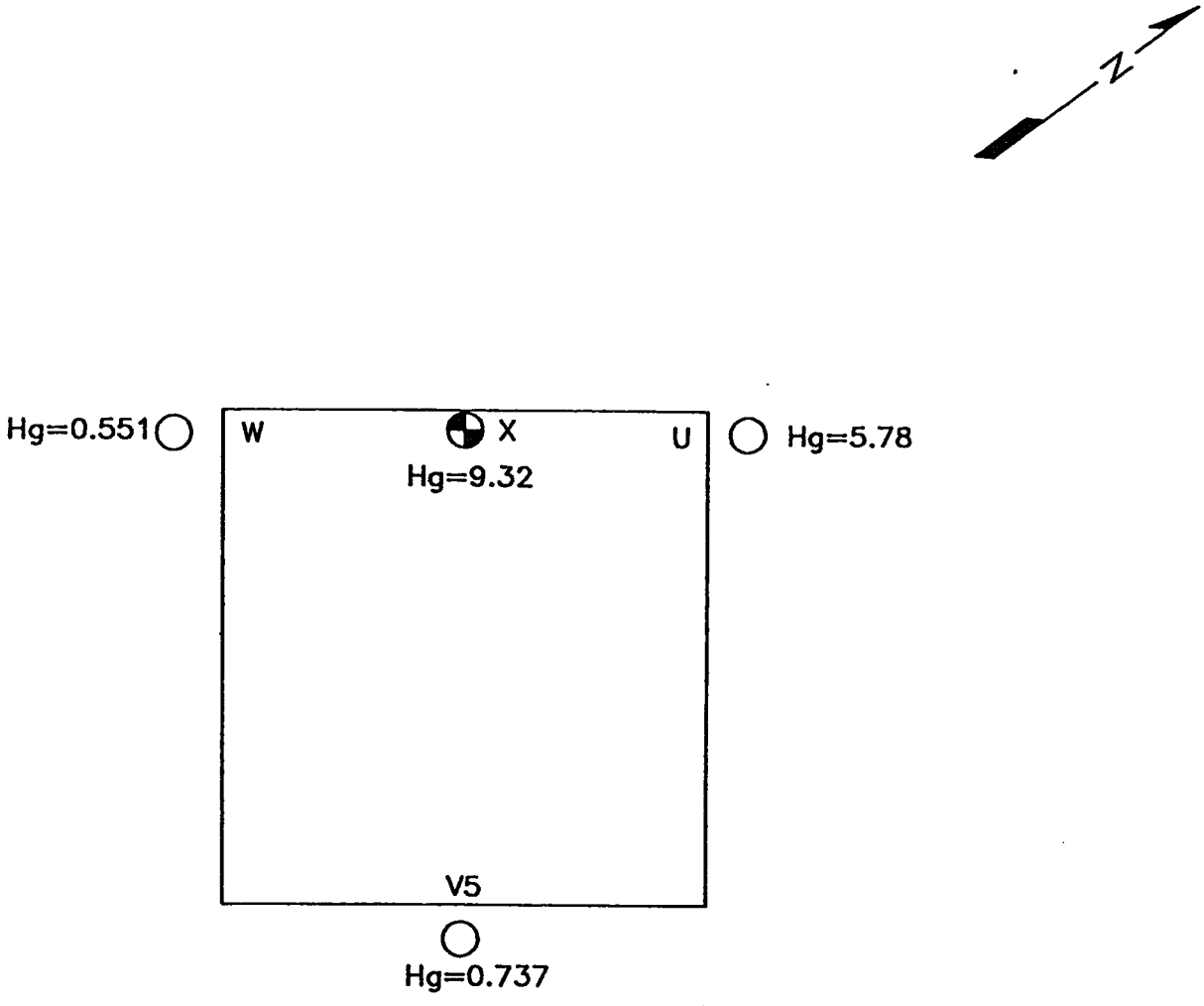
PREPARED FOR
BECTON DICKINSON & CO.
EAST RUTHERFORD, NJ

ERM-Northeast
Environmental Resources Management

SCALE 1"=5'

DATE 6/1992

FIGURE 2-11



REMEDIAL ACTION SUMMARY

PARAMETERS OF CONCERN: Hg

EXCAVATION DEPTH: 1 FT.

EXCAVATION VOLUME: 4 CU.YDS.

SURFACE: SOIL AND CONCRETE PAVEMENT

LEGEND

7.25 ○	LOCATION OF END-POINT VERIFICATION SAMPLE BELOW REMEDIAL ACTION CRITERIA AND CONCENTRATION(S) OF PARAMETER(S) OF CONCERN IN PPM.
◔	LOCATION OF EXCAVATION BASE SAMPLE
▭	LIMITS OF EXCAVATION AREA
ND	NOT DETECTED
GW	AREA WAS EXCAVATED TO GROUND WATER
T,U,V,W,X	SAMPLE IDENTIFICATION CODE

TITLE

REMEDIAL ACTION
LOCATION 505-06

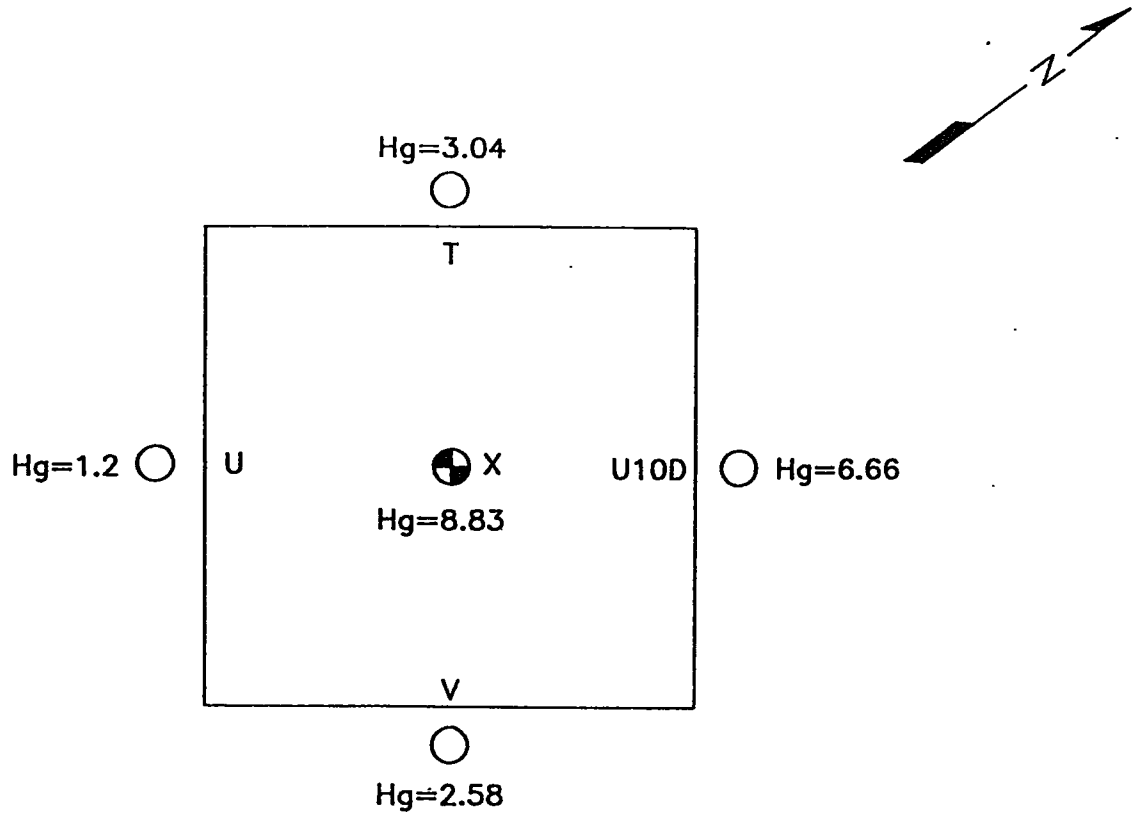
PREPARED FOR
BECTON DICKINSON & CO.
EAST RUTHERFORD, NJ

ERM ERM-Northeast
Environmental Resources Management

SCALE 1"=4'

DATE 6/1992

FIGURE 2-12



REMEDIAL ACTION SUMMARY

PARAMETERS OF CONCERN: Hg

EXCAVATION DEPTH: 2.5 FT.

EXCAVATION VOLUME: 9 CU.YDS.

SURFACE: SOIL AND FLAGSTONE

LEGEND

7.25 ○	LOCATION OF END-POINT VERIFICATION SAMPLE BELOW REMEDIAL ACTION CRITERIA AND CONCENTRATION(S) OF PARAMETER(S) OF CONCERN IN PPM.
◔	LOCATION OF EXCAVATION BASE SAMPLE
▭	LIMITS OF EXCAVATION AREA
ND	NOT DETECTED
GW	AREA WAS EXCAVATED TO GROUND WATER
T,U,V,W,X	SAMPLE IDENTIFICATION CODE

TITLE

REMEDIAL ACTION

LOCATION 505-09

PREPARED FOR

BECTON DICKINSON & CO.

EAST RUTHERFORD, NJ

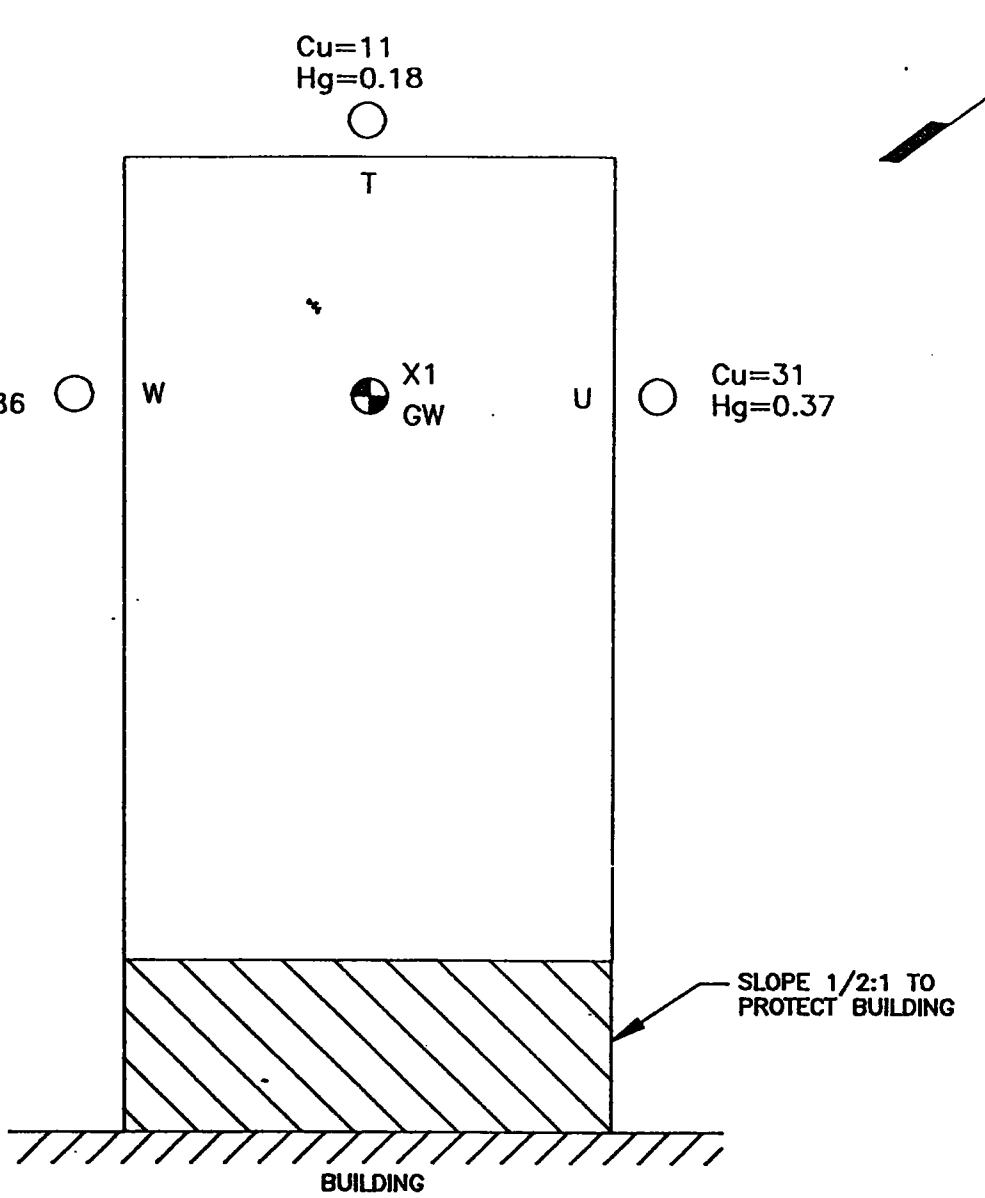
ERM ERM-Northeast Environmental Resources Management

SCALE 1"=4'

DATE 6/1992

FIGURE 2-13

BD-PP6.DWG SP



REMEDIAL ACTION SUMMARY

PARAMETERS OF CONCERN: Cu & Hg

EXCAVATION DEPTH: 6.5 FT. (GW)

EXCAVATION VOLUME: 49 CU.YDS.

SURFACE: SOIL

LEGEND

7.25 ○	LOCATION OF END-POINT VERIFICATION SAMPLE BELOW REMEDIAL ACTION CRITERIA AND CONCENTRATION(S) OF PARAMETER(S) OF CONCERN IN PPM.
◔	LOCATION OF EXCAVATION BASE SAMPLE
▭	LIMITS OF EXCAVATION AREA
ND	NOT DETECTED
GW	AREA WAS-EXCAVATED TO GROUND WATER
T,U,V,W,X	SAMPLE IDENTIFICATION CODE

TITLE

REMEDIAL ACTION
LOCATION 506-09

PREPARED FOR
BECTON DICKINSON & CO.
EAST RUTHERFORD, NJ

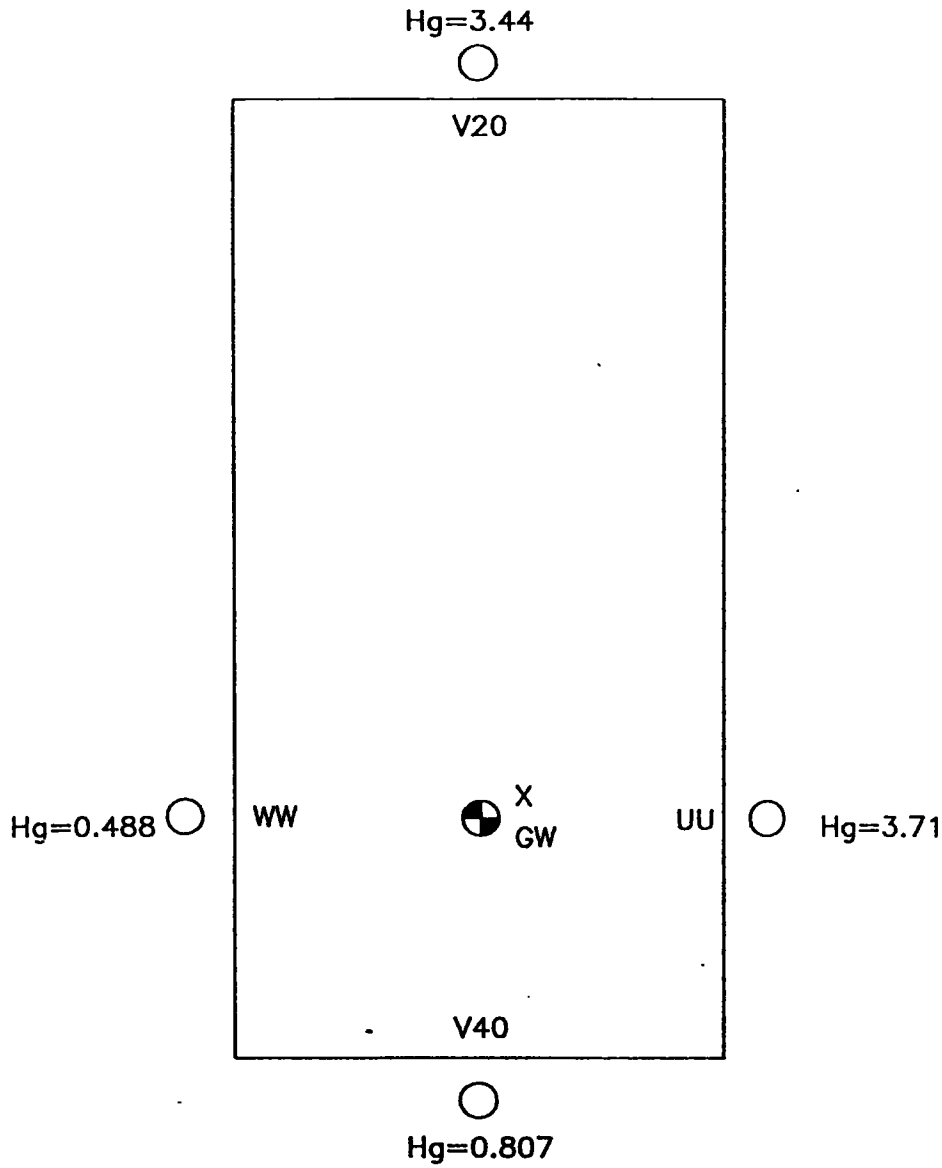
ERM-Northeast
Environmental Resources Management

SCALE 1"=4'

DATE 6/1992

FIGURE 2-14

BD-PP7 SP/EM



REMEDIAL ACTION SUMMARY

PARAMETERS OF CONCERN: Hg

EXCAVATION DEPTH: 3.5 FT. (GW)

EXCAVATION VOLUME: 27 CU.YDS.

SURFACE: ASPHALT PAVED

LEGEND

7.25 ○	LOCATION OF END-POINT VERIFICATION SAMPLE BELOW REMEDIAL ACTION CRITERIA AND CONCENTRATION(S) OF PARAMETER(S) OF CONCERN IN PPM.
◒	LOCATION OF EXCAVATION BASE SAMPLE
▭	LIMITS OF EXCAVATION AREA
ND	NOT DETECTED
GW	AREA WAS EXCAVATED TO GROUND WATER
T,U,V,W,X	SAMPLE IDENTIFICATION CODE

TITLE

REMEDIAL ACTION
LOCATION 507-22

PREPARED FOR
BECTON DICKINSON & CO.
EAST RUTHERFORD, NJ

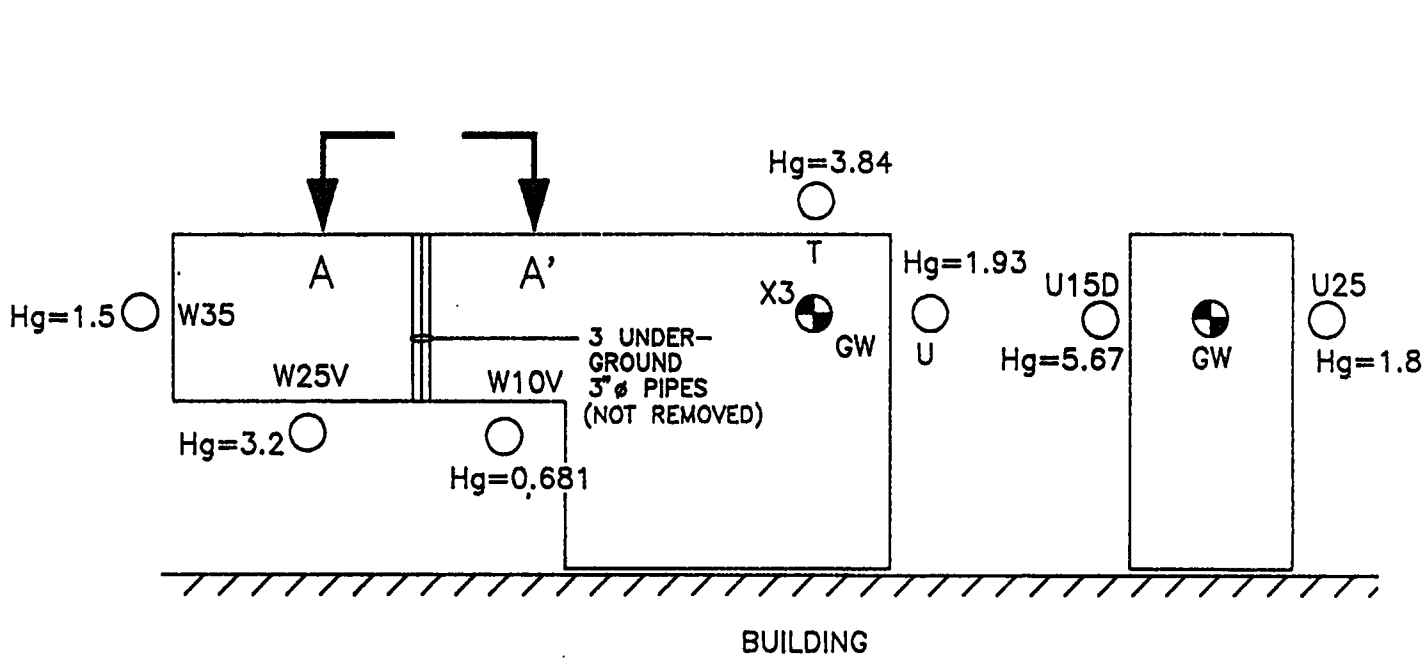
ERM ERM-Northeast
Environmental Resources Management

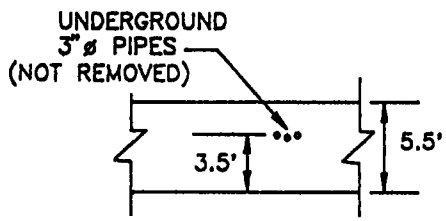
SCALE 1"=4'

DATE 6/1992

FIGURE 2-15

BD-PP16.DWG SP





CROSS SECTION A–A'

LEGEND

7.25 ○	LOCATION OF END-POINT VERIFICATION SAMPLE BELOW REMEDIAL ACTION CRITERIA AND CONCENTRATION(S) OF PARAMETER(S) OF CONCERN IN PPM.
◕	LOCATION OF EXCAVATION BASE SAMPLE
▭	LIMITS OF EXCAVATION AREA
ND	NOT DETECTED
GW	AREA WAS EXCAVATED TO GROUND WATER
T,U,V,W,X	SAMPLE IDENTIFICATION CODE

REMEDIAL ACTION SUMMARY

PARAMETERS OF CONCERN: Hg

EXCAVATION DEPTH: 5.5 FT. (GW)

EXCAVATION VOLUME: 173 CU.YDS.

SURFACE: ASPHALT PAVED

TITLE

REMEDIAL ACTION
LOCATION 508F-03

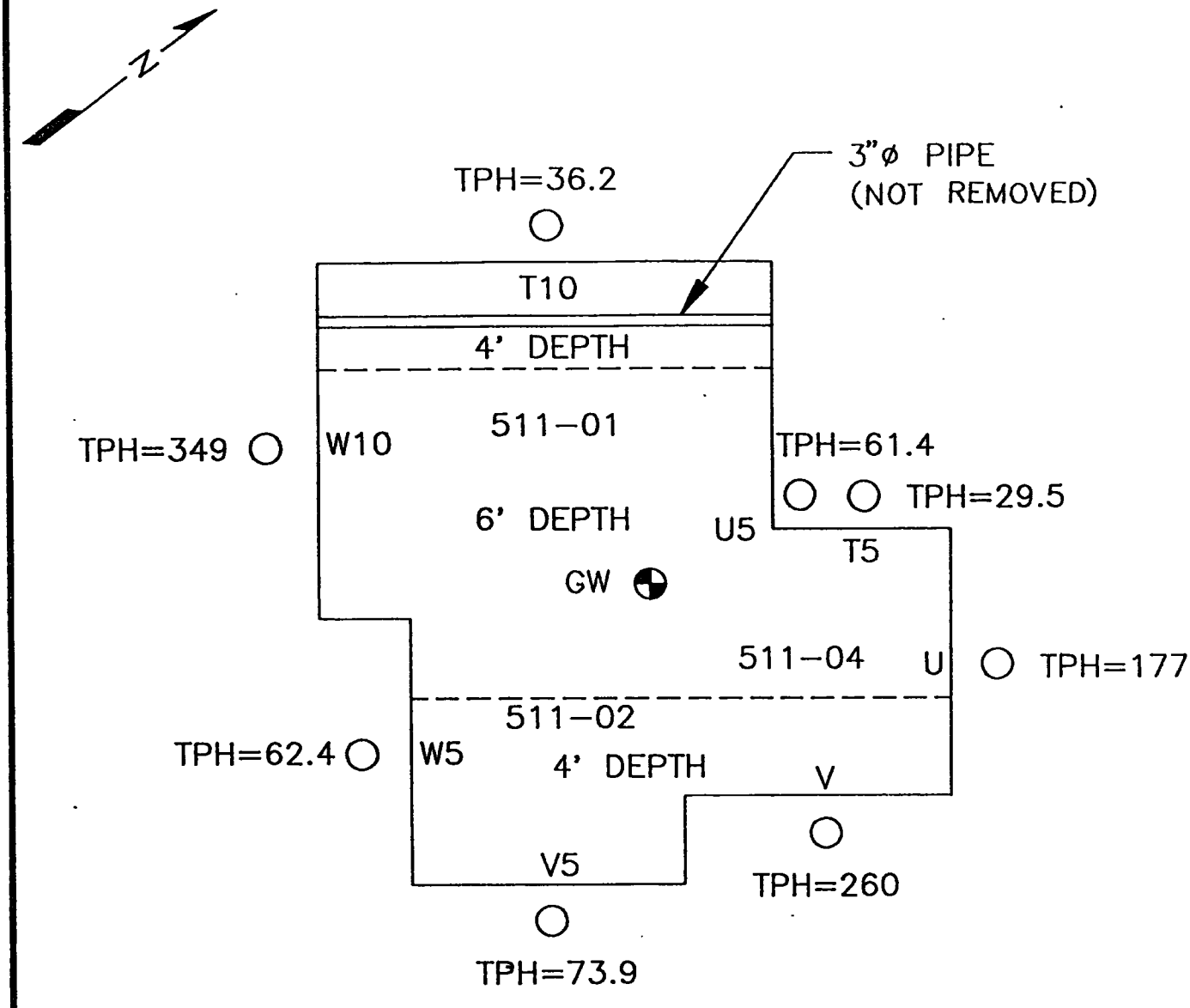
PREPARED FOR
BECTON DICKINSON & CO.
EAST RUTHERFORD, NJ

ERM-Northeast
Environmental Resources Management

SCALE 1"=12'

DATE 6/1992

FIGURE 2-16



REMEDIAL ACTION SUMMARY

PARAMETERS OF CONCERN: TPH

EXCAVATION DEPTH: 4 FT., 6 FT. (GW)

EXCAVATION VOLUME: 169 CU.YDS.

SURFACE: ASPHALT PAVED

LEGEND

7.25 ○	LOCATION OF END-POINT VERIFICATION SAMPLE BELOW REMEDIAL ACTION CRITERIA AND CONCENTRATION(S) OF PARAMETER(S) OF CONCERN IN PPM.
◒	LOCATION OF EXCAVATION BASE SAMPLE
▭	LIMITS OF EXCAVATION AREA
ND	NOT DETECTED
GW	AREA WAS EXCAVATED TO GROUND WATER
T,U,V,W,X	SAMPLE IDENTIFICATION CODE

TITLE

REMEDIAL ACTION LOCATIONS

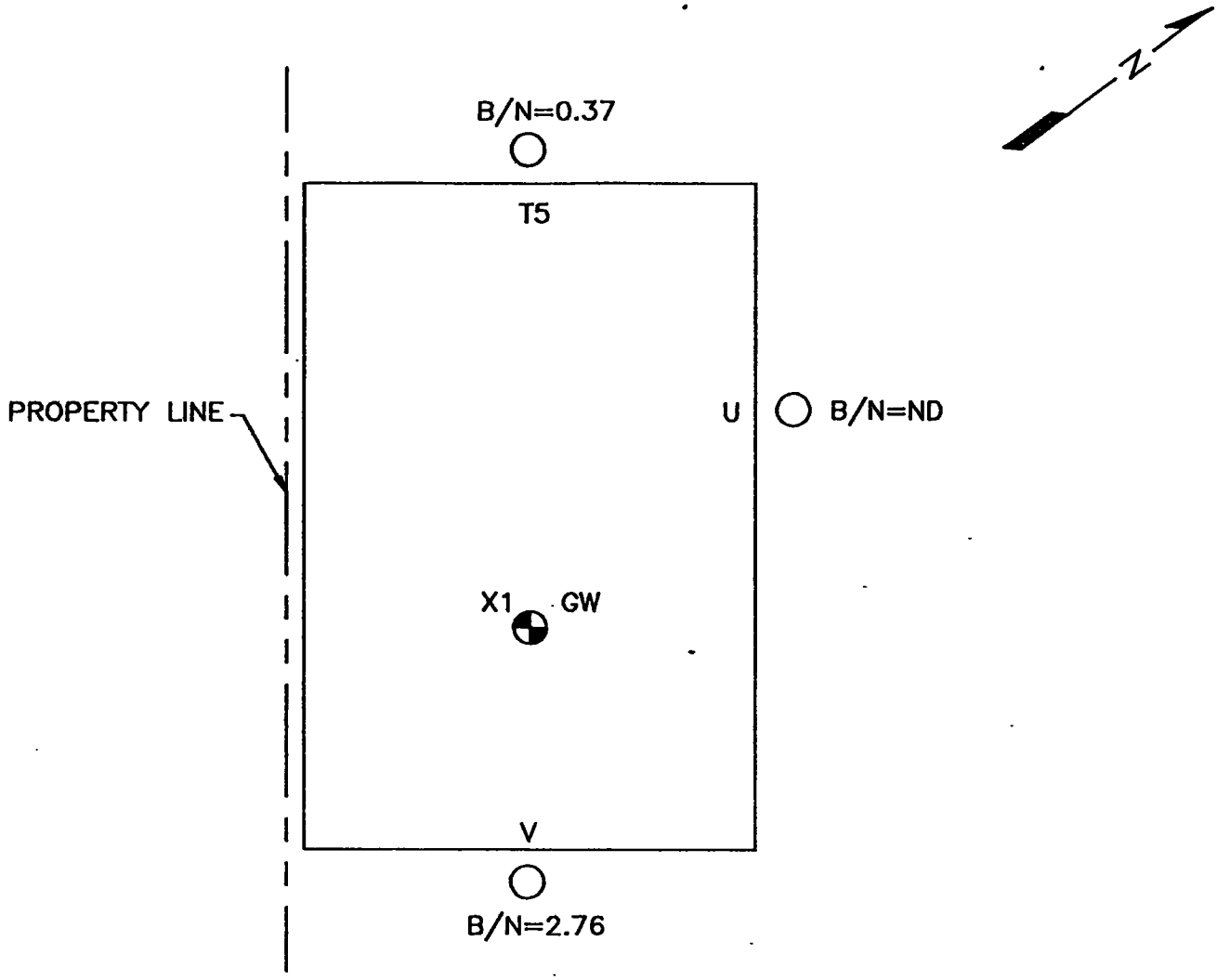
511-01, 511-02 AND 511-04

PREPARED FOR

BECTON DICKINSON & CO.
EAST RUTHERFORD, NJ

ERM ERM-Northeast Environmental Resources Management

SCALE AS NOTED | DATE 6/1992 | FIGURE 2-17



REMEDIAL ACTION SUMMARY

PARAMETERS OF CONCERN: BASE NEUTRAL EXTRACTABLE ORGANIC COMPOUNDS (B/N)

EXCAVATION DEPTH: 5.5 FT. (GW)

EXCAVATION VOLUME: 30 CU.YDS.

SURFACE: SOIL AND ASPHALT PAVED

LEGEND

7.25 ○	LOCATION OF END-POINT VERIFICATION SAMPLE BELOW REMEDIAL ACTION CRITERIA AND CONCENTRATION(S) OF PARAMETER(S) OF CONCERN IN PPM.
◔	LOCATION OF EXCAVATION BASE SAMPLE
▭	LIMITS OF EXCAVATION AREA
ND	NOT DETECTED
GW	AREA WAS EXCAVATED TO GROUND WATER
T,U,V,W,X	SAMPLE IDENTIFICATION CODE

TITLE

REMEDIAL ACTION
LOCATION MW-507

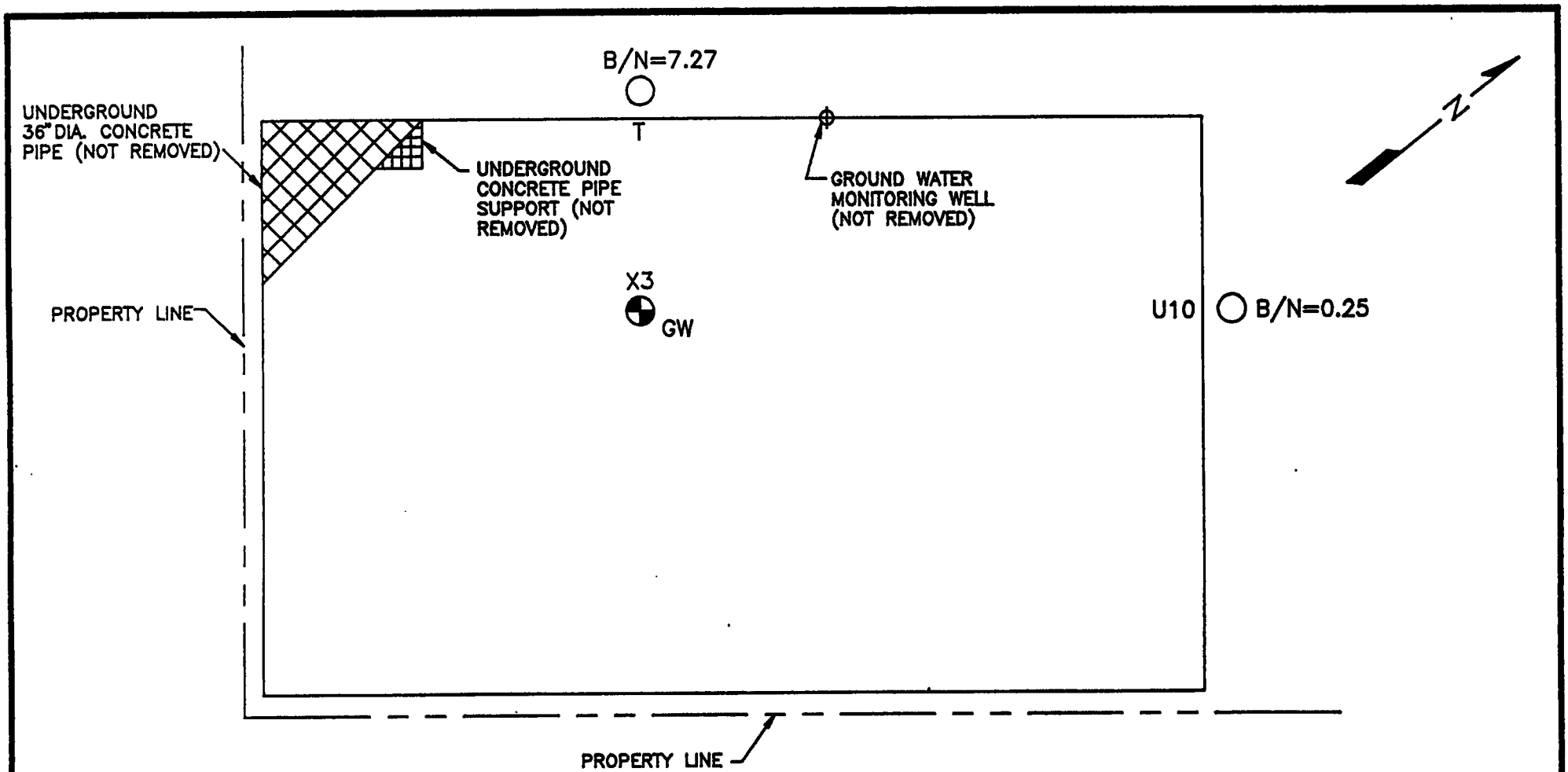
PREPARED FOR
BECTON DICKINSON & CO.
EAST RUTHERFORD, NJ

ERM-Northeast
Environmental Resource Management

SCALE 1"=4'

DATE 6/1992

FIGURE 2-18



LEGEND

7.25 ○	LOCATION OF END–POINT VERIFICATION SAMPLE BELOW REMEDIAL ACTION CRITERIA AND CONCENTRATION(S) OF PARAMETER(S) OF CONCERN IN PPM.
⊕	LOCATION OF EXCAVATION BASE SAMPLE
▭	LIMITS OF EXCAVATION AREA
ND	NOT DETECTED
GW	AREA WAS EXCAVATED TO GROUND WATER
T,U,V,W,X	SAMPLE IDENTIFICATION CODE

REMEDIAL ACTION SUMMARY

PARAMETERS OF CONCERN: BASE NEUTRAL EXTRACTABLE ORGANIC COMPOUNDS (B/N)

EXCAVATION DEPTH: 5.5 FT. (GW)

EXCAVATION VOLUME: 76 CU.YDS.

SURFACE: SOIL & ASPHALT PAVED

TITLE

REMEDIAL ACTION LOCATION MW–508

PREPARED FOR BECTON DICKINSON & CO.
EAST RUTHERFORD, NJ

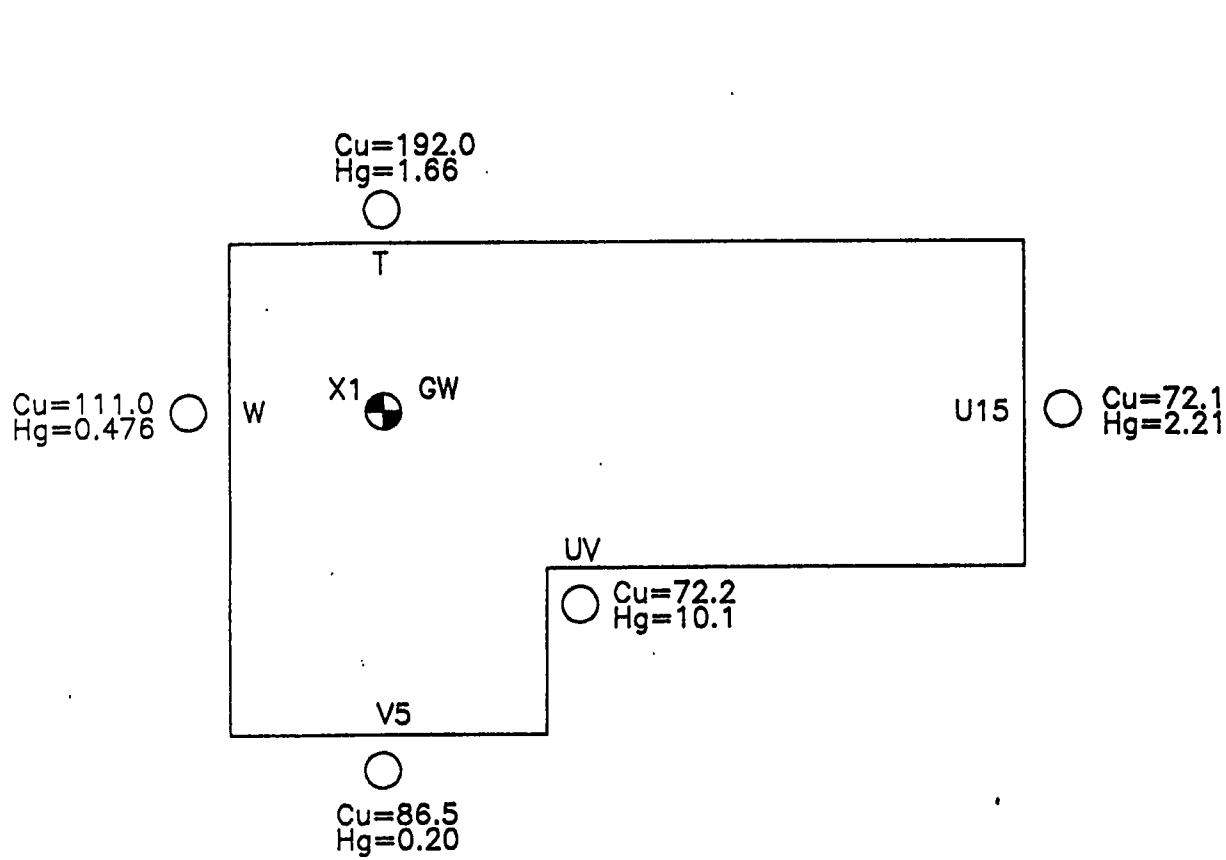
ERM ERM-Northeast Environmental Resources Management

SCALE 1"=4'

DATE 7/1992

FIGURE 2–19

BD–PP15.DWG SP



LEGEND

7.25 ○	LOCATION OF END-POINT VERIFICATION SAMPLE BELOW REMEDIAL ACTION CRITERIA AND CONCENTRATION(S) OF PARAMETER(S) OF CONCERN IN PPM.
◓	LOCATION OF EXCAVATION BASE SAMPLE
▭	LIMITS OF EXCAVATION AREA
ND	NOT DETECTED
GW	AREA WAS EXCAVATED TO GROUND WATER
T,U,V,W,X	SAMPLE IDENTIFICATION CODE

REMEDIAL ACTION SUMMARY

PARAMETERS OF CONCERN: Cu & Hg

EXCAVATION DEPTH: 2.5 FT. (GW)

EXCAVATION VOLUME: 28 CU.YDS.

SURFACE: ASPHALT PAVED

TITLE

REMEDIAL ACTION
LOCATION SP-9

PREPARED FOR
BECTON DICKINSON & CO.
EAST RUTHERFORD, NJ

ERM-Northeast
Environmental Resources Management

SCALE 1"=6'

DATE 6/1992

FIGURE 2-20

3.0 SUMMARY OF REMEDIAL PROJECT COSTS

A summary of costs for the BD Parcel Nos. 4 and 5 Soil Remedial Project is provided in Table 3-1. These costs include engineering, laboratory, remedial contractor, transportation and disposal costs. Remedial contractor costs are for soil excavation and basic site restoration. The costs presented in Table 3-1 are only for soil remedial activities completed on Parcel Nos. 4 and 5. These costs do not include costs for remedial work performed on Parcel Nos. 1, 2 and 6, water cleanup activities, or building decontamination.

TABLE 3–1
SUMMARY OF SOIL REMEDIAL COSTS
PARCEL NOS. 4 AND 5
BECTON DICKINSON AND COMPANY
EAST RUTHERFORD, BERGEN COUNTY

ENGINEER CONSULTING AND SAMPLING	$200,000
ANALYTICAL LABORATORY	$70,000
REMEDIAL CONTRACTOR	$63,000
DISPOSAL	$67,000
ESTIMATED TOTAL COST	$400,000

4.0 PROJECT TASKS REMAINING TO BE COMPLETED

All requirements of the revised Soil Remedial Action Plans for Parcel Nos. 3, 4 and 5 have been completed. Currently, the cleanup work remaining to be completed at the BD, East Rutherford site includes:

- Decontamination of Buildings on Parcel Nos. 4 and 5
- Implementation of the Parcel No. 6 Remedial Action Plan
- Completion of the Ground Water Cleanup

APPENDIX A

S&S ENVIRONMENTAL SCIENCES, INC.

Scientific and Chemical Testing and Consultation

98 Sand Park Rd., Cedar Grove, N.J. 07009
(201) 857-7188

Branch Office:
118-120 Sandford St
New Brunswick, N.J. 08903
(201) 494-2448

Kamil Sor, Ph.D.
Charles Shimel, P.E.
Yilmaz Arhan, M.S.

This report is the confidential property of the Client, and information contained may not be published or reproduced without our written permission.

Client Blue Circle Raia Inc.

Project Information of Client

Subject Laboratory Testing of Fine Aggregate (-3/8" size)

Report No 91-E-149 Date May 20,1991

We present herewith laboratory test results of one (1) fine aggregate sample (-3/8" size) received on 5-8-91. At the request of the Client, the sample was tested for Total Petroleum Hydrocarbons, TCLP (metals), and Priority Pollutant Organics (Volatile Organics +15, Acid Extractable Organics +10, Base/Neutral Extractable Organics +15, Pesticides, and PCBs. S&S Environmental Sciences, Inc. NJDEP Laboratory ID Number is 14187.

The test results are summarized in the attached table. The review of the test results indicates that all the parameters tested for were either not detected or the concentrations detected were well below the regulatory limits.

S&S ENVIRONMENTAL SCIENCES, INC.

Kamil Sor, Ph.D.
President

Attachments

cc: (1) Client
Attn.: Mr. Dominic Belsole

S&S ENVIRONMENTAL SCIENCES, INC.

BLUE CIRCLE RAIA INC.
REPORT NO. 91-E-149
MAY 20, 1991

DATE RECEIVED : 5-8-91

SSES SAMPLE ID NO. 91-231

SAMPLED BY : CLIENT

SUMMARY OF TEST RESULTS

PARAMETER	AMOUNT IN SAMPLE	NJDEP ACTION LEVEL or RCRA LIMIT
Total Petroleum Hydrocarbons, ppm	46.9	100
TCLP - Metals (ppm):		
Arsenic	< 0.005	5.0
Barium	1.2	100.0
Cadmium	< 0.02	1.0
Chromium	< 0.05	5.0
Lead	< 0.1	5.0
Mercury	< 0.0005	0.2
Selenium	< 0.002	1.0
Silver	< 0.05	5.0
PRIORITY POLLUTANTS (ppm):		
Volatile Organics +15	Not Detected (*)	1
Acid Extractables +10	Not Detected (*)	NA
Base/Neutral Extractables +15	Not Detected (*)	10
Pesticides	Not Detected (*)	NA
PCBs	Not Detected (*)	5

(*) See attached laboratory data sheets for detection limits

NA - Indicates Not Available (determined by NJDEP on a case-by-case basis)

ppm - parts per million (mg/Kg dry weight or mg/liter)

S&S ENVIRONMENTAL SCIENCES, INC.

PRIORITY POLLUTANTS

RUN DATE/TIME: 5-18-91/11:30

SAMPLE: Fine Aggregate (-3/8"size)

SAMPLE I.D.#: 91-231

LAB I.D#: ABNGA72A

MOISTURE (%): 9.0

EPA METHOD: 624, 8240
ANALYSIS BY GC/MS VOLATILE ORGANICS

PARAMETERS	RESULTS	BLANK	MDL
Acrolein	N.D.	N.D.	11.0
Acrylonitrile	N.D.	N.D.	11.0
Benzene	N.D.	N.D.	11.0
Bromodichloromethane	N.D.	N.D.	11.0
Bromoform	N.D.	N.D.	11.0
Bromethane	N.D.	N.D.	11.0
Carbontetrachloride	N.D.	N.D.	11.0
Chlorobenzene	N.D.	N.D.	11.0
Chloroethane	N.D.	N.D.	11.0
2-Chloroethyl Vinylether	N.D.	N.D.	11.0
Chloroform	N.D.	N.D.	11.0
Chloromethane	N.D.	N.D.	11.0
Dibromomethane	N.D.	N.D.	11.0
Dibromochloromethane	N.D.	N.D.	11.0
1,1-Dichloroethane	N.D.	N.D.	11.0
1,2-Dichloroethane	N.D.	N.D.	11.0
1,1-Dichloroethane	N.D.	N.D.	11.0
Trans 1,2-Dichloroethene	N.D.	N.D.	11.0
1,2-Dichloropropane	N.D.	N.D.	11.0
c-1,3-Dichloropropene	N.D.	N.D.	11.0
t-1,3-Dichloropropene	N.D.	N.D.	11.0
Ethylbenzene	N.D.	N.D.	11.0
Methylenechloride	N.D.	N.D.	11.0
1,1,2,2-Tetrachloroethane	N.D.	N.D.	11.0
Tetrachloroethene	N.D.	N.D.	11.0
Toluene	N.D.	N.D.	11.0
1,1,1-Trichloroethane	N.D.	N.D.	11.0
1,1,2-Trichloroethane	N.D.	N.D.	11.0
Trichloroethene	N.D.	N.D.	11.0
Vinyl chloride	N.D.	N.D.	22.0
Xylenes	N.D.	N.D.	11.0

All test results are in ug/kg (on dry basis), unless specified.

N.D. - Not Detected

14585-1

S&S ENVIRONMENTAL SCIENCES, INC.

BASE NEUTRALS

RUN DATE/TIME: 5-19-91/16:30

SAMPLE: Fine Aggregate (-3/8"size)

SAMPLE I.D.#: 91-231

LAB I.D.#: ABNGA72A

MOISTURE (%): 9.0

EPA METHOD: 625, 8250, 8270
ANALYSIS BY GC/MS BASE NEUTRALS

PARAMETERS	RESULTS	BLANK	MDL
Acenaphthene	N.D.	N.D.	363.0
Acenaphtylene	N.D.	N.D.	363.0
Benzidine	N.D.	N.D.	363.0
Benzo (a) Anthracene	N.D.	N.D.	363.0
Benzo (b) Flouranthene	N.D.	N.D.	363.0
Benzo (k) Flouranthene	N.D.	N.D.	363.0
Benzo (a) Pyrene	N.D.	N.D.	363.0
Benzo (g,h,i) Perylene	N.D.	N.D.	363.0
Benzyl Butyl Phthalate	N.D.	N.D.	363.0
Bis-(2-Chloroethyl) Ether	N.D.	N.D.	363.0
Bis-(2-Chloroethoxy) Methane	N.D.	N.D.	363.0
Bis-(2-Ethylhexyl) Phthalate	N.D.	N.D.	363.0
Bis-(2-Chloroisopropyl) Ether	N.D.	N.D.	363.0
4-Bromophenyl Phenyl Ether	N.D.	N.D.	363.0
2-Chloronaphthalene	N.D.	N.D.	363.0
4-Chloronaphthalene	N.D.	N.D.	363.0
4-Chlorophenyl Phenyl Ether	N.D.	N.D.	363.0
Chrysene	N.D.	N.D.	363.0
Dibenzo (a,h) Anthracene	N.D.	N.D.	363.0
Dibenzofuran	N.D.	N.D.	363.0
Di-n-Butyl Phthalate	N.D.	N.D.	363.0
1,2-Dichlorobenzene	N.D.	N.D.	363.0
1,3-Dichlorobenzene	N.D.	N.D.	363.0
1,4-Dichlorobenzene	N.D.	N.D.	363.0
3-3-Dichlorobenzidine	N.D.	N.D.	1815.0
Diethylphthalate	N.D.	N.D.	363.0
Dimethylphthalate	N.D.	N.D.	363.0
2,4-Dinitrotoluene	N.D.	N.D.	363.0
2,6-Dinitrotoluene	N.D.	N.D.	363.0

S&S ENVIRONMENTAL SCIENCES, INC.

BASE NEUTRALS

RUN DATE/TIME: 5-15-91/16:30

SAMPLE: Fine Aggregate (-3/8"size)

SAMPLE I.D.: 91-231

LAB I.D.: ABNGA72A

MOISTURE (%): 9.0

PARAMETERS	RESULTS	BLANK	MDL
Di-n-Octylphthalate	N.D.	N.D.	363.0
1,2-Diphenylhydrazine	N.D.	N.D.	363.0
Fluoranthene	N.D.	N.D.	363.0
Hexachlorobenzene	N.D.	N.D.	363.0
Hexachlorobutadiene	N.D.	N.D.	363.0
Hexachlorocyclopentadiene	N.D.	N.D.	363.0
Hexachloroethane	N.D.	N.D.	363.0
Indeno (1,2,3-cd) Pyrene	N.D.	N.D.	363.0
Isophorone	N.D.	N.D.	363.0
2-Methylnaphthalene	N.D.	N.D.	363.0
Naphthalene	N.D.	N.D.	363.0
Nitrobenzene	N.D.	N.D.	363.0
N-Nitrosodimethylamine	N.D.	N.D.	363.0
N-Nitroso di-n-Propylamine	N.D.	N.D.	363.0
N-Nitrosodiphenylamine	N.D.	N.D.	363.0
Phenanthrene	N.D.	N.D.	363.0
Pyrene	N.D.	N.D.	363.0
1,2,4-Trichlorobenzene	N.D.	N.D.	363.0

All test results are in ug/kg (on dry basis), unless specified.

N.D.: Not Detected
<: Less than detection limits

S&S ENVIRONMENTAL SCIENCES, INC.

RUN DATE: 5-15-91/16:30

SAMPLE: Fine Aggregate (-3/8"size)

SAMPLE I.D.: 91-231

LAB ID: ABNGA72A

MOISTURE %: 9.0

EPA METHOD: 625, 8250, 8270
ANALYSIS BY GC/MS ACID EXTRACTABLES

PARAMETERS	RESULTS	BLANK	MDL
Phenol	N.D.	N.D.	726
2-Chlorophenol	N.D.	N.D.	726
2-Nitrophenol	N.D.	N.D.	726
2,4-Dimethylphenol	N.D.	N.D.	726
2,4-Dichlorophenol	N.D.	N.D.	726
4-Chloro-3-Methylphenol	N.D.	N.D.	726
2,4,6-Trichlorophenol	N.D.	N.D.	726
2,4-Dinitrophenol	N.D.	N.D.	726
4-Nitrophenol	N.D.	N.D.	726
4,6-Dinitro-2-methylphenol	N.D.	N.D.	726
Pentachlorophenol	N.D.	N.D.	726

All test results are in ug/kg (on dry basis), unless specified.

14585-3

S&S ENVIRONMENTAL SCIENCES, INC.

Client : BLUE CIRCLE RAIA INC.
Project: Information of Client

SSES ID: 91-231

Sample Matrix : Fine Aggregate(-3/8"size

Date Received : 5-8-91

Method Code: SW 846 and EPA 608
Analysis by: GC/ECD

PRIORITY POLLUTANT PESTICIDES/PCBs

PARAMETERS	RESULTS	BLANK	MDL
Aldrin	ND	ND	5.0
α-BHC	ND	ND	5.0
β-BHC	ND	ND	5.0
δ-BHC	ND	ND	5.0
γ-BHC	ND	ND	5.0
Chlordane	ND	ND	40
4,4'-DDT	ND	ND	30
4,4'-DDE	ND	ND	10
4,4'-DDD	ND	ND	30
Dieldrin	ND	ND	10
Endosulfan I	ND	ND	10
Endosulfan II	ND	ND	10
Endosulfan Sulfate	ND	ND	30
Endrin	ND	ND	10
Endrin Aldehyde	ND	ND	30
Heptachlor	ND	ND	5.0
Heptachlor Epoxide	ND	ND	5.0
Toxaphene	ND	ND	250
Arochlor-1016	ND	ND	250
Arochlor-1221	ND	ND	250
Arochlor-1232	ND	ND	250
Arochlor-1242	ND	ND	250
Arochlor-1248	ND	ND	250
Arochlor-1254	ND	ND	250
Arochlor-1260	ND	ND	250

All test results are in ppb (ug/Kg dry weight basis).

ND - indicates Not Detected

MDL - indicates Method Detection Limit

APPENDIX B

ERM-Northeast

175 Froehlich Farm Boulevard • Woodbury, New York 11797 • (516) 921-4300 • Telefax (516) 921-5679 • (516) 921-5637

January 9, 1992

New Jersey Department of
Environmental Protection
Division of Hazardous Waste
Management
Manifest Section
CN 028
401 E. State Street
Trenton, NJ 08625

Enclosed are New Jersey Hazardous Waste Manifests for oil contaminated soil (waste classification no. X725) shipped from Becton Dickinson & Company, East Rutherford, Bergen County, NJ to American Landfill, Inc. in Waynesburg, Ohio. Approximately 707 cubic yards of soil was removed as part of an ECRA Remedial Project. If you have any questions, please contact me at (516) 921-4300.

Very truly yours,

Dean J. Scari
Project Manager

DJS:pm

cc: D. Gasbarro, BD
T. Tideman, BD
T. Fields, NJDEPE/DHW/BEECRA

18604001.558

APPENDIX C

ERM-Northeast

WASTE CHARACTERIZATION SAMPLING RESULTS FOR SOIL DISOSAL

BD responses to EPA Request for Information

Nos. 14

BECTON DICKINSON AND COMPANY

Verification Report for ECRA
Soil Remediation Parcel No. 6
ECRA Case No. 87578
Becton Dickinson and Company
East Rutherford,
Bergen County, New Jersey

December, 1992

Prepared For:

Becton Dickinson and Company
1 Becton Drive
Franklin Lakes, New Jersey 07417-1880

Prepared By:

ERM-NORTHEAST
175 Froehlich Farm Boulevard
Woodbury, NY 11797

18605002.856

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APPENDIX D	*Excavated Soil TCLP Analytical Results*

1.0 INTRODUCTION

1.1 BACKGROUND

Becton Dickinson and Company (B-D) owns a former manufacturing facility in the Borough of East Rutherford, Bergen County, New Jersey. B-D discontinued manufacturing operations at this facility in 1988. The location of the site is shown on the general vicinity map provided as Figure 1-1. Due to the planned cessation of operations at the site, B-D prepared and submitted an initial Environmental Cleanup Responsibility Act (ECRA) notice to the New Jersey Department of Environmental Protection (NJDEP) in June, 1987. The site was divided into six parcels (Parcel Nos. 1 through 6) each having separate tax lot and block numbers. Figure 1-2 provides a plan view of the site. Six separate ECRA submissions were made. Each submission was subsequently assigned an individual ECRA case number by the NJDEP. B-D conducted a series of comprehensive environmental investigations and made various additional ECRA submissions.

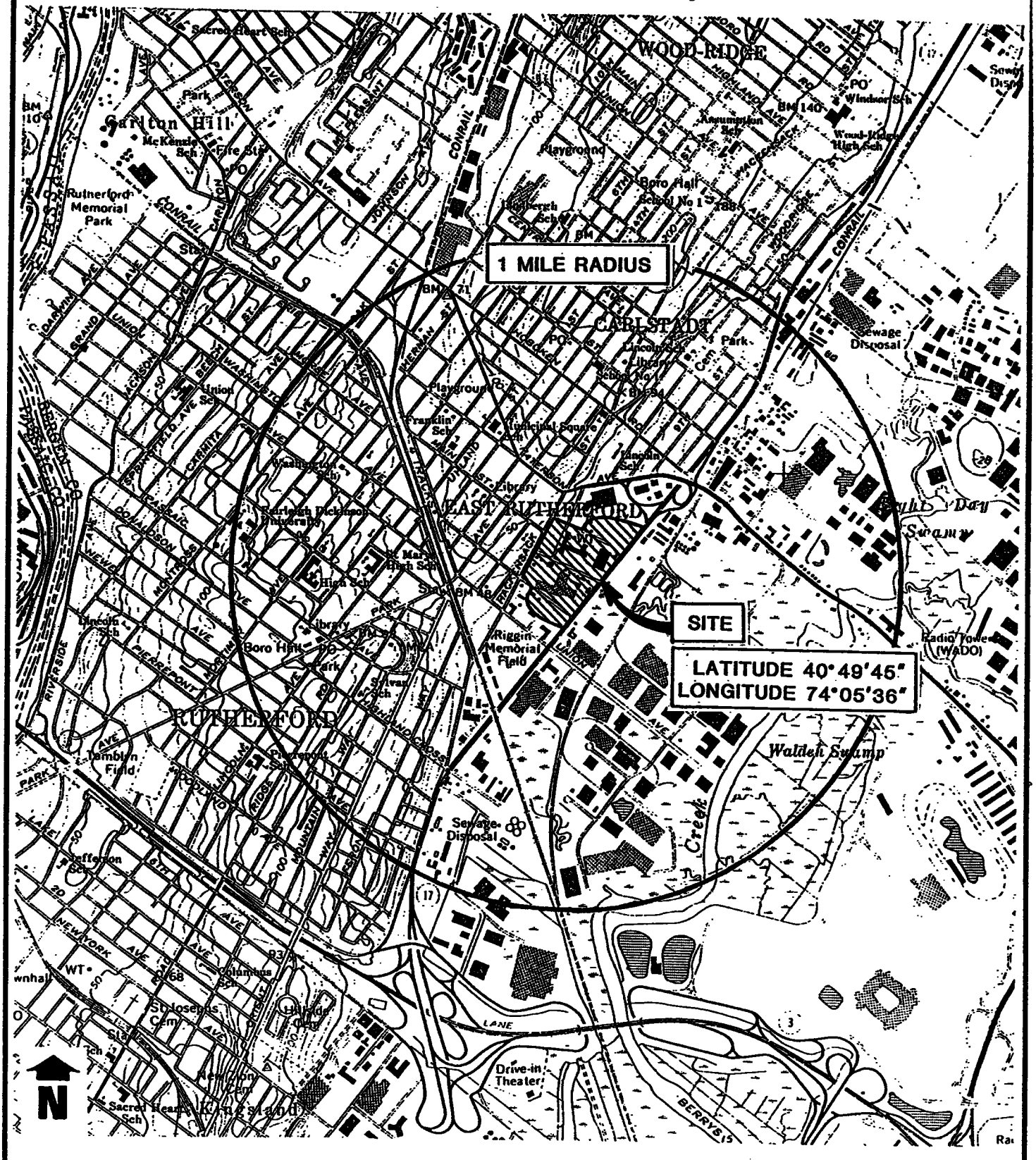
Environmental investigations of Parcel No. 1, 2 and 3 were conducted on an expedited schedule from October, 1987 through December, 1987. B-D subsequently prepared and submitted Remedial Action Plans for these three parcels in July, 1988. The Remedial Action Plans were approved by the NJDEP in October, 1988 and the soil cleanup in Parcel Nos. 1 and 2 was completed in November, 1989.

Environmental investigations were conducted in Parcel Nos. 4, 5 and 6 from February to May, 1988 and the associated Remedial Action Plans were submitted to DEPE in March, 1989. Remediation of the soil in Parcel Nos. 4 and 5 was completed in December, 1991. Soil remediation

FIGURE 1-1

General Vicinity Map – Becton Dickinson & Co.

East Rutherford, New Jersey

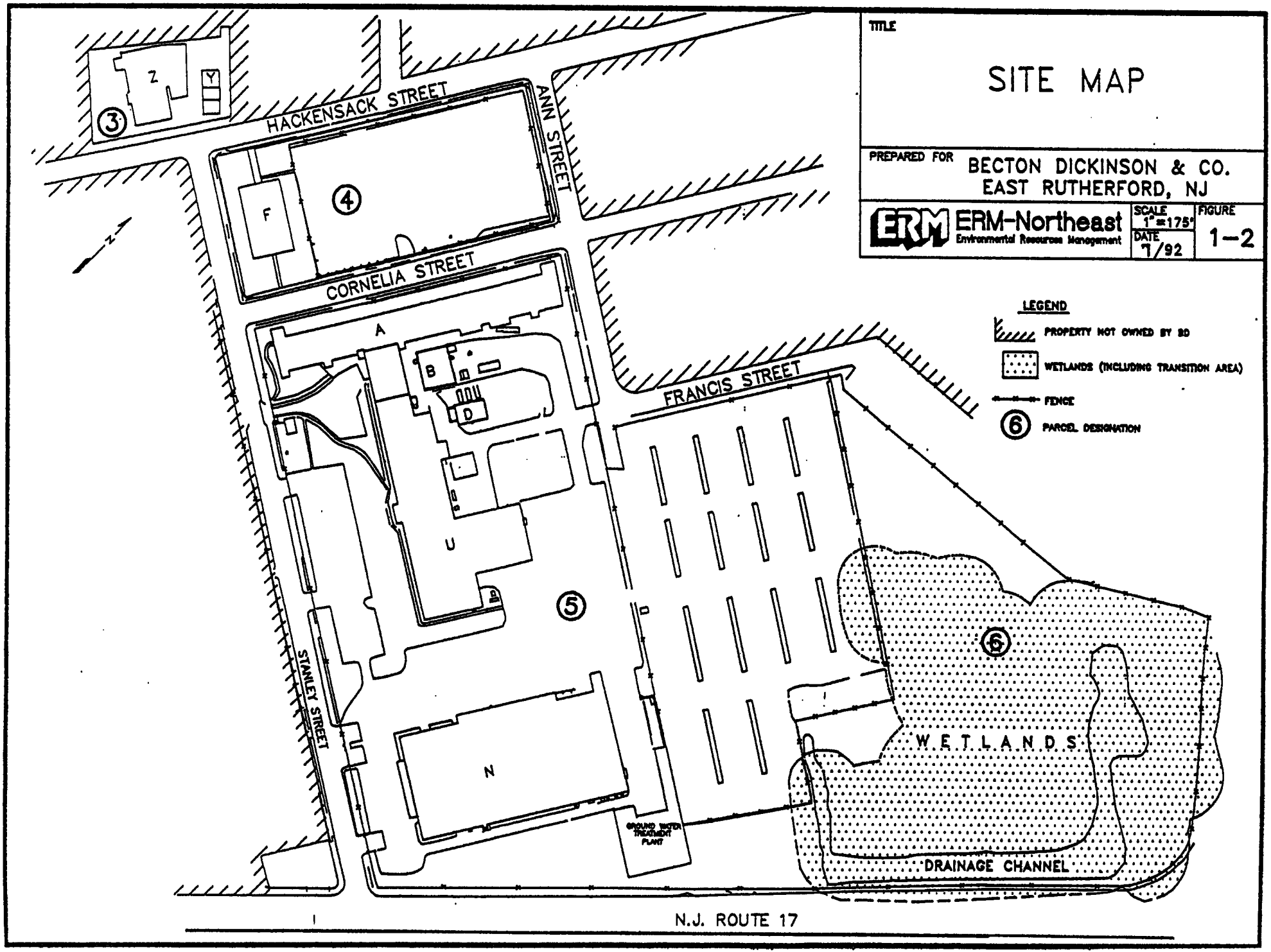


Source: Weehawken Quadrangle, N.J./N.,Y.

Scale: 1"=2000'

ERM-Northeast
Environmental Resources Management

146821


TITLE
SITE MAP
PREPARED FOR
BECTON DICKINSON & CO.
EAST RUTHERFORD, NJ
ERM-Northeast
Environmental Resources Management
SCALE
1" = 175'
DATE
7/92
FIGURE
1-2
LEGEND
PROPERTY NOT OWNED BY BD
WETLANDS (INCLUDING TRANSITION AREA)
FENCE
PARCEL DESIGNATION
HACKENSACK STREET
ANN STREET
CORNELIA STREET
FRANCIS STREET
STANLEY STREET
N.J. ROUTE 17
WETLANDS
DRAINAGE CHANNEL
GROUND WATER TREATMENT PLANT
A
B
D
F
N
U
Z
Y
3
4
5
6

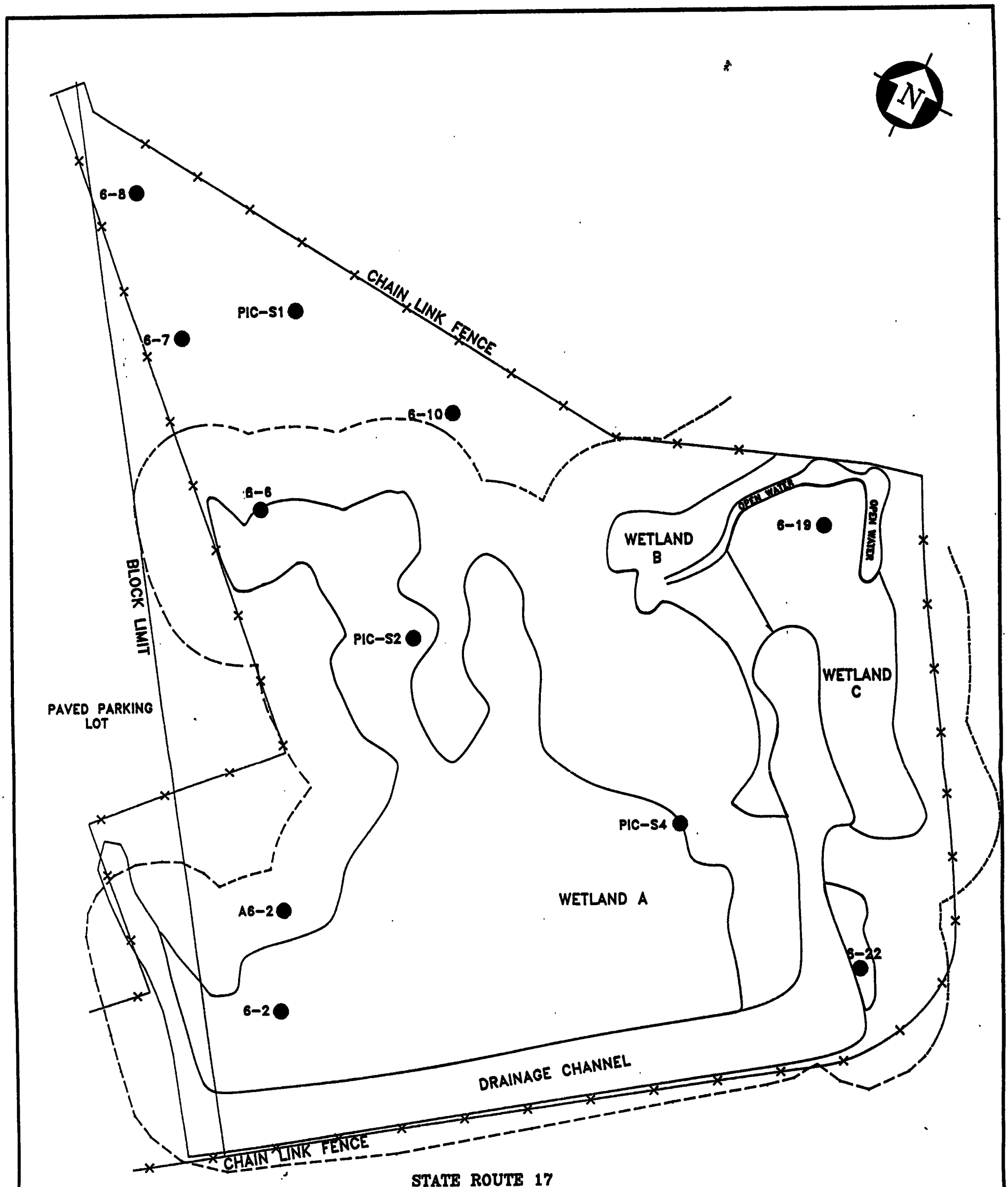
of Parcel Nos. 6 was completed in September, 1992. This report documents the Parcel No. 6 Soil Remedial Project.

Table 1-1 provides a summary listing of the project documents previously submitted to the NJDEPE.

1.2 OVERVIEW OF REMEDIAL PROJECT

The Parcel No. 6 Soil Remedial Project was initiated on August 27, 1992 and was completed as of September 14, 1992. The excavation and backfilling of the 8 Remedial Action (RA) Locations was performed by Barbella Environmental Technology, Inc. of Whitehouse, NJ. The project included excavation of four RA locations within a wetlands, as authorized by NJDEPE Freshwater Wetlands Statewide General Permit No. 0212-91-0002.3. All remedial activities were supervised by ERM-Northeast. Approximately 275 cubic yards of soil was excavated and transported under NJ Hazardous Waste Manifests to American Landfill Inc. in Waynesburg, Ohio. Figure 1-3 shows the RA Locations.

During final sampling investigations of Parcel No. 6 in 1991, RA locations 6-2 and 6-22 were under water and inaccessible. These two locations are within a wetlands and are expected to remain flooded indefinitely. As discussed in a February 5, 1992 letter to DEPE, the approved remedial action plan specifies that sampling and excavation of soil within the saturated zone is not required. Therefore, locations 6-2 and 6-22 did not require remedial action.



0 25' 50' 75'

SCALE

LEGEND

6-01-05 LOCATION IDENTIFICATION NUMBER

WETLANDS BOUNDARY

TRANSITION AREA BOUNDARY

TITLE

SOIL REMEDIAL ACTION LOCATIONS PARCEL NO. 6

PREPARED FOR BECTON DICKINSON & COMPANY
EAST RUTHERFORD, NJ

ERM-Northeast
Environmental Resources Management

SCALE	FIGURE
AS NOTED	1-3

DRAWN	JOB#	FILE NAME	DATE
E.M.	166.050.1	BACTION1	11/11/92

1.3 *OVERVIEW OF REPORT*

The remainder of the report is organized into the following sections:

2.0 SUMMARY OF REMEDIAL ACTION PLAN IMPLEMENTATION - This section describes remedial procedures and activities completed to date related to the soil cleanup of Parcel No. 6.

3.0 SUMMARY OF REMEDIAL PROJECT COSTS - This section summarizes expenditures for the remediation of soils in Parcel No. 6.

4.0 PROJECT TASKS REMAINING TO BE COMPLETED - This section summarizes the ECRA Project tasks remaining at the B-D East Rutherford, NJ Site.

TABLE 1-1
SUMMARY OF PROJECT DOCUMENTS PREVIOUSLY SUBMITTED TO NJDEPE

Report Title	Report Summary	Submission Date
ECRA - Sampling and Analysis Plan, Volume I Parcel Nos. 1, 2, 3, 4, 5, and 6	Presents site information for the initial ECRA notice and the Sampling and Analysis Plan common to each of the 6 parcels	June 1987
ECRA - Sampling and Analysis Plan, Volume II Parcel Nos. 1, 2, 3, 4, 5, and 6	Presents parcel specific information for the Sampling and Analysis Plan including results of the Phase 1a Preliminary Environmental Investigation. Includes the GIS and SES ECRA forms for each parcel and supporting information.	June 1987
ECRA - Supplementary Information, Volume III Parcel Nos. 5 and 6	Presents the results of the Phase 1b and 1c Preliminary Environmental Investigations conducted in Parcel Nos. 5 and 6 and amends the June 1987 Sampling and Analysis Plans.	Dec. 1987
ECRA - Environmental Assessment Program Parcels 1, 2, and 3	Presents results of the comprehensive environmental program conducted in Parcel Nos. 1, 2, and 3 along with the results of the Phase 1b and 1c preliminary environmental investigations.	Feb. 1988
Soil and Ground Water Remedial Action Plan(s) Parcel No. 3	Presents additional results of environmental investigations and procedures to remediate soil and ground water contamination in Parcel No. 3.	July 1988

TABLE 1-1 (CONTINUED)
SUMMARY OF PROJECT DOCUMENTS
PREVIOUSLY SUBMITTED TO NJDEPE

Report Title	Report Summary	Submission Date
ECRA Environmental Assessment Program Parcel Nos. 4, 5 and 6	Presents results of the comprehensive environmental program conducted in Parcel Nos. 4, 5 and 6	August 1988
Soil and Ground Water Remedial Action Plan(s) Parcel No. 5 and Parcel No. 6.	Presents procedures to remediate soil and ground water contamination in Parcel No. 5 and Parcel No. 6, respectively.	March 1989
Verification Report for ECRA Soil Remediation Parcel Nos. 4 and 5.	Documents soil remediation activities conducted in Parcel Nos. 4 and 5, and presents post-remedial soil quality data.	June 1992

2.0 *SUMMARY OF REMEDIAL ACTION PLAN IMPLEMENTATION*

2.1 *REVIEW OF REMEDIAL ACTION CRITERIA*

The development of soil remedial action criteria for the BD East Rutherford site is documented in the Soil and Ground Water Remedial Action Plan for Parcel No. 6, March 1989. Remedial action criteria were developed for the site based upon the ECRA recommended cleanup levels (RCLs). The criteria considered the existing site conditions, the environmental setting, environmental and health based risk assessments, the toxicity and mobility of certain contaminants, surface water discharge limitations to Berry's Creek, and the permeability of soil cover anticipated after site development. Starting with NJDEP's RCLs, a series of alternative concentration limits (generally expressed as multiples of the RCLs) were considered. These criteria were then evaluated through a quantitative risk assessment to determine the health and environmental effects resulting from implementation of these alternate criteria. A final set of criteria was selected at a level that presented no adverse health or environmental effects.

The soil remedial action criteria and the methodology used to evaluate them are presented in the Soil and Ground Water Remedial Action Plan for Parcel Nos. 1 and 2 of the East Rutherford site (ERM, 1988).

2.1.1 *Development of Soil Remedial Action Criteria*

Remedial action criteria were developed to identify soil requiring remediation in Parcel No. 6. Criteria were developed for all contaminants identified in Parcel No. 6 soils in excess of the ECRA RCLs, except for volatile organic compounds (VOC) and non-PAH base/neutral organic compounds.

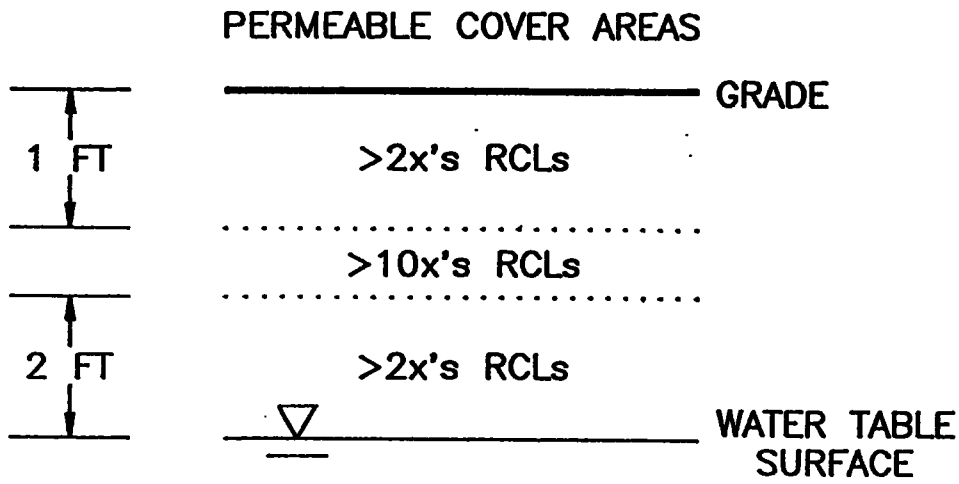
Total volatile organic compounds were detected in soil above the RCL of 1 ppm at only one location at the site (MW-508 in Parcel No. 5). The only VOC identified was acetone. The QA review of the duplicate sample indicated that the result was qualitatively suspect and may have been introduced after sampling. Due to the marginal exceedance of the RCL, as well as the suspect nature of the analysis, no criterion was established for acetone. In addition, because the water table is approximately two feet below surface in this area, cleanup of VOCs is being accomplished by the ground water recovery system.

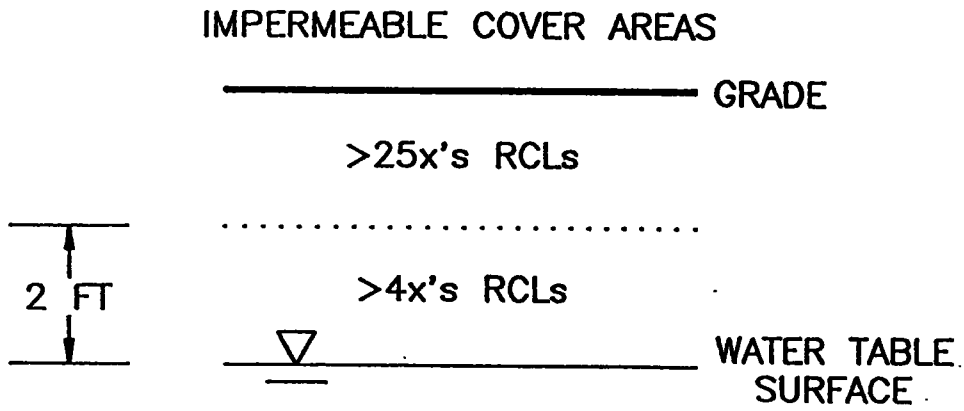
At locations where the RCL for base/neutral extractable organic compounds was exceeded, polynuclear aromatic hydrocarbons (PAHs) were the chemicals reported. Therefore, a criterion was established for PAHs. The only non-PAH compounds detected in these samples were dibenzofuran and butylbenzyl phthalate. Due to the low concentrations reported (<5 ppm) and because these areas were remediated due to high levels of PAH or TPH, no criteria for these two compounds were developed.

The chemicals for which criteria were developed are listed in Table 2-1. The soil remedial action criteria are presented in Figure 2-1. These criteria, as discussed below, are dependent upon the location of the contaminated soil with respect to the ground surface and the water table. The criteria with respect to the ground surface are intended to protect site employees. The criteria with respect to the top of the water table are intended to protect ground water quality.

Specific criteria were developed for areas that are paved (i.e., impermeable surfaces) and those locations that will remain un-paved (i.e., permeable). In addition, special consideration was given to two contaminants of concern: mercury and PAHs.

FIGURE 2-1
SOIL REMEDIAL ACTION CRITERIA
BECTON DICKINSON AND COMPANY
EAST RUTHERFORD, BERGEN COUNTY





CONTAMINANT-SPECIFIC CRITERIA

MERCURY	14 ppm *
POLYNUCLEAR AROMATIC HYDROCARBONS (PAH)	20 ppm
PETROLEUM HYDROCARBONS (PHC)	10,000 ppm *
PHC-CONTAMINATED AREAS:	
TOTAL BASE/NEUTRAL EXTRACTABLE ORGANIC COMPOUNDS	100 ppm *
TOTAL CARCINOGENIC PAH	10 ppm *
TOTAL VOLATILE ORGANIC COMPOUNDS (VOC)	10 ppm *

* = REVISED JULY, 1991

ERM ERM-Northeast
Environmental Resources Management

TABLE 2-1

CHEMICALS FOR WHICH SOIL REMEDIAL ACTION CRITERIA WERE DEVELOPED

Metals	RCL (ppm)
Cadmium	3
Chromium	100
Copper	170
Lead	250
Mercury	1
Nickel	100
Zinc	350
Organic Compounds	
Polynuclear Aromatic Hydrocarbons (PAHs)	5
Total Petroleum Hydrocarbons (TPH)	100

Soil Remedial Action Criteria For Areas With Impermeable Cover

Soil that will be maintained beneath impermeable soil cover, such as buildings and paved areas, had the following remedial action criteria applied:

- Soil located in the zone between the surface and two (2) feet above the water table required remediation if the contaminant concentrations were greater than twenty-five (25) times the ECRA RCLs.

- Soil that was within two (2) feet of the ground water table required remediation if the contaminant concentrations were greater than four (4) times the ECRA RCLs.

- Soils having contaminant concentrations less than these criteria required no action.

Soil Remedial Action Criteria For Areas With Permeable Cover

Soil that will be maintained beneath permeable soil cover, such as grass covered areas, had the following remedial action criteria applied.

- Soil within one (1) foot of the ground surface required remediation if the contaminant concentrations were greater than two (2) times the ECRA RCLs.

- Soil located in the zone between one (1) foot below grade and two (2) feet above the water table required remediation if the contaminant concentrations were greater than ten (10) times the ECRA RCLs.

- Soil within two (2) feet of the water table required remediation if contaminant concentrations were greater than two (2) times the ECRA RCLS.

- Soils having contaminant concentrations less than these criteria required no action.

Soil Contaminated with Mercury

Initially, all soil having a mercury concentration greater than two (2) ppm required remediation. However, as discussed later, this requirement was revised to 14 ppm.

Soil Contaminated with Priority Pollutant Polynuclear Aromatic Hydrocarbons

All soil having priority pollutant polynuclear aromatic hydrocarbons (PAHs) at concentrations greater than 20 ppm required remedial action.

Soil Contaminated with Petroleum Hydrocarbons

The Remedial Action Plan specified that the cleanup criteria for petroleum hydrocarbons (PHC) would be a multiple of the RCL (100 ppm), as described above. However, as discussed in Section 2.1.3, the criteria for PHC-contaminated areas was revised. PHC-areas with concentrations of PHC, total Base/Neutral Extractable Organic Compounds, total Carcinogenic PAHs, or total VOCs exceeding the criteria listed in Figure 2-1, required remedial action.

2.1.2 *Risk Assessment of Proposed Criteria*

The remedial criteria developed for the BD site were subjected to a quantitative risk assessment to ensure that no adverse impacts to human health or the environment would result from implementation of a cleanup plan on that basis.

The risk assessment was performed in accordance with the U.S. EPA Superfund Public Health Evaluation Manual (U.S. EPA, 1986) and the Draft NJDEP Risk Assessment Guidelines (1986). The steps followed in performing the risk assessment were:

- preparation of toxicity and environmental profiles,
- identification of potential exposure routes and receptors;
- estimation of exposure point concentrations of the chemicals of concern;
- comparison of exposure point concentrations to relevant and applicable standards; and
- risk characterization.

In order to evaluate risk, the routes through which receptors could potentially be exposed to contamination from the site following remediation were identified. Potential receptors included the general public (nearest residences, industrial and commercial establishments, etc.) and landscaper and other employees at the site.

The risk assessment determined that potential exposure to humans and the environment following remediation could occur through only three routes. First, contamination in ground water underlying the site could migrate off-site to Berry's Creek. Second, contamination in site soils could leach to ground water and migrate off-site to Berry's Creek. Third, site employees

could potentially be exposed to soil contaminants through direct contact with soil at the site.

On the basis of the risk assessment, no unacceptable risks to human health or the environment are expected following remediation of the site using the remedial action criteria. Post-remedial concentrations of site soil and ground water contaminants at Berry's Creek, using very conservative models, were predicted to be at or below the National Primary Drinking Water Standards or other health-based drinking water standards. The projected concentrations also meet the NJDEP Surface Water Quality Standards for SE2 waters, and FW2 waters for chemicals for which no SE2 standard exists. Projected exposures to site workers due to contact with site soils, again using conservative assumptions, also essentially meet or are below the relevant acceptable intakes.

2.1.3 *Revisions to Remedial Action Plan*

The approved Remedial Action Plan (RAP) specified that verification end-point soil samples would be taken at each Remedial Action (RA) location after the soil was excavated. However, in letters to DEP dated February 8 and March 7, 1991, ERM proposed to conduct the end-point sampling before the soil was excavated. This was intended to expedite the remedial project by obtaining disposal acceptance before work began and by avoiding delays of the excavation work caused by waiting for analytical results. During a meeting on May 7, 1991, DEP gave authorization to BD to use the delineation sampling results in place of post-excavation verification data. The Parcel No. 6 soil delineation sampling data was submitted to DEPE in a letter dated February 5, 1992.

In a letter dated March 25, 1991, DEP identified changes in the site cleanup criteria and directed BD to re-evaluate the RAP accordingly.

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2.2 *DELINEATION SAMPLING PROCEDURES AND RESULTS*

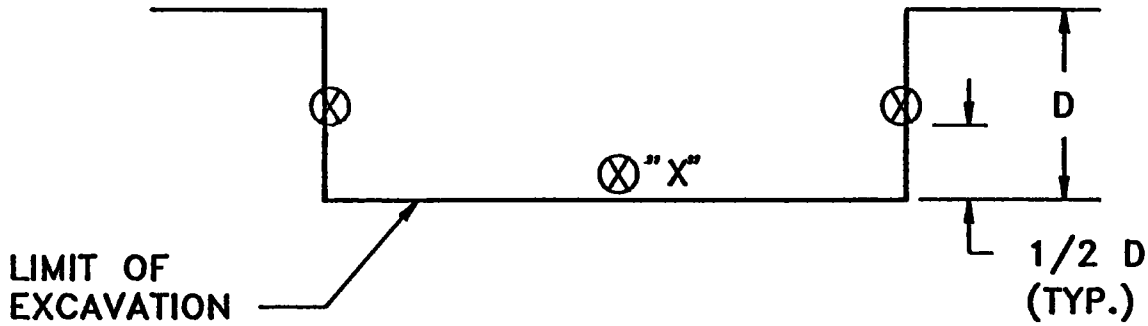
Prior to initiating the soil remedial project, a borehole sampling investigation was conducted of all 8 Remedial Action (RA) locations to completely delineate the horizontal and vertical extent of the contamination. As outlined in ERM's letter to NJDEPE, dated February 8, 1991, the objectives of this sampling effort were to establish the limits of excavation at each location and determine the volume of soil for disposal. Conducting the "end-point" sampling before soil excavation expedited the project schedule considerably. Acceptance for disposal was obtained from the landfill in advance of the project. In addition, repetitive re-sampling and re-excavation of RA locations was avoided.

The delineation sampling was conducted from June 1991 to October 1991 by ERM-Northeast. The drilling subcontractor for this project was Aquifer Drilling and Testing of Long Island City, NY and the samples were analyzed by Laboratory Resources, Inc. of Westwood, NJ (New Jersey

Certification number 02046). All sampling activities and procedures were documented by ERM-Northeast field personnel.

At each RA location, soil samples were taken to establish the horizontal and vertical limits of the volume to be excavated. The original "X-samples" (e.g., 6-2-X) were the samples taken previously during the initial Site Investigations that identified the locations of contamination. During the delineation sampling, all sample locations were referenced from the original X-sample location. As shown in Figure 2-2, the excavation depth was delineated by the samples denoted as "X1, X2 etc.", taken at 1-foot intervals (eg: X1,X2,X3, etc). Perimeter samples, which are designated T, U, V and W, were taken at a depth equal to one-half the excavation depth. These perimeter samples were taken at 5-foot increments (e.g., T,T5,T10, etc.) laterally from the original "X-sample" location. The analytical results of each sample were compared to the remedial action criteria to determine if the next incremental sample was needed. In accordance with the Remedial Action Plan, sampling at each location was advanced until the limits of the contamination were delineated, or ground water, buildings, property lines, or adjoining RA-excavation areas were encountered. A summary of the "clean" end-point sample data is provided in Table 2-2. The Tier II-format laboratory reports for all of the Parcel No. 6 delineation samples were submitted to NJDEPE in February, 1992.

All delineation sampling and analysis was conducted in accordance with Tier II protocol and the requirements of the approved Sampling Analysis Plan, Environmental Assessment Report and Remedial Action Plan (RAP). Quality assurance procedures were followed during all activities of the sampling investigation. Duplicate and Field Blank samples (designated "D" and "FB", respectively) were prepared each day sampling was performed. In addition, matrix spike and matrix spike duplicate samples were prepared and analyzed by the laboratory.



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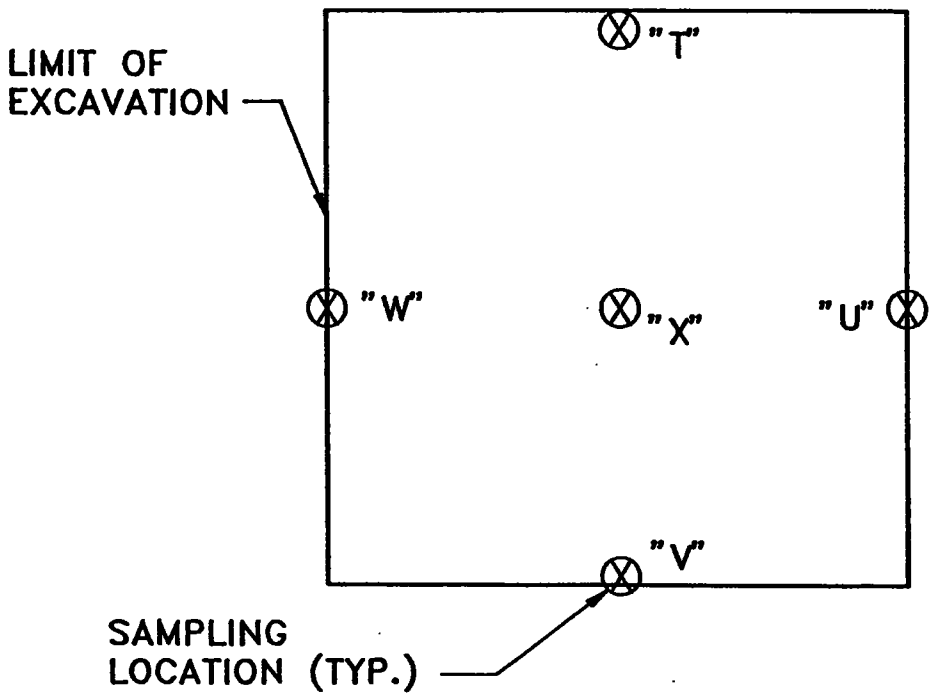

PLAN VIEW

TITLE

TYPICAL "RA" EXCAVATION

PREPARED FOR
BECTON DICKINSON & COMPANY
EAST RUTHERFORD, N.J.

ERM ERM-Northeast
Environmental Resources Management

SCALE	FIGURE
NONE	2-2
DATE 11/91	

EM/SP BDR/

TABLE 2-1

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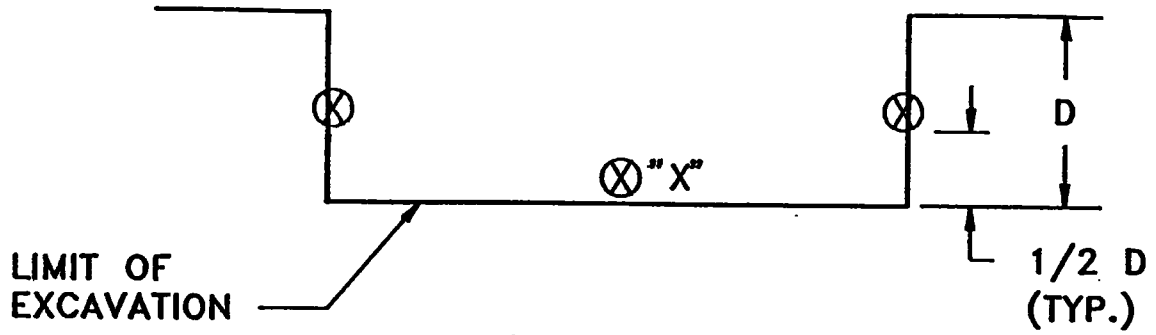
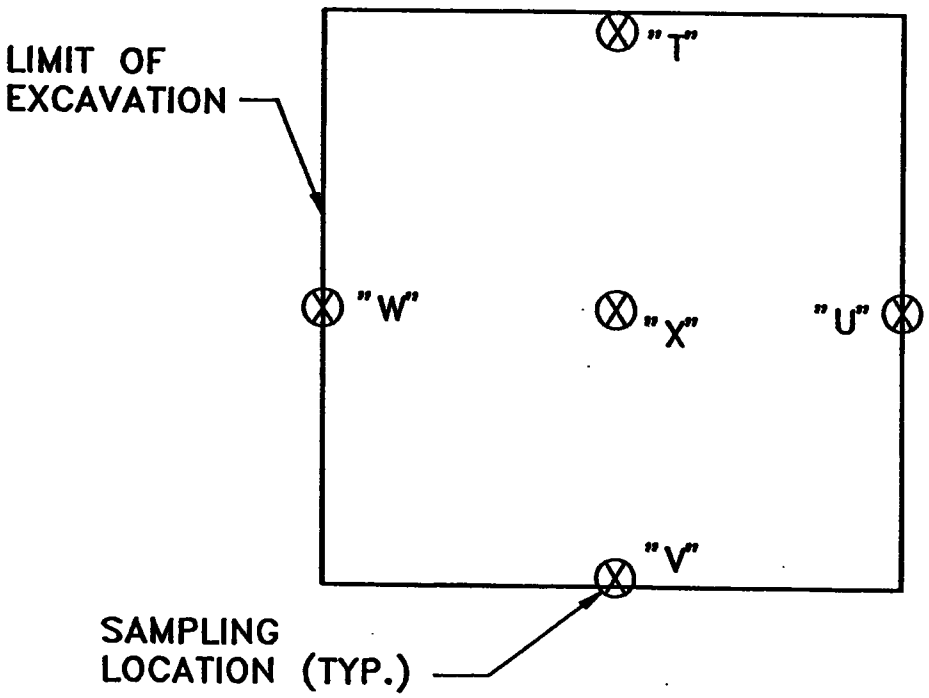
At each RA location, soil samples were taken to establish the horizontal and vertical limits of the volume to be excavated. The original "X-samples" (e.g., 6-2-X) were the samples taken previously during the initial Site Investigations that identified the locations of contamination. During the delineation sampling, all sample locations were referenced from the original X-sample location. As shown in Figure 2-2, the excavation depth was delineated by the samples denoted as "X1, X2 etc.", taken at 1-foot intervals (eg: X1,X2,X3, etc). Perimeter samples, which are designated T, U, V and W, were taken at a depth equal to one-half the excavation depth. These perimeter samples were taken at 5-foot increments (e.g., T,T5,T10, etc.) laterally from the original "X-sample" location. The analytical results of each sample were compared to the remedial action criteria to determine if the next incremental sample was needed. In accordance with the Remedial Action Plan, sampling at each location was advanced until the limits of the contamination were delineated, or ground water, buildings, property lines, or adjoining RA-excavation areas were encountered. A summary of the "clean" end-point sample data is provided in Table 2-2. The Tier II-format laboratory reports for all of the Parcel No. 6 delineation samples were submitted to NJDEPE in February, 1992.

All delineation sampling and analysis was conducted in accordance with Tier II protocol and the requirements of the approved Sampling Analysis Plan, Environmental Assessment Report and Remedial Action Plan (RAP). Quality assurance procedures were followed during all activities of the sampling investigation. Duplicate and Field Blank samples (designated "D" and "FB", respectively) were prepared each day sampling was performed. In addition, matrix spike and matrix spike duplicate samples were prepared and analyzed by the laboratory.



CROSS SECTION



PLAN VIEW

TITLE

TYPICAL "RA" EXCAVATION

PREPARED FOR
BECTON DICKINSON & COMPANY
EAST RUTHERFORD, N.J.

ERM-Northeast
Environmental Resources Management

SCALE NONE
DATE 11/91
FIGURE 2-2

EM/SP BDR

TABLE NO. 2-2
SOIL DELINEATION SAMPLING RESULTS
PARCEL NO. 6
BECTON DICKINSON & COMPANY, EAST RUTHERFORD, BERGEN COUNTY, NJ

LOCATION:	DEPTH OF SAMPLE:	CONCENTRATIONS OF PARAMETERS OF CONCERN: (ppm) Cd	Cr	Cu	Hg	Ni	Pb	Zn	TPH	BN	PAH	CaPAH	VOC
AREA 6-2;													
A6-2-X	1.5 ft.								721				
A6-2-XB	1.0 ft.									14J,B		1.6J	0.1J,B
6-2		LOCATION CURRENTLY UNDER WATER											
6-2X	0.5 ft.		294										
6-6-T	1.0 ft.						341						
6-6-U	1.0 ft.						359						
6-6-V	1.0 ft.						358						
6-6-W	1.0 ft.						414						
6-6-X1	2.0 ft.	SAMPLING TERMINATED DUE TO GROUND WATER											
6-7-T	1.25 ft.			34.5	3.90								
6-7-U5	1.25 ft.			309	7.28								
6-7-V5	1.25 ft.			109	5.07								
6-7-W5	1.25 ft.			68.3	1.62								
6-7-X2	2.5 ft.			304	10.1								
6-8-T	2.5 ft.						237	126					
6-8-U	2.5 ft.						70	78.9					
6-8-V	2.5 ft.						407	240					
6-8-W	2.5 ft.						820	322					
6-8-X1	5.0 ft.	SAMPLING TERMINATED DUE TO GROUND WATER											
6-10-T5	1.0 ft.			263	3.61		222						
6-10-U	1.0 ft.			45.2	1.13		188						
6-10-V	1.0 ft.			51.8	1.20		262						
6-10-W	1.0 ft.			165	1.57		169						
6-10-X1	2.0 ft.	SAMPLING TERMINATED DUE TO GROUND WATER											

TABLE NO. 2-2 (CONTINUED)

LOCATION:	DEPTH OF SAMPLE:	CONCENTRATIONS OF PARAMETERS OF CONCERN: (ppm) Cd	Cr	Cu	Hg	Ni	Pb	Zn	TPH	BN	PAH	CaPAH	VOC
6-19-T	0.75 ft.						69.3				12.875J		
6-19-U	0.75 ft.						214				9.497J		
6-19-V10	0.75 ft.						133				10.938J		
6-19-W20	0.75 ft.						428				19.862J		
6-19-X3	2.5 ft.	SAMPLING TERMINATED DUE TO GROUND WATER											
6-22		LOCATION CURRENTLY UNDER WATER											
6-22X	0.5 ft.		887										
PIC-S1-T5	1.25 ft.	<0.526		79.7	1.72	49.5	290	1060					
PIC-S1-U15	1.25 ft.	<0.527		554	10	93.3	156	585					
PIC-S1-V40	1.25 ft.	<0.516		679	1.82	22	191	695					
PIC-S1-W	1.25 ft.	<0.534		97.5	1.53	13.8	150	187					
PIC-S1-X2	1.5 ft.	<12.9		134	4.18	85.2	328	1900					
PIC-S2-T	0.75 ft.		32.8	20.7			64.7						
PIC-S2-U	0.75 ft.		13.5	22.5			163						
PIC-S2-V	0.75 ft.		19.5	23			109						
PIC-S2-W	0.75 ft.		20.6	20.2			47.6						
PIC-S2-XB	0.5 ft.									5.515J,B		2.459J,B	0.063B
PIC-S2-X1	1.5 ft.	SAMPLING TERMINATED DUE TO GROUND WATER											
PIC-S4-T	0.75 ft.	<0.436											
PIC-S4-U	0.75 ft.	<0.581											
PIC-S4-V	0.75 ft.	<0.636											
PIC-S4-W	0.75 ft.	<0.507											
PIC-S4-X1	1.5 ft.	<0.688											

NOTES:
Values are only given for parameter(s) of concern sampled at each location

N.D.= Not Detected

J= Estimated value; one or more of the chemical constituents meets the identification criteria, however, the concentration is less than the specified detection limit.

B= One or more of the chemical constituents were identified in the QA/QC blank sample.

Field blanks were prepared on each day of sampling and were analyzed for all the same parameters as those analyzed for the soil samples collected that day. Each field blank was prepared by collecting laboratory-prepared blank water poured over decontaminated field sampling equipment.

Soil samples were collected with stainless steel split-spoon samplers and stainless steel spoons. In paved areas (i.e.: concrete or asphalt surfaces), a small hole was made through the pavement with a hand tool (eg: pick-axe) or electric-powered "jack-hammer". The broken pavement and sub-base materials (usually gravel) were removed and a decontaminated split-spoon sampler was then driven, by hand-held sledge hammer, to the appropriate depth. The split soon sampler was then removed and opened. The soil sample was taken from the sampler with a decontaminated spoon and placed in a laboratory-prepared sample jar. In order to prepare a duplicate sample, the soil was first placed in a clean stainless steel bowl and mixed thoroughly before being divided into two separate samples and placed in sample jars.

Each soil sample was visually examined by the ERM field engineer and a description (eg: color, geologic characteristics, moisture content, etc.) was documented in the field log, along with the sample location and depth. The information on the sample jar label and recorded in the field log included the sample date, time, identification number, engineering company name (ERM-Northeast), project number, field engineer's name and analytical parameters. This information was also recorded on the chain-of-custody form that accompanied the sample from the time the sample was obtained until it was received by the laboratory.

All soil samples, duplicate sample and field blank samples were placed in a "cooler" with ice and taken to the on-site ground water treatment plant where they were then placed in a refrigerator. At the end of each day, the

samples were transported in sealed coolers to the laboratory by a courier provided by the lab. Any samples that were not immediately shipped to the lab (i.e.: held awaiting analytical results of previous samples) were stored in the refrigerator in the on-site treatment plant. Custody of the stored samples was ensured because only ERM-personnel have access to the treatment plant.

Each piece of sampling equipment was decontaminated prior to each use. The specific decontamination procedures performed depended on the chemical parameters that the sample was to be analyzed for. The decontamination procedures used during the delineation sampling investigation are as follows:

1. Soap Wash and Water Rinse

   Sampling equipment was washed with tap water and laboratory detergent, and scrubbed with a brush. The equipment was then rinsed with tap water.

2. Solvent Rinse

   Reagent grade acetone was used to clean sampling devices used for taking samples analyzed for organic compounds. Equipment used for samples analyzed for metals were rinsed with a 10% solution of nitric acid.

3. Final Rinse

   All sampling equipment was rinsed with bottled distilled water as a final decontamination step.

2.3 *SOIL REMEDIAL PROCEDURES*

The first phase of the Parcel No. 6 Soil Remedial Project involved marking the boundaries of the areas to be excavated. The "X-sample" location for each RA location was identified by ERM engineers using survey maps that were generated during the initial site investigations. As explained in Section 2.2, the original X-sample locations were used as the reference points for the RA locations. Each X-location was marked with a wooden stake and orange paint. The results of the delineation sampling were then used to define the limits (i.e., perimeter and depth) of each excavation site. Flagging, stakes and orange paint were used to establish excavation boundaries.

Barbella Environmental Technology Inc., (BET) the remedial contractor, mobilized on site on August 24, 1992, and under the supervision of ERM, began preparations for the soil removal work. BET's preparatory tasks included establishing work zones, decontamination areas and stock-pile areas. The areas in and around the RA locations were cleared of shrubs and were enclosed with bright orange fencing and warning signs. Plastic sheeting was placed on the ground next to each RA location, and decontamination areas were assembled. A stockpile area for fill material was fenced and lined with plastic sheeting and geotextile fabric. Figure 2-3 is the Soil Remedial Project Site Plan. The RA locations were excavated with a back-hoe and the excavated soil was placed directly into plastic-lined dump trucks for transport to the landfill. Surficial and subsurface material such as tree roots were removed and disposed of with the excavated soil. Plastic sheeting was placed on the ground surface between the excavation area and the transport truck to contain spilled material. Excavating at each location was continued until contamination limits, ground water or property boundaries were encountered. During excavation of the four RA locations within the wetlands, disturbance of soil and vegetation was kept

to a minimum. This work was conducted in accordance with NJDEPE Freshwater Wetlands Statewide General Permit No. 0212-91-0002.3. A copy of the permit is in Appendix A. Information and special procedures for specific RA locations are discussed below. The individual RA excavation sites are shown on Figures 2-4 through 2-11.

Location 6-6

The excavation depth for this RA location was specified as the depth of ground water, which was originally identified as approximately 2 feet below surface. However, at the time of the excavation work, the ground water depth was 2.5 feet. This resulted in an increase of soil volume from 7.0 cubic yards to 8.75 cubic yards.

Location 6-7

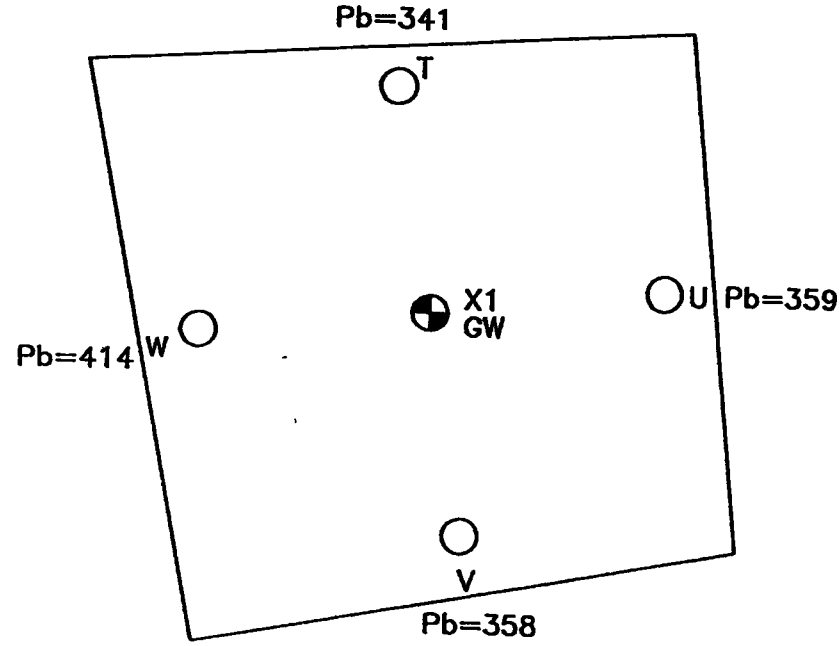
During the excavation of this location, the remnants of a structural concrete foundation was encountered below the soil surface. The substructure was not removed, due to its size. As a result, the volume of soil removed from this area was reduced by approximately 2 cubic yards.

Location 6-8

The depth of ground water at this location was approximately 6-inches deeper than the original field studies indicated. Therefore, the volume of excavated soil was approximately 2 cubic yards more than anticipated.

Location 6-10

The excavation depth of this location was increased from two feet to three feet due to the low water table. This caused the soil volume to increase by 50 percent of the original estimate.



REMEDIAL ACTION SUMMARY

PARAMETERS OF CONCERN: Pb

EXCAVATION DEPTH: 2.5 FT. (GW)

EXCAVATION VOLUME: 8.75 CU.YDS.

SURFACE: SOIL

LEGEND

7.25 ○	LOCATION OF END-POINT VERIFICATION SAMPLE BELOW REMEDIAL ACTION CRITERIA AND CONCENTRATION(S) OF PARAMETER(S) OF CONCERN IN PPM.
◔	LOCATION OF EXCAVATION BASE SAMPLE
▭	LIMITS OF EXCAVATION AREA
ND	NOT DETECTED
GW	AREA WAS EXCAVATED TO GROUND WATER
T,U,V,W,X	SAMPLE IDENTIFICATION CODE

TITLE

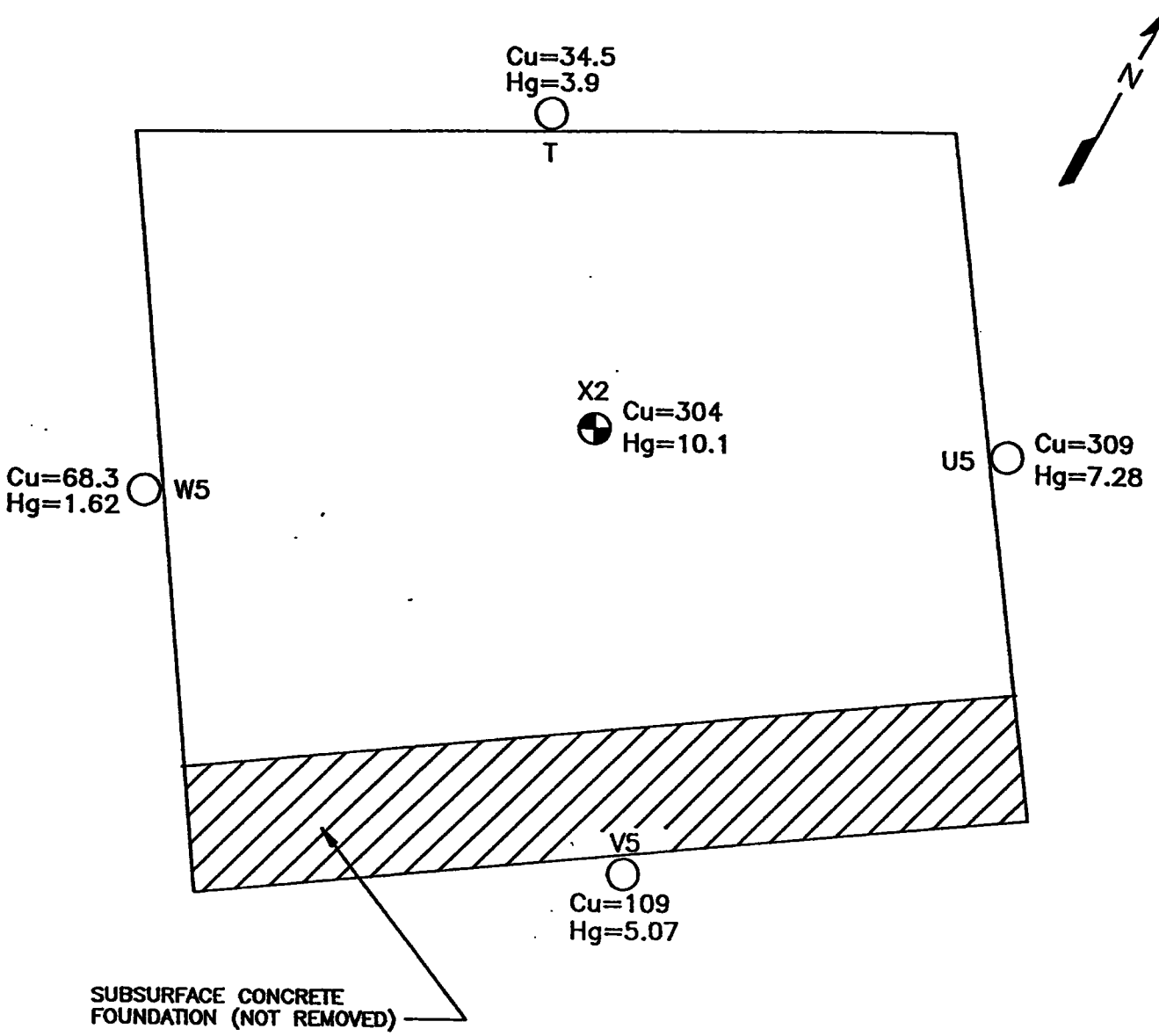
REMEDIAL ACTION LOCATION 6-6

PREPARED FOR
BECTON DICKINSON AND CO.
EAST RUTHERFORD, NJ

ERM-Northeast
Environmental Resources Management

SCALE	FIGURE
1"=4'	2-4

DRAWN	JOB NO.	FILE NAME	DATE
E.M.\R.H.	186.050.1	LOCA6-6	11/25/92



REMEDIAL ACTION SUMMARY

PARAMETERS OF CONCERN: Cu & Hg

EXCAVATION DEPTH: 2.5 FT.

EXCAVATION VOLUME: 25.9 CU.YDS.

SURFACE: SOIL

LEGEND

7.25 ○	LOCATION OF END-POINT VERIFICATION SAMPLE BELOW REMEDIAL ACTION CRITERIA AND CONCENTRATION(S) OF PARAMETER(S) OF CONCERN IN PPM.
◕	LOCATION OF EXCAVATION BASE SAMPLE
▭	LIMITS OF EXCAVATION AREA
ND	NOT DETECTED
GW	AREA WAS EXCAVATED TO GROUND WATER
T,U,V,W,X	SAMPLE IDENTIFICATION CODE

TITLE

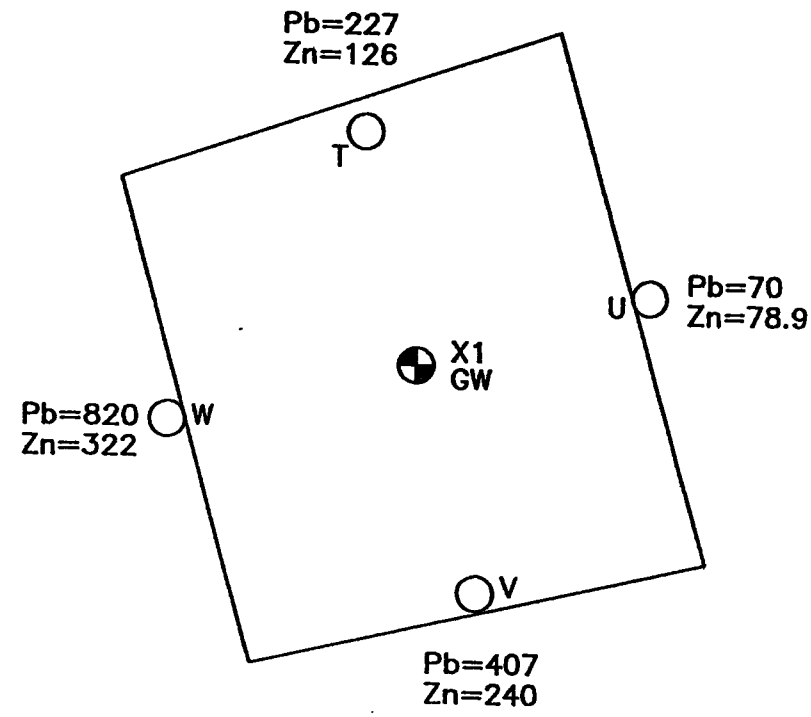
REMEDIAL ACTION LOCATION 6-7

PREPARED FOR
BECTON DICKINSON AND CO.
EAST RUTHERFORD, NJ

ERM-Northeast
Environmental Resources Management

SCALE	FIGURE
1"=4'	2-5

DRAWN	JOB NO.	FILE NAME	DATE
E.M./R.H.	186.050.1	LOCA6-7	11/25/92



REMEDIAL ACTION SUMMARY

PARAMETERS OF CONCERN: Pb & Zn

EXCAVATION DEPTH: 5.5 FT. (GW)

EXCAVATION VOLUME: 20.9 CU.YDS.

SURFACE: SOIL

LEGEND

7.25 ○	LOCATION OF END-POINT VERIFICATION SAMPLE BELOW REMEDIAL ACTION CRITERIA AND CONCENTRATION(S) OF PARAMETER(S) OF CONCERN IN PPM.
◔	LOCATION OF EXCAVATION BASE SAMPLE
▭	LIMITS OF EXCAVATION AREA
ND	NOT DETECTED
GW	AREA WAS EXCAVATED TO GROUND WATER
T,U,V,W,X	SAMPLE IDENTIFICATION CODE

TITLE

REMEDIAL ACTION LOCATION 6-8

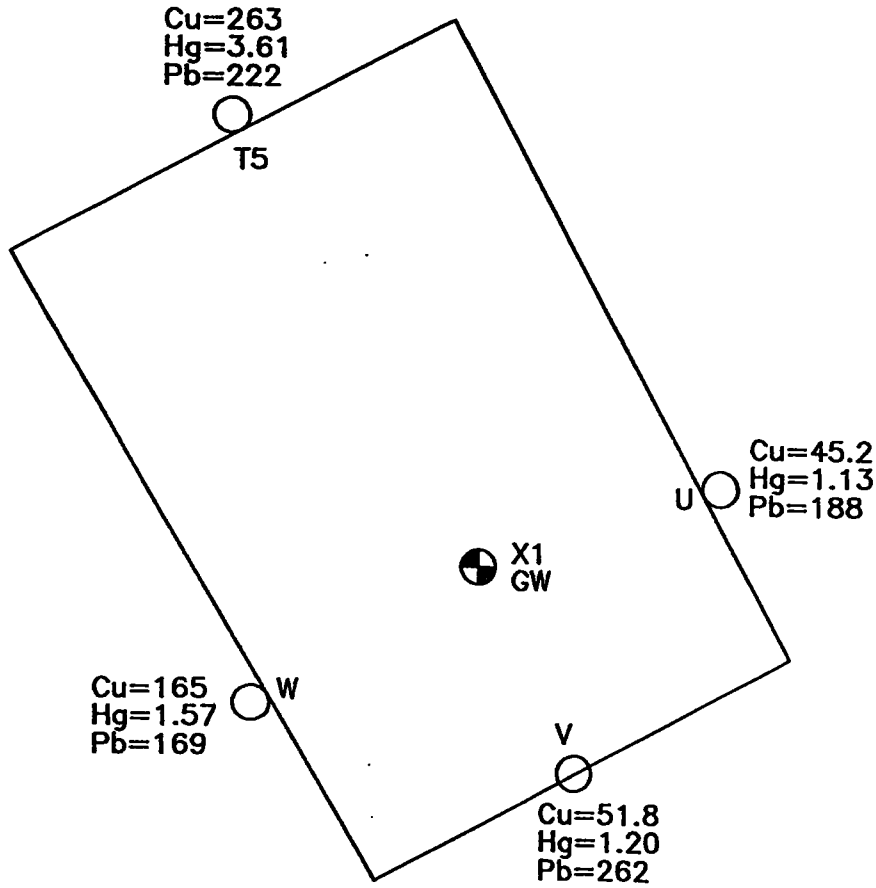
PREPARED FOR
BECTON DICKINSON AND CO.
EAST RUTHERFORD, NJ

ERM-Northeast
Environmental Resources Management

SCALE 1"=4'

FIGURE 2-6

DRAWN | JOB NO. | FILE NAME | DATE



REMEDIAL ACTION SUMMARY

PARAMETERS OF CONCERN: Cu, Hg & Pb

EXCAVATION DEPTH: 3.0 FT. (GW)

EXCAVATION VOLUME: 16.5 CU.YDS.

SURFACE: SOIL

LEGEND

7.25 ○	LOCATION OF END-POINT VERIFICATION SAMPLE BELOW REMEDIAL ACTION CRITERIA AND CONCENTRATION(S) OF PARAMETER(S) OF CONCERN IN PPM.
◔	LOCATION OF EXCAVATION BASE SAMPLE
▭	LIMITS OF EXCAVATION AREA
ND	NOT DETECTED
GW	AREA WAS EXCAVATED TO GROUND WATER
T,U,V,W,X	SAMPLE IDENTIFICATION CODE

TITLE

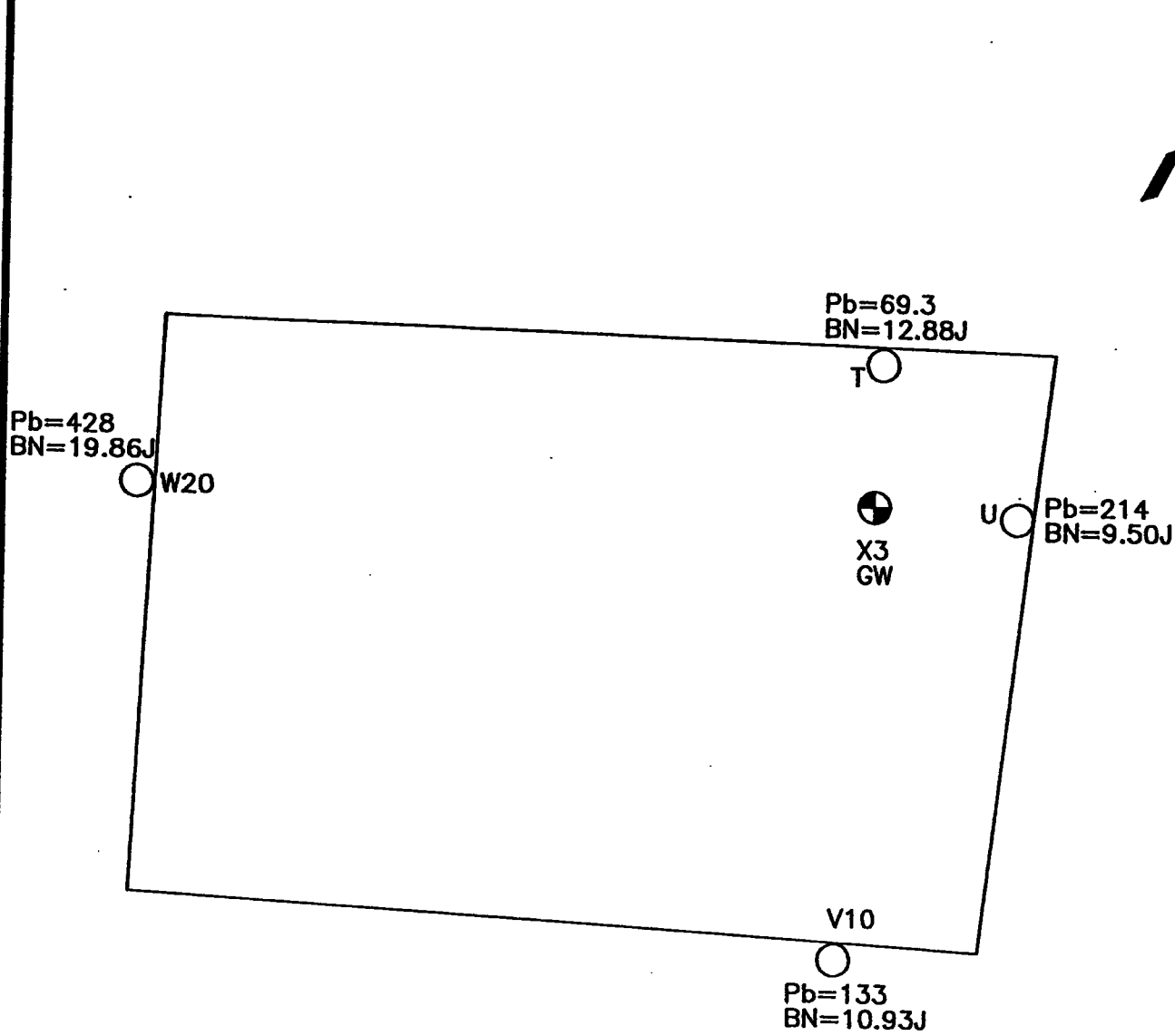
REMEDIAL ACTION LOCATION 6-10

PREPARED FOR
BECTON DICKINSON AND CO.
EAST RUTHERFORD, NJ

ERM-Northeast
Environmental Resources Management

SCALE	FIGURE
1"=4'	2-7

DRAWN	JOB NO.	FILE NAME	DATE
E.M./R.H.	186.050.1	LOCA6-10	11/25/92



REMEDIAL ACTION SUMMARY

PARAMETERS OF CONCERN: Pb & BASE NEUTRAL EXTRACTABLE ORGANIC COMPOUNDS (BN)

EXCAVATION DEPTH: 3.0 FT. (GW)

EXCAVATION VOLUME: 67.2 CU.YDS.

SURFACE: SOIL

LEGEND

7.25 ○	LOCATION OF END-POINT VERIFICATION SAMPLE BELOW REMEDIAL ACTION CRITERIA AND CONCENTRATION(S) OF PARAMETER(S) OF CONCERN IN PPM.
◒	LOCATION OF EXCAVATION BASE SAMPLE
▭	LIMITS OF EXCAVATION AREA
ND	NOT DETECTED
GW	AREA WAS EXCAVATED TO GROUND WATER
T,U,V,W,X	SAMPLE IDENTIFICATION CODE

TITLE

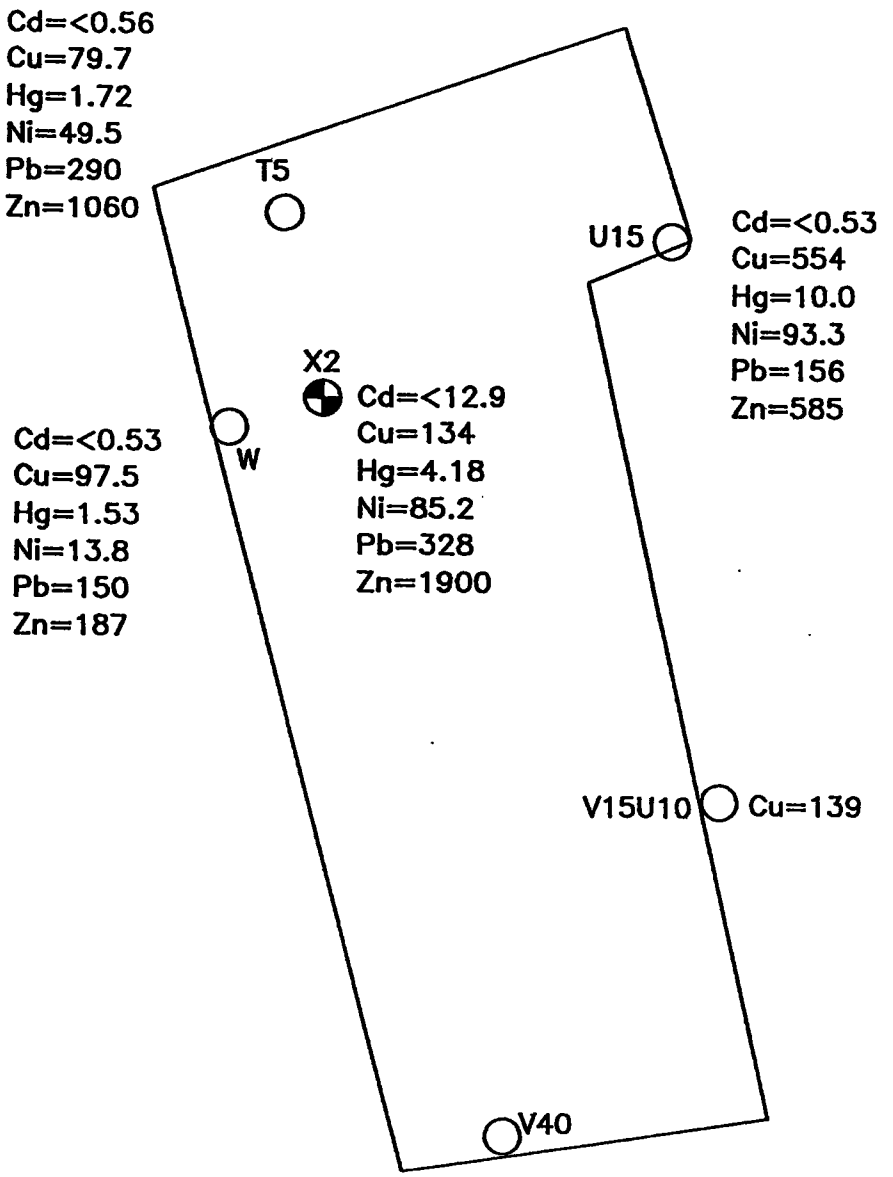
REMEDIAL ACTION LOCATION 6-19

PREPARED FOR
BECTON DICKINSON AND CO.
EAST RUTHERFORD, NJ

ERM-Northeast
Environmental Resources Management

SCALE	FIGURE
1"=6'	2-8

DRAWN	JOB NO.	FILE NAME	DATE
E.M./R.H.	186.050.1	LOCA6-19	11/25/92



REMEDIAL ACTION SUMMARY

PARAMETERS OF CONCERN: Cd, Cu, Hg, Ni, Pb, Zn

EXCAVATION DEPTH: 2.5 FT.

EXCAVATION VOLUME: 111 CU.YDS.

SURFACE: SOIL

LEGEND

7.25 ○	LOCATION OF END-POINT VERIFICATION SAMPLE BELOW REMEDIAL ACTION CRITERIA AND CONCENTRATION(S) OF PARAMETER(S) OF CONCERN IN PPM.
◔	LOCATION OF EXCAVATION BASE SAMPLE
▭	LIMITS OF EXCAVATION AREA
ND	NOT DETECTED
GW	AREA WAS EXCAVATED TO GROUND WATER
T,U,V,W,X	SAMPLE IDENTIFICATION CODE

TITLE

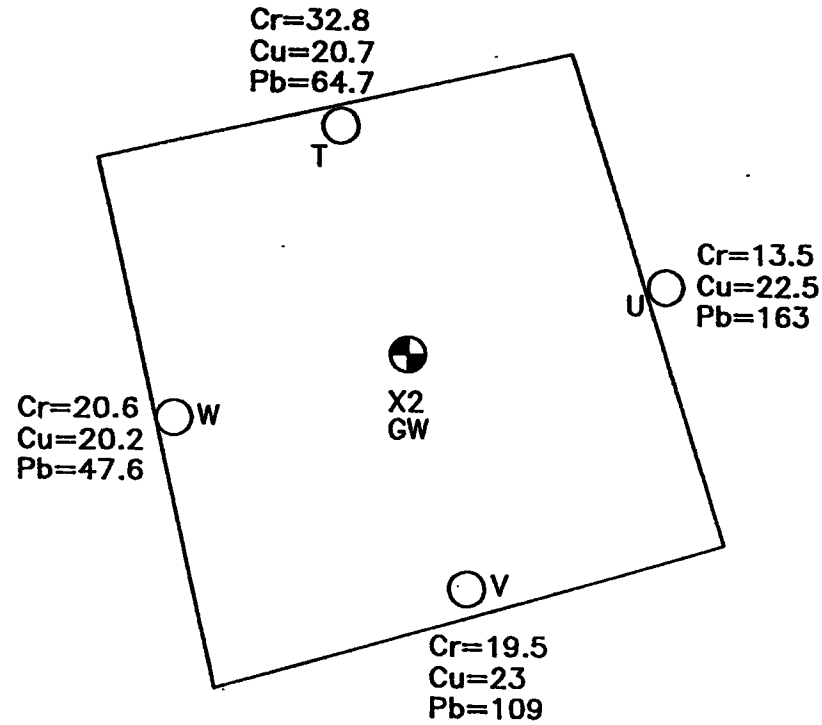
REMEDIAL ACTION LOCATION PIC-S1

PREPARED FOR
BECTON DICKINSON AND CO.
EAST RUTHERFORD, NJ

ERM-Northeast
Environmental Resources Management

SCALE	FIGURE
1"=10'	2-9

DRAWN	JOB NO.	FILE NAME	DATE
E.M.	186.050.1	LOCAS-1	11/9/92



REMEDIAL ACTION SUMMARY

PARAMETERS OF CONCERN: Cr, Cu & Pb

EXCAVATION DEPTH: 5 FT. (GW)

EXCAVATION VOLUME: 18.5 CU.YDS.

SURFACE: SOIL

LEGEND

7.25 ○	LOCATION OF END-POINT VERIFICATION SAMPLE BELOW REMEDIAL ACTION CRITERIA AND CONCENTRATION(S) OF PARAMETER(S) OF CONCERN IN PPM.
◕	LOCATION OF EXCAVATION BASE SAMPLE
▭	LIMITS OF EXCAVATION AREA
ND	NOT DETECTED
GW	AREA WAS EXCAVATED TO GROUND WATER
T,U,V,W,X	SAMPLE IDENTIFICATION CODE

TITLE

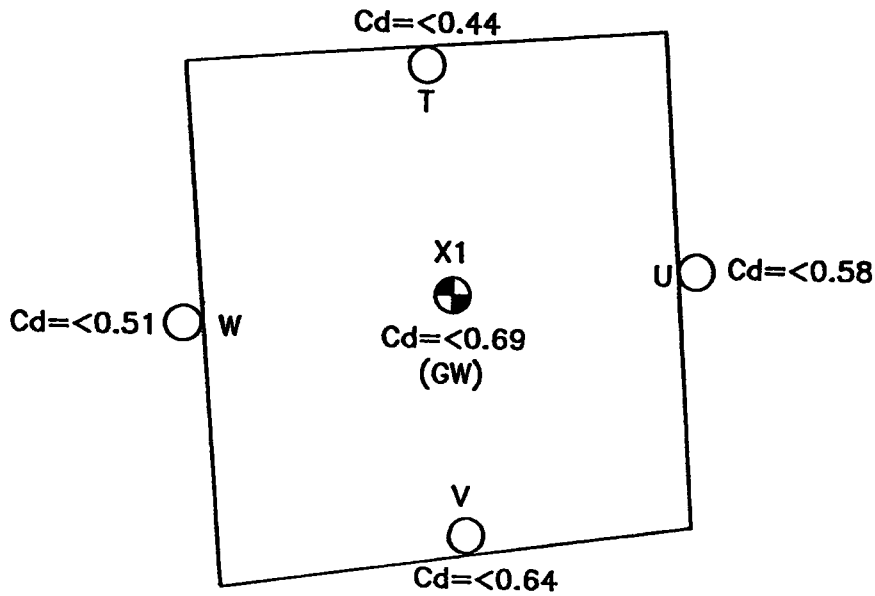
REMEDIAL ACTION LOCATION PIC-S2

PREPARED FOR
BECTON DICKINSON AND CO.
EAST RUTHERFORD, NJ

ERM-Northeast
Environmental Resources Management

SCALE	FIGURE
1"=4'	2-10

DRAWN	JOB NO.	FILE NAME	DATE
E.M.	186.050.1	LOCAS-2	11/9/92



REMEDIAL ACTION SUMMARY

PARAMETERS OF CONCERN: Cd

EXCAVATION DEPTH: 1.5 FT. (GW)

EXCAVATION VOLUME: 6 CU.YDS.

SURFACE: SOIL

LEGEND

7.25 ○	LOCATION OF END-POINT VERIFICATION SAMPLE BELOW REMEDIAL ACTION CRITERIA AND CONCENTRATION(S) OF PARAMETER(S) OF CONCERN IN PPM.
◕	LOCATION OF EXCAVATION BASE SAMPLE
▭	LIMITS OF EXCAVATION AREA
ND	NOT DETECTED
GW	AREA WAS EXCAVATED TO GROUND WATER
T,U,V,W,X	SAMPLE IDENTIFICATION CODE

TITLE

REMEDIAL ACTION LOCATION PIC-S4

PREPARED FOR
BECTON DICKINSON AND CO.
EAST RUTHERFORD, NJ

ERM-Northeast
Environmental Resources Management

SCALE	FIGURE
1"=4'	2-11

DRAWN	JOB NO.	FILE NAME	DATE
E.M./R.H.	186.050.1	LOCAS-4	11/25/92

Location 6-19

The amount of soil removed from Location 6-19 was approximately 11 cubic yards more than expected because of the increase in ground water depth.

Location PIC-S1

The volume of soil excavated from this RA location was approximately 5 percent more than the original specification.

Location PIC-S2

The depth to ground water at Location PIC-S2 was significantly greater than during previous site investigations. This increased the excavated soil volume by more than three times.

Location PIC-S4

At the time that this location was to be excavated, this area was under water from heavy rain. However, this flooded condition was assumed to be temporary and the location was excavated to the prescribed depth and volume.

When excavation of an RA Location was completed, the ERM engineer recorded the dimensions, volume of soil excavated, and types of materials encountered. The excavation was immediately backfilled with clean fill material supplied by Blue Circle Raia, Inc. of Hackensack, NJ. A laboratory report on the analysis of a fill material sample (P6-BF) is provided in Appendix B. The excavated areas were surveyed by Howard F. Greenspan Associates of Upper Montclair, NJ. Soil transport and disposal procedures are discussed in Section 2.4. Table 2-3 summarizes the Parcel Nos. 4 and 5 Soil Remedial Project. Figure 2-12 presents post-excavation soil quality.

TABLE 2–3
SUMMARY OF PARCEL NO. 6 SOIL REMEDIAL PROJECT
BECTON DICKINSON AND COMPANY
EAST RUTHERFORD, BERGEN COUNTY, NJ

LOCATION	EXCAVATED SOIL VOLUME, CU. YDS.	EXCAVATION DEPTH, FT.	PARAMETERS OF CONCERN
6–6	8.8	2.5(GW)	Pb
6–7	25.9	2.5	Cu & Hg
6–8	20.9	5.5(GW)	Pb & Zn
6–10	16.5	3.0(GW)	Cu, Hg & Pb
6–19	67.2	3.0(GW)	BN & Pb
PIC–S1	111.1	2.5	Cd, Cu, Hg, Ni, Pb & Zn
PIC–S2	18.5	5.0(GW)	Cr, Cu & Pb
PIC–S4	6.0	1.5	Cd
TOTAL	274.9		

Note: GW = Location was excavated to ground water depth.

2.4 CONTAMINATED SOIL DISPOSAL PROCEDURES

When each dump truck was filled with excavated material, the load was completely covered with a plastic tarp for transport. The ERM engineer completed New Jersey Hazardous Waste and Landfill Non-hazardous Waste manifests for each shipment. Each manifest was signed by the truck driver and BD's Corporate Environmental Coordinator, Ted Tideman. The manifests were submitted to NJDEPE, Environmental Regulation, Hazardous Waste Regulation, Bureau of Advisement and Manifest in September 1992, (see transmittal letter dated September 29, 1992, in Appendix C). Photocopies of the manifests were sent to Tessie Fields, NJDEPE, Site Remediation Program, DRPSR in October 1992 (see October 1, 1992 transmittal letter in Appendix C).

The excavated soil was classified as a New Jersey Hazardous Waste, Classification Nos. X725 and X726, due to petroleum hydrocarbon contamination. However, for shipment out of state, the waste was classified as non-hazardous. Before the soil was excavated, in-situ soil samples were collected at each RA excavation site. A total of 8 grab samples were collected and composited into one sample (BD-P6) which was sent to Laboratory Resources, Inc. for TCLP analysis. The analytical results indicated that the soil was not a RCRA Hazardous Waste. A copy of the TCLP analytical results is provided in Appendix D.

All 275 cubic yards of excavated soil and material were shipped for disposal to American Landfill, Inc. in Waynesburg, Ohio.

3.0 *SUMMARY OF REMEDIAL PROJECT COSTS*

A summary of costs for the BD Parcel No. 6 Soil Remedial Project is provided in Table 3-1. These costs include engineering, laboratory, remedial contractor, transportation and disposal costs. Remedial contractor costs are for soil excavation and basic site restoration. The costs presented in Table 3-1 are only for soil remedial activities completed on Parcel No. 6. These costs do not include costs for remedial work performed on Parcel Nos. 1 through 5, water cleanup activities, or building decontamination.

TABLE 3–1
SUMMARY OF SOIL REMEDIAL COSTS
PARCEL NO. 6
BECTON DICKINSON AND COMPANY
EAST RUTHERFORD, BERGEN COUNTY

ENGINEER CONSULTING AND SAMPLING	$100,000
ANALYTICAL LABORATORY	$25,000
REMEDIAL CONTRACTOR	$67,000
DISPOSAL	$20,000
ESTIMATED TOTAL COST	$212,000

4.0 *PROJECT TASKS REMAINING TO BE COMPLETED*

All requirements of the revised Soil Remedial Action Plans for Parcel Nos. 3, 4, 5 and 6 have been completed. Currently, the cleanup work remaining to be completed at the BD, East Rutherford site includes:

- Decontamination of Buildings on Parcel Nos. 4 and 5
- Completion of the Ground Water Cleanup

Appendix A

State of New Jersey
Department of Environmental Protection and Energy
Environmental Regulation
Land Use Regulation Program
CN 401
Trenton, NJ 08625-0401

Scott A. Weiner
Commissioner

Robert A. Tuc
Administrat

JUL 02 1992

Diane E. Heim, Project Manager
ERM-Northeast
175 Froehlich Farm Boulevard
Woodbury, New York 11797

RE: Authorization for Freshwater Wetlands Statewide General Permit, Water Quality Certification and Waiver of Transition Area for Access

Applicant Name: Becton Dickinson & Company
LURP File No.: 0212-91-0002.3
General Permit No.:4
Statute: N.J.S.A. 13:9B-1 et seq.
Effective date JUL 02 1992 Expiration date JUL 02 1997
East Rutherford, Bergen County
Block 88 Lot 49A, Block 89 All lots
Hackensack Drainage Basin
Nearest Waterway: Berrys Creek

Dear Ms. Heim:

The Land Use Regulation Program has reviewed the referenced application for a Freshwater Wetlands Statewide General Permit authorization pursuant to the requirements of the Freshwater Wetlands Protection Act Rules at N.J.A.C. 7:7A. The proposed activity is authorized by Freshwater Wetlands Statewide General Permit # 4, which allows all regulated activities, which are undertaken, authorized or otherwise expressly approved in writing by the Department, for the investigation, cleanup or removal of hazardous substances.

Limit of Authorized Disturbance

Based on plans entitled "Soil Excavation Locations Within the Wetland and Transition Area, ECRA Remedial Project", consisting of one sheet, dated January 27, 1992, unrevised, and prepared by ERM-Northeast, the authorized activity involves the disturbance of 0.018 of an acre of wetlands for the excavation and removal of contaminated soils and replacement with clean fill. Any additional disturbance of freshwater wetlands or State open waters shall be considered a violation of the Freshwater Wetlands Protection Act unless the activity is exempt or a permit is obtained prior to the start of the disturbance from the Land Use Regulation Program.

Permit Conditions

The activities allowed by this authorization shall comply with the following conditions. Failure to comply with these conditions shall constitute a violation of the Freshwater Wetlands Protection Act (N.J.S.A. 13:9B-1 et.seq.).

Special conditions:

All areas disturbed, either by excavation or heavy equipment, shall be maintained and/or returned to original grade.

General conditions:

1. All fill and other earth work on the lands encompassed within this permit authorization shall be stabilized in accordance with "Standards for Soil Erosion and Sediment Control in New Jersey" (obtainable from local Soil Conservation District Offices), or equal engineering specifications, to prevent eroded soil from entering adjacent waterways or wetlands at any time during and subsequent to construction.

2. This permit is revocable, or subject to modification or change at any time, when in the judgement of the Department of Environmental Protection & Energy of the State of New Jersey, such revocation, modification or change shall be necessary.

3. The issuance of this permit shall not be deemed to affect in any way other actions by the Department on any future application.

4. The activities shown by plans and/or other engineering data, which are this day approved, subject to the conditions herewith established, shall be constructed and/or executed in conformity with such plans and/or engineering data and the said conditions.

5. No change in plans or specifications shall be made except with the prior written permission of the Department.

6. The granting of this authorization shall not be construed to in any way affect the title or ownership of the property, and shall not make the Department or the State a party in any suit or question of ownership of the property.

7. This authorization is not valid and no work shall be undertaken until such time as all other required approvals and permits have been obtained.

8. A copy of this authorization shall be kept at the work site and shall be exhibited upon request of any person.

Waiver of Transition Area

The Land Use Regulation Program has determined that the wetlands affected by this permit authorization are of intermediate resource value and the standard transition area or buffer required adjacent to these wetlands is 50 feet. The resource value classification is the basis for determining the standard width of transition area required for the wetlands affected by this permit authorization. The authorization of activities under this Freshwater Wetlands Statewide General Permit includes a transition area waiver. This waiver allows encroachment only in that portion of the transition area that has been determined by the Program to be necessary to accomplish the authorized activities.

Any additional prohibited activities conducted within the standard transition area on-site shall require a separate transition area waiver from the Program. Prohibited activities within a transition area are defined at N.J.A.C. 7:7A-6.2(a).

Water Quality Certificate

This letter of authorization to conduct a regulated activity in a wetland or open water includes the Program's approval of a Water Quality Certificate for these activities.

Duration of Authorization/Notification of Work

This authorization for a Freshwater Wetlands Statewide General Permit is valid for five years from the date of in this letter. The permittee shall allow an authorized Program representative the right to inspect the construction site. The permittee will notify, in writing, the Land Use Regulation Program, Bureau of Enforcement at CN 401, 9 Ewing Street, Trenton, NJ 08625, 7 days prior to commencement of work authorized by this letter.

Appeal of Decision

The applicant or other affected party, if aggrieved by this decision to authorize the activities specified in this permit, may request a hearing on this decision by submitting a written request for an administrative hearing to Robert Tudor, Administrator, c/o Lisa Wright, Land Use Regulation Program, CN 401, Trenton, NJ 08625, within thirty (30) days of the date of the issuance date of this permit.

This written request must include a completed copy of the attached Administrative Hearing Request Checklist and all information identified in Section III of that list.

If you have any questions regarding this Freshwater Wetlands Statewide General Permit authorization, please contact Mark Joseph of our staff at (609) 633-6449. Please reference the permit number in any communication concerning this action.

Sincerely,

William Neyenhouse

William Neyenhouse, Section Chief
Bureau of Inland Regulation

WN/mj

c. U.S. Army Corps of Engineers
Philadelphia District
New York District ()
Bureau of Enforcement (x)
Trenton Office
Toms River Office (x)
East Rutherford Borough Clerk ()
East Rutherford Borough Planning Board
Bergen County Planning Board

Administrative Hearing Request Checklist and Tracking Form for Permits

I. Permit Being Appealed:

_____

Title and Type of Permit

_____ _____

Issuance Date of Permit Permit Number

II. Person Requesting Hearing:

_____ _____

Name Name of Attorney (if applicable)

_____ _____

_____ _____

Address Address of Attorney

III. Please Include the Following Information as Part of Your Request:

A. A copy of the decision letter;
B. The date the permittee received the final permit;
C. A list of all permit conditions and issues contested;
D. The legal and factual questions at issue;
E. A statement as to whether or not the permittee raised each legal and factual issues during the public comment period on the permit;
F. Suggested revised or alternative permit conditions;
G. An estimate of the time required for the hearing;
H. A request, if necessary, for a barrier-free hearing location for physically disabled persons;
I. A clear indication of any willingness to negotiate a settlement with the Department prior to the Department's processing of your hearing request to the Office of Administrative Law; and
J. This form, completed, signed and dated with all of the information listed above, including attachments, to:

1. Robert Tudor, Administrator, C/O Lisa Wright, Land Use Regulation, CN 401, Trenton, NJ 08625 (w/attachments)

2. Richard J. McManus, Director, Office of Legal Affairs CN 402, Trenton, NJ 08625 (w/o attachments)

3. All co-permittees (w/attachments)

IV. Signature: _____ Date _____

Appendix B

LABORATORY RESOURCES, INC.
363 OLD HOOK ROAD
WESTWOOD, NJ 07675
LAB. CERTIFICATION: NJ 02046
NY 10588

DATE COLLECTED: 08/28/92
DATE RECEIVED : 09/01/92
DATE ANALYZED : 09/03/92
DILUTION FACT.: 1.0

CLIENT : ERM NORTH P6 BF
LAB SAMPLE : W209004-01
ANALYST : JOHN
FILE NAME : >B7316

GC/MS VOLATILE ORGANICS REPORT

COMPOUND	UG/KG	MDL	COMPOUND	UG/KG	MDL
CHLOROMETHANE	ND	10	1,2-DICHLOROPROPANE	ND	5
VINYL CHLORIDE	ND	10	BROMODICHLOROMETHANE	ND	5
BROMOMETHANE	ND	10	2-CHLOROETHYLVINYLETHER	ND	5
CHLOROETHANE	ND	10	TRANS-1,3-DICHLOROPROPENE	ND	5
ACROLEIN	ND	52	CIS-1,3-DICHLOROPROPENE	ND	5
TRICHLOROFLUOROMETHANE	ND	5	1,1,2-TRICHLOROETHANE	ND	5
1,1-DICHLOROETHENE	ND	5	DIBROMOCHLOROMETHANE	ND	5
CARBON DISULFIDE	ND	5	BROMOFORM	ND	5
ACETONE	ND	10	4-METHYL-2-PENTANONE	ND	10
ACRYLONITRILE	ND	52	TOLUENE	ND	5
METHYLENE CHLORIDE	4 JB	5	TETRACHLOROETHENE	ND	5
TRANS-1,2-DICHLOROETHENE	ND	5	2-HEXANONE	ND	10
1,1-DICHLOROETHANE	ND	5	CHLOROBENZENE	ND	5
CHLOROFORM	ND	5	ETHYLBENZENE	ND	5
1,2-DICHLOROETHANE	ND	5	M,P-XYLENE	ND	5
VINYL ACETATE	ND	10	O-XYLENE	ND	5
2-BUTANONE	ND	10	STYRENE	ND	5
1,1,1-TRICHLOROETHANE	ND	5	1,1,2,2-TETRACHLOROETHANE	ND	5
CARBON TETRACHLORIDE	ND	5	1,3-DICHLOROBENZENE	ND	5
BENZENE	ND	5	1,4-DICHLOROBENZENE	ND	5
TRICHLOROETHENE	ND	5	1,2-DICHLOROBENZENE	ND	5

SURROGATE COMPOUNDS	RECOVERY	LIMITS	STATUS
1,2-DICHLOROETHANE-D4	103 %	70 - 121	OK
TOLUENE-D8	96 %	81 - 117	OK
4-BROMOFLUOROBENZENE	101 %	74 - 121	OK

J Indicates detected below MDL
ND Indicates compound not detected
B Indicates compound also present in blank

Percent Solid of 96.9 is used for all target compounds.

LABORATORY RESOURCES, INC.
363 OLD HOOK ROAD
WESTWOOD, NJ 07675
LAB. CERTIFICATION: NJ 02046
NY 10588

DATE COLLECTED: 08/28/92
DATE RECEIVED : 09/01/92
DATE ANALYZED : 09/09/92
DILUTION FACT.: 10.0

CLIENT : ERM NORTHEAST P6 BF
LAB SAMPLE : W209004-01
ANALYST : ANDY
FILE NAME : >C6252

TCLP VOLATILE ORGANICS REPORT

COMPOUND	MG/L	MDL
VINYL CHLORIDE	ND	.100
1,1-DICHLOROETHENE	ND	.050
CHLOROFORM	ND	.050
1,2-DICHLOROETHANE	ND	.050
CARBON TETRACHLORIDE	ND	.050
TRICHLOROETHENE	ND	.050
BENZENE	ND	.050
2-BUTANONE	ND	.100
TETRACHLOROETHENE	ND	.050
CHLOROBENZENE	ND	.050

SURROGATE COMPOUNDS	RECOVERY	LIMITS	STATUS
1,2-DICHLOROETHANE-D4	92 %	76 - 114	OK
TOLUENE-D8	103 %	88 - 110	OK
4-BROMOFLUOROBENZENE	93 %	86 - 115	OK

J Indicates detected below MDL
ND Indicates compound not detected
B Indicates compound also present in blank

REGULATORY RESOURCES, INC.
461 OLD HOOK ROAD
WESTWOOD, NJ 07675
I.D. IDENTIFICATION: NJ 02046
NY 10588

DATE COLLECTED: 08/28/92
DATE EXTRACTED: 09/10/92
DATE ANALYZED : 09/15/92
DILUTION FACT.: 1.0

CLIENT : ERM NE P6 BF
LAB SAMPLE : W209004-01
ANALYST : ED
FILE NAME : >03787

GC/MS BASE NEUTRALS ACIDS REPORT

COMPOUND	UG/KG	MDL	COMPOUND	UG/KG	MDL
N-NITROSODIMETHYLAMINE	ND	341	3-NITROANILINE	ND	1703
PHENOL	ND	341	ACENAPHTHENE	ND	341
2-CHLOROPHENOL	ND	341	2,4-DINITROPHENOL	ND	1703
BIS(2-CHLOROETHYL)ETHER	ND	341	DIBENZOFURAN	ND	341
1,3-DICHLOROBENZENE	ND	341	4-NITROPHENOL	ND	1703
1,4-DICHLOROBENZENE	ND	341	2,4-DINITROTOLUENE	ND	341
BENZYL ALCOHOL	ND	341	FLUORENE	ND	341
1,2-DICHLOROBENZENE	ND	341	4-NITROANILINE	ND	1703
2-METHYLPHENOL	ND	341	DIETHYLPHTHALATE	ND	341
BIS(2-CHLOROISOPROPYL)ETHER	ND	341	4-CHLOROPHENYL-PHENYLETHER	ND	341
N-NITROSO-DI-N-PROPYLAMINE	ND	341	4,6-DINITRO-2-METHYLPHENOL	ND	1703
HEXACHLOROETHANE	ND	341	N-NITROSODIPHENYLAMINE	ND	341
3- and 4-METHYLPHENOL	ND	681	AZOBENZENE	ND	341
NITROBENZENE	ND	341	4-BROMOPHENYL-PHENYLETHER	ND	341
ISOPHORONE	ND	341	HEXACHLOROBENZENE	ND	341
2-NITROPHENOL	ND	341	PENTACHLOROPHENOL	ND	1703
2,4-DIMETHYLPHENOL	ND	341	PHENANTHRENE	ND	341
BIS(2-CHLOROETHOXY)METHANE	ND	341	ANTHRACENE	ND	341
2,4-DICHLOROPHENOL	ND	341	DI-N-BUTYLPHTHALATE	ND	341
BENZOIC ACID	ND	1703	FLUORANTHENE	ND	341
1,2,4-TRICHLOROBENZENE	ND	341	BENZIDINE	ND	341
NAPHTHALENE	ND	341	PYRENE	ND	341
4-CHLOROANILINE	ND	341	BUTYLBENZYLPHTHALATE	ND	341
HEXACHLOROBUTADIENE	ND	341	BENZO(A)ANTHRACENE	ND	341
2-METHYLNAPHTHALENE	ND	341	3,3'-DICHLOROBENZIDINE	ND	681
4-CHLORO-3-METHYLPHENOL	ND	341	CHRYSENE	ND	341
HEXACHLOROCYCLOPENTADIENE	ND	341	BIS(2-ETHYLHEXYL)PHTHALATE	52 J	341
2,4,5-TRICHLOROPHENOL	ND	1703	DI-N-OCTYLPHTHALATE	ND	341
2,4,6-TRICHLOROPHENOL	ND	341	BENZO(B)FLUORANTHENE	ND	341
2-CHLORONAPHTHALENE	ND	341	BENZO(K)FLUORANTHENE	ND	341
2-NITROANILINE	ND	1703	BENZO(A)PYRENE	ND	341
ACENAPHTHYLENE	ND	341	INDENO(1,2,3-CD)PYRENE	ND	341
DIMETHYLPHTHALATE	ND	341	DIBENZO(A,H)ANTHRACENE	ND	341
2,6-DINITROTOLUENE	ND	341	BENZO(G,H,I)PERYLENE	ND	341

SURROGATE COMPOUNDS	RECOVERY	LIMITS	STATUS
NITROBENZENE-D5	74 %	23 - 120	OK
2-FLUOROBIPHENYL	28 %	30 - 115	OUT
4-TERPHENYL-D14	51 %	18 - 137	OK
PHENOL-D6	28 %	24 - 113	OK
2-FLUOROPHENOL	26 %	25 - 121	UK
2,4,6-TRIBROMOPHENOL	26 %	19 - 122	OK

J Indicates detected below MDL
ND Indicates compound not detected
B Indicates compound also present in blank

Percent Solid of 96.9 is used for all Target compounds.

LABORATORY RESOURCES, INC.
345 OLD NORK ROAD
WESTWOOD, NJ 07675
LAB. CERTIFICATION: NJ 12046
NY 10588

DATE COLLECTED: 08/28/92
DATE EXTRACTED: 09/11/92
DATE ANALYZED : 09/14/92
DILUTION FACT.: 2.0

CLIENT : ERM NE P6 BF
LAB SAMPLE : W209004-01
ANALYST : ED
FILE NAME : >03775

GC/MS SEMIVOLATILES TCLP REPORT

COMPOUND	MG/L	MDL
1,4-DICHLOROBENZENE	ND	.020
HEXACHLOROETHANE	ND	.020
NITROBENZENE	ND	.020
HEXACHLOROBUTADIENE	ND	.020
PYRIDINE	ND	.100
2-METHYLPHENOL	ND	.020
3- and 4-METHYLPHENOL	ND	.040
PENTACHLOROPHENOL	ND	.100
2,4,5-TRICHLOROPHENOL	ND	.100
2,4,6-TRICHLOROPHENOL	ND	.020
2,4-DINITROTOLUENE	ND	.020
HEXACHLOROBENZENE	ND	.020

SURROGATE COMPOUNDS	RECOVERY	LIMITS	STATUS
NITROBENZENE-D5	75 %	35 - 114	OK
2-FLUOROBIPHENYL	73 %	43 - 116	OK
4-TERPHENYL-D14	71 %	33 - 141	OK
PHENOL-D6	34 %	10 - 94	OK
2-FLUOROPHENOL	50 %	21 - 100	OK
2,4,6-TRIBROMOPHENOL	69 %	10 - 123	OK

J Indicates detected below MDL
ND Indicates compound not detected
B Indicates compound also present in blank

LABORATORY RESOURCES, INC.
363 OLD HOOK ROAD
WESTWOOD, NJ 07675
LAB CERTIFICATION: NJ 02046
NY 10588

WORK ORDER #: W209004
DATE COLLECTED: 08/28/92
DATE EXTRACTED: 09/10/92
DATE ANALYZED: 09/15/92
DILUTION FACTOR: 10.0
ANALYST: EILEEN

PARAMETER	CLIENT ID > P6 BF SAMPLE ID > 01	MDL
ALDRIN	ND	34.1
ALPHA-BHC	ND	34.1
BETA-BHC	ND	34.1
DELTA-BHC	ND	34.1
GAMMA-BHC (LINDANE)	ND	34.1
CHLORDANE	ND	171
4,4'-DDD	ND	34.1
4,4'-DDE	ND	34.1
4,4'-DDT	ND	34.1
DIELDRIN	ND	34.1
ENDOSULFAN I	ND	34.1
ENDOSULFAN II	ND	34.1
ENDOSULFAN SULFATE	ND	34.1
ENDRIN	ND	34.1
ENDRIN ALDEHYDE	ND	34.1
ENDRIN KETONE	ND	34.1
HEPTACHLOR	ND	34.1
HEPTACHLOR EPOXIDE	ND	34.1
METHOXYCHLOR	ND	171
TOXAPHENE	ND	341
AROCLOR 1016	ND	171
AROCLOR 1221	ND	171
AROCLOR 1232	ND	171
AROCLOR 1242	ND	171
AROCLOR 1248	ND	171
AROCLOR 1254	ND	171
AROCLOR 1260	ND	171

SURROGATE RECOVERY (DBC)	84.81%
RETENTION TIME SHIFT (DBC)	-0.21%

MDL = MINIMUM DETECTION LIMIT
ND = NOT DETECTED AT THE MDL
ADVISORY SURROGATE LIMITS(20-150)
RETENTION TIME SHIFT LIMITS (+/- 1.5%)

ALL RESULTS EXPRESSED IN UG/KG
METHOD 8080

LABORATORY RESOURCES, INC.
365 OLD HOOK ROAD
WESTWOOD, NJ 07675
LAB CERTIFICATION: NJ 02046
NY 10588

WORK ORDER #: W209004
DATE COLLECTED: 08/28/9
DATE EXTRACTED:09/10/92PE
DATE ANALYZED:09/15/92PE
DATE EXTRACTED:09/10/92HE
DATE ANALYZED:09/16/92HE
DILUTION FACTOR: 4.0 PE
DILUTION FACTOR: 4.0 HE
ANALYST: EILEEN

PARAMETER	CLIENT ID > P6 BF SAMPLE ID > 01	MDL
CHLORDANE (ALPHA & GAMMA)	ND	0.0020
ENDRIN	ND	0.0004
HEPTACHLOR	ND	0.0004
HEPTACHLOR EPOXIDE	ND	0.0004
LINDANE	ND	0.0004
METHOXYCHLOR	ND	0.0020
TOXAPHENE	ND	0.0040
2,4-D	ND	0.0020
2,4,5-TP(SILVEX)	ND	0.0004
SURROGATE RECOVERY (DBC)	92.66%	
RETENTION TIME SHIFT (DBC)	0.30%	
SURROGATE RECOVERY (DCAA)	43.09%	

MDL = MINIMUM DETECTION LIMIT
ND = NOT DETECTED AT THE MDL
608 ADVISORY SURROGATE LIMITS(20-150)
RETENTION TIME SHIFT LIMITS(+/-1.5%)
DBC SURROGATE RECOVERY APPLIES TO 608 ANALYSIS ONLY.
DCAA SURROGATE RECOVERY APPLIES TO 509B ANALYSIS ONLY.

ALL RESULTS EXPRESSED IN MG/L
METHOD 608 (TCLP PESTICIDES)
METHOD 509B (TCLP HERBICIDES)

Laboratory Resources INC
A UNITED WATER RESOURCES COMPANY
363 Old Hook Road
Westwood, New Jersey 07675-3235
(201) 666-6644 • FAX: (201) 666-7978

NJ Certification # 02046
NY Certification # 10588

ERM Northeast
175 Froelich Farm Boulevard
Woodbury, N.Y. 11797

Attn: Dean Scari

Date of Report: 09/29/92
Work Order #: W2-09-004
Date Received: 09/01/92
Client #: 000339
P.O./Project #: 186.050.2

PARAMETER	P6 BF
ALUMINUM	5000*
ANTIMONY	<1.03*
ARSENIC	<1.03*
ARSENIC - TCLP	<0.104
BARIUM	42.1*
BARIUM -TCLP	0.833
BERYLLIUM	<0.382*
CADMIUM	<0.382*
CADMIUM - TCLP	<0.0094
CALCIUM	6610*
CHROMIUM	10.2*
CHROMIUM - TCLP	<0.0208
COBALT	4.44*
COPPER	<1.91*
IRON	9700*
LEAD	5.07*
LEAD - TCLP	<0.100

All results expressed as mg/L unless otherwise stated
(See reverse for additional information)

Laboratory Resources INC
A UNITED WATER RESOURCES COMPANY
363 Old Hook Road
Westwood, New Jersey 07675-3235
(201) 666-6644 • FAX: (201) 666-7978

NJ Certification # 02046
NY Certification # 10588

Work Order # W2-09-004

PARAMETER	P6 BF
MAGNESIUM	3980*
MANGANESE	221*
MERCURY	<0.0808*
MERCURY - TCLP	<0.0005
NICKEL	4.09*
POTASSIUM	1550*
SELENIUM	<0.512*
SELENIUM - TCLP	<0.102
SILVER	<0.764*
SILVER - TCLP	<0.0222
SODIUM	<382*
THALLIUM	<1.03*
VANADIUM	10.2*
ZINC	15.5*
CORROSIVITY (pH)	9.8
CYANIDE, TOTAL	1.29*
IGNITABILITY (DEGREES F)	>160
PAINT FILTER LIQUIDS TEST	negative
PETROLEUM HYDROCARBONS S	<24.8*
SOLIDS, TOTAL %	96.9

038

ALL TRACE METAL TCLP RESULTS GAVE BEEN CORRECTED FOR ANALYTICAL BIAS ACCORDING TO THE QUALITY CONTROL SECTION OF METHOD 1311 IN THE FEDERAL REGISTER, 40 CFR 261, JUNE 1990.

All results expressed as mg/L unless otherwise stated
(See reverse for additional information)

Appendix C

ERM-Northeast

175 Froehlich Farm Blvd
Woodbury, NY 11797
(516) 921-4300
(516) 921-5679 (Fax)

29 September 1992

New Jersey Department of
Environmental Protection and Energy
Environmental Regulation
Hazardous Waste Regulation
Bureau of Advisement & Manifest
CN028
401 East State Street
Floor 5
Trenton, NJ 08625-0028

ERM

Re: Becton Dickinson and Company
East Rutherford, Bergen County
USEPA ID No. NJD000304782

Enclosed are New Jersey Hazardous Waste Manifests for oil contaminated soil (waste classification nos. X725 and 726) shipped from Becton Dickinson and Company, East Rutherford, NJ to American Landfill, Inc., in Waynesburg, Ohio. Approximately 275 cubic yards of soil was removed as part of an ECRA Remedial Project. If you have any questions, please contact me at (516) 921-4300.

Very truly yours,

Dean J. Scari
Project Manager

DJS:pm
cc: D. Gasbarro, BD
T. Tideman, BD
T. Fields, NJDEPE

18605002.652

Appendix D

CERTIFIED ANALYSIS OF WATER, WASTEWATER, SOILS, SLUDGES AND INDUSTRIAL DISCHARGES

Laboratory Resources INC
A UNITED WATER RESOURCES COMPANY
363 Old Hook Road
Westwood, New Jersey 07675-3235
(201) 666-6644 • FAX: (201) 666-7978

NJ Certification # 02046
NY Certification # 10588

ERM Northeast
175 Froelich Farm Boulevard
Woodbury, N.Y. 11797

Attn: Dean Scari

Date of Report: 03/20/92
Work Order #: W2-03-033
Date Received: 03/03/92
Client #: 000339
P.O./Project #: 186.050

PARAMETER	BD TR 12	BD P6
ARSENIC - TCLP	<0.105	<0.105
BARIUM -TCLP	1.42	1.89
CADMIUM - TCLP	<0.0050	0.0150
CHROMIUM - TCLP	0.0169	0.0344
LEAD - TCLP	0.142	1.90
MERCURY - TCLP	<0.0002	<0.0002
NICKEL - TCLP	<0.0240	0.114
SELENIUM - TCLP	<0.0980	<0.0980
SILVER - TCLP	<0.0058	<0.0058
CORROSIVITY (pH)	7.2	7.4
IGNITABILITY (DEGREES F)	>160F	>160F
PAINT FILTER LIQUIDS TEST	NEG	NEG
PETROLEUM HYDROCARBONS S	571*	81.0*
SOLIDS, TOTAL %	86.7	82.8

All trace metal TCLP results have been corrected for analytical bias according to the quality control section 8.0 in the Federal Register, Vol. 55, No. 126, Friday,

LABORATORY RESOURCES, INC.
363 OLD HOOK ROAD
WESTWOOD, NJ 07675
LAB CERTIFICATION: NJ 02046
NY 10568

WORK ORDER #: W203033
DATE COLLECTED: 03/02/9
DATE EXTRACTED: 03/06/9
DATE ANALYZED: 03/10/9
DILUTION FACTOR: 10.0
ANALYST:STEPHANIE

PARAMETER	CLIENT ID > BD P6 SAMPLE ID > 02	MDL
AROCLOR 1016	ND	200
AROCLOR 1221	ND	200
AROCLOR 1232	ND	200
AROCLOR 1242	ND	200
AROCLOR 1248	357	200
AROCLOR 1254	ND	200
AROCLOR 1260	ND	200

SURROGATE RECOVERY (DBC) 73.29%
RETENTION TIME SHIFT (DBC) -0.05%

MDL = MINIMUM DETECTION LIMIT
ND = NOT DETECTED AT THE MDL
ADVISORY SURROGATE LIMITS(20-150)
RETENTION TIME SHIFT LIMITS (+/- 1.5%)

ALL RESULTS EXPRESSED IN UG/KG
METHOD 8080

LABORATORY RESOURCES, INC.
565 OLD HOOK ROAD
WESTWOOD, NJ 07675
LAB. CERTIFICATION: NJ 02046
NY 10588

DATE COLLECTED: 03/02/92
DATE EXTRACTED: 03/05/92
DATE ANALYZED : 03/10/92
DILUTION FACT.: 2.0

CLIENT : ERM BD P6
LAB SAMPLE : W203033-02
ANALYST : GREG WS
FILE NAME : >A3180

GC/MS SEMIVOLATILES TCLP REPORT

COMPOUND	MG/L	MDL
1,4-DICHLOROBENZENE	ND	.020
HEXACHLOROETHANE	ND	.020
NITROBENZENE	ND	.020
HEXACHLOROBUTADIENE	ND	.020
PYRIDINE	ND	.100
2-METHYLPHENOL	ND	.020
3-METHYLPHENOL	ND	.100
4-METHYLPHENOL	ND	.020
PENTACHLOROPHENOL	ND	.100
2,4,5-TRICHLOROPHENOL	ND	.100
2,4,6-TRICHLOROPHENOL	ND	.020
2,4-DINITROTOLUENE	ND	.020
HEXACHLOROBENZENE	ND	.020

SURROGATE COMPOUNDS	RECOVERY	LIMITS	STATUS
NITROBENZENE-D5	86 %	35 - 114	OK
2-FLUOROBIPHENYL	63 %	43 - 116	OK
4-TERPHENYL-D14	83 %	33 - 141	OK
PHENOL-D6	47 %	10 - 94	OK
2-FLUOROPHENOL	68 %	21 - 100	OK
2,4,6-TRIBROMOPHENOL	131 %	10 - 123	OUT

J Indicates detected below MDL
ND Indicates compound not detected
B Indicates compound also present in blank

ERM-Northeast

175 Froehlich Farm Blvd
Woodbury, NY 11797
(516) 921-4300
(516) 921-5679 (Fax)

1 October 1992

Ms. Tessie W. Fields, Section Chief
New Jersey Department of Environmental
Protection and Energy
Site Remediation
Division of Responsible Party Site Remediation
Industrial Site Evaluation
BEECRA
401 E. State Street
CN-029
Trenton, NJ 08625

ERM

Re: Becton Dickinson and Company
East Rutherford, Bergen County
ECRA Case No. 87578

Dear Tessie:

Enclosed are New Jersey Hazardous Waste Manifests for oil contaminated soil (waste classification nos. X725 and X726) shipped from Becton Dickinson and Company, East Rutherford, NJ to American Landfill, Inc., in Waynesburg, Ohio. Approximately 275 cubic yards of soil was removed during the Parcel No. 6 Cleanup Project. If you have any questions, please contact me.

Very truly yours,

Dean J. Scari
Project Manager

DJS:pjl

cc: T. Tideman, BD
D. Gasbarro, BD

18605002.682

ISRA SITE INVESTIGATION REPORT SUB-BUILDING SOILS INVESTIGATION PARCEL NO. 5 ISRA CASE NO. 87577

Becton Dickinson and Company
East Rutherford, Bergen County, New Jersey

October, 1994

Prepared For:

Becton Dickinson and Company

Prepared By:

ERM-NORTHEAST
175 Froehlich Farm Boulevard
Woodbury, New York 11797

18609405.214

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1.0 INTRODUCTION

1.1 BACKGROUND

Becton Dickinson and Company (BD) owns a former manufacturing facility in the Borough of East Rutherford, Bergen County, New Jersey. BD discontinued manufacturing operations at this facility in 1988 and vacated the site in December 1990. The location of the site is shown on the general vicinity map provided as Figure 1-1. Figure 1-2 provides a plan view of the site. In June 1987, BD prepared and submitted an initial Environmental Cleanup Responsibility Act (ECRA) notice to the New Jersey Department of Environmental Protection (NJDEP). The site was divided into six parcels (Parcel Nos. 1 through 6) each having separate tax lot and block numbers. Six separate ECRA submissions were made. Each submission was subsequently assigned an individual ECRA case number by the NJDEP. BD conducted a series of comprehensive environmental investigations and made various additional ECRA submissions.

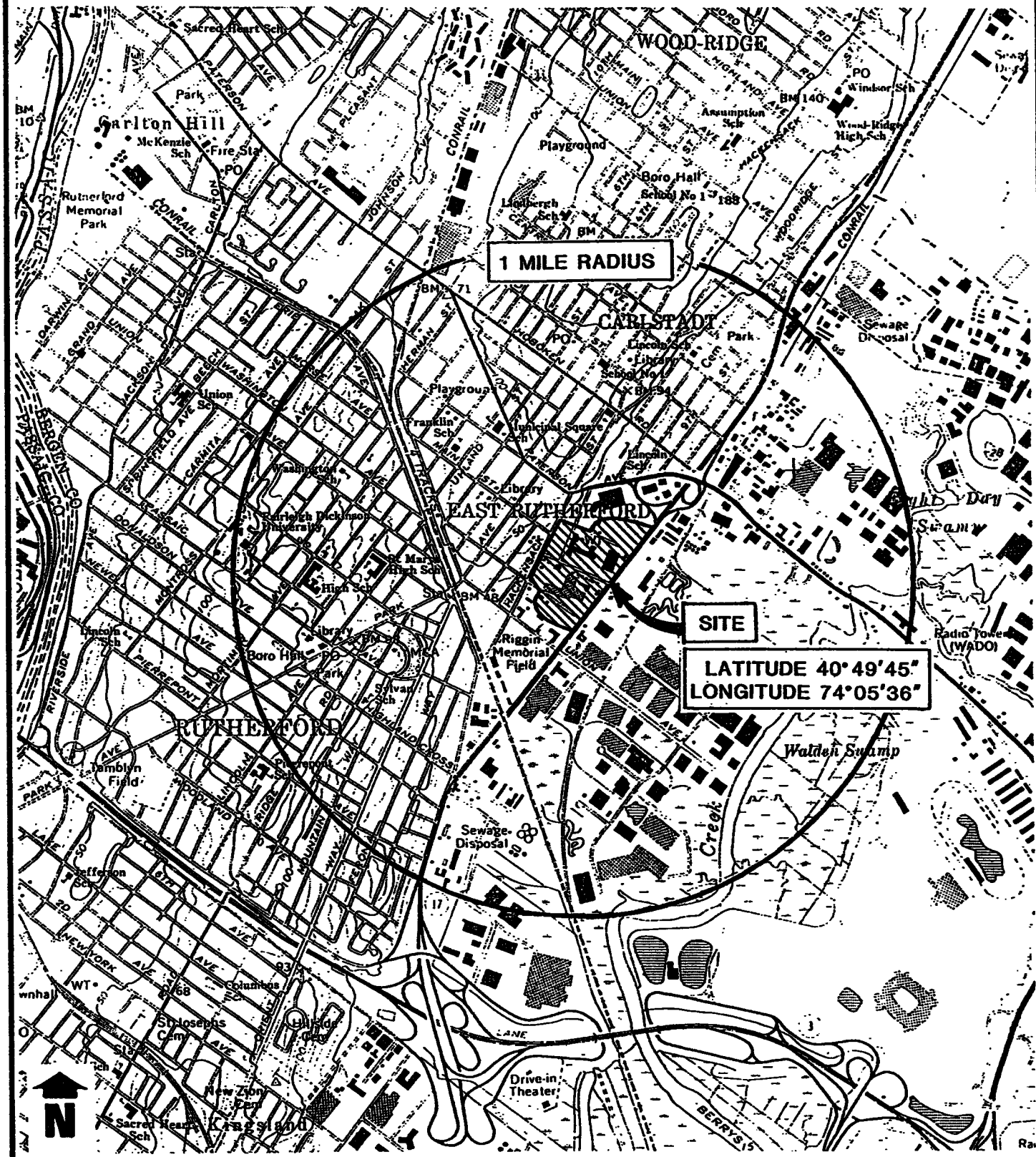
Environmental investigations of Parcel No. 1, 2 and 3 were conducted on an expedited schedule from October 1987 through December 1987. BD subsequently prepared and submitted Remedial Action Plans (RAP) for these three parcels in July 1988. The Remedial Action Plans were approved by the NJDEP in October 1988 and the soil cleanup in Parcel Nos. 1 and 2 was completed in November 1989. NJDEP issued Full Compliance Letters for the Parcel Nos. 1 and 2 ECRA Cases in May 1991 and for the Parcel No. 3 ECRA/ISRA Case in July 1993. Parcel Nos. 1 and 2 were sold in 1989, and Parcel No. 3 was sold in 1993.

Environmental investigations were conducted in Parcel Nos. 4, 5 and 6 from February to May 1988. The Remedial Action Plans for these Parcels were

FIGURE 1-1

General Vicinity Map – Becton, Dickinson & Co.

East Rutherford, New Jersey

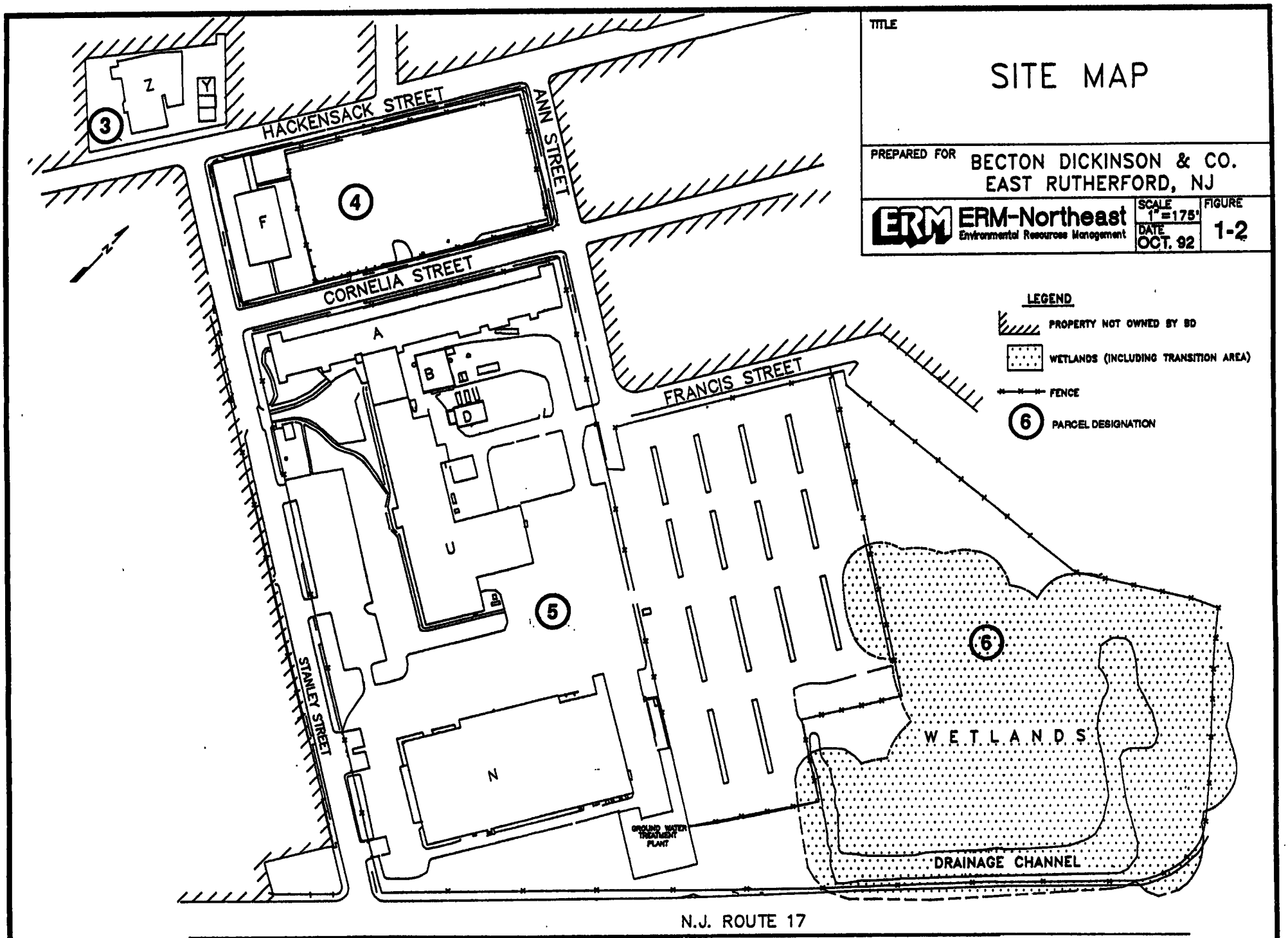


Source: Weehawken Quadrangle, N.J./N.,Y.

Scale: 1"=2000'

ERM-Northeast
Environmental Resources Management

146621


TITLE
SITE MAP
PREPARED FOR BECTON DICKINSON & CO.
EAST RUTHERFORD, NJ
ERM ERM-Northeast
Environmental Resources Management
SCALE 1" = 175'
DATE OCT. 92
FIGURE 1-2
LEGEND
PROPERTY NOT OWNED BY BD
WETLANDS (INCLUDING TRANSITION AREA)
FENCE
PARCEL DESIGNATION
HACKENSACK STREET
ANN STREET
CORNELIA STREET
FRANCIS STREET
STANLEY STREET
N.J. ROUTE 17
WETLANDS
DRAINAGE CHANNEL
GROUND WATER TREATMENT PLANT
A
B
D
F
N
U
Y
Z
3
4
5
6

A-SITE/R.H.

submitted to DEP in March 1989 and were approved in September 1989. At that time, the Site Redevelopment Plan under consideration included re-use of the existing buildings and, therefore, required the buildings to remain intact. As a result, previous site investigations and RAPs for Parcel Nos. 4 and 5 addressed soil only in areas outside the buildings. Remediation of soil in Parcel Nos. 4 and 5 was completed in December 1991 and soil remediation of Parcel No. 6 was completed in September 1992. The Soil Remediation Reports for Parcel Nos. 4 and 5 and Parcel No. 6 were submitted to NJDEP in June 1992 and December 1992, respectively. NJDEP issued an ISRA Full Compliance Letter for the Parcel No. 6 Case in September 1993. In February 1994, the Department issued an ISRA Full Compliance Letter for the Parcel No. 4 Case and for the Parcel No. 5 Soil Remediation.

Table 1-1 provides a summary listing of the project documents previously submitted to the NJDEP.

1.2 PURPOSE OF SITE INVESTIGATION

As discussed hereinbefore, previous ECRA soil investigations of Parcel No.5 were limited to outdoor areas because, according to the Site Redevelopment Plan at that time (which is summarized in the Soil and Ground Water Remedial Action Plan, Parcel No. 5, ERM, March 1989), the existing buildings were to remain unchanged. However, due to recent negotiations regarding the sale of the BD property, the redevelopment plan has changed. Currently, redevelopment of the BD site will require the demolition of all site buildings on Parcel Nos. 4 and 5, except for the ground water treatment plant. This necessitates an assessment of soils beneath buildings that will be demolished. The purpose of this Site Investigation is to assess the sub-building soils.

BD responses to EPA Request for Information

Nos. 14

A MEMBER OF THE ENVIRONMENTAL RESOURCES MANAGEMENT GROUP

ISRA SITE INVESTIGATION REPORT SUB-BUILDING SOILS INVESTIGATION PARCEL NO. 5 ISRA CASE NO. 87577

Becton Dickinson and Company
East Rutherford, Bergen County, New Jersey

October, 1994

Prepared For:

Becton Dickinson and Company

Prepared By:

ERM-NORTHEAST
175 Prochilo Farm Boulevard
Woodbury, New York 11797

ERM

TABLE 1-1
SUMMARY OF PROJECT DOCUMENTS
PREVIOUSLY SUBMITTED TO NJDEPE

Report Title	Report Summary	Submission Date
ECRA - Sampling and Analysis Plan, Volume I Parcel Nos. 1, 2, 3, 4, 5, and 6	Presents site information for the initial ECRA notice and the Sampling and Analysis Plan common to each of the 6 parcels	June 1987
ECRA - Sampling and Analysis Plan, Volume II Parcel Nos. 1, 2, 3, 4, 5, and 6	Presents parcel specific information for the Sampling and Analysis Plan including results of the Phase 1a Preliminary Environmental Investigation. Includes the GIS and SES ECRA forms for each parcel and supporting information.	June 1987
ECRA - Supplementary Information, Volume III Parcel Nos. 5 and 6	Presents the results of the Phase 1b and 1c Preliminary Environmental Investigations conducted in Parcel Nos. 5 and 6 and amends the June 1987 Sampling and Analysis Plans.	December 1987
ECRA - Environmental Assessment Program Parcels 1, 2, and 3	Presents results of the comprehensive environmental program conducted in Parcel Nos. 1, 2, and 3 along with the results of the Phase 1b and 1c preliminary environmental investigations.	Feb. 1988
Soil and Ground Water Remedial Action Plan(s) Parcel No. 3	Presents additional results of environmental investigations and procedures to remediate soil and ground water contamination in Parcel No. 3.	July 1988
ECRA Environmental Assessment Program Parcel Nos. 4, 5 and 6	Presents results of the comprehensive environmental program conducted in Parcel Nos. 4, 5 and 6	August 1988

TABLE 1-1 CONTINUED

Soil and Ground Water Remedial Action Plan(s) Parcel Nos. 4 and 5, and Parcel No. 6	Presents procedures to remediate soil and ground water contamination in Parcel Nos. 4 and 5, and Parcel No. 6, respectively.	March 1989
Verification Report for ECRA Site Remediation Parcel Nos. 1 and 2	Documents the implementation of the Soil Remedial Action in Parcel Nos. 1 and 2.	November 1989
Verification Report for ECRA Soil Remediation Parcel Nos. 4 and 5	Documents the implementation of the Soil Remedial Action in Parcel Nos. 4 and 5.	June 1992
Verification Report for ECRA Soil Remediation Parcel No. 6	Documents the implementation of the Soil Remedial Action in Parcel No. 6.	December 1992

1.3 *SITE DESCRIPTION*

The following is a summary of information provided in documents previously submitted to NJDEP for this ISRA Case. The BD site is situated on the western flank of a northeast-trending hillside bordering the Meadowlands. It slopes moderately to the southeast towards Route 17. The northwestern portion of the site (Parcel 4 and the northwestern portion of Parcel 5) slopes steeply near Building A and then flattens towards Route 17.

Parcel No. 5 coyers approximately 14 acres and is occupied by buildings over 25 percent of the parcel. The remaining area is asphalt with small portions (less than 10%) of grass. The northwestern portion of the parcel, bordering Cornelia Street, is a topographic high with elevations ranging between 20 and 25 feet msl. For about 100 feet southeastward towards Route 17, the land surface generally slopes to an elevation of about 10 feet msl. The topographic relief flattens over the remainder of the parcel down to a low of about 5 feet along Route 17.

1.4 *SITE GEOLOGY*

The BD site and the surrounding area is underlain by two general hydrogeologic units. These consist of the Brunswick Formation and the overlying Pleistocene glacial deposits consisting of layers of sands, silts, clays and gravels. A thin (4-7 foot) layer of fill materials overlies the unconsolidated sediments.

The site is situated in the Hackensack River basin in the Piedmont Province of the Appalachian Highlands. Bedrock is sedimentary, chiefly sandstone, mudstone and conglomerate members of the Triassic Brunswick Formation. The surface of the bedrock is irregular and dips steeply eastward. It has been modified by preglacial streams, interglacial melt water streams and glacial ice scouring action during the Pleistocene Epoch.

Bedrock

The bedrock beneath the site dips steeply to the southeast (towards Route 17). Depths range from 33 feet below grade at MW-33D (Parcel 4) to 102 feet deep at Route 17 (508D). Westward along Route 17, bedrock is approximately 120 feet deep.

The boring logs for those wells that extend to the bedrock surface indicate that a siltstone member of the Brunswick underlies the site. Ground water occurs in the Brunswick and is used for industrial supply within a five-mile radius of the site. However, since there are only three wells within one mile of the site, and they are each over 170 feet deep and not used for potable supply, the hydrogeologic properties of the bedrock are not detailed in this report.

Pleistocene Deposits

A southeastward thickening wedge of glacially derived sediments overlies the siltstone at the site. The materials within this wedge consist of layers of clays, silts, sands and gravels that can be divided into at least seven general hydrogeologic units. These units consist of the following zones:

- Unsaturated Zone
- Unconfined Aquifer
- Shallow Clay Unit
- Semi-Confined Aquifer
- Glaciolacustrine Clay
- Deeper Sand Unit
- Till

Unsaturated Zone

The uppermost layer of materials found underlying the site ranges in thickness from approximately 10 feet at the northern corner of Parcel 4 to near land

surface at Parcel 6. It consists of both man-made fill materials and variably sorted glacial meltwater sands and silts with occasional traces of clay.

The fill layer is a mixture of the aforementioned fine and coarse-grained sediments containing a broad spectrum of man-made objects. These objects include glass fragments from presumably off-specification thermometers and syringes, metal turnings, coal and ash, bricks, and wood fragments.

Permeabilities of these surficial materials were not measured for this study. However, due to the heterogeneous nature of these materials, it is assumed that the vertical and horizontal permeabilities will exhibit a large range of values.

Unconfined Aquifer

The upper aquifer unit consists primarily of moderate-to-well sorted, fine-to-medium glacial meltwater deposits. Some poorly sorted ice-contact deposits (till materials) ranging from clay-sized particles to boulders are also present. The variability of this zone is illustrated by a cursory review of the geologic logs for this unit (see ECRA Environmental Assessment, Parcel Nos. 4, 5 and 6, ERM, August 1988).

Shallow horizontal flow in this uppermost zone is in a generally south-southeasterly direction. Water levels were measured biweekly from April through May 1988 to confirm the initial observations of shallow flow. A general lowering of water levels (thinning of the saturated thickness) was observed in a two-month time period.

Local anomalies in the flow direction occur in the central and southern portions of Parcel 5. The causes are not known, but may be due to areally limited lenses with order of magnitude differences in K. These anomalies can

be either caused by man-made (nearby storm drains, fill materials) changes or by natural variations in grain-sized depositional environments.

Shallow flow velocity (v) beneath the site is controlled by both the variations in hydraulic conductivity (K) and hydraulic gradient (i). The gradient varies from 0.053 ft/ft near MW-33 to a relatively flat 0.009 ft/ft over the central and southern portions of the site.

The average velocity of ground water flow as calculated from a derivation of Darcy's Law and the velocity equation of hydraulics ($v = Ki/n$; where n = the effective porosity of the materials... assumed to be 0.25) ranged between 0.02 ft/day and 210 ft/day using estimated K values. This range of four orders of magnitude illustrates the highly variable nature of these materials.

Shallow Clay Unit

A shallow clay unit is present along the southeastern boundary of the site. This clay unit acts as an acquitted in the vicinity of Building N where it underlies the unconfined sand unit described above. The cross section shows that the clay attains a maximum thickness of 10 feet at the southern corner of Parcel 5 (MW-508) and generally thins towards the northeast through Parcel 6. Peat, between 1 and 3 feet thick, mantles the clay.

For discussions regarding the semi-confined and confined aquifers, refer to the ECRA Environmental Assessment Program, Parcel Nos. 4, 5 and 6 (ERM, August 1988).

2.0 *REMEDIAL ACTION CRITERIA*

2.1 *DEVELOPMENT OF SITE REMEDIAL ACTION CRITERIA*

The development of soil remedial action criteria for the BD East Rutherford site is documented in the Soil and Ground Water Remedial Action Plan for Parcel No. 5, (ERM March 1989). Remedial action criteria was developed for the site based upon the NJDEP ECRA Recommended Cleanup Levels (RCLs). The criteria considered the existing site conditions, the environmental setting, environmental and health based risk assessments, the toxicity and mobility of certain contaminants, surface water discharge limitations to Berry's Creek, and the permeability of soil cover anticipated after site development. Starting with NJDEP's RCLs, a series of alternative concentration limits (generally expressed as multiples of the RCLs) were considered. These criteria were then evaluated through a quantitative risk assessment to determine the health and environmental effects resulting from implementation of these alternate criteria. A final set of criteria were selected at a level that presented no adverse health or environmental affects.

The soil remedial action criteria for the BD site, and the methodology used to evaluate them, are presented in the Soil and Ground Water Remedial Action Plan for Becton Dickinson and Company, East Rutherford (ERM, July 1988).

Remedial action criteria were developed to identify soil requiring remediation in Parcel No. 5. Initially, criteria were developed for all contaminants identified in Parcel No. 5 soils in excess of the ECRA RCLs, except for volatile organic compounds (VOC) and non-PAH base/neutral organic compounds. During the initial ECRA site investigations, total volatile organic compounds were detected in soil above the RCL of 1 ppm at only one location (MW-508). The only VOC identified was acetone. The QA review of the duplicate sample indicated that the result was qualitatively suspect and may have been introduced after sampling. Due to the marginal exceedance of the

RCL as well as the suspect nature of the analysis, no criterion was established for acetone. In addition, because the water table is approximately two feet below surface in this area, cleanup of VOCs is being accomplished by the ground water recovery system.

At locations where the RCL for base/neutral extractable organic compounds was exceeded, polynuclear aromatic hydrocarbons (PAHs) were the chemicals reported. Therefore, a criterion was established for PAHs. The only non-PAH compounds detected in these samples were dibenzofuran and butylbenzyl phthalate. Due to the low concentrations reported (<5 ppm) and because these areas were remediated due to high levels of PAH or TPH, no criteria for these two compounds were developed.

The chemicals for which criteria were developed are listed in Table 2-1. The soil remedial action criteria are presented in Figure 2-1. These criteria, as discussed below, are dependent upon the location of the contaminated soil with respect to the ground surface and the water table. The criteria with respect to the ground surface are intended to protect site employees. The criteria with respect to the top of the water table are intended to protect ground water quality.

Specific criteria were developed for areas that are paved (i.e., impermeable surfaces) and those locations that will remain un-paved (i.e., permeable). In addition, special consideration was given to two contaminants of concern; mercury and PAHs.

Soil Remedial Action Criteria For Areas With Permeable Cover

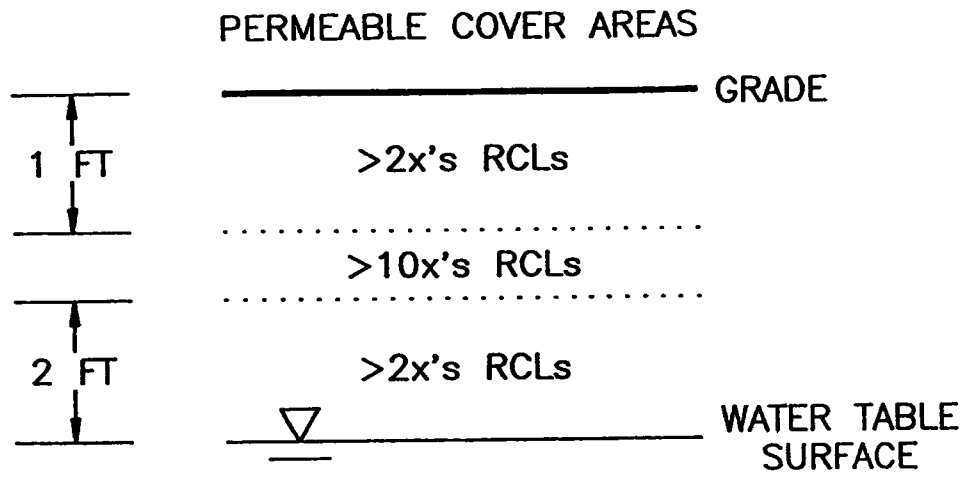
Soil that will be maintained beneath permeable soil cover, such as grass covered areas, had the following remedial action criteria applied:

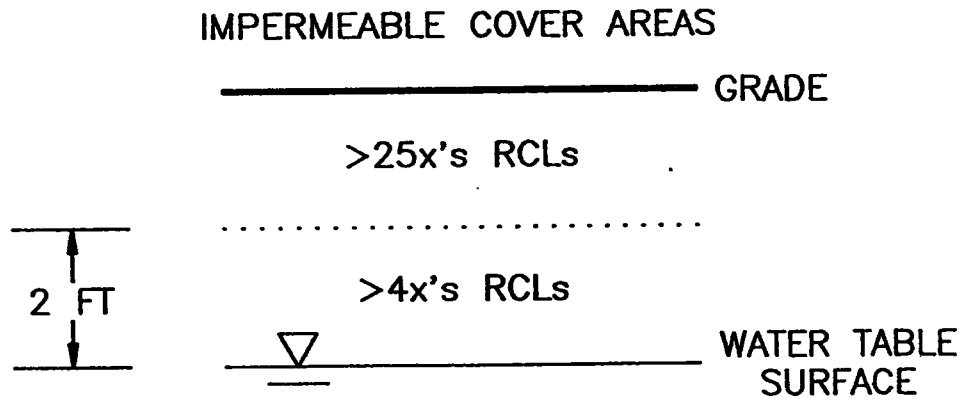
TABLE 2-1

CHEMICALS FOR WHICH SOIL REMEDIAL ACTION CRITERIA WERE DEVELOPED

Metals	RCL (ppm)
Cadmium	3
Chromium	100
Copper	170
Lead	250
Mercury	1
Nickel	100
Zinc	350
Organic Compounds	
Polynuclear Aromatic Hydrocarbons (PAHs)	5
Total Petroleum Hydrocarbons (TPH)	100

FIGURE 2-1
SOIL REMEDIAL ACTION CRITERIA
BECTON DICKINSON AND COMPANY
EAST RUTHERFORD, BERGEN COUNTY





CONTAMINANT-SPECIFIC CRITERIA

MERCURY	14	ppm *
POLYNUCLEAR AROMATIC HYDROCARBONS (PAH)	20	ppm
PETROLEUM HYDROCARBONS (PHC)	10,000	ppm *
PHC-CONTAMINATED AREAS:		
TOTAL BASE/NEUTRAL EXTRACTABLE ORGANIC COMPOUNDS	100	ppm *
TOTAL CARCINOGENIC PAH	10	ppm *
TOTAL VOLATILE ORGANIC COMPOUNDS (VOC)	10	ppm *

* = REVISED JULY, 1991

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Environmental Resources Management

REMEDACT/EM

- Soil within one (1) foot of the ground surface required remediation if the contaminant concentrations were greater than two (2) times the ECRA RCLs.

- Soil located in the zone between one (1) foot below grade and two (2) feet above the water table required remediation if the contaminant concentrations were greater than ten (10) times the ECRA RCLs.

- Soil within two (2) feet of the water table required remediation if contaminant concentrations were greater than two (2) times the ECRA RCLS.

- Soils having contaminant concentrations less than these criteria required no action.

Soil Remedial Action Criteria For Areas With Impermeable Cover

(Note: This criteria was not used for the investigation of sub-building soils. See Section 2.4).

Soil that will be maintained beneath impermeable soil cover, such as buildings and paved areas, had the following remedial action criteria applied:

- Soil located in the zone between the surface and two (2) feet above the water table required remediation if the contaminant concentrations were greater than twenty-five (25) times the ECRA RCLs.

- Soil that was within two (2) feet of the ground water table required remediation if the contaminant concentrations were greater than four (4) times the ECRA RCLs.

- Soils having contaminant concentrations less than these criteria required no action.

Soil Contaminated with Mercury

Initially, all soil having a mercury concentration greater than two (2) ppm required remediation. However, as discussed later, this requirement was revised to 14 ppm.

Soil Contaminated with Priority Pollutant Polynuclear Aromatic Hydrocarbons

All soil having priority pollutant polynuclear aromatic hydrocarbons (PAHs) at concentrations greater than 20 ppm required remedial action.

Soil Contaminated with Petroleum Hydrocarbons

The Remedial Action Plan specified that the cleanup criteria for petroleum hydrocarbons (PHC) would be a multiple of the RCL (100 ppm), as described above. However, as discussed in Section 2.3, the criteria for PHC-contaminated areas was revised. PHC-areas with concentrations of PHC, total Base/Neutral Extractable Organic Compounds, total Carcinogenic PAHs, or total VOCs exceeding the criteria listed in Figure 2-1, required remedial action.

2.2 *SUMMARY OF RISK ASSESSMENT*

The remedial criteria developed for the BD site were subjected to a quantitative risk assessment to ensure that no adverse impacts to human health or the environment would result from implementation of a cleanup plan on that basis. The results of the risk assessment are documented in reports previously submitted to NJDEP: Soil and Ground Water Remedial Action Plan (ERM, July 1988) and, Risk Assessment of Worker Exposure During Site Preparation (ERM, May 1989).

The risk assessment was performed in accordance with the USEPA Superfund Public Health Evaluation Manual (USEPA, 1986) and the Draft NJDEP Risk Assessment Guidelines (1986). The steps followed in performing the risk assessment were:

- preparation of toxicity and environmental profiles;
- identification of potential exposure routes and receptors;
- estimation of exposure point concentrations of the chemicals of concern;
- comparison of exposure point concentrations to relevant and applicable standards; and
- risk characterization.

In order to evaluate risk, the routes through which receptors could potentially be exposed to contamination from the site following remediation were identified. Potential receptors included the general public (nearest residences, industrial and commercial establishments, etc.) and landscaper and other employees at the site.

The risk assessment determined that potential exposure to humans and the environment following remediation could occur through only three routes. First, contamination in ground water underlying the site could migrate off-site to Berry's Creek. Second, contamination in site soils could leach to ground water and migrate off-site to Berry's Creek. Third, site employees could potentially be exposed to soil contaminants through direct contact with soil at the site.

On the basis of the risk assessment, no unacceptable risks to human health or the environment are expected following remediation of the site using the remedial action criteria. Post-remedial concentrations of site soil and ground water contaminants at Berry's creek, using very conservative models, were

predicted to be at or below the National Primary Drinking Water Standards or other health-based drinking water standards. The projected concentrations also meet the NJDEP Surface Water Quality Standards for SE2 waters, and FW2 waters for chemicals for which no SE2 standard exists. Projected exposures to site workers due to contact with site soils, again using conservative assumptions, also essentially meet or are below the relevant acceptable intakes.

2.3 *REVISIONS TO REMEDIAL ACTION PLAN*

The approved Remedial Action Plan (RAP) specified that verification end-point soil samples would be taken at each Remedial Action (RA) location after the soil was excavated. However, in letters to DEP dated 8 February and 7 March 1991, ERM proposed to conduct the end-point sampling before the soil was excavated. This was intended to expedite the remedial project by obtaining disposal acceptance before work began and by avoiding delays of the excavation work caused by waiting for analytical results. During a meeting on 7 May 1991, DEP gave authorization to BD to use delineation sampling results in place of post-excavation verification data.

In a letter dated 25 March 1991, DEP identified changes in the site cleanup criteria and directed BD to re-evaluate the RAP accordingly. Tessie Fields of DEP/DHWM/BEECRA identified additional criteria for VOCs and petroleum hydrocarbons (PHC) during phone conversations on 27 March and 19 April 1991 with the ERM engineer.

The revised cleanup criteria was discussed during the 7 May 1991 meeting and subsequent telephone conversations. As a result, in a letter dated 30 July 1991, DEP authorized implementation of the original cleanup criteria from the RAP and approved 14 ppm as the remedial criteria for mercury. Figure 2-1 includes the revised cleanup criteria.

2.4 *APPLICATION OF THE SOIL REMEDIAL ACTION CRITERIA*

As of this writing, the site redevelopment plans for Parcel No. 5 have not been finalized, and future building locations and areas to be paved have not been identified. Therefore, for the purpose of this Site Investigation of soils beneath buildings, only the most conservative remedial action criteria (i.e.: criteria for areas with permeable cover) was used to evaluate the sampling results. However, it is expected that after redevelopment, the site will be virtually covered with buildings and asphalt pavement.

3.0 *SUMMARY OF SITE INVESTIGATION*

3.1 *OVERVIEW OF SUB-BUILDING SITE INVESTIGATION*

ERM-Northeast (ERM) developed the sampling plan for the Site Investigation. The sub-building soil investigation was conducted in April 1994. The soil borings were performed by Aquifer Drilling and Testing of Long Island City, New York under the supervision of ERM-Northeast. The soil samples were analyzed by Gulf States Analytical, Inc. of Houston, Texas (NJDEP Certification No. 82749). All Site Investigation activities and procedures were documented by an ERM field geologist.

3.2 *DEVELOPMENT OF SITE INVESTIGATION*

The sampling plan was based on the Sampling and Analysis Plans (ERM, June 1987) for the initial ECRA Site Investigations. In order to establish the potential areas of environmental concern to be investigated, historical site information was evaluated to identify locations and types of manufacturing activities, indoor areas of chemical and waste storage, and locations of on-site waste disposal prior to the construction of site buildings. This involved the review of site plans, BD files and previous ECRA documents, and interviewing BD facility personnel. The indoor Site Investigation also focused on four nearby outdoor areas of contamination previously remediated in December, 1991. For these areas, which were adjacent to buildings, the objective of the investigation was to determine if residual contamination extended under the buildings. Discussions of these former areas of contamination (i.e.; Remedial Action Locations) are presented in the Verification Report for ECRA Soil Remediation, Parcel Nos. 4 and 5 (ERM June, 1992). Approximately 13 potential areas of concern, throughout seven buildings, were identified for investigation. Historical site information relative to each area of concern is discussed in Section 3.4.

Building F on Parcel No. 4 previously contained administrative and engineering offices. The Employee Facilities Wing (Building EFW) on Parcel No. 5 previously included employee locker rooms, restrooms, offices, a library, and a cafeteria. Neither of these buildings were used for manufacturing operations or chemical storage. Therefore, the investigation of soils beneath Buildings F and EFW was considered unnecessary.

The selection of the chemical constituents of concern (i.e. sample analytes) was based on the type(s) of activity formerly conducted within the area of concern, as well as the results of previous sampling investigations of other similar areas throughout the facility. For example, the seven metals selected for sample analysis were the only metal contaminants found elsewhere on site, and were associated with former production areas involving metal plating processes or mercury thermometer manufacturing.

Sample locations were biased toward areas of suspected contamination, such as floor drains and sumps. Sampling depths were selected based on the typical mobility of the chemical of concern, and the type of sub-building material encountered (e.g. soil, clean fill, waste material, etc.). A total of 51 soil boring locations were identified for investigation. Figure 3-1 shows the areas of concern and sample locations.

3.3 SAMPLING PROCEDURES

All sampling and analysis was conducted in accordance with NJDEP Tier II protocol and the requirements of the DEP-approved ECRA Sampling and Analysis Plan (ERM, June 1987), Environmental Assessment Report (ERM, August 1988), and the Remedial Action Plan (RAP). Quality assurance procedures were followed during all activities of the sampling investigation. Duplicate and Field Blank samples were prepared each day sampling was performed. In addition, matrix spike and matrix spike duplicate samples were

prepared and analyzed by the laboratory. All sampling and drilling activities were documented by an ERM field geologist.

Soil borings were advanced through the concrete slab at 51 locations within Parcel No. 5 buildings. At each location, a four-inch hole was cut through the concrete floor with an electric powered coring drill. Soil samples were collected with stainless steel split-spoon samplers. The concrete core and sub-base materials (usually gravel) were removed and a decontaminated split-spoon sampler was then driven, by hand-held sledge hammer, to the appropriate depth. The split soon sampler was then removed and opened. The soil sample was taken from a discrete 6-inch interval within the sampler with a decontaminated spoon and placed in a laboratory-prepared sample jar.

Each soil sample was visually examined by the ERM field geologist and a description (eg: color, geologic characteristics, moisture content, etc.) was documented in the field log, along with the sample location and depth. The information on the sample jar label and recorded in the field log included the sample date, time, identification number, engineering company name (ERM-Northeast), project number, field geologist's name and analytical parameters. This information was also recorded on the chain-of-custody form that accompanied the sample from the time the sample was obtained until it was received by the laboratory.

Field blanks were prepared at a rate of 10% of the total number of samples collected and were analyzed for the same parameters as those analyzed for the soil samples collected that day. Each field blank was prepared by collecting laboratory-prepared blank water poured over decontaminated field sampling equipment. Duplicate samples were collected at a rate of 5% of the total number of samples and were analyzed for the same parameters of the original samples.

All soil samples, duplicate sample and field blank samples were placed in a "cooler" with ice and taken to the on-site ERM field office where they were then placed in a refrigerator. At the end of each day, the samples were shipped via overnight courier service, in sealed coolers, to the laboratory. Any samples that were not immediately shipped to the lab (i.e. held awaiting analytical results of previous samples) were stored in the refrigerator in the on-site ERM office. Custody of the stored samples was ensured because only ERM-personnel have access to the site field office.

Each piece of sampling equipment was decontaminated prior to each use. The specific decontamination procedures performed depended on the chemical parameters that the sample was to be analyzed for. The decontamination procedures used during the delineation sampling investigation are as follows:

1. *Soap Wash and Water Rinse*

   Sampling equipment was washed with tap water and laboratory detergent, and scrubbed with a brush to remove all visible residues of soil. The equipment was then rinsed with tap water, followed by a distilled water rinse.

2. *Solvent Rinse*

   Reagent grade acetone was used to clean sampling devices used for taking samples analyzed for organic compounds. Equipment used for samples analyzed for metals were rinsed with a solution of nitric acid.

3. *Final Rinse*

   All sampling equipment was then rinsed with bottled distilled water as a final decontamination step.

3.4 SITE INVESTIGATION RESULTS

A summary of the Site Investigation sample data is provided in Table 3-1. The sampling investigation of each area of concern, and the corresponding sampling results, are discussed below. As indicated in Section 2.0, the Site Investigation results were compared to the remedial action criteria for areas with permeable cover, which are the most conservative criteria for the site. The areas of concern and borehole locations are shown on Figure 3-1. A summary of analytical methods and quality assurance indicators is provided in Table 3-2.

Building A

Former Plating Area (A-FPA)

The area that was formerly used for plating operations in Building A was located in the southern portion of the building. Process waste water was discharged via floor sumps through the first floor of the building to an outdoor neutralizing pit at the south end.

A total of eight borings were located inside this section of the building during the Site Investigation. These borings were somewhat evenly distributed throughout the area. One of the borings (A-FPA-3) was located to correspond to an outdoor area of mercury contamination (Remedial Action Location 501-09) previously remediated. Five of the borings were used to investigate shallow depths for metals, total petroleum hydrocarbons (TPH), base neutral (BN) and volatile organic compounds (VOCs). Three of the borings were advanced to the water table to determine if soil immediately above the water table was a continuing source of VOCs to ground water.

The compounds and analytes analyzed and the concentrations detected are summarized in Table 3-1. TPH concentrations in two of the deeper borings, A-FPA-7 and A-FPA-8, at the depths of 78-84" and 60-66", were detected,

Table 3-1
SOIL QUALITY DATA - BUILDING A
PARCEL NO. 5 SUB-BUILDING INVESTIGATION
BECTON DICKINSON AND COMPANY
EAST RUTHERFORD, BERGEN COUNTY
ISRA CASE NO. 87577

Sample Number	A-FPA-1	A-FPA-1	A-FPA-2	A-FPA-2	A-FPA-3	A-FPA-4	A-FPA-5
Date Collected	4/4/94	4/4/94	4/5/94	4/5/94	4/5/94	4/5/94	4/5/94
Depth Collected	0-6"	18-24"	0-6"	18-24"	0-6"	0-6"	0-6"
Volatile Organic Compounds (in ppb)*							
Trichloroethene	NA	1.4 U	NA	1.4 U	NA	NA	NA
Xylenes	NA	0.28 U	NA	0.27 U	NA	NA	NA
Chloroform	NA	0.23 U	NA	0.22 U	NA	NA	NA
Methylene Chloride	NA	0.49 U	NA	0.47 U	NA	NA	NA
Toluene	NA	0.35 U	NA	0.34 U	NA	NA	NA
1,1Dichloroethane	NA	1.3 U	NA	1.3 U	NA	NA	NA
Total Petroleum Hydrocarbons (TPH, in ppm)	1.06 U	NA	1.06 U	NA	1.15 U	1.12 U	1.15 U
Metals (in ppm)							
Cadmium	0.22 U	NA	0.22 U	NA	0.75	0.23 U	0.24 U
Chromium	6.0 J	NA	6.5 J	NA	11.9 J	19.2 J	8.7 J
Copper	11	NA	7.2	NA	50.3	73.6	9.4
Lead	3.1 R	NA	3.0 J	NA	94.4 J	34.0 J	19.2 J
Nickel	7.2	NA	9.9	NA	36.8	1020	488
Zinc	25.2	NA	18.9	NA	114	72.6	31.2
Mercury	0.07 BJ	NA	0.05 UJ	NA	14.1 J	0.51 J	0.06 UJ

Notes:

NA: Not Analyzed

U: Indicates analyte was analyzed for, but not detected. Detection limit is given.

J: QC qualifier, indicates estimated value.

* Only those compounds that have been detected are listed.

Shaded values indicate an exceedance of soil remedial action criteria.

Table 3-1 (continued)
SOIL QUALITY DATA - BUILDING A
PARCEL NO. 5 SUB-BUILDING INVESTIGATION
BECTON DICKINSON AND COMPANY
EAST RUTHERFORD, BERGEN COUNTY
ISRA CASE NO. 87577

Sample Number	A-FPA-6	A-FPA-6	A-FPA-7	A-FPA-7	A-FPA-8	A-FPA-8
Date Collected	4/11/94	4/11/94	4/12/94	4/12/94	4/13/94	4/13/94
Depth Collected	36-42"	102-108"	78-84"	120-126"	60-66"	120-126"
Volatile Organic Compounds (in ppb)*						
Trichloroethene	NA	3.0	NA	1.5 U	NA	1.6 U
Xylenes	NA	3.1	NA	0.30 U	NA	0.31 U
Chloroform	NA	1.5	NA	0.25 U	NA	0.25 U
Methylene Chloride	NA	0.54 U	NA	0.52 U	NA	0.53 U
Toluene	NA	2.0	NA	0.38 U	NA	0.39 U
1,1Dichloroethane	NA	0.37 U	NA	0.88 U	NA	0.90 U
Total Petroleum Hydrocarbons (TPH, in ppm)	46.2	NA	24.1	NA	41.5	NA
Metals (in ppm)						
Cadmium	0.24 UJ	NA	0.22 UJ	NA	0.22 UJ	NA
Chromium	197 J	NA	17.0 J	NA	7.4 J	NA
Copper	150 J	NA	6.7 J	NA	6.1 J	NA
Lead	61.6 J	NA	1.6 UJ	NA	2.2 R	NA
Nickel	29.4 J	NA	57.7 J	NA	7.3 J	NA
Zinc	51.9 J	NA	15.7 J	NA	17.4 J	NA
Mercury	0.20 J	NA	0.05 UJ	NA	0.05 UJ	NA

Notes:

NA: Not Analyzed

U: Indicates analyte was analyzed for, but not detected. Detection limit is given.

J: QC qualifier, indicates estimated value.

* Only those compounds that have been detected are listed.

Shaded values indicate an exceedance of soil remedial action criteria.

Table 3-1 (continued)
SOIL QUALITY DATA - BUILDING A
PARCEL NO. 5 SUB-BUILDING INVESTIGATION
BECTON DICKINSON AND COMPANY
EAST RUTHERFORD, BERGEN COUNTY
ISRA CASE NO. 87577

Sample Number	A-MMD-1	A-MMD-2	A-MMD-3	A-MMD-4	A-MMD-4	A-MMD-5	A-MMD-5
Date Collected	4/5/94	4/5/94	4/5/94	4/4/94	4/4/94	4/4/94	4/4/94
Depth Collected	0-6"	0-6"	0-6"	0-6"	18-24"	0-6"	18-24"
Volatile Organic Compounds (in ppb)*							
Trichloroethene	NA	NA	NA	NA	1.4 U	NA	1.5 U
Xylenes	NA	NA	NA	NA	0.27 U	NA	0.30 U
Chloroform	NA	NA	NA	NA	0.22 U	NA	0.24 U
Methylene Chloride	NA	NA	NA	NA	0.47 U	NA	0.52 U
Toluene	NA	NA	NA	NA	0.34 U	NA	0.37 U
1,1Dichloroethane	NA	NA	NA	NA	1.3 U	NA	1.3 U
Total Petroleum Hydrocarbons (TPH, in ppm)	1.14 U	1.13 U	1.14 U	1.11 U	NA	1.12 U	NA
Semi-Volatile Organic Compounds (in ppb)*							
Acenaphthene	NA	NA	NA	61 U	NA	NA	NA
Anthracene	NA	NA	NA	48 U	NA	NA	NA
Benzo (a) anthracene	NA	NA	NA	55 U	NA	NA	NA
Benzo (a) pyrene	NA	NA	NA	70 U	NA	NA	NA
Benzo (b) fluoranthene	NA	NA	NA	52 U	NA	NA	NA
Benzo (g,h,i) perylene	NA	NA	NA	69 U	NA	NA	NA
Benzo (k) fluoranthene	NA	NA	NA	60 U	NA	NA	NA
Chrysene	NA	NA	NA	53 U	NA	NA	NA
Dibenzo (a,h) anthracene	NA	NA	NA	73 U	NA	NA	NA
Fluoranthene	NA	NA	NA	67 U	NA	NA	NA
Fluorene	NA	NA	NA	34 U	NA	NA	NA
Indeno (1,2,3-cd) pyrene	NA	NA	NA	73 U	NA	NA	NA
Phenanthrene	NA	NA	NA	43 U	NA	NA	NA
Pyrene	NA	NA	NA	59 U	NA	NA	NA
Metals (in ppm)							
Cadmium	0.24 U	0.31 B	0.24 U	0.23 U	NA	0.23 U	NA
Chromium	9.2 J	14.8 J	10.3 J	10.1 J	NA	9.5 J	NA
Copper	29.9	185	119	8	NA	13.6	NA
Lead	5.2 J	8.9 R	6.8 R	4.6 R	NA	6.7 R	NA
Nickel	11.7	39.1	18.9	10.5	NA	9.9	NA
Zinc	29.1	80.4	50.6	30.4	NA	30.6	NA
Mercury	0.06 UJ	0.28 J	0.06 UJ	0.06 UJ	NA	0.06 UJ	NA

* Only those compounds that have been detected are listed.

Notes: NA: Not Analyzed

U: Indicates analyte was analyzed for, but not detected. Detection limit is given.

J: QC qualifier, indicates estimated value.

Shaded values indicate an exceedance of soil remedial action criteria.

Table 3-1 (continued)
SOIL QUALITY DATA - BUILDING A
PARCEL NO. 5 SUB-BUILDING INVESTIGATION
BECTON DICKINSON AND COMPANY
EAST RUTHERFORD, BERGEN COUNTY
ISRA CASE NO. 87577

Sample Number	A-MERC-1	A-MERC-2	A-MERC-3	A-MERC-4	A-MERC-5
Date Collected	4/4/94	4/4/94	4/4/94	4/4/94	4/4/94
Depth Collected	0-6"	0-6"	0-6"	0-6"	0-6"
Metals (in ppm)	***Permeable Soil Criteria in Parentheses***				
Cadmium	NA	NA	NA	NA	NA
Chromium	NA	NA	NA	NA	NA
Copper	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA
Nickel	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA
Mercury	0.06 U J	0.06 U J	0.05 U J	0.05 U J	0.07 U J

Notes:

NA: Not Analyzed

U: Indicates analyte was analyzed for, but not detected.
Detection limit is given.

J: QC qualifier, indicates estimated value.

* Only those compounds that have been detected are listed.

Shaded values indicate an exceedance of soil remedial action criteria.

Table 3-1 (Continued)
SOIL QUALITY DATA - BUILDING U
PARCEL NO. 5 SUB BUILDING INVESTIGATION
BECTON DICKINSON AND COMPANY
EAST RUTHERFORD, BERGEN COUNTY
ISRA CASE NO. 87577

Sample Number	UW-1	UW-1	UW-1	UW-2	UW-2	U-MMD-1	U-MMD-1	U-MMD-2	U-MMD-2	U-MMD-3	U-MMD-3	U-MMD-4	U-MMD-4	U-MMD-5	U-MMD-5
Date Collected	4/6/94	4/6/94	4/6/94	4/13/94	4/13/94	4/5/94	4/5/94	4/5/94	4/5/94	4/5/94	4/5/94	4/6/94	4/6/94	4/6/94	4/6/94
Depth Collected	0-6"	18-24"	42-48"	0-6"	18-24"	0-6"	18-24"	0-6"	18-24"	0-6"	18-24"	0-6"	18-24"	0-6"	18-24"
Volatile Organic Compounds (in ppb)*															
Benzene	NA	0.34 U	0.34 U	NA	0.34 U	NA	0.36 U	NA	5.9 U	NA	0.36 U	NA	5.6 U	NA	1.5
Ethyl Benzene	NA	0.18 U	0.18 U	NA	0.18 U	NA	0.19 U	NA	5.9 U	NA	0.19 U	NA	5.6 U	NA	2.6
Trichloroethene	NA	1.5 U	1.5 U	NA	1.5 U	NA	8.1	NA	44	NA	1.5 U	NA	9.5	NA	15
Xylenes	NA	0.29 U	0.29 U	NA	0.29 U	NA	2.8	NA	0.32 U	NA	0.30 U	NA	0.3	NA	11
Chloroform	NA	0.23 U	0.23 U	NA	0.23 U	NA	0.24 U	NA	4.2 U	NA	0.24 U	NA	2.1	NA	4.3
Methylene Chloride	NA	0.50 U	0.50 U	NA	0.50 U	NA	0.52 U	NA	8.1	NA	0.52 U	NA	3.0	NA	4.9
Toluene	NA	0.36 U	0.36 U	NA	0.36 U	NA	1.7	NA	1.7	NA	0.38 U	NA	5.6 U	NA	3.9
Total Petroleum Hydrocarbons (TPH, in ppm)	1.06 U	NA	NA	33.2	NA	1.09 U	NA	1.03 U	NA	1.13 U	NA	1.12 U	NA	214	NA
Semi-Volatile Organic Compounds (in ppb)*															
Acenaphthene	NA	NA	NA	NA	NA	NA	NA	57 U	NA	NA	NA	NA	NA	49 J	NA
Anthracene	NA	NA	NA	NA	NA	NA	NA	44 U	NA	NA	NA	NA	NA	89	NA
Benzo (a) anthracene	NA	NA	NA	NA	NA	NA	NA	130	NA	NA	NA	NA	NA	190	NA
Benzo (a) pyrene	NA	NA	NA	NA	NA	NA	NA	110	NA	NA	NA	NA	NA	170	NA
Benzo (b) fluoranthene	NA	NA	NA	NA	NA	NA	NA	110	NA	NA	NA	NA	NA	190	NA
Benzo (g,h,i) perylene	NA	NA	NA	NA	NA	NA	NA	90	NA	NA	NA	NA	NA	69	NA
Benzo (k) fluoranthene	NA	NA	NA	NA	NA	NA	NA	130	NA	NA	NA	NA	NA	170	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA	150	NA	NA	NA	NA	NA	230	NA
Dibenzo (a,h) anthracene	NA	NA	NA	NA	NA	NA	NA	68 U	NA	NA	NA	NA	NA	73 U	NA
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	270	NA	NA	NA	NA	NA	410	NA
Fluorene	NA	NA	NA	NA	NA	NA	NA	32 U	NA	NA	NA	NA	NA	42	NA
Indeno (1,2,3-cd) pyrene	NA	NA	NA	NA	NA	NA	NA	95	NA	NA	NA	NA	NA	95	NA
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	150	NA	NA	NA	NA	NA	420	NA
Pyrene	NA	NA	NA	NA	NA	NA	NA	260	NA	NA	NA	NA	NA	310	NA
Metals (in ppm)															
Cadmium	0.22 U	NA	NA	0.22 UJ	NA	0.30 B	NA	0.35 B	NA	0.24 U	NA	0.24 U	NA	0.27 B	NA
Chromium	8.2	NA	NA	7.7 J	NA	6.6 J	NA	22.1 J	NA	12.2 J	NA	12.1 J	NA	40.3 J	NA
Copper	13.8	NA	NA	10.5 J	NA	36.2	NA	64.6	NA	25	NA	29.2	NA	34.9 J	NA
Lead	8.7	NA	NA	7.3 R	NA	33.4 J	NA	268	NA	763 J	NA	503 J	NA	39.5 J	NA
Nickel	10.3	NA	NA	10.4 J	NA	7	NA	21.1	NA	11.5	NA	10	NA	15.0 J	NA
Zinc	39.4	NA	NA	29.8 J	NA	35.6	NA	87.7	NA	91.5	NA	90.3	NA	47.4 R	NA
Mercury	0.05 U	NA	NA	0.05 UJ	NA	2.2	NA	40.2	NA	0.84 J	NA	3.5 J	NA	2.7 J	NA

Notes:
NA: Not Analyzed
U: Indicates analyte was analyzed for, but not detected. Detection limit is given.
J: QC qualifier, indicates estimated value.

* Only those compounds that have been detected are listed.

Shaded values indicate an exceedance in the soil remedial action criteria.

Table 3-1 (Continued)
SOIL QUALITY DATA - BUILDING U
PARCEL NO. 5 SUB BUILDING INVESTIGATION
BECTON DICKINSON AND COMPANY
EAST RUTHERFORD, BERGEN COUNTY
ISRA CASE NO. 87577

Sample Number	UMP-1	UMP-2	UMP-3	UMP-4	U-BFD-1
Date Collected	4/6/94	4/6/94	4/6/94	4/6/94	4/8/94
Depth Collected	0-6"	0-6"	0-6"	0-6"	0-6"
Total Petroleum Hydrocarbons (TPH, in ppm)	4.83	15.4	1.11 U	1.11 U	1.24 U
Metals (in ppm)					
Cadmium	0.92	0.27 B	0.46 B	0.23 U	0.26 UJ
Chromium	25.7 J	8.7 J	15.6 J	14.3 J	7.9 J
Copper	376 J	134 J	34.3 J	12.3	17.8 J
Lead	669 J	816 J	4120 J	105 J	7.5 R
Nickel	97.7 J	21.5 J	10.5 J	10.1	7.8 J
Zinc	852 J	168 J	171 J	64.4	23.8 J
Mercury	22.0 J	14.5 J	1.4 J	2.0 J	0.06 UJ

Notes:

Shaded values indicate soil criteria exceedences

U: Indicates analyte was analyzed for ,but not detected. Detection limit is given.

J: QC qualifier, indicates estimated value.

* Only those compounds that have been detected are listed.

Shaded values indicate an exceedance in the soil remedial action criteria.

Table 3-1 (Continued)
SOIL QUALITY DATA - BUILDING B
PARCEL NO. 5 SUB - BUILDING INVESTIGATION
BECTON DICKINSON AND COMPANY
EAST RUTHERFORD, BERGEN COUNTY
ISRA CASE NO. 87577

Sample Number	B-1	B-1	B-2	B-3	B-4	B-4
Date Collected	4/13/94	4/14/94	4/8/94	4/8/94	4/13/94	4/13/94
Depth Collected	24-30"	42-48"	0-6"	0-6"	84-90"	90-96"
Volatile Organic Compounds (in ppb)*						
Trichloroethene	NA	1.6 U	NA	NA	NA	1.5 U
Xylenes	NA	0.32 U	NA	NA	NA	0.30 U
Chloroform	NA	0.26 U	NA	NA	NA	0.24 U
Methylene Chloride	NA	0.56 U	NA	NA	NA	0.52 U
Toluene	NA	0.40 U	NA	NA	NA	0.38 U
1,1Dichloroethane	NA	0.93 U	NA	NA	NA	0.87 U
Total Petroleum Hydrocarbons (TPH, in ppm)	36.7	NA	12.3	6.73	57.6	NA

Notes:
NA: Not Analyzed
U: Indicates analyte was analyzed for, but not detected. Detection limit is given.
J: QC qualifier, indicates estimated value.

* Only those compounds that have been detected are listed.

Shaded values indicate an exceedance of the soil remedial action criteria.

Table 3-1 (continued)
SOIL QUALITY DATA - BUILDING D
PARCEL NO. 5 SUB-BUILDING INVESTIGATION
BECTON DICKINSON AND COMPANY
EAST RUTHERFORD, BERGEN COUNTY
ISRA CASE NO. 87577

Sample Number	D-1	D-1	D-2	D-2
Date Collected	4/8/94	4/8/94	4/8/94	4/9/94
Depth Collected	0-6"	18-24"	48-54"	60-66"
Volatile Organic Compounds (in ppb)*				
Benzene	NA	2.3	NA	0.38 U
Ethyl Benzene	NA	1.4	NA	0.20 U
Trichloroethene	NA	67	NA	13
Xylenes	NA	3.9	NA	3
Chloroform	NA	9.1 J	NA	0.26 U
Methylene Chloride	NA	6.8 J	NA	0.55 U
Toluene	NA	4	NA	2.1
Total Petroleum Hydrocarbons (TPH, in ppm)	1.10 U	NA	6.74	NA

Notes:

NA: Not Analyzed

U: Indicates analyte was analyzed for, but not detected. Detection limit is given.

J: QC qualifier, indicates estimated value.

* Only those compounds that have been detected are listed.

Shaded values indicate an exceedance of the soil remedial action criteria.

Table 3-1 (Continued)
SOIL QUALITY DATA - BUILDING N
PARCEL NO. 5 SUB-BUILDING INVESTIGATION
BECTON DICKINSON AND COMPANY
EAST RUTHERFORD, BERGEN COUNTY
ISRA CASE NO. 87577

Sample Number	N-1	N-1	N-2	N-2	N-3	N-3	N-4	N-4	N-5	N-5	N-6	N-6	N-7	N-7
Date Collected	4/6/94	4/6/94	4/7/94	4/7/94	4/7/94	4/7/94	4/7/94	4/7/94	4/7/94	4/7/94	4/7/94	4/7/94	4/7/94	4/7/94
Depth Collected	0-6"	18-24"	0-6"	18-24"	0-6"	18-24"	0-6"	18-24"	0-6"	18-24"	0-6"	18-24"	0-6"	18-24"
Volatile Organic Compounds (in ppb)*														
Trichloroethene	NA	1.5 U	NA	0.5 U	NA	0.5 U	NA	0.5 U	NA	1.5 U	NA	1.5 U	NA	5.2
Xylenes	NA	7	NA	0.29 U	NA	0.29 U	NA	0.29 U	NA	1.4	NA	3.4	NA	0.29 U
Chloroform	NA	0.23 U	NA	0.23 U	NA	0.23 U	NA	0.51 U	NA	0.23 U	NA	2.4	NA	0.24 U
Methylene Chloride	NA	0.50 U	NA	0.50 U	NA	0.50 U	NA	0.50 U	NA	0.50 U	NA	1.9	NA	0.51 U
Toluene	NA	0.36 U	NA	0.36 U	NA	0.36 U	NA	0.37 U	NA	0.36 U	NA	1.5	NA	0.37 U
Total Petroleum Hydrocarbons (TPH, in ppm)	1.08 U	NA	1.09 U	NA	7.23	NA	1.06 U	NA	1.08 U	NA	1.10 U	NA	1.07 U	NA
Metals (in ppm)														
Cadmium	0.23 U	NA	0.23 U	NA	0.23 U	NA	0.22 U	NA	0.23 U	NA	0.23 U	NA	0.22 U	NA
Chromium	1.3 J	NA	1.2 J	NA	1.3 J	NA	4.6 J	NA	4.4 J	NA	5.7 J	NA	2.9 J	NA
Copper	3.3 J	NA	1.2 BJ	NA	5.7 J	NA	4.5 J	NA	4.2 J	NA	5.3 J	NA	4.7 J	NA
Lead	1.7 UJ	NA	1.7 UJ	NA	2.6 J	NA	1.9 J	NA	3.4 J	NA	4.3 J	NA	1.7 J	NA
Nickel	1.8 BJ	NA	1.2 BJ	NA	3.8 BJ	NA	3.6 BJ	NA	3.3 BJ	NA	5.7 J	NA	3.6 BJ	NA
Zinc	4.9 R	NA	2.6 R	NA	15.5 R	NA	10.9 R	NA	9.4 R	NA	13.9 R	NA	9.3 R	NA
Mercury	0.21 J	NA	0.05 UJ	NA	0.06 UJ	NA	0.05 UJ	NA	0.05 UJ	NA	0.06 UJ	NA	0.05 UJ	NA

Notes:
NA: Not Analyzed
U: Indicates analyte was analyzed for, but not detected. Detection limit is given.
J: QC qualifier, indicates estimated value.

* Only those compounds that have been detected are listed.

Shaded values indicate an exceedance of soil remedial action criteria.

Table 3-1 (Continued)
SOIL QUALITY DATA - BUILDING N
PARCEL NO. 5 SUB-BUILDING INVESTIGATION
BECTON DICKINSON AND COMPANY
EAST RUTHERFORD, BERGEN COUNTY
ISRA CASE NO. 87577

Sample Number	N-8	N-8	N-9	N-9	N-10	N-10	N-10	N-11	N-11
Date Collected	4/7/94	4/7/94	4/6/94	4/6/94	4/6/94	4/6/94	4/11/94	4/7/94	4/7/94
Depth Collected	0-6"	18-24"	0-6"	18-24"	0-6"	18-24"	90-96"	0-6"	18-24"
Volatile Organic Compounds (in ppb)*									
Trichloroethene	NA	190	NA	1.5 U	NA	1.5 U	NA	NA	1.5 U
Xylenes	NA	0.29 U	NA	0.29 U	NA	0.29 U	NA	NA	1.2
Chloroform	NA	0.24 U	NA	0.24 U	NA	0.24 U	NA	NA	0.23 U
Methylene Chloride	NA	0.51 U	NA	0.50 U	NA	0.51 U	NA	NA	0.50 U
Toluene	NA	0.37 U	NA	0.36 U	NA	0.37 U	NA	NA	0.36 U
Total Petroleum Hydrocarbons (TPH, in ppm)	1.10 U	NA	1.07 U	NA	1.09 U	NA	NA	1.10 U	NA
Metals (in ppm)									
Cadmium	0.23 U	NA	0.23 U	NA	0.39 B	NA	NA	0.23 U	NA
Chromium	5.6 J	NA	2.0 J	NA	3.9 J	NA	NA	4.4 J	NA
Copper	6.6 J	NA	3.8 J	NA	70.4 J	NA	NA	5.1 J	NA
Lead	4.3 J	NA	1.7 UJ	NA	34.1 J	NA	NA	1.7 UJ	NA
Nickel	4.9 J	NA	2.8 BJ	NA	55.5 J	NA	NA	5.3 J	NA
Zinc	13.2 R	NA	7.8 R	NA	70.2 R	NA	NA	10.9 R	NA
Mercury	0.06 UJ	NA	0.05 UJ	NA	0.84 J	NA	29.5 J	0.06 UJ	NA

Notes:

NA: Not Analyzed

U: Indicates analyte was analyzed for, but not detected. Detection limit is given.

J: QC qualifier, indicates estimated value.

* Only those compounds that have been detected are listed.

Shaded values indicate an exceedance of soil remedial action criteria.

Table 3-1 (Continued)
SOIL QUALITY DATA - BUILDING T
PARCEL NO. 5 SUB BUILDING INVESTIGATION
BECTON DICKINSON AND COMPANY
EAST RUTHERFORD, BERGEN COUNTY
ISRA CASE NO. 87577

Sample Number	T-1	T-1	T-2	T-2	T-3	T-3	T-4	T-4
Date Collected	4/7/94	4/7/94	4/7/94	4/7/94	4/7/94	4/7/94	4/7/94	4/7/94
Depth Collected	0-6"	18-24"	24-30"	42-48"	0-6"	18-24"	24-30"	42-48"
Volatile Organic Compounds (in ppb)								
Trichloroethene	NA	1.5 U	NA	1.5	NA	5.1	NA	2.8
Xylenes	NA	1.7	NA	.031 U	NA	0.30 U	NA	0.30 U
Chloroform	NA	4.1	NA	3.1	NA	1.7	NA	3
Methylene Chloride	NA	4.9	NA	3.6	NA	2.2	NA	4.5
Toluene	NA	1.6	NA	0.38 U	NA	1.6	NA	0.38 U
Total Petroleum Hydrocarbons (TPH, in ppm)	67.8 J	NA	2500	NA	3890	NA	1290	NA
Semi-Volatile Organic Compounds (in ppb)								
Anthracene	40 J	NA	NA	NA	NA	NA	NA	NA
Benzo (a) anthracene	180	NA	NA	NA	NA	NA	NA	NA
Benzo (b) fluoranthene	160	NA	NA	NA	NA	NA	NA	NA
Benzo (k) fluoranthene	140	NA	NA	NA	NA	NA	NA	NA
Benzo (g,h,i) perylene	97	NA	NA	NA	NA	NA	NA	NA
Benzo (a) pyrene	180	NA	NA	NA	NA	NA	NA	NA
Chrysene	220	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	370	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	210	NA	NA	NA	NA	NA	NA	NA
Pyrene	350	NA	NA	NA	NA	NA	NA	NA
Indeno (1,2,3-cd) pyrene	130	NA	NA	NA	NA	NA	NA	NA
Metals (in ppm)								
Cadmium	0.87	NA	2.3	NA	0.48 B	NA	0.76	NA
Chromium	9.5 J	NA	11.0 J	NA	13.0 J	NA	9.9 J	NA
Copper	62.0 J	NA	85.9 J	NA	34.6 J	NA	39.2 J	NA
Lead	76.8 J	NA	116 J	NA	30.7 J	NA	58.2 J	NA
Nickel	12.9 J	NA	12.1 J	NA	12.9 J	NA	37.8 J	NA
Zinc	98.0 R	NA	204 J	NA	52.0 J	NA	296 J	NA
Mercury	0.37 J	NA	0.48 J	NA	0.33 J	NA	0.42 J	NA

Notes:

NA: Not Analyzed

U: Indicates analyte was analyzed for, but not detected. Detection limit is given.

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* Only those compounds that have been detected are listed.

Shaded values indicate an exceedance of soil remedial action criteria.

Table 3-2
Analytical Methods and Quality Assurance Indicators
Sub-Building Site Investigation
Becton Dickinson and Company
ISRA Case No. 87577

Matrix	Analytical Parameters	Number of Samples	Duplicates	Field Blanks	Trip Blanks	MS/MSD
Soil	VOC	35	2	5	5	3
Soil	SVOC/PAH	4	1	2	-	2
Soil	Metals	46	2	6	-	-
Soil	TPH	46	2	6	-	-
	Total	87	5	6	5	5

Parameter	Number of Samples	Sample Matrix	Analytical Method Reference	Sample Preservation	Required Holding Time	Container
VOC	35+5 Duplicates	Soil	SW-846	Cool, 4 C	14 days *	120 ml glass bottle with polypropylene cap, teflon liner
SVOC/PAH	4+3 Duplicates	Soil	SW-846	Cool, 4 C	14 days until extraction, then 40 days until analysis *	1000 ml amber glass bottle with teflon-lined cap
Metals	46+2 Duplicates	Soil	SW-846	Cool, 4 C	128 days *	4, 8, 16 or 32 oz. glass bottle, phenolic cap, polyethylene liner
TPH	46+2 Duplicates	Soil	SW-846	Cool, 4 C	28 days *	4 oz. glass bottle
QA/QC Samples						
VOC	10	Water	SW-846	Cool 4 C Hydrochloric Acid	14 days *	40 ml glass bottle, phenolic plastic screw cap, teflon-lined septum
SVOC/PAH	2	Water	SW-846	Cool 4 C	14 days until extraction, then 40 days until analysis *	1000 ml amber glass bottle with teflon-lined cap
Metals	6	Water	SW-846	Cool 4 C, Nitric Acid	128 days, except Hg - 28 days *	1000 ml plastic bottle, plastic cap, plastic liner
TPH	6	Water	SW-846	Cool 4 C	28 days *	1 liter glass bottle

* All required holding times were met for all samples analyzed.

Building U

Former Metal Machining and Degreasing (U-MMD)

Metal machining and degreasing was formerly conducted in the western portion of Building U. Samples from five borings, distributed throughout this portion of Building U, were collected and analyzed for VOCs, BN and TPH. Methylene chloride was detected in samples U-MMD-1, U-MMD-2 and U-MMD-4. These detections were below the cleanup criteria for total VOCs. Two metals, lead and mercury, exceeded the in this portion of Building U. Lead exceeded the remedial action criteria in the 0-6" interval from U-MMD-3 and U-MMD-4. Mercury exceeded the remedial action criteria in the 0-6" interval from U-MMD-2. All other "BD" metals were either below the detection limit or below the remedial action criteria.

Basement Drain (U-BFD-1)

In the basement of the Building U north stairwell is a condensate return pump for the building heating system. A condensate drain pipe from the pump discharges to a nearby floor drain. A sample was obtained near this drain at six inches below the floor. TPH and metals concentrations at this location were all below the remedial action criteria.

Building UW

This building was an "addition" to Building U that was used for computer operations. Soil boring UW-1 was located to correspond to an area of mercury and copper contamination (Remedial Action Location 506-09) previously excavated, as well as a nearby area of VOC ground water contamination. Soil boring UW-2 was installed to investigate fill material known to underlie Building UW. The analytical data for the UW samples

indicate no detectable levels of VOCs, and metals concentrations well below the remedial action criteria.

Building D

This building was formerly used to store solvents and oil. Sumps and floor drains are present throughout this building. Two borings were located near floor drains within the building. One of the borings (D-2) also corresponds to an outdoor area of TPH contamination (Remedial Action Location 503-03) previously remediated. All VOC and TPH concentrations were below the remedial action criteria.

Building N

Three areas of concern were identified within Building N. The former activities in this building included metal machining and degreasing, which was conducted within the central area, glass manufacturing, and wastewater neutralization. Floor drains were present throughout the building. Samples from eleven borings were obtained. Several borings were located to investigate the floor drains, and borehole N-10 was located to investigate the southern end of an outdoor area of mercury contamination (Remedial Action Location 508F-03) that was previously remediated. All concentrations of VOCs, TPH, and metals were below the cleanup criteria.

Building B

The boiler building housed the oil fired boilers for heating the facility. Floor drains and sumps were located throughout the building. Four borings were located to investigate the drains and sumps. All TPH concentrations were below the remedial criteria and there were no detectable levels of VOCs in any Building B samples.

Building T

The northern wing of this building was used to store containerized process wastes. Three sealed sumps were present within this building to collect runoff. Three of the four Building N borings were located adjacent to these sumps to investigate the possible impact on underlying soil. The fourth borehole was used to evaluate soil under the northern end of the building. As shown in Table 3-1, all parameters were found at concentrations below soil remedial action criteria.

The southern portion of Building T houses the on-site ground water treatment system. This portion of the building will remain intact after site redevelopment and for the duration of the ground water remediation project. Prior to construction of the ground water treatment system in 1990, this portion of Building T was a company vehicle garage. For these reasons, investigation of soils beneath the southern section of Building T was deemed unnecessary.

Building EFW

As previously discussed, this building was not used for manufacturing, production or chemical storage; therefore, a sub-slab investigation of this building was not warranted. The location of this building is shown on Figure 3-1.

4.0 *FINDINGS AND RECOMMENDATIONS*

According to the results of the Site Investigation of soil beneath the Parcel No. 5 buildings, nine areas of concern have metals concentrations exceeding the remedial action criteria established by the Site Remedial Action Plan. All other constituent concentrations were found to be below the criteria. Table 4-1 summaries these findings.

In accordance with the Parcel No. 5 Remedial Action Plan (ERM, March 1989), contaminated soil at each of the nine Remedial Action (RA) locations will be excavated and removed for off-site disposal. Currently, BD is conducting a Remedial Investigation (RI) of the nine RA locations in order to delineate the horizontal and vertical extent of contamination at each location. The RI is being conducted in accordance with NJDEP Tier II protocol, the DEP-approved ECRA Sampling and Analysis Plan (ERM, June 1987), and the Parcel No. 5 Remedial Action Plan. The delineation sampling procedures used for the RI are the same as those used previously at this site, and are presented in the Verification Report for ECRA Soil Remediation, Parcel Nos. 4 and 5 (ERM, June 1992).

Upon completion of the RI, BD will submit to NJDEP a Remedial Investigation Report and Remedial Action Plan Addendum. The document will include the RI results and analytical data, a work plan for remediation of the nine RA locations, and a schedule for implementation of the remedial action.

DTS

BD responses to EPA Request for Information

Nos. 14

A MEMBER OF THE ENVIRONMENTAL RESOURCES MANAGEMENT GROUP

ISRA REMEDIAL INVESTIGATION REPORT AND REMEDIAL ACTION PLAN ADDENDUM SUB-BUILDING SOILS PARCEL NO. 5 ISRA CASE NO. 87577

Becton Dickinson and Company
East Rutherford, Bergen County, New Jersey

March 1995

Prepared For:

Becton Dickinson and Company

Prepared By:

ERM-NORTHEAST
175 Froehlich Farm Boulevard
Woodbury, New York 11797

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Craig A. Werle, Principal

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ISRA REMEDIAL INVESTIGATION REPORT AND REMEDIAL ACTION PLAN ADDENDUM SUB-BUILDING SOILS PARCEL NO. 5 ISRA CASE NO. 87577

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175 Froehlich Farm Boulevard
Woodbury, New York 11797

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1.0 INTRODUCTION

1.1 BACKGROUND

Becton Dickinson and Company (BD) owns a former manufacturing facility in the Borough of East Rutherford, Bergen County, New Jersey. BD discontinued manufacturing operations at this facility in 1988 and vacated the site in December 1992. The location of the site is shown on the general vicinity map provided as Figure 1-1. Figure 1-2 provides a plan view of the site. In June 1987, BD prepared and submitted an initial Environmental Cleanup Responsibility Act (ECRA) notice to the New Jersey Department of Environmental Protection (NJDEP). The site was divided into six parcels (Parcel Nos. 1 through 6) each having separate tax lot and block numbers. Six separate ECRA submissions were made. Each submission was subsequently assigned an individual ECRA case number by the NJDEP. BD conducted a series of comprehensive environmental investigations and made various additional ECRA submissions.

Environmental investigations of Parcel No. 1, 2 and 3 were conducted on an expedited schedule from October 1987 through December 1987. BD subsequently prepared and submitted Remedial Action Plans (RAP) for these three parcels in July 1988. The Remedial Action Plans were approved by the NJDEP in October 1988 and the soil cleanup in Parcel Nos. 1 and 2 was completed in November 1989. NJDEP issued Full Compliance Letters for the Parcel Nos. 1 and 2 ECRA Cases in May 1991 and for the Parcel No. 3 ECRA/ISRA Case in July 1993. Parcel Nos. 1 and 2 were sold in 1989, and Parcel No. 3 was sold in 1993.

Environmental investigations were conducted in Parcel Nos. 4, 5 and 6 from February to May 1988. The Remedial Action Plans for these Parcels were

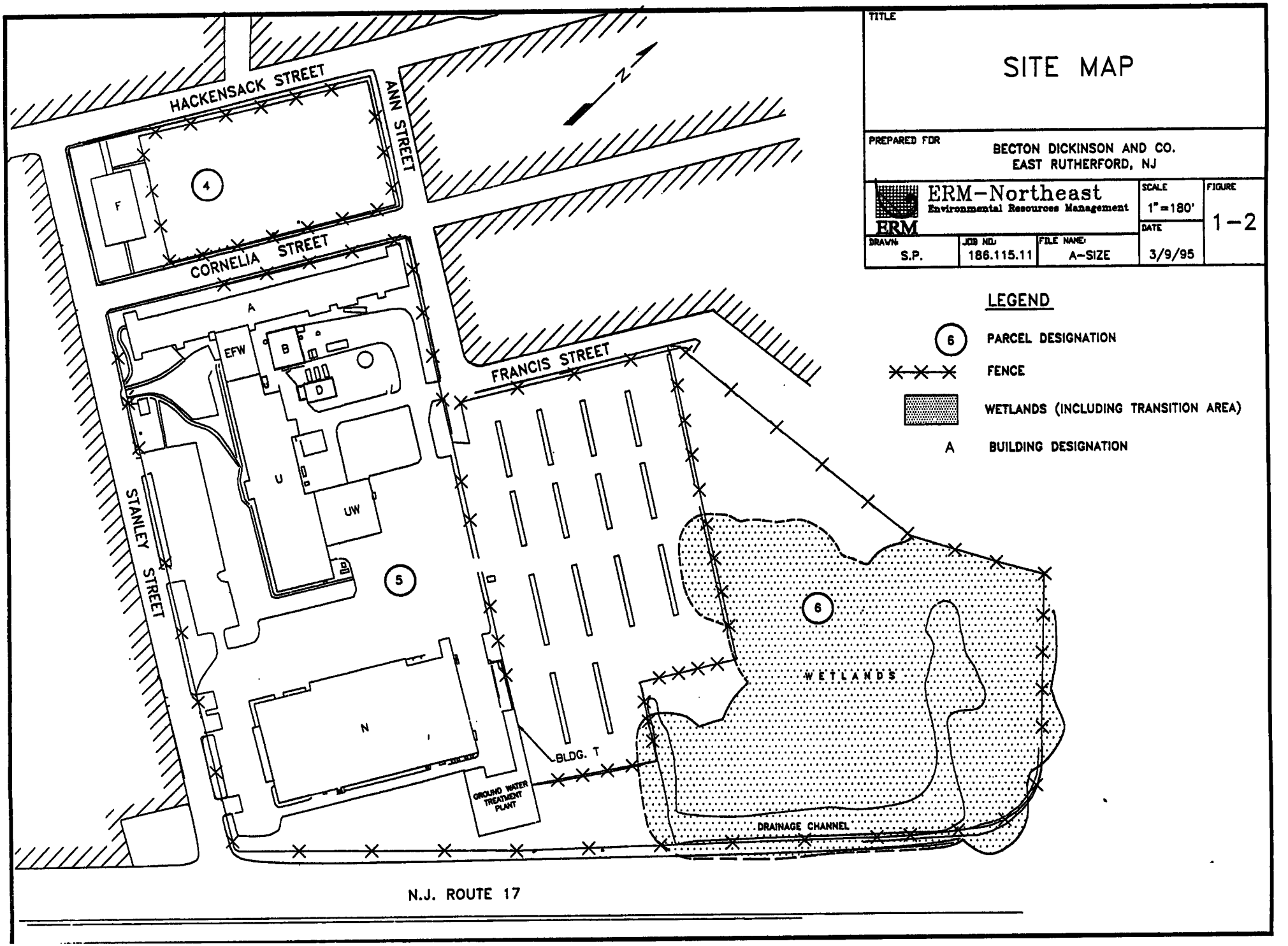
FIGURE 1-1
General Vicinity Map - Becton Dickinson and Co.
East Rutherford, New Jersey

Source: Weehawken Quadrangle, N.J./N.Y.

Scale: 1"=2000'

ERM-Northeast
Environmental Resources Management

146621


HACKENSACK STREET
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FRANCIS STREET
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WETLANDS
BLDG. T
GROUND WATER TREATMENT PLANT
DRAINAGE CHANNEL
N.J. ROUTE 17
N
TITLE
SITE MAP
PREPARED FOR
BECTON DICKINSON AND CO.
EAST RUTHERFORD, NJ
ERM-Northeast
Environmental Resources Management
SCALE
1"=180'
FIGURE
1-2
DATE
3/9/95
DRAWN
S.P.
JOB NO.
186.115.11
FILE NAME
A-SIZE
LEGEND
6 PARCEL DESIGNATION
FENCE
WETLANDS (INCLUDING TRANSITION AREA)
A BUILDING DESIGNATION

submitted to DEP in March 1989 and were approved in September 1989. At that time, the Site Redevelopment Plan under consideration included re-use of the existing buildings and, therefore, required the buildings to remain intact. As a result, previous site investigations and RAPs for Parcel Nos. 4 and 5 addressed soil only in areas outside the buildings. Remediation of soil in Parcel Nos. 4 and 5 was completed in December 1991 and soil remediation of Parcel No. 6 was completed in September 1992. The Soil Remediation Reports for Parcel Nos. 4 and 5 and Parcel No. 6 were submitted to NJDEP in June 1992 and December 1992, respectively. NJDEP issued an ISRA Full Compliance Letter for the Parcel No. 6 Case in September 1993. In February 1994, the Department issued an ISRA Full Compliance Letter for the Parcel No. 4 Case and for the Parcel No. 5 Soil Remediation.

As discussed hereinbefore, previous ECRA soil investigations of Parcel No.5 were limited to outdoor areas because, according to the Site Redevelopment Plan at that time (which is summarized in the Soil and Ground Water Remedial Action Plan, Parcel No. 5, ERM, March 1989), the existing buildings were to remain unchanged. However, due to recent negotiations regarding the sale of the BD property, the redevelopment plan has changed. Currently, redevelopment of the BD site will require the demolition of all site buildings on Parcel Nos. 4 and 5, except for the ground water treatment plant. This necessitated an assessment of soils beneath buildings that will be demolished.

The Site Investigation (SI) of sub-building soil was conducted in April, 1994. The SI identified sub-building locations where RAP soil criteria is exceeded and therefore, require remedial action (RA). The results of the Soil Investigation are documented in the ISRA Site Investigation Report, Sub-Building Soils Investigation, Parcel No. 5 (ERM, October 1994), and are discussed in Section 3.0 of this report.

Table 1-1 provides a summary listing of the project documents previously submitted to the NJDEP.

1.2 *PURPOSE OF REMEDIAL INVESTIGATION*

A Remedial Investigation (RI) was conducted on the RA locations identified by the SI in order to delineate the horizontal and vertical extent of contamination. This report presents the findings of the Remedial Investigation.

1.3 *SITE DESCRIPTION*

The following is a summary of information provided in documents previously submitted to NJDEP for this ISRA Case. The BD site is situated on the western flank of a northeast-trending hillside bordering the Meadowlands. It slopes moderately to the southeast towards Route 17. The northwestern portion of the site (Parcel 4 and the northwestern portion of Parcel 5) slopes steeply near Building A and then flattens towards Route 17.

Parcel No. 5 covers approximately 14 acres and is occupied by buildings over 25 percent of the parcel. The remaining area is asphalt with small portions (less than 10%) of grass. The northwestern portion of the parcel, bordering Cornelia Street, is a topographic high with elevations ranging between 20 and 25 feet msl. For about 100 feet southeastward towards Route 17, the land surface generally slopes to an elevation of about 10 feet msl. The topographic relief flattens over the remainder of the parcel down to a low of about 5 feet along Route 17.

1.4 *SITE GEOLOGY*

The BD site and the surrounding area is underlain by two general hydrogeologic units. These consist of the Brunswick Formation and the overlying Pleistocene glacial deposits consisting of layers of sands, silts, clays

TABLE 1-1

SUMMARY OF PROJECT DOCUMENTS PREVIOUSLY SUBMITTED TO NJDEPE

Report Title	Report Summary	Submission Date
ECRA - Sampling and Analysis Plan, Volume I Parcel Nos. 1, 2, 3, 4, 5, and 6	Presents site information for the initial ECRA notice and the Sampling and Analysis Plan common to each of the 6 parcels	June 1987
ECRA - Sampling and Analysis Plan, Volume II Parcel Nos. 1, 2, 3, 4, 5, and 6	Presents parcel specific information for the Sampling and Analysis Plan including results of the Phase 1a Preliminary Environmental Investigation. Includes the GIS and SES ECRA forms for each parcel and supporting information.	June 1987
ECRA - Supplementary Information, Volume III Parcel Nos. 5 and 6	Presents the results of the Phase 1b and 1c Preliminary Environmental Investigations conducted in Parcel Nos. 5 and 6 and amends the June 1987 Sampling and Analysis Plans.	December 1987
ECRA - Environmental Assessment Program Parcels 1, 2, and 3	Presents results of the comprehensive environmental program conducted in Parcel Nos. 1, 2, and 3 along with the results of the Phase 1b and 1c preliminary environmental investigations.	February 1988
Soil and Ground Water Remedial Action Plan(s) Parcel No. 3	Presents additional results of environmental investigations and procedures to remediate soil and ground water contamination in Parcel No. 3.	July 1988
ECRA Environmental Assessment Program Parcel Nos. 4, 5 and 6	Presents results of the comprehensive environmental program conducted in Parcel Nos. 4, 5 and 6	August 1988

TABLE 1-1 (continued)

Soil and Ground Water Remedial Action Plan(s) Parcel Nos. 4 and 5, and Parcel No. 6	Presents procedures to remediate soil and ground water contamination in Parcel Nos. 4 and 5, and Parcel No. 6, respectively.	March 1989
Verification Report for ECRA Site Remediation Parcel Nos. 1 and 2	Documents the implementation of the Soil Remedial Action in Parcel Nos. 1 and 2.	November 1989
Verification Report for ECRA Soil Remediation Parcel Nos. 4 and 5	Documents the implementation of the Soil Remedial Action in Parcel Nos. 4 and 5.	June 1992
Verification Report for ECRA Soil Remediation Parcel No. 6	Documents the implementation of the Soil Remedial Action in Parcel No. 6.	December 1992
ISRA Site Investigation Report, Sub-Building Soil Investigation, Parcel No. 5	Presents the results of the investigation of sub-building soil in Parcel No. 5	October 1994

and gravels. A thin (4-7 foot) layer of fill materials overlies the unconsolidated sediments.

The site is situated in the Hackensack River basin in the Piedmont Province of the Appalachian Highlands. Bedrock is sedimentary, chiefly sandstone, mudstone and conglomerate members of the Triassic Brunswick Formation. The surface of the bedrock is irregular and dips steeply eastward. It has been modified by preglacial streams, interglacial melt water streams and glacial ice scouring action during the Pleistocene Epoch.

Bedrock

The bedrock beneath the site dips steeply to the southeast (towards Route 17). Depths range from 33 feet below grade at MW-33D (Parcel 4) to 102 feet deep at Route 17 (508D). Westward along Route 17, bedrock is approximately 120 feet deep.

The boring logs for those wells that extend to the bedrock surface indicate that a siltstone member of the Brunswick underlies the site. Ground water occurs in the Brunswick and is used for industrial supply within a five-mile radius of the site. However, since there are only three wells within one mile of the site, and they are each over 170 feet deep and not used for potable supply, the hydrogeologic properties of the bedrock are not detailed in this report.

Pleistocene Deposits

A southeastward thickening wedge of glacially derived sediments overlies the siltstone at the site. The materials within this wedge consist of layers of clays, silts, sands and gravels that can be divided into at least seven general hydrogeologic units. These units consist of the following zones:

- Unsaturated Zone

- Unconfined Aquifer
- Shallow Clay Unit
- Semi-Confined Aquifer
- Glaciolacustrine Clay
- Deeper Sand Unit
- Till

Unsaturated Zone

The uppermost layer of materials found underlying the site ranges in thickness from approximately 10 feet at the northern corner of Parcel 4 to near land surface at Parcel 6. It consists of both man-made fill materials and variably sorted glacial meltwater sands and silts with occasional traces of clay.

The fill layer is a mixture of the aforementioned fine and coarse-grained sediments containing a broad spectrum of man-made objects. These objects include glass fragments from presumably off-specification thermometers and syringes, metal turnings, coal and ash, bricks, and wood fragments.

Permeabilities of these surficial materials were not measured for this study. However, due to the heterogeneous nature of these materials, it is assumed that the vertical and horizontal permeabilities will exhibit a large range of values.

Unconfined Aquifer

The upper aquifer unit consists primarily of moderate-to-well sorted, fine-to-medium glacial meltwater deposits. Some poorly sorted ice-contact deposits (till materials) ranging from clay-sized particles to boulders are also present. The variability of this zone is illustrated by a cursory review of the geologic logs for this unit (see ECRA Environmental Assessment, Parcel Nos. 4, 5 and 6, ERM, August 1988).

Shallow horizontal flow in this uppermost zone is in a generally south-southeasterly direction. Water levels were measured biweekly from April through May 1988 to confirm the initial observations of shallow flow. A general lowering of water levels (thinning of the saturated thickness) was observed in a two-month time period.

Local anomalies in the flow direction occur in the central and southern portions of Parcel 5. The causes are not known, but may be due to areally limited lenses with order of magnitude differences in K. These anomalies can be either caused by man-made (nearby storm drains, fill materials) changes or by natural variations in grain-sized depositional environments.

Shallow flow velocity (v) beneath the site is controlled by both the variations in hydraulic conductivity (K) and hydraulic gradient (i). The gradient varies from 0.053 ft/ft near MW-33 to a relatively flat 0.009 ft/ft over the central and southern portions of the site.

The average velocity of ground water flow as calculated from a derivation of Darcy's Law and the velocity equation of hydraulics ($v = Ki/n$; where n = the effective porosity of the materials... assumed to be 0.25) ranged between 0.02 ft/day and 210 ft/day using estimated K values. This range of four orders of magnitude illustrates the highly variable nature of these materials.

Shallow Clay Unit

A shallow clay unit is present along the southeastern boundary of the site. This clay unit acts as an acquitted in the vicinity of Building N where it underlies the unconfined sand unit described above. The cross section shows that the clay attains a maximum thickness of 10 feet at the southern corner of Parcel 5 (MW-508) and generally thins towards the northeast through Parcel 6. Peat, between 1 and 3 feet thick, mantles the clay.

For discussions regarding the semi-confined and confined aquifers, refer to the ECRA Environmental Assessment Program, Parcel Nos. 4, 5 and 6 (ERM, August 1988).

1.5 *GROUND WATER REMEDIAL ACTION*

BD is implementing the NJDEP approved Remedial Action Plan (RAP) to remediate contaminated ground water in Parcel Nos. 2, 5 and 6. In accordance with the RAP, ground water is collected and treated prior to discharge to the Bergen County Utilities Authority wastewater treatment facility. The ground water recovery system began operation in May 1990. The system consists of eight collection trenches of a total length of 825 feet, and three recovery wells. The trenches and wells were installed to various depths ranging from 8 to 30 feet, each extending to the top of a thick, areally extensive, lacustrine clay. Each recovery trench contains a horizontal perforated collection pipe connected to a pump well. The recovered ground water is transferred from the trenches and wells via a force main to an on-site treatment system located in Building T on Parcel No. 5.

The Ground Water Monitoring Program for the BD site was initiated in 1987 under NJPDES-DGW Permit No. NJ0001074, which was changed by DEP to Permit No. NJ0078981 in 1993. After each round of ground water sampling, BD submits a NJPDES-DGW Monitoring Report to NJDEP. In addition, the procedures and analytical data for ground water monitoring conducted during the ECRA Site Investigations are documented in several of the ECRA reports listed in Table 1-1, including the RAP.

In May 1990, BD submitted to DEP a NJPDES-DGW permit renewal application that included a letter (dated 7 May 1990) proposing modifications of the Monitoring Program. The proposed changes included an increase from the number of monitoring wells and a decrease in the sampling frequency of quarterly to biannually. During a telephone conversation on 11 July 1990,

BD's engineer ERM-Northeast (ERM) was given authorization by DEP, Division of Waste Resources, Bureau of Ground Water Management (BGWM) to implement these proposed modifications.

In 1993, BD submitted to DEP a Ground Water Remediation Report (ERM, 12 February 1993) that provided a status report on the ground water cleanup and included proposed modifications for the project. The recommendations included the suspension of ground water monitoring at six wells, the elimination of monitoring for priority pollutant metals at all site wells, and terminating the operation of Recovery Well No. 2 on Parcel No. 5. In letters dated 7 June 1993 and 1 February 1994, NJDEP approved these modifications.

Currently, the East Rutherford Site Ground Water Monitoring Program includes the sampling of site wells for volatile organic contaminants, twice a year. Table 1-2 lists the wells that are sampled under the Monitoring Program.

TABLE 1-2
Ground Water Monitoring Wells
Becton Dickinson and Company, East Rutherford, Bergen County
ISRA Case No. 87577
NJPDES-DGW Permit No. NJ0078981

Well Designation	Location (Parcel No.)
MW-101	1
MW-6	2
MW-11	2
MW-17	2
MW-18S	2
MW-19	2
MW-21R	2
MW-42R	2
MW-50	2
MW-202	2
MW-206	2
MW-1	4
MW-2	5
MW-4	5
MW-15S	5
MW-16S	5
MW-36	5
MW-39	5
MW-508	5
MW-510	5
MW-520	5
MW-601/RW-12	6

2.0 *REMEDIAL ACTION CRITERIA*

2.1 *DEVELOPMENT OF SITE REMEDIAL ACTION CRITERIA*

The development of soil remedial action criteria for the BD East Rutherford site is documented in the Soil and Ground Water Remedial Action Plan for Parcel No. 5, (ERM March 1989). Remedial action criteria was developed for the site based upon the NJDEP ECRA Recommended Cleanup Levels (RCLs). The criteria considered the existing site conditions, the environmental setting, environmental and health based risk assessments, the toxicity and mobility of certain contaminants, surface water discharge limitations to Berry's Creek, and the permeability of soil cover anticipated after site development. Starting with NJDEP's RCLs, a series of alternative concentration limits (generally expressed as multiples of the RCLs) were considered. These criteria were then evaluated through a quantitative risk assessment to determine the health and environmental effects resulting from implementation of these alternate criteria. A final set of criteria were selected at a level that presented no adverse health or environmental affects.

The soil remedial action criteria for the BD site, and the methodology used to evaluate them, are presented in the Soil and Ground Water Remedial Action Plan for Becton Dickinson and Company, East Rutherford (ERM, July 1988).

Remedial action criteria were developed to identify soil requiring remediation in Parcel No. 5. Initially, criteria were developed for all contaminants identified in Parcel No. 5 soils in excess of the ECRA RCLs, except for volatile organic compounds (VOC) and non-PAH base/neutral organic compounds. During the initial ECRA site investigations, total volatile organic compounds were detected in soil above the RCL of 1 ppm at only one location (MW-508). The only VOC identified was acetone. The QA review of the duplicate sample indicated that the result was qualitatively suspect and may have been introduced after sampling. Due to the marginal exceedance of the

RCL as well as the suspect nature of the analysis, no criterion was established for acetone. In addition, because the water table is approximately two feet below surface in this area, cleanup of VOCs is being accomplished by the ground water recovery system.

At locations where the RCL for base/neutral extractable organic compounds was exceeded, polynuclear aromatic hydrocarbons (PAHs) were the chemicals reported. Therefore, a criterion was established for PAHs. The only non-PAH compounds detected in these samples were dibenzofuran and butylbenzyl phthalate. Due to the low concentrations reported (<5 ppm) and because these areas were remediated due to high levels of PAH or TPH, no criteria for these two compounds were developed.

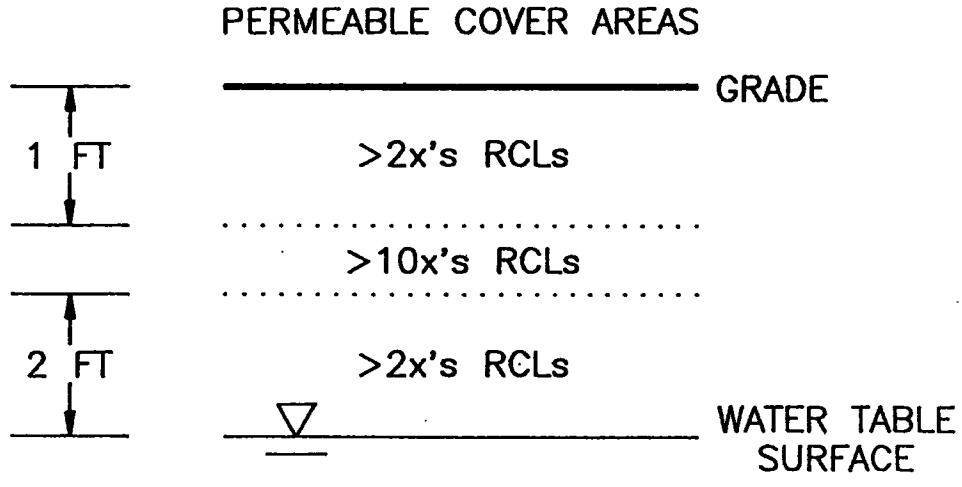
The chemicals for which criteria were developed are listed in Table 2-1. The soil remedial action criteria are presented in Figure 2-1. These criteria, as discussed below, are dependent upon the location of the contaminated soil with respect to the ground surface and the water table. The criteria with respect to the ground surface are intended to protect site employees and visitors. The criteria with respect to the top of the water table are intended to protect ground water quality.

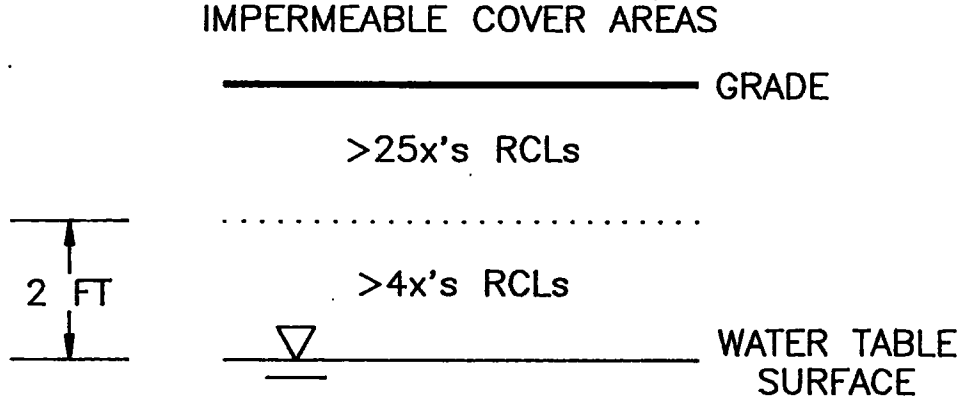
Specific criteria were developed for areas that are paved (i.e., impermeable surfaces) and those locations that will remain un-paved (i.e., permeable). In addition, special consideration was given to two contaminants of concern; mercury and PAHs.

Soil Remedial Action Criteria For Areas With Permeable Cover

Soil that will be maintained beneath permeable soil cover, such as grass covered areas, had the following remedial action criteria applied:

FIGURE 2-1
SOIL REMEDIAL ACTION CRITERIA
BECTON DICKINSON AND COMPANY
EAST RUTHERFORD, BERGEN COUNTY





CONTAMINANT-SPECIFIC CRITERIA

MERCURY	14 ppm *
POLYNUCLEAR AROMATIC HYDROCARBONS (PAH)	20 ppm
PETROLEUM HYDROCARBONS (PHC)	10,000 ppm *
PHC-CONTAMINATED AREAS:	
TOTAL BASE/NEUTRAL EXTRACTABLE ORGANIC COMPOUNDS	100 ppm *
TOTAL CARCINOGENIC PAH	10 ppm *
TOTAL VOLATILE ORGANIC COMPOUNDS (VOC)	10 ppm *

* = REVISED JULY, 1991

ERM-Northeast
Environmental Resources Management

TABLE 2-1

CHEMICALS FOR WHICH SOIL REMEDIAL ACTION CRITERIA WERE DEVELOPED

Metals	RCL (ppm)
Cadmium	3
Chromium	100
Copper	170
Lead	250
Mercury	1
Nickel	100
Zinc	350
Organic Compounds	
Polynuclear Aromatic Hydrocarbons (PAHs)	5
Total Petroleum Hydrocarbons (TPH)	100

- Soil within one (1) foot of the ground surface required remediation if the contaminant concentrations were greater than two (2) times the ECRA RCLs.

- Soil located in the zone between one (1) foot below grade and two (2) feet above the water table required remediation if the contaminant concentrations were greater than ten (10) times the ECRA RCLs.

- Soil within two (2) feet of the water table required remediation if contaminant concentrations were greater than two (2) times the ECRA RCLS.

- Soils having contaminant concentrations less than these criteria required no action.

Soil Remedial Action Criteria For Areas With Impermeable Cover

Soil that will be maintained beneath impermeable soil cover, such as buildings and paved areas, had the following remedial action criteria applied:

- Soil located in the zone between the surface and two (2) feet above the water table required remediation if the contaminant concentrations were greater than twenty-five (25) times the ECRA RCLs.

- Soil that was within two (2) feet of the ground water table required remediation if the contaminant concentrations were greater than four (4) times the ECRA RCLs.

- Soils having contaminant concentrations less than these criteria required no action.

Soil Contaminated with Mercury

Initially, all soil having a mercury concentration greater than two (2) ppm required remediation. However, as discussed later, this requirement was revised to 14 ppm.

Soil Contaminated with Priority Pollutant Polynuclear Aromatic Hydrocarbons

All soil having priority pollutant polynuclear aromatic hydrocarbons (PAHs) at concentrations greater than 20 ppm required remedial action.

Soil Contaminated with Petroleum Hydrocarbons

The Remedial Action Plan specified that the cleanup criteria for petroleum hydrocarbons (PHC) would be a multiple of the RCL (100 ppm), as described above. However, as discussed in Section 2.3, the criteria for PHC-contaminated areas was revised. PHC-areas with concentrations of PHC, total Base/Neutral Extractable Organic Compounds, total Carcinogenic PAHs, or total VOCs exceeding the criteria listed in Figure 2-1, required remedial action.

2.2 *SUMMARY OF RISK ASSESSMENT*

The remedial criteria developed for the BD site were subjected to a quantitative risk assessment to ensure that no adverse impacts to human health or the environment would result from implementation of a cleanup plan on that basis. The results of the risk assessment are documented in reports previously submitted to NJDEP: Soil and Ground Water Remedial Action Plan (ERM, July 1988) and, Risk Assessment of Worker Exposure During Site Preparation (ERM, May 1989).

The risk assessment was performed in accordance with the USEPA Superfund Public Health Evaluation Manual (USEPA, 1986) and the Draft NJDEP Risk Assessment Guidelines (1986). The steps followed in performing the risk assessment were:

- preparation of toxicity and environmental profiles;
- identification of potential exposure routes and receptors;

- estimation of exposure point concentrations of the chemicals of concern;
- comparison of exposure point concentrations to relevant and applicable standards; and
- risk characterization.

In order to evaluate risk, the routes through which receptors could potentially be exposed to contamination from the site following remediation were identified. Potential receptors included the general public (nearest residences, industrial and commercial establishments, etc.) and landscaper and other employees at the site.

The risk assessment determined that potential exposure to humans and the environment following remediation could occur through only three routes. First, contamination in ground water underlying the site could migrate off-site to Berry's Creek. Second, contamination in site soils could leach to ground water and migrate off-site to Berry's Creek. Third, site employees could potentially be exposed to soil contaminants through direct contact with soil at the site.

On the basis of the risk assessment, no unacceptable risks to human health or the environment are expected following remediation of the site using the remedial action criteria. Post-remedial concentrations of site soil and ground water contaminants at Berry's creek, using very conservative models, were predicted to be at or below the National Primary Drinking Water Standards or other health-based drinking water standards. The projected concentrations also meet the NJDEP Surface Water Quality Standards for SE2 waters, and FW2 waters for chemicals for which no SE2 standard exists. Projected exposures to site workers due to contact with site soils, again using conservative assumptions, also essentially meet or are below the relevant acceptable intakes.

2.3 *REVISIONS TO REMEDIAL ACTION PLAN*

The approved Remedial Action Plan (RAP) specified that verification end-point soil samples would be taken at each Remedial Action (RA) location after the soil was excavated. However, in letters to DEP dated 8 February and 7 March 1991, ERM proposed to conduct the end-point sampling before the soil was excavated. This was intended to expedite the remedial project by obtaining disposal acceptance before work began and by avoiding delays of the excavation work caused by waiting for analytical results. During a meeting on 7 May 1991, DEP gave authorization to BD to use delineation sampling results in place of post-excavation verification data.

In a letter dated 25 March 1991, DEP identified changes in the site cleanup criteria and directed BD to re-evaluate the RAP accordingly. Tessie Fields of DEP/DHWM/BEECRA identified additional criteria for VOCs and petroleum hydrocarbons (PHC) during phone conversations on 27 March and 19 April 1991 with the ERM engineer.

The revised cleanup criteria was discussed during the 7 May 1991 meeting and subsequent telephone conversations. As a result, in a letter dated 30 July 1991, DEP authorized implementation of the original cleanup criteria from the RAP and approved 14 ppm as the remedial criteria for mercury. Figure 2-1 includes the revised cleanup criteria.

2.4 *APPLICATION OF THE SOIL REMEDIAL ACTION CRITERIA*

At the time that the Site Investigation was implemented, the site redevelopment plans for Parcel No. 5 had not been finalized, and future building locations and areas to be paved had not been identified. Therefore, for the purpose of the Site Investigation of soils beneath buildings, only the most conservative remedial action criteria (i.e.: criteria for areas with permeable cover) was used to evaluate the SI sampling results. However, after completion of the SI, the

site redevelopment plans were finalized and reviewed by BD. These final plans require that the redeveloped site be covered entirely with buildings and asphalt pavement. As a result, the Remedial Investigation (RI) of the sub-building soils was conducted in accordance with criteria for areas with impermeable cover. The RI procedures and results are discussed in Section 4.0.

Investigation of soil beneath the Parcel No. 5 buildings, nine areas of concern have elevated concentrations of metals. All nine areas have concentrations of metals exceeding the remedial action criteria for permeable surfaces, and five of the nine areas have concentrations exceeding the impermeable surface criteria. All other constituent concentrations were found to be below all remedial criteria. Table 3-1 summarizes these findings.

TABLE 3-1

SUMMARY OF SITE INVESTIGATION RESULTS
PARCEL NO. 5 SUB-BUILDING SOIL INVESTIGATION
BECTON DICKINSON AND COMPANY
EAST RUTHERFORD, BERGEN COUNTY
ISRA CASE NO.87577

Building Location	SI Location	Contaminants of Concern
A	FPA-3	Mercury
A	FPA-4	Nickel
A	FPA-5	Nickel
U	MMD-2	Mercury
U	MMD-3	Lead
U	MMD-4	Lead
U	MP-1	Copper, Lead, Zinc, Mercury
U	MP-2	Lead, Mercury
U	MP-3	Lead

4.0 *SUMMARY OF REMEDIAL INVESTIGATION*

4.1 *OVERVIEW OF REMEDIAL INVESTIGATION*

ERM-Northeast (ERM) developed the sampling plan for the Remedial Investigation (RI). The sub-building soil investigation was conducted from June through November 1994. The soil borings were performed by Aquifer, Drilling and Testing of Long Island City, New York under the supervision of ERM-Northeast. The soil samples were analyzed by Gulf States Analytical, Inc. of Houston, Texas (NJDEP Certification No. 82749). During the Remedial Investigation, a total of 130 soil borings were completed and 159 soil samples collected to establish the vertical and horizontal limits of contamination. All RI activities and procedures were documented by an ERM field geologist. Geologic boring logs are presented in Appendix A.

4.2 *DEVELOPMENT OF REMEDIAL INVESTIGATION*

The RI sampling plan was based on the Sampling and Analysis Plans (ERM, June 1987) for the initial ECRA Site Investigations of the BD site, and the sampling plan for the previous remedial investigation of Parcel No. 5, as documented in the Verification Report for ECRA Soil Remediation, Parcel Nos. 4 and 5 (ERM, June 1992). The technical basis of the RI is presented in the ISRA Site Investigation Report, Sub-Building Soils Investigation, Parcel No. 5 (ERM, October 1994).

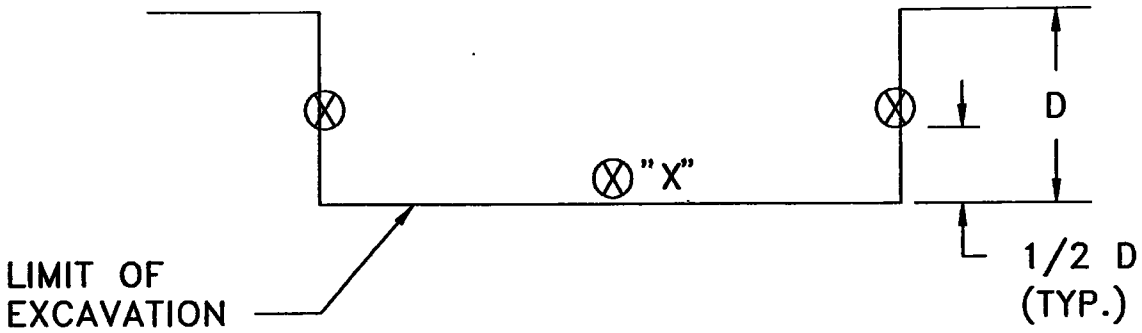
4.3 *RI SAMPLING PROCEDURES*

All sampling and analysis was conducted in accordance with NJDEP Tier II protocol and the requirements of the DEP-approved ECRA Sampling and Analysis Plan (ERM, June 1987), Environmental Assessment Report (ERM, August 1988), and the Remedial Action Plan (RAP). Quality assurance procedures were followed during all activities of the sampling investigation.

Duplicate and Field Blank samples were prepared each day sampling was performed. In addition, matrix spike and matrix spike duplicate samples were prepared and analyzed by the laboratory. All sampling and drilling activities were documented by an ERM field geologist.

At each RI location, soil samples were taken to establish the horizontal and vertical limits of contamination. The original "X-samples" (e.g., A-FPA-3-X1) were the samples taken previously during the Site Investigation that identified the locations of contamination. During the RI sampling, all sample locations were referenced from the original X-sample location. As shown in Figure 4-1, the depth of contamination was delineated by the samples denoted as "X1, X2, etc.", taken at one-foot intervals (e.g., X1, X2, X3, etc.). Perimeter samples, which are designated T, U, V and W, were taken at a depth equal to one-half the contamination depth. These perimeter samples were taken at five-foot increments (e.g., T, T5, T10, etc.) laterally from the original "X-sample" location. The analytical results of each sample were compared to the remedial action criteria to determine if the next incremental sample was needed. In accordance with the Remedial Action Plan, sampling at each location was advanced until the limits of the contamination were delineated, or ground water, or adjoining RI areas were encountered.

Soil borings were advanced through the concrete slab at nine areas of concern within Parcel No. 5 buildings. At each location, a four-inch hole was cut through the concrete floor with an electric powered coring drill. Soil samples were collected with stainless steel split-spoon samplers. The concrete core and sub-base materials (usually gravel) were removed and a decontaminated split-spoon sampler was then driven, by hand-held sledge hammer, to the appropriate depth. The split soon sampler was then removed and opened. The soil sample was taken from a discrete 6-inch interval within the sampler with a decontaminated spoon and placed in a laboratory-prepared sample jar.



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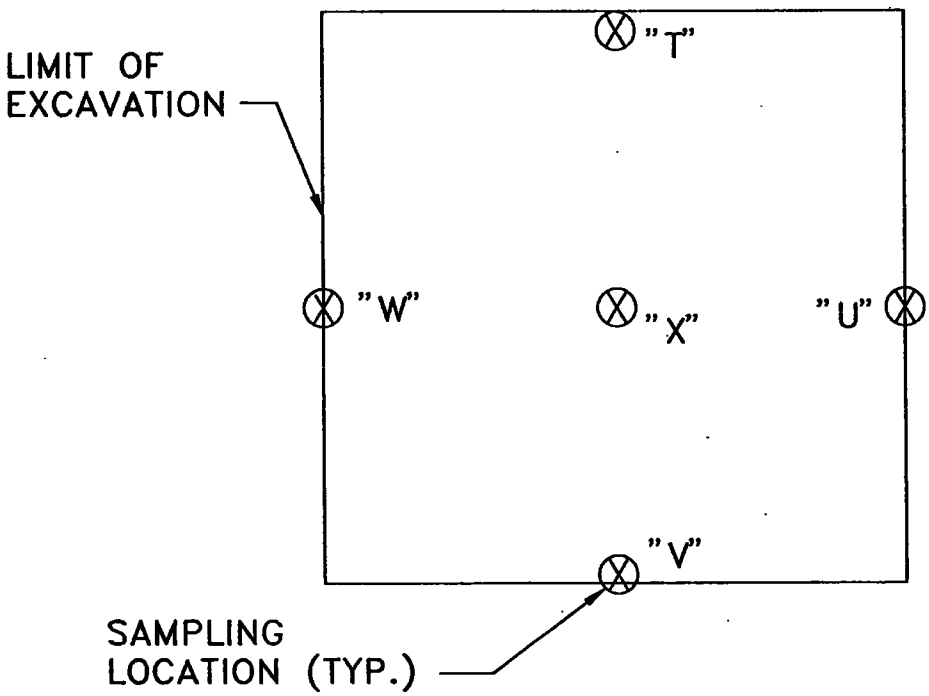


PLAN VIEW

TITLE

TYPICAL RI LOCATION

PREPARED FOR

BECTON DICKINSON AND CO.
EAST RUTHERFORD, N.J.

ERM-Northeast
Environmental Resources Management

SCALE	FIGURE
NONE	4-1

DRAWN:	JOB NO.:	FILE NAME:	DATE
S.P.	186.094.11	BDRA	12/16/94

Each soil sample was visually examined by the ERM field geologist and a description (e.g., color, geologic characteristics, moisture content, etc.) was documented in the field log, along with the sample location and depth. The information on the sample jar label and recorded in the field log included the sample date, time, identification number, engineering company name (ERM-Northeast), project number, field geologist's name and analytical parameters. This information was also recorded on the chain-of-custody form that accompanied the sample from the time the sample was obtained until it was received by the laboratory.

Field blanks were prepared at a rate of 10% of the total number of samples collected and were analyzed for the same parameters as those analyzed for the soil samples collected that day. Each field blank was prepared by collecting laboratory-prepared blank water poured over decontaminated field sampling equipment. Duplicate samples were collected at a rate of 5% of the total number of samples and were analyzed for the same parameters of the original samples.

All soil samples, duplicate sample and field blank samples were placed in a "cooler" with ice and taken to the on-site ERM field office where they were then placed in a refrigerator. At the end of each day, the samples were shipped via overnight courier service, in sealed coolers, to the laboratory. Any samples that were not immediately shipped to the lab (i.e. held awaiting analytical results of previous samples) were stored in the refrigerator in the on-site ERM office. Custody of the stored samples was ensured because only ERM-personnel have access to the site field office.

Each piece of sampling equipment was decontaminated prior to each use. The specific decontamination procedures performed depended on the chemical parameters that the sample was to be analyzed for. The decontamination procedures used during the delineation sampling investigation are as follows:

1. *Soap Wash and Water Rinse*

Sampling equipment was washed with tap water and laboratory detergent, and scrubbed with a brush to remove all visible residues of soil. The equipment was then rinsed with tap water, followed by a distilled water rinse.

2. *Solvent Rinse*

Reagent grade acetone was used to clean sampling devices used for taking samples analyzed for organic compounds. Equipment used for samples analyzed for metals were rinsed with a solution of nitric acid.

3. *Final Rinse*

All sampling equipment was then rinsed with bottled distilled water as a final decontamination step.

4.4 *REMEDIAL INVESTIGATION RESULTS*

The analytical results of all samples collected during the RI are presented in Table 4-1. Table 4-2 is an Analytical Methods and Quality Assurance Summary for the RI. In order to delineate contamination at each RI location, the analytical results of the RI samples were compared to the remedial action criteria, which are presented in Section 2.0. The following summarizes the vertical and horizontal soil delineation that was conducted at each RI Location:

A-FPA-3 - The parameter of concern at RI Location A-FPA-3 is mercury. To delineate the area of mercury contamination, a total of four soil borings were completed and six soil samples collected in three directions covering an area as approximately 75 square feet. Soil sampling methodologies are described in Section 4.3. No samples were collected in the "W" direction due to the

TABLE 4-1
SOIL QUALITY DATA
REMEDIAL INVESTIGATION OF
PARCEL NO. 5 SUB-BUILDING SOIL
BECTON DICKINSON AND COMPANY, EAST RUTHERFORD, NEW JERSEY
ISRA CASE NO. 87577

CONCENTRATIONS OF
PARAMETERS OF CONCERN: (ppm)

* = Exceeds Remedial Action Criteria

LOCATION:	DEPTH OF SAMPLE: (ft.)	Cd	Cr	Cu	Pb	Ni	Zn	Hg
A-FPA-3-X1	0-0.5							14.1*
A-FPA-3-X2	0.5-1.5							0.176
A-FPA-3-X3	1.5-2.5							0.076
A-FPA-3-T	0.25							<0.1
A-FPA-3-U	0.25							<0.1
A-FPA-3-V	0.25							2.46
A-FPA-3-W	NO SAMPLE DUE TO END OF BUILDING							
A-FPA-4-X1	0-0.5					1020		
A-FPA-4-X2	0.5-1.5					316		
A-FPA-4-X3	1.5-2.5					37.4		
A-FPA-4-T	0.75					512		
A-FPA-4-U	0.75					643		
A-FPA-4-V	NO SAMPLE DUE TO END OF BUILDING							
A-FPA-4-W	0.75					46.6		
A-FPA-4-T5	0.75					530		
A-FPA-4-U5	0.75					940		
A-FPA-4-T10	0.75					28.9		
A-FPA-4-U10	0.75					308		
A-FPA-4-U15	0.75					256		
A-FPA-4-U20	0.75					115		
A-FPA-5-X1	0-0.5					488		
A-FPA-5-X2	0.5-1.5					70.7		
A-FPA-5-X3	1.5-2.5					61.9		
A-FPA-5-T	0.25		10.6		44.5	9280*		
A-FPA-5-U	0.25					2840*		
A-FPA-5-V	0.25					813		
A-FPA-5-W	0.25					16.8		
A-FPA-5-T5	0.25					7.5		
A-FPA-5-U5	0.25					152		
A-FPA-5-V5	0.25					56.2		
U-MMD-2-X1	0-0.5							40.2*
U-MMD-2-X2	0.5-1.5							0.65
U-MMD-2-X3	1.5-2.5							11.1
U-MMD-2-T	0.25							3.3
U-MMD-2-U	NO SAMPLE DUE TO END OF BUILDING							
U-MMD-2-V	0.25							3.9
U-MMD-2-W	0.25							1.8

TABLE 4-1 (CONTINUED)
SOIL QUALITY DATA
REMEDIAL INVESTIGATION OF
PARCEL NO. 5 SUB-BUILDING SOIL
BECTON DICKINSON AND COMPANY, EAST RUTHERFORD, NEW JERSEY
ISRA CASE NO. 87577

CONCENTRATIONS OF
PARAMETERS OF CONCERN: (ppm)

* = Exceeds Remedial Action Criteria

LOCATION:	DEPTH OF SAMPLE: (ft.)	Cd	Cr	Cu	Pb	Ni	Zn	Hg
U-MMD-3-X1	0-0.5				763			
U-MMD-3-X2	0.5-1.5				1010			
U-MMD-3-X3	1.5-2.5				298			
U-MMD-3-T	0.75				99.0			
U-MMD-3-U	0.75				81.1			
U-MMD-3-V	0.75				372			
U-MMD-3-W	0.75				45.7			
U-MMD-4-X1	0-0.5				505			
U-MMD-4-X2	0.5-1.5				453			
U-MMD-4-X3	1.5-2.5				315			
U-MMD-4-X	0.25				399			
U-MMD-4-U	0.25				340			
U-MMD-4-V	0.25				695			
U-MMD-4-W	0.25				435			
U-MMD-4-V5	0.25				699			0.69
U-MMD-4-V10	0.25				148			
U-MP-1-X1	0-0.5			376	669		852	22.0*
U-MP-1-X2	0.5-1.5			399	109		311	26.7*
U-MP-1-X3	1.5-2.5			348	88.4		414	33.3*
U-MP-1-X4	2.5-3.5			200				12.0
U-MP-1-X5	3.5-4.5			137				4.0
U-MP-1-T	1.25			495	93.5		295	73.2*
U-MP-1-U	1.25			775	169		521	35.2*
U-MP-1-V	1.25			244	940		253	27.5*
U-MP-1-W	1.25			232	92.7		184	32.2*
U-MP-1-T-5	1.25			317	368	38.5		32.1*
U-MP-1-U-5	1.25			9.5				1.8
U-MP-1-V-5	1.25				191			30.1*
U-MP-1-W-5	1.25							39.0*
U-MP-1-T-10	1.25			447	256			36.5*
U-MP-1-V-10	1.25							15.4*
U-MP-1-W-10	1.25							39.2*
U-MP-1-T-15	1.25							25.6*
U-MP-1-V-15	1.25							41.2*
U-MP-1-W-15	1.25							18.7*
U-MP-1-T-20	1.25							39.2*
U-MP-1-V-20	1.25							1.6

TABLE 4-1 (CONTINUED)
SOIL QUALITY DATA
REMEDIAL INVESTIGATION OF
PARCEL NO. 5 SUB-BUILDING SOIL
BECTON DICKINSON AND COMPANY, EAST RUTHERFORD, NEW JERSEY
ISRA CASE NO. 87577

CONCENTRATIONS OF
PARAMETERS OF CONCERN: (ppm)

* = Exceeds Remedial Action Criteria

LOCATION:	DEPTH OF SAMPLE: (ft.)	Cd	Cr	Cu	Pb	Ni	Zn	Hg
U-MP-1-W-20	1.25							31.8*
U-MP-1-T-25	1.25							105*
U-MP-1-W-25	1.25							56.8*
U-MP-1-T-30	1.25							247*
U-MP-1-W-30	1.25							64.7*
U-MP-1-T-35	1.25							65.0*
U-MP-1-W-35	1.25							63.9*
U-MP-1-T-40	1.25							39.6*
U-MP-1-W-40	1.25							1.8
U-MP-1-T-45	1.25							45.2*
U-MP-1-W-45	1.25							9.7
U-MP-1-T-50	1.25							67.2*
U-MP-1-W-50	1.25							19.7*
U-MP-1-T-55	1.25							24.4*
U-MP-1-W-55	1.25							23.7*
U-MP-1-T-60	1.25							59.9*
U-MP-1-W-60	1.25							2.6
U-MP-1-T-65	1.25			117				5.7
U-MP-2-X1	0-0.5				816			14.5*
U-MP-2-X2	0.5-1.5				143			76.5*
U-MP-2-X3	1.5-2.5				231			57.5*
U-MP-2-X4	2.5-3.5							11.2
U-MP-2-X5	3.5-4.5							19.4*
U-MP-2-X6	4.5-5.5							71.0*
U-MP-2-X7	5.5-6.5							64.3*
U-MP-2-X8	6.5-7.5							0.09
U-MP-2-T	2.25				847			2.1
U-MP-2-U	2.25				242			61.4*
U-MP-2-V	2.25				138			73.1*
U-MP-2-W	2.25				98.9			29.1*
U-MP-2-T-5	2.25				1170			
U-MP-2-U-5	2.25							59.5*
U-MP-2-V-5	2.25							99.2*
U-MP-2-W-5	2.25							65.2*
U-MP-2-T-10	2.25				1400			
U-MP-2-T-10	0.5				2900			
U-MP-2-U-10	3.25							2.9
U-MP-2-V-10	NO SAMPLE DUE TO END OF BUILDING							
U-MP-2-W-10	2.25							83.3*

TABLE 4-1 (CONTINUED)
SOIL QUALITY DATA
REMEDIAL INVESTIGATION OF
PARCEL NO. 5 SUB-BUILDING SOIL
BECTON DICKINSON AND COMPANY, EAST RUTHERFORD, NEW JERSEY
ISRA CASE NO. 87577

CONCENTRATIONS OF
PARAMETERS OF CONCERN: (ppm)

* = Exceeds Remedial Action Criteria

LOCATION:	DEPTH OF SAMPLE: (ft.)	Cd	Cr	Cu	Pb	Ni	Zn	Hg
U-MP-2-T-15	0.5				155			
U-MP-2-T-15	2.25				121			
U-MP-2-T-15	3.25							6.9
U-MP-2-W-15	2.25				0.89			19.5*
U-MP-2-W-20	2.25							9.8
U-MP-2-W-20	3.25							12.4
U-MP-3-X1	0-0.5				4120			
U-MP-3-X2	0.5-1.5				661			
U-MP-3-X3	1.5-2.5				667			
U-MP-3-X4	2.5-3.5				1050			
U-MP-3-X5	3.5-4.5				523			
U-MP-3-X6	4.5-5.5				2000			
U-MP-3-X7	5.5-6.5				158			
U-MP-3-T	2.75				1620			
U-MP-3-U	2.75				1210			
U-MP-3-V	2.75			26.7	2560	8.4		
U-MP-3-W	2.75				1880			
U-MP-3-T	0.5				1600			
U-MP-3-U	0.5				2500			
U-MP-3-V	0.5				2690			
U-MP-3-W	0.5				3160			
U-MP-3-T-5	0.5				2920	8.3		
U-MP-3-U-5	0.5				1640			
U-MP-3-V-5	2.75			33.8	2680			
U-MP-3-W-5	0.5				2380			
U-MP-3-T-10	0.5				930			
U-MP-3-T-10	2.75				3970			
U-MP-3-U-10	0.5				2240			
U-MP-3-U-10	2.75				4380			
U-MP-3-V-10	NO SAMPLE DUE TO END OF BUILDING							
U-MP-3-W-10	NO SAMPLE DUE TO END OF BUILDING							
U-MP-3-T-15	0.5				2070			
U-MP-3-T-15	2.75				3390			
U-MP-3-U-15	0.5				4390			
U-MP-3-U-15	2.75				1020			
U-MP-3-U-20	NO SAMPLE DUE TO LOCATION UMP-2							
U-MP-3-T-20	0.5				2260			
U-MP-3-T-20	2.75				1870			
U-MP-3-T-25	0.5				2350			

TABLE 4-1 (CONTINUED)
SOIL QUALITY DATA
REMEDIAL INVESTIGATION OF
PARCEL NO. 5 SUB-BUILDING SOIL
BECTON DICKINSON AND COMPANY, EAST RUTHERFORD, NEW JERSEY
ISRA CASE NO. 87577

CONCENTRATIONS OF
PARAMETERS OF CONCERN: (ppm)

* = Exceeds Remedial Action Criteria

LOCATION:	DEPTH OF SAMPLE: (ft.)	Cd	Cr	Cu	Pb	Ni	Zn	Hg
U-MP-3-T-25	2.75				2640			
U-MP-3-T-30	0.5				2530			
U-MP-3-T-30	2.75				713			
U-MP-3-T-35	0.5				1610			
U-MP-3-T-35	2.75				674			
U-MP-3-T-40	0.5				1270			
U-MP-3-T-40	2.75				294			
U-MP-3-T-45	0.5				587			
U-MP-3-T-45	2.75				138			
U-MP-3-T-50	0.5				737			
U-MP-3-T-50	2.75				58.9			
U-MP-3-T-55	0.5				201			
U-MP-3-T-55	2.75				230			

Table 4-2
Analytical Methods / Quality Assurance Summary
Remedial Investigation of Sub-Building Soil
Becton Dickinson and Co., East Rutherford
ISRA Case No. 87577

Matrix	Analytical Parameters	Number of Samples	Duplicates	Field Blanks	Trip Blanks	MS/MSD
Soil	COPPER	15	2	17	0	6
Soil	CHROMIUM	1	0	17	0	1
Soil	LEAD	83	5	17	0	21
Soil	ZINC	7	1	17	0	1
Soil	NICKEL	25	0	17	0	2
Soil	MERCURY	73	5	17	0	20
	Total	204	9	17	5	41

Parameter	Number of Samples	Sample Matrix	Analytical Method Reference	Sample Preservation	Required Holding Time	Container
Metals	204+9 Duplicates	Soil	SW-846	Cool, 4 C	128 days *	125 ml. glass jar, phenolic cap, polyethylene liner
QA/QC Samples(field blanks)						
Metals	17	Water	SW-846	Cool 4 C, Nitric Acid	128 days, except Hg - 28 days *	1000 ml plastic bottle, plastic cap, plastic liner

* All required holding times were met for all samples analyzed.

proximity of the Building's exterior wall, as shown in Figure 4-2. The depth of contamination is within one (1) foot of the concrete floor - soil interface.

A-FPA-4 - The parameter of concern at RI Location A-FPA-4 was nickel. The RI determined that the concentration of nickel in soil at this location is less than the RI criteria. Therefore, no further action is required at this location.

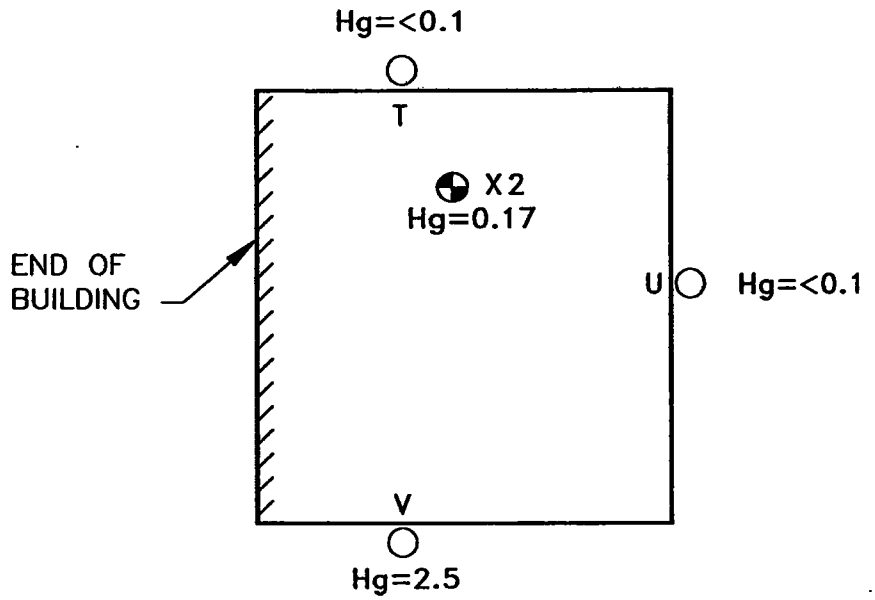
A-FPA-5 - The parameter of concern at RI Location A-FPA-5 is nickel. To delineate the area of nickel contamination a total of eight soil borings were completed and ten soil samples collected in four directions covering an area of approximately 225 square feet. As summarized in Figure 4-3, the contaminated soil was delineated to a depth of one (1) feet below the concrete floor - soil interface.

U-MMD-2 - The parameter of concern at RI Location U-MMD-2 is mercury. To delineate the area of mercury contamination a total of 4 soil borings were completed and 6 soil samples collected in three directions covering an area of approximately 120 square feet. No samples were collected in the "U" direction due to the proximity of the Building's exterior wall, as summarized in Figure 4-4. The mercury contamination was limited to within one (1) foot the concrete floor - soil interface.

U-MMD-3 - The parameter of concern at RI Location U-MMD-3 was lead. The RI determined that the concentration of lead in soil at this location is less than the RI criteria. Therefore, no further action is required at this location.

U-MMD-4 - The parameter of concern at RI Location U-MMD-4 was lead. The RI determined that the concentration of lead in soil at this location is less than the RI criteria. Therefore, no further action is required at this location.

U-MP-1 - The parameter of concern at RI Location U-MP-1 is mercury. To delineate this area, a total of 36 soil borings were completed and 39 soil

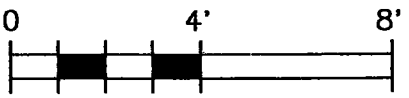


REMEDIAL INVESTIGATION SUMMARY

PARAMETER OF CONCERN: MERCURY (Hg)

DEPTH: 1 FT.

SURFACE: 8" CONCRETE



GRAPHIC SCALE

LEGEND

2.46 ○	LOCATION OF R.I. END-POINT SAMPLE BELOW REMEDIAL ACTION CRITERIA AND CONCENTRATION(S) OF PARAMETER(S) OF CONCERN IN PPM.
⊕	LOCATION OF BASE SAMPLE
▭	AREA OF CONTAMINATED SOIL
T,U,V,W,X	SAMPLE IDENTIFICATION CODE

TITLE

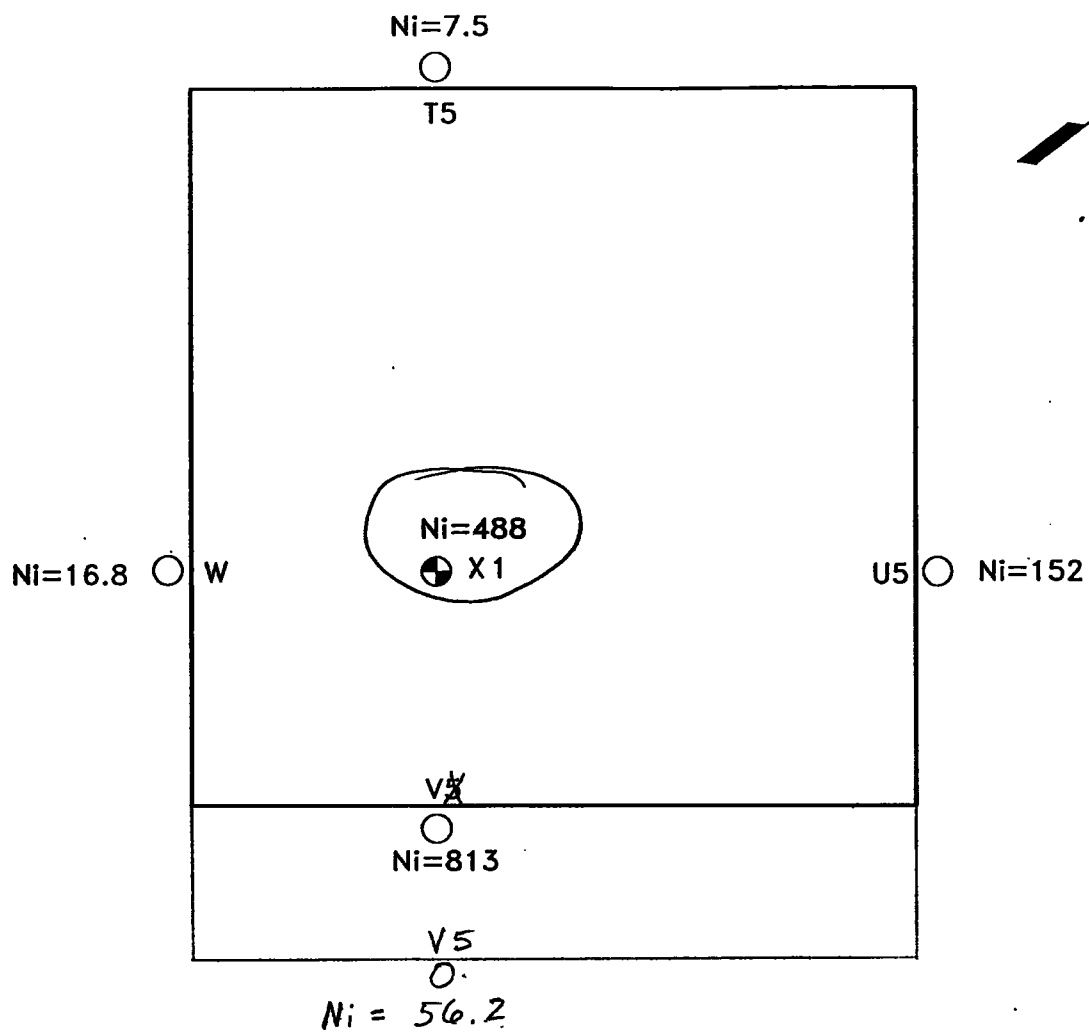
REMEDIAL INVESTIGATION LOCATION A-FPA-3

PREPARED FOR
BECTON DICKINSON AND CO.
EAST RUTHERFORD, NJ

ERM-Northeast
Environmental Resources Management

SCALE	FIGURE
GRAPHIC	4-2

DRAWN:	JOB NO.:	FILE NAME:	DATE
S.P./S.P.	186.094.11	A-FPA-3	12/16/94



REMEDIAL INVESTIGATION SUMMARY

PARAMETER OF CONCERN: NICKEL (Ni)

DEPTH: 1 FT.

SURFACE: 8" CONCRETE

0 4' 8'

GRAPHIC SCALE

LEGEND

46.7 ○ LOCATION OF R.I. END-POINT SAMPLE BELOW REMEDIAL ACTION CRITERIA AND CONCENTRATION(S) OF PARAMETER(S) OF CONCERN IN PPM.

⊕ LOCATION OF BASE SAMPLE

▭ AREA OF CONTAMINATED SOIL

T,U,V,W,X SAMPLE IDENTIFICATION CODE

TITLE

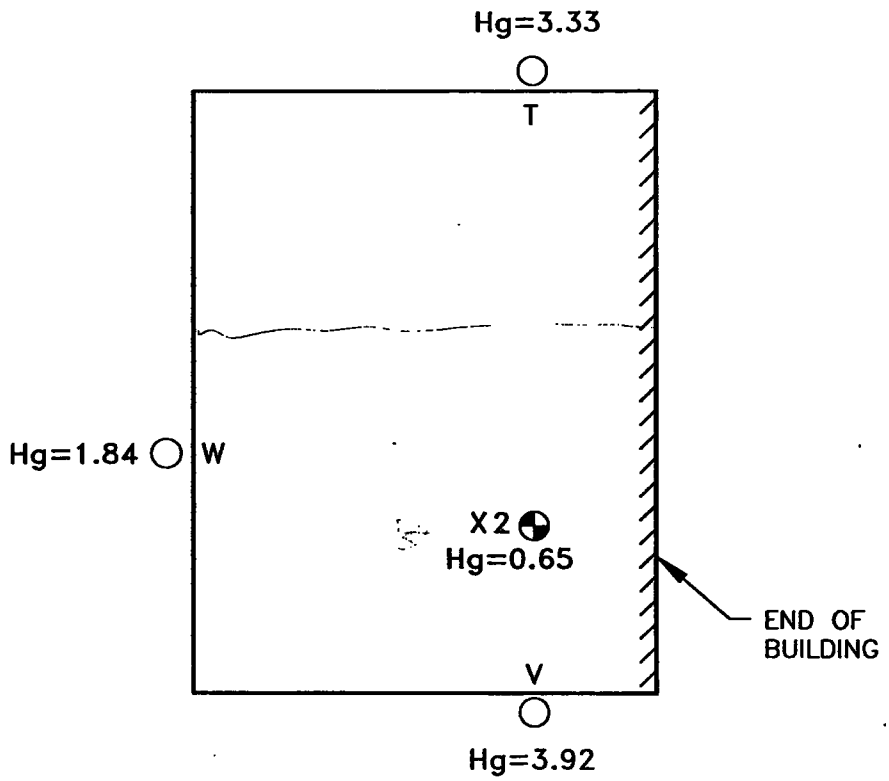
REMEDIAL INVESTIGATION LOCATION A-FPA-5

PREPARED FOR
BECTON DICKINSON AND CO.
EAST RUTHERFORD, NJ

ERM-Northeast
Environmental Resources Management

SCALE	FIGURE
GRAPHIC	4-3

DRAWN:	JOB NO.:	FILE NAME:	DATE
S.P./S.P.	186.115.11	A-FPA-95	1/24/95

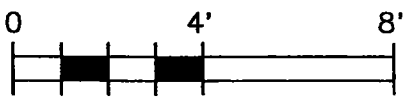


REMEDIAL INVESTIGATION SUMMARY

PARAMETER OF CONCERN: MERCURY (Hg)

DEPTH: 1 FT.

SURFACE: 8" CONCRETE



GRAPHIC SCALE

LEGEND

3.92 ○	LOCATION OF R.I. END-POINT SAMPLE BELOW REMEDIAL ACTION CRITERIA AND CONCENTRATION(S) OF PARAMETER(S) OF CONCERN IN PPM.
◒	LOCATION OF BASE SAMPLE
▭	AREA OF CONTAMINATED SOIL
T,U,V,W,X	SAMPLE IDENTIFICATION CODE

TITLE

REMEDIAL INVESTIGATION LOCATION U-MMD-2

PREPARED FOR

BECTON DICKINSON AND CO.
EAST RUTHERFORD, NJ

ERM-Northeast
Environmental Resources Management

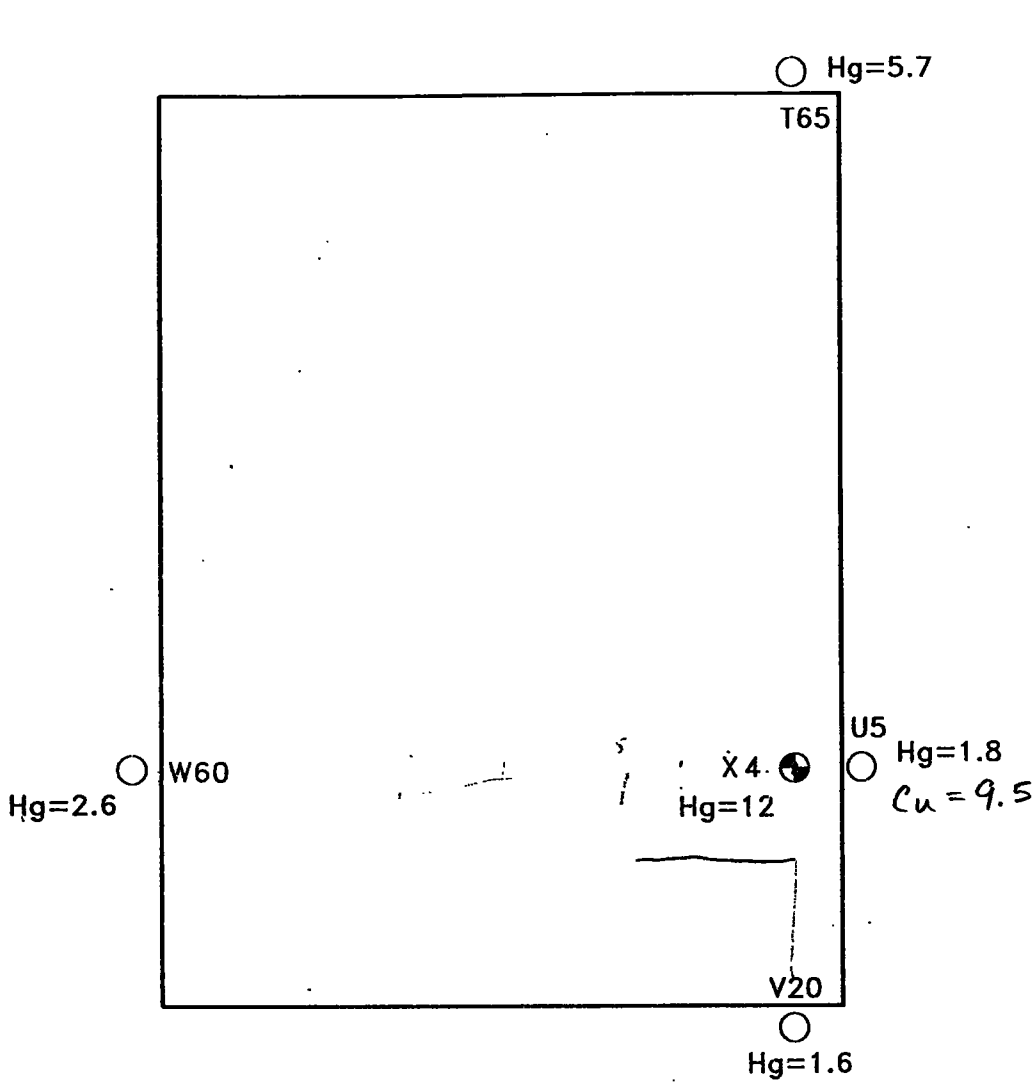
SCALE	FIGURE
GRAPHIC	4-4

DRAWN:	JOB NO.:	FILE NAME:	DATE
S.P./S.P.	186.115.11	UMMD2-95	1/24/95

samples collected in four directions covering an area of approximately 6,650 square feet. Figure 4-5 details this RI Location, which was delineated to a depth of 2.5 feet below the concrete floor - soil interface. All other constituent concentrations were found to be less than the RI criteria.

U-MP-2 - The parameter of concern at RI Location U-MP-2 is mercury. To delineate the area of lead and mercury contamination, a total of 20 soil borings were completed and 27 soil samples collected in four directions covering an area of approximately 740 square feet. As summarized in Figure 4-6, the soil contamination terminates at a depth of 6.5 feet below the concrete floor - soil interface. All other constituent concentrations were found to be less than the RI criteria.

U-MP-3 - The parameter of concern at RI Location U-MP-3 was lead. The RI determined that the concentration of lead in soil at this location is less than the RI criteria. Therefore, no further action is required at this location.



REMEDIAL INVESTIGATION SUMMARY

PARAMETER OF CONCERN: MERCURY (Hg)

DEPTH: 2.5 FT.

SURFACE: 8" CONCRETE

0 20' 40'

GRAPHIC SCALE

LEGEND

1.8 ○ LOCATION OF R.I. END-POINT SAMPLE BELOW REMEDIAL ACTION CRITERIA AND CONCENTRATION(S) OF PARAMETER(S) OF CONCERN IN PPM.

◐ LOCATION OF BASE SAMPLE

▭ AREA OF CONTAMINATED SOIL

T,U,V,W,X SAMPLE IDENTIFICATION CODE

TITLE

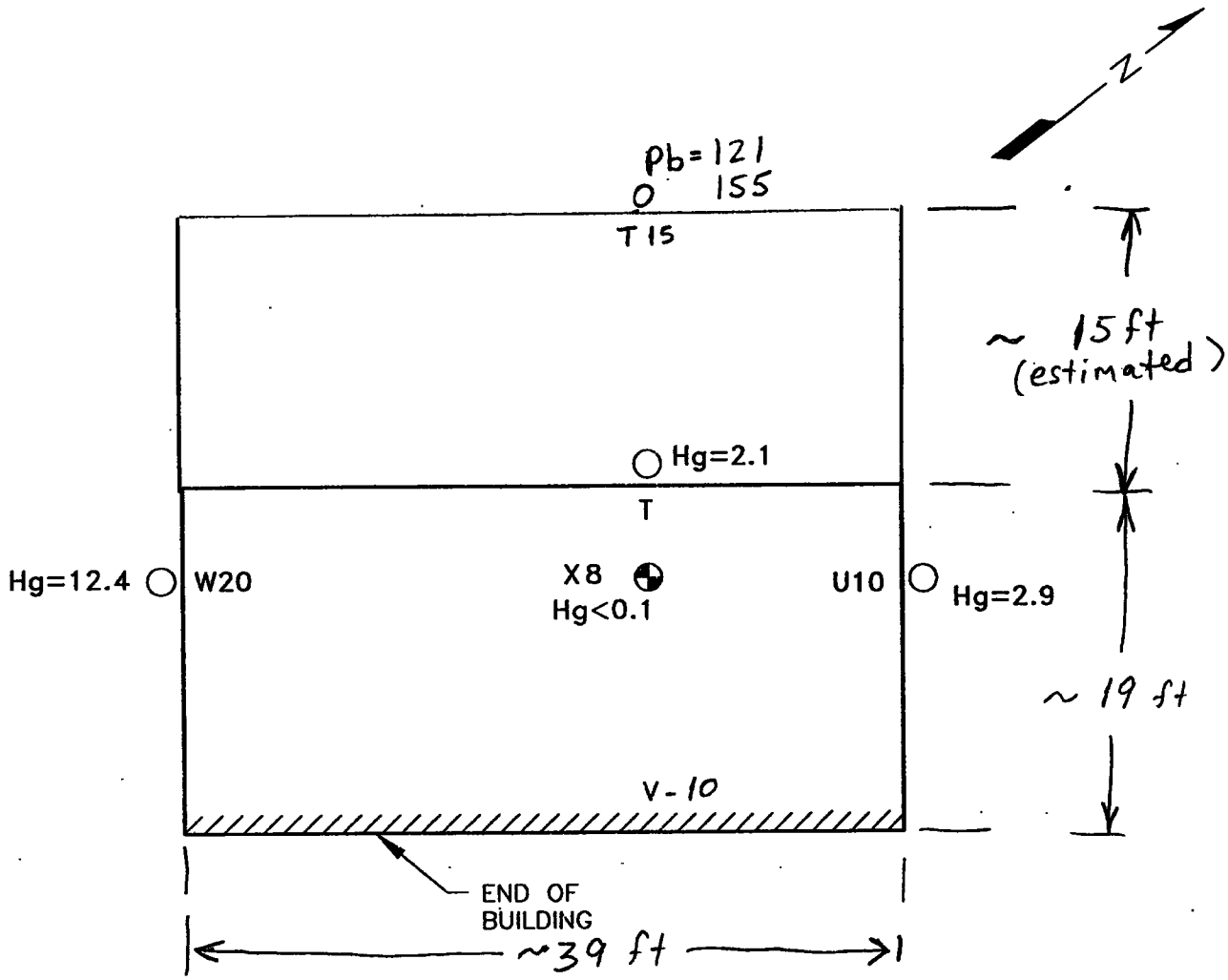
REMEDIAL INVESTIGATION LOCATION U-MP-1

PREPARED FOR
BECTON DICKINSON AND CO.
EAST RUTHERFORD, NJ

ERM-Northeast
Environmental Resources Management

SCALE	FIGURE
GRAPHIC	4-5

DRAWN:	JOB NO.:	FILE NAME:	DATE
S.P./S.P.	186.115.11	U-MP1-95	1/24/95



REMEDIAL INVESTIGATION SUMMARY

PARAMETER OF CONCERN: MERCURY (Hg)

DEPTH: 6.5 FT.

SURFACE: 8" CONCRETE

~ 340 yd³

0 10' 20'

GRAPHIC SCALE

LEGEND

9.8 ○ LOCATION OF R.I. END-POINT SAMPLE BELOW REMEDIAL ACTION CRITERIA AND CONCENTRATION(S) OF PARAMETER(S) OF CONCERN IN PPM.

◓ LOCATION OF BASE SAMPLE

▭ AREA OF CONTAMINATED SOIL

T,U,V,W,X SAMPLE IDENTIFICATION CODE

TITLE

REMEDIAL INVESTIGATION LOCATION U-MP-2

PREPARED FOR
BECTON DICKINSON AND CO.
EAST RUTHERFORD, NJ

ERM-Northeast
Environmental Resources Management

SCALE	FIGURE
GRAPHIC	4-6

DRAWN:	JOB NO.:	FILE NAME:	DATE
S.P./S.P.	186.115.11	U-MP2-95	1/24/95

5.0 *ADDENDUM TO SOIL REMEDIAL ACTION PLAN*

5.1 *BASIS OF REMEDIAL ACTION*

The five areas of contaminated soil beneath the buildings in Parcel No. 5, as identified in Section 4.0, will be remediated in accordance with the procedures of the Soil and Ground Water Remedial Action Plan, Parcel No. 5 (ERM, March 1989) (RAP). The development of the RAP and a technical evaluation of the soil remedial action procedures for the BD site are presented in the Soil and Ground Remedial Action Plan, Parcel Nos. 1 and 2 (ERM, July 1988). An abbreviated summary of the soil remedial action procedures is provided below.

5.2 *SOIL REMEDIAL ACTION*

Excavation and off-site disposal of contaminated soil will be the technique used to achieve compliance with the site-specific remedial action criteria for the areas beneath the Parcel No. 5 buildings. The contaminated soil will be removed from the site and transported to an appropriate waste disposal facility. Prior to shipment, the soil will be sampled and characterized for proper waste classification and disposal facility approval.

For the purposes of this remedial action, the five areas of sub-building soil contamination area designated as Remedial Action (RA) locations. Table 5-1 provides a summary of the proposed soil remedial action and lists the contaminants of concern, dimensions and anticipated volumes of excavated soil for each RA location. Figure 5-1 is a site plan showing the RA locations.

TABLE 5-1

SUMMARY OF PROPOSED REMEDIAL ACTION
PARCEL NO. 5 SUB-BUILDING SOIL
BECTON DICKINSON AND COMPANY
EAST RUTHERFORD, BERGEN COUNTY
ISRA CASE NO. 87577

Remedial Action Location	Surface Area (Sq. Ft.)	Excavation Depth (Ft.)	Estimated Soil Volume (Cu. Yds.)	Contaminants of Concern
A-FPA-3	75	1.0	~~3~~	Mercury
A-FPA-5	225	1.0	~~8~~ 10	Nickel
U-MMD-2	120	1.0	4	Mercury
U-MP-1	6,650	2.5	616	Mercury
U-MP-2	740	6.5	~~179~~ 340	Mercury
TOTAL	7,810		~~810~~	
AFPA-4	720	1.5	40	
UMMD-3	120	1.5	7	
UMMD-4	400	1.5	20	
UMP-3	2950	5.5	600	
Total			~1600	

5.3 *SOIL REMEDIAL ACTION PROCEDURES*

The first phase of the Soil Remedial Action will involve marking the boundaries of the areas to be excavated. The "X-sample" location for each RA location will be identified by ERM engineers using survey maps that were generated during the Site Investigation. As explained in Section 4.3, the original X-sample locations were used as the reference points for the RA locations. Each X-location will be marked with orange paint. The results of the RI will be used to defined the limits (i.e., perimeter and depth) of each excavation site, as delineated in Figures 4-2 through 4-6. Flagging and/or orange paint will be used to establish excavation boundaries.

The Remedial Action preparatory tasks will include establishing work zones, decontamination areas and stock-pile areas. Each of the nine work zones will be enclosed with bright orange fencing and warning signs. Within the work zones, plastic sheeting will be placed on the ground next to the excavation area(s), and decontamination areas will be established. A stockpile area for fill material will be fenced and lined with plastic sheeting and geotextile fabric.

Although the buildings on Parcel No. 5 will be demolished prior to the implementation of this Remedial Action Plan, the concrete foundation slabs of the buildings will remain in place over the RA locations until the time of the excavation work. If feasible, the concrete slab over each RA location will be removed, decontaminated (i.e., cleaned of contaminated soil) at the location, and disposed of separately from the soil. If soil decontamination of the slab concrete is not possible, the concrete will be removed and shipped off-site for disposal with the soil.

The RA locations will be excavated with power equipment such as a back-hoe. Plastic sheeting will be placed on the ground surface next to each RA location. All excavation soil and materials removed from each RA location will be placed directly into plastic-lined dump trucks for transport to the disposal

facility. If immediate transport of the soil to the disposal facility is not possible, the excavated soil will be stockpiled on site. Surficial and subsurface material such as abandoned underground pipes will be removed and disposed of with the excavated soil. Excavating at each location will continue until contamination limits or ground water are encountered.

5.4 SCHEDULE

The demolition of the BD site buildings is tentatively scheduled for mid-1995. The implementation of this Remedial Action Plan Addendum for sub-building soils will occur after the building demolition work has been completed, which is expected to be in late-1995. BD will submit a RAP implementation schedule to NJDEP in early 1995, after the site demolition and re-development schedules have been established. Monthly ISRA Project Status Reports will be submitted to NJDEP during the soil remediation and an ISRA Remedial Action Report documenting the soil remediation activities will be submitted to DEP within 90 days of completion of the remedial action.

Appendix A

Geologic Boring Logs

ERM-Northeast

175 Froehlich Farm Blvd., Woodbury, New York 11797

LOG OF BORING: Building A: Former plating area

Project Name & Location	Project Number
Becton Dickinson & Co. East Rutherford, New Jersey	186.094.11
Drilling Company	**Sampling Method**
Aquifer Testing and Drilling	Split Spoon
ERM-Northeast Geologist	**Sampling Equipment**
John Sheehan	Sledge Hammer

DEPTH (ft below grade)	SAMPLES: Date	Recovery (ft.)	Blow per 6 in.	Concrete core thickness	Distance from X (ft.)	A-FPA-3 SUB-BUILDING DELINEATION SAMPLING SOIL DESCRIPTION	Sample Interval/ Analytical Parameters
0 1 2 3 4	9-Jun	1.6 1.7	NA	8"	0	A-FPA-3 0.5-2.5': Brown fine and medium SAND with some reddish brown fractured shale at tip. Dry. No odor, no soil staining. 2.5-4.5': Light brown, trending to a darker brown, fine SAND. Well sorted (fill material). Dry. No odor, no soil staining.	0.5-1.5' / Hg 1.5-2.5 / Hg 2.5-3.5 / Hg 3.5-4.0' / Hg
0 1 2	14-Jun	1.7	NA	7"	5	A-FPA-3-T 0-2': Brown fine SAND with some brick fragments. Well sorted. Dry. No odor, no soil staining.	0.25' / Hg
0 1 2	14-Jun	1.5	NA	8"	5	A-FPA-3-U 0-2': 3" of gravel. Brown fine SAND. Well sorted. Dry. No odor, no soil staining.	0.25' / Hg
0 1 2	14-Jun	1.7	NA	8"	5	A-FPA-3-V 0-2': 4" gravel. Brown fine and medium SAND. Dry. No odor, no soil staining.	0.25' / Hg

NA = Not Applicable

Note: Depth indicated for soil description and sample intervals are in feet below concrete slab.

RIA-FPA3.XLS

ERM-Northeast

175 Froehlich Farm Blvd., Woodbury, New York 11797

LOG OF BORING: Building U: Former plating area

Project Name & Location	Project Number
Becton Dickinson & Co. East Rutherford, New Jersey	186.094.11
Drilling Company	**Sampling Method**
Aquifer Testing and Drilling	Split Spoon
ERM-Northeast Geologist/Engineer	**Sampling Equipment**
John Sheehan	Sledge Hammer

DEPTH (ft below grade)	SAMPLES: Date	Recovery (ft.)	Blow per 6 in.	Concrete core thickness	Distance rom X (ft.)	A-FPA-4 SUB-BUILDING DELINEATION SAMPLING SOIL DESCRIPTION	Sample Interval/ Analytical Parameters
0 1 2 3 4	31-May	1.4 1.6	NA NA	8"	0 0	A-FPA-4X2 and A-FPA-4X3 0.5-2.5': Reddish brown and brown fine SAND with some gravel and fractured shale fragments. Moist at top, dry at tip. No odor, no soil staining. A-FPA-4X4 and A-FPA-4X5 2.5-4.5': Dark brown and brown fine SAND with traces of gravel. Well sorted. Finer material than above. Dry. No odor, no stain.	0.5-1.5' / Ni 1.5-2.5' / Ni 2.5-3.5' / Ni 3.5-4.5' / Ni
0 1 2	8-Jun	1.8	NA	8"	5	A-FPA-4-T 0-2': Dark brown fine SAND and SILT trending to a brown fine SAND with some medium sand. Dry. No odor, no soil staining.	0.75' / Ni
0 1 2	8-Jun	1.7	NA	7"	5	A-FPA-4-U 0-2': Brown fine SAND with some silt and a trace of gravel. Dry. No odor, no soil staining.	0.75' / Ni
0 1 2	8-Jun	1.7	NA	8"	5	A-FPA-4-V 0-2': Dark brown fine SAND and SILT trending to a white fine and medium SAND with some coarse sand and fine gravel (fill). This sample was collected outside building therefore the depth corresponds to inside building.	0.75' / Ni
0 1 2	8-Jun	1.2	NA	8"	5	A-FPA-4-W 0-2': Brown fine SAND with silt, trending to a light brown fine sand fill material. Dry. No odor, no soil staining.	0.75' / Ni
0 1 2	15-Jun	1.1	NA	8"	10	A-FPA-4-T-5 0-2': Light brown fine SAND. Well sorted (fill material). Dry. No odor, no soil staining.	0.75' / Ni
0 1 2	15-Jun	1.7	NA	8"	10	A-FPA-4-U-5 0-2': Dark brown silty SAND, trending to a brown fine SAND. More sand than seen in the area. Dry. No odor, no soil staining.	0.75' / Ni

NA = Not Applicable

Note: Depth indicated for soil description and sample intervals are in feet below concrete slab.

ERM-Northeast

175 Froehlich Farm Blvd., Woodbury, New York 11797

LOG OF BORING: Building U: Former plating area

Project Name & Location	Project Number
Becton Dickinson & Co. East Rutherford, New Jersey	186.094.11
Drilling Company	**Sampling Method**
Aquifer Testing and Drilling	Split Spoon
ERM-Northeast Geologist/Engineer	**Sampling Equipment**
John Sheehan	Sledge Hammer

DEPTH (ft below grade)	SAMPLES					A-FPA-4 SUB-BUILDING DELINEATION SAMPLING SOIL DESCRIPTION	Sample Interval/ Analytical Parameters
	Date	Recovery (ft.)	Blow per 6 in.	Concrete core thickness	Distance rom X (ft.)		
0 1 2	21-Jun	1.1	NA	7"	15	A-FPA-4-T-10 0-2': Brown fine SAND with some silt, trace of medium sand. Dry. No odor. No soil staining.	0.75' / Ni
0 1 2	21-Jun	1.7	NA	7"	15	A-FPA-4-U-10 0-2': Reddish Brown fine SAND trending to a lighter brown SAND. Some gravel towards tip area. Dry. No odor. No soil staining.	0.75' / Ni
0 1 2	21-Jun	1.1	NA	7"	20	A-FPA-4-U-15 0-2': Light brown fine SAND with some coarse SAND and a trace of gravel. Dry. No odor, no soil staining.	0.75' / Ni
0 1 2	1-Jul	1.2	NA	7"	25	A-FPA-4-U-20 0-2': Reddish brown fine SAND and silt with fragmented shale, trending to a brown fine SAND. Dry. No odor, no soil staining.	0.75' / Ni
0 1 2	29-Jun	1.1	NA	18"	30	A-FPA-4-V-25 0-2': Light brown fine SAND and silt. Well sorted material, soft. Dry. No odor, no soil staining.	0.75' / Ni

NA = Not Applicable

Note: Depth indicated for soil description and sample intervals are in feet below concrete slab.

ERM-Northeast

175 Froehlich Farm Blvd., Woodbury, New York 11797

LOG OF BORING: Building A: Former plating area

Project Name & Location	Project Number
Becton Dickinson & Co. East Rutherford, New Jersey	186.094.11
Drilling Company	**Sampling Method**
Aquifer Testing and Drilling	Split Spoon
ERM-Northeast Geologist/Engineer	**Sampling Equipment**
John Sheehan	Sledge Hammer

DEPTH (ft below grade)	SAMPLES Date	Recovery (ft.)	Blow per 6 in.	Concrete core thickness	Distance from X (ft.)	A-FPA-5 SUB-BUILDING DELINEATION SAMPLING SOIL DESCRIPTION	Sample Interval/ Analytical Parameters
0 1 2 3	31-May	1.4 1.6	NA NA	8"	0 0	A-FPA-5X2 and A-FPA-5X3 0.5-2.5': Brown and reddish brown fine and medium SAND and fractured shale fragments (bedrock). No odor. A-FPA-5X4 and A-FPA-5X5 2.5-4.5': Brown and reddish brown fine and medium SAND with some fractured shale fragments. No odor.	0.5-1.5 / Ni 1.5-2.5 / Ni 2.5-3.5 / Ni 3.5-4.5 / Ni
0 1 2	8-Jun	1.6	NA	6"	5	A-FPA-5-T 0-2': Brown fine SAND and SILT with occasional gravel. Dry. No odor, no soil staining.	0.25' / Ni
0 1 2	8-Jun	1.6	NA	6"	5	A-FPA-5-U 0-2': Brown fine SAND with some silt and Coarse Sand, occasional gravel. Dry. No odor, no soil staining.	0.25' / Ni
0 1 2	8-Jun	1.7	NA	6"	5	A-FPA-5-V 0-2': Light brown fine and medium SAND with coarse sand, trace gravel fill material. Dry. No odor, no soil staining.	0.25' / Ni
0 1 2	8-Jun	1.4	NA	7"	5	A-FPA-5-W 0-2': Brown fine SAND with silt, some gravel fill material. Dry. No odor, no soil staining.	0.25' / Ni
0 1 2	14-Jun	1.1	NA	7"	10	A-FPA-5-T-5 0-2': 7" Brown and dark brown fine SAND and silt, trace of clay an gravel. Dry. No odor, no soil staining.	0.25' / Ni
0 1 2	14-Jun	1.7	NA	6"	10	A-FPA-5-U-5 0-2': Brown SILT and CLAY with some fine sand, finer material than seen in the area. Dry. No odor, no soil staining.	0.25' / Ni
0 1 2	14-Jun	1.1	NA	7"	10	A-FPA-5-V-5 0-2': Dark brown trending to brown fine SAND with silt, more sandier towards tip. Dry. No odor, no soil staining.	0.25' / Ni

NA = Not Applicable

Note: Depth indicated for soil description and sample intervals are in feet below concrete slab.

RIA-FPA5.XLS

ERM-Northeast

175 Froehlich Farm Blvd., Woodbury, New York 11797

LOG OF BORINGS: Building U: Former metal machining and degreasing area

Project Name & Location Becton Dickinson & Co. East Rutherford, New Jersey	Project Number 186.094.11
Drilling Company Aquifer Testing and Drilling	Sampling Method Split Spoon
ERM-Northeast Geologist/Engineer John Sheehan	Sampling Equipment Sledge Hammer

DEPTH (ft below grade)	SAMPLES Date	Recovery (ft.)	Blow per 6 in.	Concrete core thickness	Distance from X (ft.)	U-MMD-2 SUB-BUILDING DELINEATION SAMPLING SOIL DESCRIPTION	Sample Interval/ Analytical Parameters
0 1 2 3 4	31-May	1.4 1.7	NA NA	8"	0	U-MMD-2X 0.5-2.5': Dark brown fine and medium SAND, with some gravel. No odor, no soil staining. Unsorted material. 2.5-4.5': Dark brown and brown fine SAND, with a trace of gravel. Well sorted. Finer than above. Dry. No odor, no soil staining.	0.5-1.5', 1.5-2.5'/ Hg 2.5-3.0', 3.5-4.5'/ Hg
0 1 2	14-Jun	1.1	NA	7"	5	U-MMD-2-T 0-2': Brown fine and medium SAND, with a trace of gravel. Well sorted, soft material. Dry. No odor, no soil staining.	0.25'/Hg
0 1 2	14-Jun	0	NA	8"	5	U-MMD-2-U 0-2': Refusal, no sample.	0.25'/Hg
0 1 2	14-Jun	1.1	NA	8"	5	U-MMD-2-V 0-2': Brown and reddish brown fine SAND, well sorted. Dry. No odor, no soil staining.	0.25'/Hg
0 1 2	14-Jun	1.2	NA	8"	5	U-MMD-2-W 0-2': Brown fine and medium SAND, trace of gravel. Dry. No odor, no soil staining.	0.25'/Hg

NA = Not Applicable

Note: Depth indicated for soil description and sample intervals are in feet below concrete slab.

RIU-MMD2.XLS

ERM-Northeast

175 Froehlich Farm Blvd., Woodbury, New York 11797

LOG OF BORINGS: Building U: Former metal machining and degreasing area

Project Name & Location Becton Dickinson & Co. East Rutherford, New Jersey	Project Number 186.094.11
Drilling Company Aquifer Testing and Drilling	Sampling Method Split Spoon
ERM-Northeast Geologist/Engineer John Sheehan	Sampling Equipment Sledge Hammer

DEPTH (ft below grade)	SAMPLES: Date	Recovery (ft.)	Blow per 6 in.	Concrete core thickness	Distance from X (ft.)	U-MMD-3 SUB-BUILDING DELINEATION SAMPLING SOIL DESCRIPTION	Sample Interval/ Analytical Parameters
0 1 2 3 4	31-May	1.6 1.8	NA NA	8"	0	U-MMD-3X 0.5-2.5': Dark brown fine and medium SAND, with gravel and fragments of shale. No odor, no soil staining. Coarser material. 2.5-4.5': Dark brown and reddish brown fine and medium SAND. Moist. No odor no soil staining.	0.5-1.5', 1.5-2.5'/Pb 2.5-3.0', 3.5-4.5'/Pb
0 1 2	13-Jun	1.6	NA	7"	5	UMMD-3-T 0-2': Brown and Dark brown fine SAND with some silt and a trace of gravel. Dry. No odor, no soil staining.	0.75'/Pb
0 1 2	13-Jun	1.7	NA	8"	5	U-MMD-3-U 0-2': Brown and reddish brown fine SAND with some silt and fractured shale. Dry. No odor, no soil staining.	0.75'/Pb
0 1 2	13-Jun	1.7	NA	8"	5	U-MMD-3-V 0-2': Dark Brown and reddish brown fine SAND and SILT with fractured shale and gravel. Dry. No odor, no soil staining.	0.75'/Pb
0 1 2	13-Jun	1.2	NA	8"	5	U-MMD-3-W 0-2': Dark brown fine and medium SAND trending to a reddish brown fractured shale and gravel. Dry. No odor, no soil staining.	0.75'/Pb

NA = Not Applicable

Note: Depth indicated for soil description and sample intervals are in feet below concrete slab.

ERM-Northeast

175 Froehlich Farm Blvd., Woodbury, New York 11797

LOG OF BORINGS: Building U: Former metal machining and degreasing area

Project Name & Location	Project Number
Becton Dickinson & Co. East Rutherford, New Jersey	186.094.11
Drilling Company	**Sampling Method**
Aquifer Testing and Drilling	Split Spoon
ERM-Northeast Geologist/Engineer	**Sampling Equipment**
John Sheehan	Sledge Hammer

DEPTH (ft below grade)	SAMPLES Date	Recovery (ft.)	Blow per 6 in.	Concrete core thickness	Distance from X (ft.)	U-MMD-4 SUB-BUILDING DELINEATION SAMPLING SOIL DESCRIPTION	Sample Interval/ Analytical Parameters
0 1 2	13-Jun	1.5	NA	7"	5	UMMD-4-T 0-2': Brown and Dark brown fine and medium SAND with a trace of gravel trace and coarse sand. Dry. No odor, no soil staining.	0.75'/Pb
0 1 2	13-Jun	1.7	NA	8"	5	U-MMD-4-U 0-2': Brown and Dark Brown fine and medium SAND with a trace of gravel. Dry. No odor, no soil staining.	0.75'/Pb
0 1 2	13-Jun	1.4	NA	7"	5	U-MMD-4-V 0-2': Light brown and brown fine and medium SAND with a trace of coarse sand. Dry. No odor, no soil staining.	0.75'/Pb
0 1 2	13-Jun	1.2	NA	8"	5	U-MMD-4-W 0-2': Brown fine and medium SAND with some coarse sand. Dry. No odor, no soil staining.	0.75'/Pb
0 1 2 3 4	31-May	1.2 1.7	NA NA	8"	0 0	U-MMD-4X (second round of samples) 0.5-2.5': Brown fine and medium SAND, with trace of gravel. Some white crystals present. Dry. No odor, no soil staining. 2.5-4.5': Light brown and brown fine and medium SAND, with a trace of gravel. No odor no soil staining.	0.5-1.5', 1.5-2.5'/Pb 2.5-3.0', 3.5-4.5'/Pb
0 1 2	14-Jun	1.1	NA	7"	5	UMMD-4-T (second round of samples) 0-2': Brown fine and medium SAND with some gravel. Some glass fragments present. Dry. No odor, no soil staining.	0.25'/Pb
0 1 2	14-Jun	1.1	NA	8"	5	U-MMD-4-U (second round of samples) 0-2': Brown and light brown fine and medium sand. Black fragments present. Dry. No odor, no soil staining.	0.25'/Pb

NA = Not Applicable

Note: Depth indicated for soil description and sample intervals are in feet below concrete slab.

ERM-Northeast

175 Froehlich Farm Blvd., Woodbury, New York 11797

LOG OF BORINGS: Building U: Former metal machining and degreasing area

Project Name & Location Becton Dickinson & Co. East Rutherford, New Jersey	Project Number 186.094.11
Drilling Company Aquifer Testing and Drilling	Sampling Method Split Spoon
ERM-Northeast Geologist/Engineer John Sheehan	Sampling Equipment Sledge Hammer

DEPTH (ft below grade)	SAMPLES					U-MMD-4 SUB-BUILDING DELINEATION SAMPLING SOIL DESCRIPTION	Sample Interval/ Analytical Parameters
	Date	Recovery (ft.)	Blow per 6 in.	Concrete core thickness	Distance from X (ft.)		
0 1 2	14-Jun	1.2	NA	9"	5	U-MMD-4-V (second round of samples) 0-2': Brown fine and medium SAND. Well sorted soft material. Dry. No odor, no soil staining.	0.25'/Pb
0 1 2	20-Jun	1.7	NA	10"	10	U-MMD-4-V-5 0-2': Brown and light brown fine SAND, well sorted, Occational gravel. Dry. No odor, no soil staining.	0.25'/Pb
0 1 2	24-Jun	1.6	NA	10"	15	U-MMD-4-V-10 0-2': Brown fine and medium SAND, well sorted, trace of fine gravel. Dry. No odor, no soil staining.	0.25'/Pb

NA = Not Applicable

Note: Depth indicated for soil description and sample intervals are in feet below concrete slab.

RIU-MMD4.XLS

ERM-Northeast

175 Froehlich Farm Blvd., Woodbury, New York 11797

LOG OF BORINGS: Building U: Former metal pressing area

Project Name & Location Becton Dickinson & Co. East Rutherford, New Jersey	**Project Number** 186.094.11
Drilling Company Aquifer Testing and Drilling	**Sampling Method** Split Spoon
ERM-Northeast Geologist John Sheehan/Theodore Masters	**Sampling Equipment** Sledge Hammer

DEPTH (ft below grade)	SAMPLES: Date	Recovery (ft.)	Blow per 6 in.	Concrete core thickness	Distance from X (ft.)	UMP-1 SUB-BUILDING DELINEATION SAMPLING SOIL DESCRIPTION	Sample Interval/ Analytical Parameters
0	10-Jun	1.2	NA	8"	0	U-MP-1 0-2' Brown fine SAND and SILT, with occasional gravel. Very compact. Dry. No odor, no soil staining.	0.5-1.5'/Pb, Cu, Zn, Hg
1							1.5-2.5'/Pb, Cu, Zn, Hg
2	10-Jun	1.1	NA		0	2.0-4.0' Dark brown fine SAND with some to a trace of gravel. Very compac Dry. No odor, no soil staining.	2.5-3.0/Pb, Cu, Zn, Hg
3							3.5-4.5'/Pb, Cu, Zn, Hg
4	10-Jun	0.7	NA		0	4.0-6.0' Dark brown fine SAND and SILT, trending to a light brown CLAY. Dry. No odor, no soil staining.	4.5-5.5'/Pb, Cu, Zn, Hg
5							5.5-6.5'/Pb, Cu, Zn, Hg
6							
0	20-Jun	1.4	NA	5"	5	U-MP-1-T 0-2': Brown fine SAND with some silt and a trace of clay. Compact material. Dry. No odor, no soil staining.	1.25'/Cu, Hg, Zn, Pb
1							
2							
0	20-Jun	1.1	NA	7"	5	U-MP-1-U 0-2': Brown fine SAND with silt a and trace of clay. Dry. No odor, no soil staining.	1.25'/Cu, Hg, Zn, Pb
1							
2							
0	20-Jun	1.7	NA	10"	5	U-MP-1-V 0-2': Brown fine SAND with some silt and medium sand. Dry. No odor, no soil staining.	1.25'/Cu, Hg, Zn, Pb
1							
2							
0	20-Jun	1.8	NA	8"	5	U-MP-1-W Top 0.9': Brown and whitish brown fine SAND and SILT. Dry. No odor, some black soil staining. 0.9-1.8': Brown fine SAND and SILT with some clay. Some shale fragments present. Compact material. No odor, no soil staining.	1.25'/Cu, Hg, Zn, Pb
1							
2							
0	24-Jun	1.1	NA	7"	10	U-MP-1-T-5 0-2': Brown fine and medium SAND with some gravel. Dry. No odor, no soil staining.	1.25'/Cu, Hg
1							
2							

NA = Not Applicable

Note: Depth indicated for soil description and sample intervals are in feet below concrete slab.

175 Froehlich Farm Blvd., Woodbury, New York 11797

LOG OF BORINGS: Building U: Former metal pressing area

Project Name & Location	Project Number
Becton Dickinson & Co. East Rutherford, New Jersey	186.094.11
Drilling Company	**Sampling Method**
Aquifer Testing and Drilling	Split Spoon
ERM-Northeast Geologist	**Sampling Equipment**
John Sheehan/Theodore Masters	Sledge Hammer

DEPTH (ft below grade)	SAMPLES					UMP-1 SUB-BUILDING DELINEATION SAMPLING SOIL DESCRIPTION	Sample Interval/ Analytical Parameters
	Date	Recovery (ft.)	Blow per 6 in.	Concrete core thickness	Distance from X (ft.)		
0 1 2	24-Jun	1.7	NA	7"	10	U-MP-1-U-5 0-2': Light brown fine SAND with a trace of fine gravel. Well sorted material. Dry. No odor, no soil staining.	1.25'/Cu, Hg
0 1	24-Jun	1.7	NA	4"	10	U-MP-1-V-5 0-2': Brown fine and medium SAND with some gravel. Concrete in tip. Dry. No odor, no soil staining.	1.25'/Hg, Pb
0 1 2	24-Jun	1.7	NA	6"	10	U-MP-1-W-5 0-2': Brown fine SAND with some gravel. Dry No odor, no soil staining.	1.25'/Hg
0 1 2	29-Jun	1.1	NA	8"	15	U-MP-1-T-10 0-2': Brown fine SAND with some silt and a trace of gravel. Cobble at tip of spoon (sandstone).	1.25'/Cu, Hg
0 1 2	29-Jun	1.6	NA	8"	15	U-MP-1-V-10 0-2': Brown fine SAND with some silt, gravel and coarse sand. Unsorted material. Dry. No odor, no soil staining.	1.25'/Hg
0 1 2	29-Jun	1.7	NA	8"	15	U-MP-1-W-10 0-2': Dark brown fine SAND and SILT with occasional gravel and fractured shale. Dry. No odor, no soil staining.	1.25'/Hg
0 1 2	1-Jul	1.1	NA	8"	20	U-MP-1-T-15 0-2': Brown fine SAND with silt and a trace of coarse sand and gravel. Dry. No odor, no soil staining.	1.25'/Hg

NA = Not Applicable

Note: Depth indicated for soil description and sample intervals are in feet below concrete slab.

175 Froehlich Farm Blvd., Woodbury, New York 11797

LOG OF BORINGS: Building U: Former metal pressing area

Project Name & Location	Project Number
Becton Dickinson & Co. East Rutherford, New Jersey	186.094.11
Drilling Company	**Sampling Method**
Aquifer Testing and Drilling	Split Spoon
ERM-Northeast Geologist	**Sampling Equipment**
John Sheehan/Theodore Masters	Sledge Hammer

DEPTH (ft below grade)	SAMPLES					UMP-1 SUB-BUILDING DELINEATION SAMPLING SOIL DESCRIPTION	Sample Interval/ Analytical Parameters
	Date	Recovery (ft.)	Blow per 6 in.	Concrete core thickness	Distance from X (ft.)		
0 1 2	1-Jul	1.1	NA	8.5"	20	U-MP-1-V-15 0-2': Light brown fine SAND with silt and a trace of gravel. Darker and denser material with depth. Dry. No odor, no soil staining.	1.25'/Hg
0 1 2	1-Jul	1.4	NA	9"	20	U-MP-1-W-15 0-2': Brown and light brown fine SAND with some silt and gravel. Hard material. No odor, no soil staining.	1.25'/Hg
0 1 2	19-Jul	1.1	NA	8"	25	U-MP-1-T-20 0-2': Dark brown and reddish brown fine SAND and SILT with some reddish shale fragments. A trace of coal fragments present. No odor, no soil staining, dry.	1.25'/Hg
0 1 2	19-Jul	1.2	NA	8"	25	U-MP-1-V-20 0-2': Dark brown fine SAND with some silt and a trace of black coal fragments.	1.25'/Hg
0 1 2	19-Jul	1.2	NA	8"	25	U-MP-1-W-20 0-2': Brown to reddish brown fine SAND and SILT. Some white ash-like material, black coal and reddish shale fragments present.	1.25'/Hg
0 1 2	19-Jul	1.2	NA	8"	30	U-MP-1-T-25 0-2': Dark brown to reddish brown fine SAND and SILT with a trace of black coal and coarse angular gravel. Dry. No odor, no soil staining.	1.25'/Hg
0 1 2	19-Jul	1	NA	8"	30	U-MP-1-V-25 0-2': Dark brown fine SAND and SILT with some fragments of coal, and a trace of white, ash-like material and fragments of reddish shale.	1.25' Hg
0 1 2	19-Jul	1.1	NA	8"	30	U-MP-1-W-25 0-2': Brown and reddish brown fine SAND and SILT with some angular gravel and white ash-like material. Coal fragments present throughout sample. Dry. Slight petroleum like odor and dark soil staining at tip of spoon.	1.25'/Hg

NA = Not Applicable

Note: Depth indicated for soil description and sample intervals are in feet below concrete slab.

175 Froehlich Farm Blvd., Woodbury, New York 11797

LOG OF BORINGS: Building U: Former metal pressing area

Project Name & Location Becton Dickinson & Co. East Rutherford, New Jersey	Project Number 186.094.11
Drilling Company Aquifer Testing and Drilling	Sampling Method Split Spoon
ERM-Northeast Geologist John Sheehan/Theodore Masters	Sampling Equipment Sledge Hammer

DEPTH (ft below grade)	SAMPLES Date	Recovery (ft.)	Blow per 6 in.	Concrete core thickness	Distance from X (ft.)	UMP-1 SUB-BUILDING DELINEATION SAMPLING SOIL DESCRIPTION	Sample Interval/ Analytical Parameters
0 1 2	28-Jul	1.8	NA	8"	35	U-MP-1-T-30 0-2': Brown fine SAND and SILT with some very coarse angular gravel (bluestone and quartz) and a trace of white ash material and glass. Dry. No odor, no soil staining.	1.25'/Hg
0 1 2	28-Jul	1.4	NA	8"	35	U-MP-1-W-30 0-2': Brown fine SAND and SILT grading to a reddish brown fine SAND and SILT. Traces of fine gravel, coal fragments and glass present. Dry. No odor no soil staining.	1.25'/Hg
0 1 2	28-Jul	1.3	NA	8"	40	U-MP-1-T-35 0-2': Brown and fine SAND and SILT with some fine and coarse gravel fragments. Fragment of thick glass (clear) at 1.5'. Dry. No odor, no soil staining.	1.25'/Hg
0 1 2	28-Jul	1.6	NA	8"	40	U-MP-1-W-35 0-2': Brown and dark brown fine SAND and SILT with some fine gravel and coal fragments. Trace of white ash material present. Dry. No odor, no soil staining.	1.25'/Hg
0 1 2	28-Jul	1.6	NA	8"	45	U-MP-1-T-40 0-2': Brown fine SAND and SILT with some coarse gravel and a trace of white ash-like material. Fragment of what appears to be a glass thermometer (small cylinder with white backing). No odor, no soil staining.	1.25'/Hg
0 1 2	28-Jul	1.8	NA	8"	45	U-MP-1-W-40 0-2': Brown fine SAND and SILT with some reddish brown coarse shale fragments. Trace of coal and white ash-like material present. Dry. No odor, no soil staining.	1.25'/Hg
0 1 2	28-Jul	1.5	NA	8"	50	U-MP-1-T-45 0-2': Brown, with some reddish brown, fine SAND and SILT with little coarse gravel. Trace of white ash material, glass and porcelain like fragments present. No odor, no soil staining	1.25'/Hg

NA = Not Applicable

Note: Depth indicated for soil description and sample intervals are in feet below concrete slab.

175 Froehlich Farm Blvd., Woodbury, New York 11797

LOG OF BORINGS: Building U: Former metal pressing area

Project Name & Location	Project Number
Becton Dickinson & Co. East Rutherford, New Jersey	186.094.11
Drilling Company	**Sampling Method**
Aquifer Testing and Drilling	Split Spoon
ERM-Northeast Geologist	**Sampling Equipment**
John Sheehan/Theodore Masters	Sledge Hammer

DEPTH (ft below grade)	SAMPLES					UMP-1 SUB-BUILDING DELINEATION SAMPLING SOIL DESCRIPTION	Sample Interval/ Analytical Parameters
	Date	Recovery (ft.)	Blow per 6 in.	Concrete core thickness	Distance from X (ft.)		
0 1 2	28-Jul	1.6	NA	8"	50	U-MP-1-W-45 0-2': Brown fine SAND and SILT with some subrounded coarse gravel and a trace of porcelain fragments, coal, cinders and white ash-like material. No odor, no soil staining.	1.25'/Hg
0 1 2	28-Jul	1.5	NA	8"	55	U-MP-1-T-50 0-2': Brown fine SAND and SILT with some coarse reddish brown gravel and a trace of coal fragments. Large chunks of thick glass present. No odor, no soil staining.	1.25'/Hg
0 1 2	28-Jul	1.2	NA	8"	55	U-MP-1-W-50 0-2': Brown fine SAND with some silt and a trace of fine gravel. Trace of white ash-like material present. No odor, no soil staining.	1.25'/Hg
0 1 2	17-Aug	1.3	NA	7"	60	U-MP-1-T-55 0-2': Brown fine SAND and SILT with a trace of fractured shale and white ash-like material. Dry. No odor, no soil staining.	1.25'/Hg
0 1 2	25-Oct	1.5	NA	8"	60	U-MP-1-W-55 0-2': Dark brown fine SAND and SILT with some clay. Trace of gravel. Dry. No odor, no soil staining.	1.25'/Hg
0 1 2	17-Aug	1.2	NA	8"	65	U-MP-1-T-60 0-2': Brown fine SAND and SILT with some fractured shale and a trace of glass fragments. No odor, no soil staining.	1.25'/Hg
0 1 2	25-Oct	1.2	NA	8"	65	U-MP-1-W-60 0-2': Brown and dark brown fine SAND and SILT. Trace of gravel No odor, no soil staining.	1.25'/Hg
0 1 2	17-Aug	1.8	NA	8"	70	U-MP-1-T-65 0-2': Brown to reddish brown fine SAND and SILT with some fine gravel and coal fragments, Dry. No odor, no soil staining.	1.25'/Hg & Cu

NA = Not Applicable
Note: Depth indicated for soil description and sample intervals are in feet below concrete slab.

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LOG OF BORINGS: Building U: Former metal pressing area

Project Name & Location	Project Number
Becton Dickinson & Co. East Rutherford, New Jersey	186.094.11
Drilling Company	**Sampling Method**
Aquifer Testing and Drilling	Split Spoon
ERM-Northeast Geologist	**Sampling Equipment**
John Sheehan/Theodore Masters	Sledge Hammer

DEPTH (ft below grade)	SAMPLES					UMP-1 SUB-BUILDING DELINEATION SAMPLING SOIL DESCRIPTION	Sample Interval/ Analytical Parameters
	Date	Recovery (ft.)	Blow per 6 in.	Concrete core thickness	Distance from X (ft.)		
0 1 2	17-Aug	1.8	NA	8"	75	U-MP-1-T-70 0-2': Brown to reddish brown fine SAND and SILT with some fine gravel. Fragment of fractured glass (appears to be from a thermometer) present. Dry. No odor, no soil staining.	1.25'/Hg & Cu
0 1 2	17-Aug	1.6	NA	8"	80	U-MP-1-T-75 0-2': Brown to reddish brown fine SAND and SILT with some fragments of brick and bluestone gravel. Dry. No odor, no soil staining.	1.25'/Hg & Cu
0 1 2	17-Aug	1	NA	8"	85	U-MP-1-T-80 0-2': Brown to reddish brown fine SAND and SILT with some coarse gravel in tip of spoon. Wet from coring water. No odor, no soil staining.	1.25'/Hg
0 1 2	17-Aug	1.2	NA	8"	90	U-MP-1-T-85 0-2': Brown and reddish brown fine SAND and SILT with some fragments of brick and coal. Dry to moist. No odor, no soil staining. at top of spoon from coring water.	1.25'/Hg
0 1 2	17-Aug	1.4	NA	8"	95	U-MP-1-T-90 0-2': Brown fine SAND and SILT with some gravel. Abrupt change to a reddish brown SAND (brittle) and fractured shale. Dry, except where coring water penetrated top of sample. No odor, no soil staining.	1.25'/Hg

NA = Not Applicable

Note: Depth indicated for soil description and sample intervals are in feet below concrete slab.

ERM-Northeast

175 Froehlich Farm Blvd., Woodbury, New York 11797

LOG OF BORINGS: Building U: Former metal pressing area

Project Name & Location	Project Number
Becton Dickinson & Co. East Rutherford, New Jersey	186.094.11
Drilling Company	**Sampling Method**
Aquifer Testing and Drilling	Split Spoon
ERM-Northeast Geologist/Engineer	**Sampling Equipment**
John Sheehan	Sledge Hammer

DEPTH (ft below grade)	SAMPLES: Date	Recovery (ft.)	Blow per 6 in.	Concrete core thickness	Distance from X (ft.)	UMP-2 SUB-BUILDING DELINEATION SAMPLING SOIL DESCRIPTION	Sample Interval/ Analytical Parameters
0	25-Oct	1.2	NA	8"	0	U-MP-2 0-2': Brown and dark brown fine and medium SAND with some silt and gravel. Dry. No odor, no soil staining.	0.5-1.5'/Pb,Hg
1							1.5-2.5'/Pb,Hg
2		1.1	NA			2-4': Dark brown fine SAND with some silt and a trace gravel. Dry. No odor, no soil staining.	2.5-3.5'/ Hg
3							3.5-4.5'/ Hg
4		1.2	NA			4-6': Brown and dark brown fine SAND and SILT with a trace of clay and gravel. Dry. No odor, no soil staining.	4.5-5.5'/ Hg
5							5.5-6.5'/ Hg
6		1.6	NA			6-8': Dark brown fine SAND and silt trending to a fine sand. Dry. No odor, no soil staining.	6.5-7.5'/ Hg
7							7.5-8.5'/ Hg
8		1.7	NA			8-10': Dark brown and black fine SILT and clay. Some glass fragments present. Dry. No odor, no soil staining. Brown clay at tip.	8.5-9.5'/ Hg
9							9.5-10.5'/ Hg
10							
0	22-Jun	1.1	NA	8"	5	U-MP-2-T 0-2': Brown and dark brown fine and medium SAND with some gravel. Dry. No odor, no soil staining.	
1							
2		0.9	NA			2-4': Brown fine SAND with some silt and a trace gravel. Traces of coal fragments presents. Dry. No odor, no soil staining.	2.25'/Hg, Pb
3							
4							
0	22-Jun	1.7	NA	8"	5	U-MP-2-U 0-2': Brown fine and medium SAND with some gravel and a trace of silt. Dry. No odor, no soil staining.	
1							
2		1.9	NA			2-4': Dark brown fine SAND with some gravel and silt. Dry. No odor, no soil staining.	2.25'/Hg, Pb
3							
4							

NA = Not Applicable

Note: Depth indicated for soil description and sample intervals are in feet below concrete slab.

ERM-Northeast

175 Froehlich Farm Blvd., Woodbury, New York 11797

LOG OF BORINGS: Building U: Former metal pressing area

Project Name & Location	Project Number
Becton Dickinson & Co. East Rutherford, New Jersey	186.094.11
Drilling Company	**Sampling Method**
Aquifer Testing and Drilling	Split Spoon
ERM-Northeast Geologist/Engineer	**Sampling Equipment**
John Sheehan	Sledge Hammer

DEPTH (ft below grade)	SAMPLES: Date	Recovery (ft.)	Blow per 6 in.	Concrete core thickness	Distance from X (ft.)	UMP-2 SUB-BUILDING DELINEATION SAMPLING SOIL DESCRIPTION	Sample Interval/ Analytical Parameters
0	22-Jun	1.7	NA	9"	5	U-MP-2-V 0-2': Brown fine SAND with some silt and gravel. Some glass material present towards bottom of spoon. Dry. No odor, no soil staining.	
1							
2		1.1	NA			2-4': Dark brown fine SAND with some medium sand and gravel. Dry. No odor, no soil staining.	2.25'/Hg, Pb
3							
4							
0	22-Jun	1.6	NA	8"	5	U-MP-2-W 0-2': Brown fine SAND with a trace of gravel. Dry and brittle. No odor, no soil staining.	
1							
2		2.0	NA			2-4': Dark brown fine and medium SAND with some gravel. Fragments of glass present. Moist towards tip. No odor, no soil staining.	2.25'/Hg, Pb
3							
4							
0	28-Jun	1.1	NA	9"	10	U-MP-2-T-5 0-2': Dark brown fine and medium SAND with a trace of fine gravel. Pieces of coal present. Dry. No odor, no soil staining.	
1							
2		1.2	NA			2-4': Light brown fine SAND with some medium sand and fine gravel. Dry. No odor, no soil staining.	2.25'/Pb
3							
4							
0	28-Jun	1.7	NA	11"	10	U-MP-2-U-5 0-2': Light brown fine and medium SAND with a trace of silt and fine gravel. Dry. No odor, no soil staining.	
1							
2		0.7	NA			2-4': Dark Brown and brown fine SAND with some medium sand. Dry. No odor, no soil staining.	2.25'/Hg
3							
4							

NA = Not Applicable

Note: Depth indicated for soil description and sample intervals are in feet below concrete slab.

ERM-Northeast

175 Froehlich Farm Blvd., Woodbury, New York 11797

LOG OF BORINGS: Building U: Former metal pressing area

Project Name & Location	Project Number
Becton Dickinson & Co. East Rutherford, New Jersey	186.094.11
Drilling Company	**Sampling Method**
Aquifer Testing and Drilling	Split Spoon
ERM-Northeast Geologist/Engineer	**Sampling Equipment**
John Sheehan	Sledge Hammer

DEPTH (ft below grade)	SAMPLES Date	Recovery (ft.)	Blow per 6 in.	Concrete core thickness	Distance from X (ft.)	UMP-2 SUB-BUILDING DELINEATION SAMPLING SOIL DESCRIPTION	Sample Interval/ Analytical Parameters
0	28-Jun	1.1	NA	9"	10	U-MP-2-V-5 0-2': Dark brown fine and medium SAND with some silt and fine gravel. Dry. No odor, no soil staining.	
1							
2		1.2	NA			2-4': Light brown and brown fine SAND, with some silt and gravel. Some glass fragments present. Dry. No odor, no soil staining.	2.25'/Hg
3							
4							
0	28-Jun	1.2	NA	12"	10	U-MP-2-W-5 0-2': Brown fine SAND and SILT with some fine gravel. No odor, no soil staining.	
1							
2		1.4	NA			2-4': Brown fine SAND and SILT with a trace of fine gravel. No odor, no soil staining.	2.25'/Hg
3							
4							
0	1-Jul	1.1	NA	8"	15	U-MP-2-T-10 0-2': Dark brown with an area of black and brick red fine SAND with some silt and a trace of coarse sand. Dry. No odor, no soil staining.	0.5'/Pb
1							
2		1.4	NA			2-4': Dark brown fine SAND with silt and a trace of coarse sand and gravel. Wet in areas due to coring water. Dry. No odor, no soil staining.	2.75'/Pb
3							
4							
0	19-Jul	1.4	NA	8"	15	U-MP-2-T-10 (second round for this location) 0-2': Dark brown sandy SILT with some fine sand and a trace of sub-rounded gravel and fragments of coal and white ash. Wet at top due to coring water, otherwise dry. No odor, no soil staining.	0.5'/Pb
1							
2							
0	1-Nov	1.5	NA	9"	15	U-MP-2-U-10 0-2': Brown fine SAND with some silt and medium sand.Trace of brick fragments. Dry. No odor, no soil staining.	
1							
2		1.7	NA			2-4': Brown and reddish brown fine SAND with some silt and coarse sand. Brick fragments present. Dry. No odor, no soil staining.	3.25'/Hg
3							
4							

NA = Not Applicable

Note: Depth indicated for soil description and sample intervals are in feet below concrete slab.

ERM-Northeast

175 Froehlich Farm Blvd., Woodbury, New York 11797

LOG OF BORINGS: Building U: Former metal pressing area

Project Name & Location	Project Number
Becton Dickinson & Co. East Rutherford, New Jersey	186.094.11
Drilling Company	**Sampling Method**
Aquifer Testing and Drilling	Split Spoon
ERM-Northeast Geologist/Engineer	**Sampling Equipment**
John Sheehan	Sledge Hammer

DEPTH (ft below grade)	SAMPLES					UMP-2 SUB-BUILDING DELINEATION SAMPLING SOIL DESCRIPTION	Sample Interval/ Analytical Parameters
	Date	Recovery (ft.)	Blow per 6 in.	Concrete core thickness	Distance from X (ft.)		
0	29-Jun	1.1	NA	8"	15	U-MP-2-V-10 0-2': Light brown fine SAND with some silt and gravel. Dry. No odor, no soil staining.	0.5'/Hg
1							
2		1.4	NA			2-4': Brown fine SAND with some silt and coarse sand. Finer material than above. Dry. No odor, no soil staining.	2.75'/Hg
3							
4							
0	1-Jul	1.7	NA	8"	15	U-MP-2-W-10 0-2': Dark brown and brown fine SAND with silt and a trace of coarse sand and gravel. No odor, no soil staining.	0.5'/Hg
1							
2		1.4	NA			2-4': Dark brown with an area of black, fine SAND with silt and a trace of fine gravel. Dry. No odor, no soil staining.	2.75'/Hg
3							
4							
0	19-Jul	0.7	NA	12"	20	U-MP-2-T-15 0-2': Dark brown to reddish brown sandy SILT with some coarse gravel and traces of glass and coal fragments. Dry, no odor, no soil staining.	0.5'/Hg
1							
2		1.2	NA			2-4': Dark reddish brown sandy SILT with some gravel (shale) grading to a dark brown fine SAND with a trace of coal and white ash-like material. Dry, no odor or soil staining, no glass.	3.25'/Hg
3							
4							
0	19-Jul	1.7	NA	8"	20	U-MP-2-W-15 0-2': Dark brown SAND and SILT with a trace of coal fragments and white ash. Dry. No odor, no soil staining.	
1							
2		1.2	NA			2-4': Dark brown fine SAND and SILT with a trace of coarse angular gravel. Traces of white ash-like material and glass fragments present.	2.25'/Hg
3							
4							

NA = Not Applicable

Note: Depth indicated for soil description and sample intervals are in feet below concrete slab.

ERM-Northeast
175 Froehlich Farm Blvd., Woodbury, New York 11797

LOG OF BORINGS: Building U: Former metal pressing area

Project Name & Location	Project Number
Becton Dickinson & Co. East Rutherford, New Jersey	186.094.11
Drilling Company	**Sampling Method**
Aquifer Testing and Drilling	Split Spoon
ERM-Northeast Geologist/Engineer	**Sampling Equipment**
John Sheehan	Sledge Hammer

DEPTH (ft below grade)	SAMPLES					UMP-2 SUB-BUILDING DELINEATION SAMPLING SOIL DESCRIPTION	Sample Interval/ Analytical Parameters
	Date	Recovery (ft.)	Blow per 6 in.	Concrete core thickness	Distance from X (ft.)		
0	1-Nov	1.5	NA	12"	25	U-MP-2-T-20 0-2': Dark brown fine SAND and SILT with some coarse to medium gravel and a trace of glass fragments. Dry. No odor, no soil staining,	
1							
2		1.7	NA			2-4': Brown and reddish brown fine SAND and SILT. Trace of clay. No odor, no soil staining,	3.25'/Hg
3							
4							
0	19-Jul	1.3	NA	12"	26	U-MP-2-W-20 0-2': Brown fine SAND and SILT with some coarse to medium gravel and a trace of coal fragments. Wet from coring water. No odor, no soil staining,	
1							
2		1.1	NA			2-4': Brown to reddish brown fine SAND and SILT with some coarse reddish shale fragments.	3.25'/Hg
3							
4							
0	2-Nov	1.2	NA	12"	30	U-MP-2-T-25 0-2': Brown fine SAND and SILT with some coarse to medium gravel and a trace of brick fragments. Dry. No odor, no soil staining,	
1							
2		1.7	NA			2-4': Brown SAND and SILT with some reddish brown shale fragments. Dry. No odor, no soil staining,	3.25'/Hg
3							
4							
0	1-Nov	1.5	NA	12"	30	U-MP-2-W-25 0-2': Dark brown and areas of black fine SAND and SILT with a trace of clay. Some glass fragments present. Dry. No odor, no soil staining,	
1							
2		1.1	NA			2-4': Dark brown and areas of black fine SAND and SILT. Some to trace Clay. Dry. No odor. No soil staining.	3.25'/Hg
3							
4							

NA = Not Applicable
Note: Depth indicated for soil description and sample intervals are in feet below concrete slab.

ERM-Northeast

175 Froehlich Farm Blvd., Woodbury, New York 11797

LOG OF BORINGS: Building U: Former metal pressing area

Project Name & Location	Project Number
Becton Dickinson & Co. East Rutherford, New Jersey	186.094.11
Drilling Company	**Sampling Method**
Aquifer Testing and Drilling	Split Spoon
ERM-Northeast Geologist/Engineer	**Sampling Equipment**
John Sheehan	Sledge Hammer

DEPTH (ft below grade)	SAMPLES Date	Recovery (ft.)	Blow per 6 in.	Concrete core thickness	Distance from X (ft.)	UMP-2 SUB-BUILDING DELINEATION SAMPLING SOIL DESCRIPTION	Sample Interval/ Analytical Parameters
0	2-Nov	1.4	NA	12"	35	U-MP-2-T-30 0-2': Brown fine SAND and SILT with some coarse to medium gravel and a trace of brick fragments. Dry. No odor, no soil staining,	
1							
2		1.6	NA			2-4': Brown SAND and SILT with some reddish brown shale fragments. Dry. No odor, no soil staining,	3.25'/Hg
3							
4							
0	2-Nov	1.2	NA	12"	35	U-MP-2-W-30 0-2': Dark brown fine SAND and SILT with some course sand Trace of gravel. Dry. No odor, no soil staining,	
1							
2		1.4	NA			2-4': Dark brown and areas of black fine SAND and SILT. Some to trace Clay. Some brick fragments present. Dry. No odor. No soil staining.	3.25'/Hg
3							
4							
0	2-Nov	1.5	NA	14"	40	U-MP-2-W-35 0-2': Dark brown and black fine SAND and SILT with some course sand Trace of gravel. Dry. No odor. No soil staining.	
1							
2		1.7	NA			2-4': Dark brown and areas of black fine SAND and SILT. Some to trace clay Some brick fragments present. Dry. No odor. No soil staining.	3.25'/Hg
3							
4							

NA = Not Applicable

Note: Depth indicated for soil description and sample intervals are in feet below concrete slab.

ERM-Northeast

175 Froehlich Farm Blvd., Woodbury, New York 11797

LOG OF BORINGS: Building U: Former metal pressing area

Project Name & Location Becton Dickinson & Co. East Rutherford, New Jersey	**Project Number** 186.094.11
Drilling Company Aquifer Testing and Drilling	**Drill Rig Type/Method** Mobile B-61/HSA
ERM-Northeast Geologist John Sheehan	**Sampling Equipment/Method** Split Spoon

DEPTH (ft below grade)	SAMPLES					UMP-3 SUB-BUILDING DELINEATION SAMPLING SOIL DESCRIPTION	Sample Interval/ Analytical Parameters
	Date	Recovery (ft.)	Blow per 6 in.	Concrete core thickness	Distance from X (ft.)		
0	8-Jun	1.2	7	8"	NA	U-MP-3X 0-2': Brown fine SAND, with some silt and coarse sand. Unsorted material. Fill material. Dry. No odor, no soil staining.	0.5-1.5'/Pb
			7				1.5-2.5'/Pb
1			11				
			7				
2		1.1	11		NA	2-4': Brown fine SAND and medium sand, with some silt (fill material). Dry. No odor no soil staining.	2.5-3.0'/Pb
			14				3.5-4.5'/Pb
3			11				
			12				
4		1.1	17		NA	4-6': Top to 0.7'-Brown fine and medium SAND with some silt.	4.5-5.5'/Pb
			17			0.7 to tip: Reddish brown SILT and SAND with some shale fragments, and gravel. Dry. No odor, no soil staining.	5.5-6.5'/Pb
5			21				
			21				
6							

NA = Not Applicable

Note: Depth indicated for soil description and sample intervals are in feet below concrete slab.

ERM-Northeast

175 Froehlich Farm Blvd., Woodbury, New York 11797

LOG OF BORINGS: Building U: Former metal pressing area

Project Name & Location	Project Number
Becton Dickinson & Co. East Rutherford, New Jersey	186.094.11
Drilling Company	**Sampling Method**
Aquifer Testing and Drilling	Split Spoon
ERM-Northeast Geologist	**Sampling Equipment**
John Sheehan/Theodore Masters	Sledge Hammer

DEPTH (ft below grade)	SAMPLES Date	Recovery (ft.)	Blow per 6 in.	Concrete core thickness	Distance from X (ft.)	UMP-3 SUB-BUILDING DELINEATION SAMPLING SOIL DESCRIPTION	Sample Interval/ Analytical Parameters
0	24-Jun	1.1	NA	8"	5	U-MP-3-T 0-2': Dark brown fine SAND with some silt and fine gravel. Dry. No odor, no soil staining.	0.5'/Pb
1							
2		1.2	NA			2-4': Light brown fine SAND with some silt and fine gravel. Dry. No odor, no soil staining.	2.75'/Pb
3							
4							
0	24-Jun	1.7	NA	14"	5	U-MP-3-U 0-2': Dark brown fine SAND with some silt and a trace of fine gravel. Pieces of brick towards top. Hard material. Dry. No odor, no soil staining.	0.5'/Pb
1							
2		1.5	NA			2-4': Brown fine SAND with some silt and fine gravel. Hard material. Dry. No odor, no soil staining.	2.75'/Pb
3							
4							
0	24-Jun	1.7	NA	17"	5	U-MP-3-V 0-2': Brown fine SAND with some silt and a trace of gravel. Dry. No odor, no soil staining.	
1							
2		1.2	NA			2-4': Dark brown fine SAND with traces of silt and fine gravel. Hard material. Dry. No odor, no soil staining.	2.75'/Pb
3							
4							
0	24-Jun	1.7	NA	12"	5	U-MP-3-W 0-2': Brown fine SAND with some medium sand and fine gravel. Pieces of coal present towards tip of spoon. No odor, no soil staining.	0.5'/Pb
1							
2		1.6	NA			2-4': Brown fine SAND with some silt and a trace of gravel. Hard material. Pieces of coal present. No odor, no soil staining.	2.75'/Pb
3							
4							
0	28-Jun	1.1	NA	10"	5	U-MP-3-T (second round of samples) 0-2': Dark brown fine SAND with some silt and a trace of fine gravel. Dry. No odor, no soil staining.	0.5'/Pb
1							
2							

NA = Not Applicable

Note: Depth indicated for soil description and sample intervals are in feet below concrete slab.

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175 Froehlich Farm Blvd., Woodbury, New York 11797

LOG OF BORINGS: Building U: Former metal pressing area

Project Name & Location	Project Number
Becton Dickinson & Co. East Rutherford, New Jersey	186.094.11
Drilling Company	**Sampling Method**
Aquifer Testing and Drilling	Split Spoon
ERM-Northeast Geologist	**Sampling Equipment**
John Sheehan/Theodore Masters	Sledge Hammer

DEPTH (ft below grade)	SAMPLES: Date	Recovery (ft.)	Blow per 6 in.	Concrete core thickness	Distance from X (ft.)	UMP-3 SUB-BUILDING DELINEATION SAMPLING SOIL DESCRIPTION	Sample Interval/ Analytical Parameters
0 1 2	28-Jun	1.7	NA	8"	5	U-MP-3-U (second round of samples) 0-2': Light brown fine SAND and SILT with a trace of fine and medium gravel. Hard material. Dry. No odor, no soil staining.	0.5'/Pb
0 1 2	28-Jun	1.6	NA	8"	5	U-MP-3-V (second round of samples) 0-2': Dark Brown fine SAND with some silt and fine gravel. Dry. No odor, no soil staining.	0.5'/Pb
0 1 2	28-Jun	1.7	NA	9"	5	U-MP-3-W (second round of samples) 0-2': Brown fine SAND with some silt with a trace of fine gravel. No odor, no soil staining.	0.5'/Pb
0 1 2	1-Jul	1.1	NA	8"	10	U-MP-3-T-5 0-2': Brown and light brown fine and medium SAND with silt and a trace of fine gravel. Dry. No odor, no soil staining.	0.5'/Pb
0 1 2	1-Jul	1.7	NA	8"	10	U-MP-3-U-5 0-2': Dark brown and brown fine SAND and SILT with a trace of gravel and coarse sand. Pieces of glass present. Hard material. Dry. No odor, no soil staining.	0.5'/Pb
0 1 2 3 4	29-Jun	1.1 1.4	NA NA	8"	10	U-MP-3-V-5 0-2': Light brown fine SAND with some silt and gravel. Dry. No odor, no soil staining. 2-4': Brown fine SAND with some silt and coarse sand. Finer material than above. Dry. No odor, no soil staining.	 2.75'/Pb
0 1 2	28-Jun	1.7	NA	8"	10	U-MP-3-W-5 0-2': Dark brown fine SAND and SILT with a trace of gravel. No odor, no soil staining.	0.5'/Pb

NA = Not Applicable

Note: Depth indicated for soil description and sample intervals are in feet below concrete slab.

ERM-Northeast

175 Froehlich Farm Blvd., Woodbury, New York 11797

LOG OF BORINGS: Building U: Former metal pressing area

Project Name & Location	Project Number
Becton Dickinson & Co. East Rutherford, New Jersey	186.094.11
Drilling Company	**Sampling Method**
Aquifer Testing and Drilling	Split Spoon
ERM-Northeast Geologist	**Sampling Equipment**
John Sheehan/Theodore Masters	Sledge Hammer

DEPTH (ft below grade)	SAMPLES: Date	Recovery (ft.)	Blow per 6 in.	Concrete core thickness	Distance from X (ft.)	UMP-3 SUB-BUILDING DELINEATION SAMPLING SOIL DESCRIPTION	Sample Interval/ Analytical Parameters
0	19-Jul	1.2	NA	8"	15	U-MP-3-T-10 0-2': Dark brown and brown fine SAND, SILT and coarse GRAVEL, grading down to a brown fine SAND with little silt. Wet at top due to coring water. Dry, throughout remaining sample.	0.5'/Pb
1							
2		1.1	NA	8"		2-4': Brown fine SAND with some silt and a trace of fine gravel. Wet from coring water. No odor, no soil staining.	2.75'/Pb
3							
4							
0	19-Jul	1.8	NA	8"	15	U-MP-3-U-10 0-2': Dark brown fine SAND and SILT with some fragments of black coal. Dry. No odor, no soil staining.	0.5'/Pb
1							
2		1.4	NA			2-4': Dark brown fine SAND and SILT with a trace of shale and coal fragments. Trace of white ash-like material present in tip of spoon. Dry. No odor, no soil staining	2.75'/Pb
3							
4							
0	19-Jul	1.6	NA	8"	20	U-MP-3-U-15 0-2': Dark brown fine SAND and SILT with little sub-rounded gravel and a trace of coal fragments. Dry. No odor, no soil staining.	0.5'/Pb
1							
2		0.5	NA			2-4': Very dark brown to black fine SAND and SILT with some white ash material. Coarse angular bluestone present in tip of spoon.	2.75/Pb
3							
4							
0	19-Jul	1.1	NA	8"	20	U-MP-3-T-15 0-2': Dark brown to reddish brown fine SAND and SILT with a trace of coal fragments. Dry. No odor, no soil staining.	0.5'/Pb
1							
2		1.2	NA			2-4': Dark brown fine SAND and SILT with a trace of black coal fragments. Dry, no odor, no stain.	2.75'/Pb
3							
4							

NA = Not Applicable

Note: Depth indicated for soil description and sample intervals are in feet below concrete slab.

ERM-Northeast

175 Froehlich Farm Blvd., Woodbury, New York 11797

LOG OF BORINGS: Building U: Former metal pressing area

Project Name & Location	Project Number
Becton Dickinson & Co. East Rutherford, New Jersey	186.094.11
Drilling Company	**Sampling Method**
Aquifer Testing and Drilling	Split Spoon
ERM-Northeast Geologist	**Sampling Equipment**
John Sheehan/Theodore Masters	Sledge Hammer

DEPTH (ft below grade)	SAMPLES: Date	Recovery (ft.)	Blow per 6 in.	Concrete core thickness	Distance from X (ft.)	UMP-3 SUB-BUILDING DELINEATION SAMPLING SOIL DESCRIPTION	Sample Interval/ Analytical Parameters
0	27-Jul	1.8	NA	7"	25	U-MP-3-T-20 0-2': Brown fine to medium SAND and SILT with a trace of coal fragments and roots. Fragments of shale present. No odor, no soil staining.	0.5'/Pb
1							
2		1	NA			2-4': Brown fine to medium SAND and SILT with a trace of coal, white ash fragments, roots and fragments of shale. No odor, no soil staining.	2.75'/Pb
3							
4							
0	27-Jul	1.2	NA	8"	30	U-MP-3-T-25 0-2': 8" concrete. Brown fine SAND with some silt and a trace of fine gravel. Layer of white ash-like material in tip.	0.5'/Pb
1							
2		1.1	NA			2-4': Brown fine SAND with some silt and a trace of large shale fragments. No odor, no soil staining.	2.75'/Pb
3							
4							
0	27-Jul	1.7	NA	8"	35	U-MP-3-T-30 0-2': Brown medium to fine SAND with some silt. Layer of white ash-like material present. No odor, no stain.	0.5'/Pb
1							
2		1.4	NA			2-4': Brown medium to fine SAND with some silt and traces of white ash-like material and coal fragments. No odor, no soil staining.	2.75'/Pb
3							
4							
0	27-Jul	1.8	NA	8"	40	U-MP-3-T-35 0-2': Brown medium to fine SAND with some silt and a trace of white ash-like material at tip of spoon. No odor, no soil staining.	0.5'/Pb
1							
2		1.2	NA			2-4': Brown fine to medium SAND with some silt and a trace of white ash and coal fragments.	2.75'/Pb
3							
4							

NA = Not Applicable

Note: Depth indicated for soil description and sample intervals are in feet below concrete slab.

ERM-Northeast

175 Froehlich Farm Blvd., Woodbury, New York 11797

LOG OF BORINGS: Building U: Former metal pressing area

Project Name & Location	Project Number
Becton Dickinson & Co. East Rutherford, New Jersey	186.094.11
Drilling Company	**Sampling Method**
Aquifer Testing and Drilling	Split Spoon
ERM-Northeast Geologist	**Sampling Equipment**
John Sheehan/Theodore Masters	Sledge Hammer

DEPTH (ft below grade)	SAMPLES					UMP-3 SUB-BUILDING DELINEATION SAMPLING SOIL DESCRIPTION	Sample Interval/ Analytical Parameters
	Date	Recovery (ft.)	Blow per 6 in.	Concrete core thickness	Distance from X (ft.)		
0	27-Jul	1.5	NA	7"	45	U-MP-3-T-40 0-2': Brown fine to medium SAND with some silt and fine gravel. Trace of coal fragments present.	0.5'/Pb
1							
2		1.2	NA			2-4': Brown fine to medium SAND with some silt and fine gravel. Trace of coal and white ash fragments present.	2.75'/Pb
3							
4							
0	16-Aug	1.8	NA	7"	50	U-MP-3-T-45 0-2': Brown to light brown fine SAND some silt and a trace of coal fragments. Dry. No odor, no soil staining.	0.5'/Pb
1							
2		1.6	NA			2-4': Brown fine SAND with some shale fragments present in tip of spoon. Trace of coal fragments and white ash-like material present. Dry.	2.75'/Pb
3							
4							
0	16-Aug	1.2	NA	7"	55	U-MP-3-T-50 0-2': Brown fine SAND with a trace of medium gravel. Wet from coring water at top of spoon. No odor, no soil staining.	0.5'/Pb
1							
2		1.9	NA			2-4': Brown fine SAND with some silt and small gavel and a trace of glass and coal fragments. Dry. No odor, no stain.	2.75'/Pb
3							
4							
0	16-Aug	1.7	NA	8"	60	U-MP-3-T-55 0-2': Brown fine SAND with some silt and a trace of gravel. Trace white ash-like material present. Wet from coring water. No odor, no soil staining.	0.5'/Pb
1							
2		1.5	NA			2-4': Brown fine SAND with some silt. Brick and glass tubing fragments present. Moist to wet from coring fluid. No odor, no soil staining.	2.75'/Pb
3							
4							

NA = Not Applicable

Note: Depth indicated for soil description and sample intervals are in feet below concrete slab.

ERM-Northeast

175 Froehlich Farm Blvd., Woodbury, New York 11797

LOG OF BORINGS: Building U: Former metal pressing area

Project Name & Location	Project Number
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ERM-Northeast Geologist	**Sampling Equipment**
John Sheehan/Theodore Masters	Sledge Hammer

DEPTH (ft below grade)	SAMPLES: Date	Recovery (ft.)	Blow per 6 in.	Concrete core thickness	Distance from X (ft.)	UMP-3 SUB-BUILDING DELINEATION SAMPLING SOIL DESCRIPTION	Sample Interval/ Analytical Parameters
0	16-Aug	1	NA	8"	65	U-MP-3-T-60 0-2': Brown fine SAND with some silt and a trace of gravel. Wet from coring water.	0.5'/Pb
1							
2		1.2	NA			2-4': Brown fine SAND with some silt and medium gravel. Trace of brick, coal, glass and white ash-like fragments present. Moist.	2.75'/Pb
3							
4							
0	16-Aug	1.2	NA	8"	70	U-MP-3-T-65 0-2': Brown fine SAND with some silt and a trace of fine gravel. Dry. No odor, no soil staining.	0.5'/Pb
1							
2		1.8	NA			2-4': Brown to reddish brown fine SAND with some silt and a trace of coarse gravel and white ash--like material, coal and glass fragments. Dry. No odor, no soil staining.	2.75'/Pb
3							
4							

NA = Not Applicable

Note: Depth indicated for soil description and sample intervals are in feet below concrete slab.

CD responses to EPA Request for Information

Nos. 14

A MEMBER OF THE ENVIRONMENTAL RESOURCES MANAGEMENT GROUP

VERIFICATION REPORT FOR ECRA SOIL REMEDIATION PARCEL 5 SUB-BUILDING SOIL

ECRA Case No. 87577
Becton Dickinson and Company
East Rutherford, Bergen County, New Jersey

December 1996

Prepared for:

Becton Dickinson and Company
1Becton Drive
Franklin Lakes, New Jersey

Prepared by:

ERM-NORTHEAST, INC.
175 Froehlich Farm Blvd.
Woodbury, NY 11797

ERM

ERM-Northeast's Commitment to Quality

Our Quality Policy

We will fully understand and document our clients' requirements for each assignment.

We will conform to those requirements at all times and satisfy the requirements in the most efficient and cost effective manner.

Our quality policy and procedures include an absolute commitment to provide superior service and responsiveness to our clients

Our Quality Goals

To serve you.

To serve you well.

To continually improve that service.

Our Quality Improvement Process

Train each employee.

Establish and implement requirements based on a preventative approach.

Maintain a standing Quality Improvement Team to ensure continuous improvement.

Empower Corrective Action Teams to analyze, correct and eliminate problems.

Continually strive to improve our client relationships.

John A. DeFilippi, P.E.
Chairman

Howard Wiseman, P.E.
President

State of New Jersey

Christine Todd Whitman
Governor

Department of Environmental Protection

Robert C. Shinn, Jr.
Commissioner

MAR 15 1996

Glenn Barbi
Becton Dickinson & Co.
One Becton Drive
Franklin Lakes, New Jersey

Re: Remediation Agreement In the Matter of Becton Dickinson & Co. (Parcel 5)
Stanley Street, E. Rutherford, Bergen County
ISRA Case # 87577
Proposed Additional Soil Remedial Investigation Dated: December 11, 1995
Proposed Alternate Cleanup Criteria Dated: January 11, 1996

Dear Mr. Barbi:

Please be advised that the New Jersey Department of Environmental Protection (NJDEP) has completed its review of the above referenced proposed additional soil investigation and the proposed alternate cleanup criteria. The NJDEP's comments regarding the referenced submittals are noted below:

II Soils

1. Alternate Cleanup Criteria

Becton Dickinson submitted a proposal to use alternate site specific residential soil cleanup criteria for mercury and nickel. The alternate criteria for mercury and nickel were based on incidental ingestion and derived using the most recent Environmental Protection Agency guidance criteria.

The proposed site specific alternate residential soil cleanup criteria for mercury and nickel are acceptable. The site specific criteria are:

Mercury	23 parts per million (ppm)
Nickel	1600 ppm

2. Additional Remedial Investigation Sampling

Becton Dickinson seeks confirmation from the NJDEP that the proposed remedial action locations and sample locations are acceptable. In each case the sample locations are based on previous remedial investigation sampling results and the delineation criteria specified in the Technical Requirements for Site Remediation, N.J.A.C. 7:26E.

The proposed sub-building locations requiring further remedial action are A-FPA-5 for nickel, U-MMD-2 for mercury, U-MMD-3 for lead, U-MMD-4 for lead, U-MP-1 for copper, lead, and mercury, U-MP-2 for lead and mercury, and U-MP-3 for lead. The proposed locations are acceptable.

The proposed locations, which require further delineation soil sampling are listed below:

A-FPA-4-V
U-MMD-2-U
U-MMD-4-W5
U-MP-1-T, U, V5, and W for lead at 0-0.5 feet
U-MP-2-U, V, and W for lead at 0-0.5 feet

U-MP-2-V10
U-MP-3-V10 and W10

These proposed sampling locations are acceptable.

II Ground Water Conditions

Becton Dickinson submitted a renewal application in May 1990 for their New Jersey Pollutant Discharge Elimination System/Discharge to Ground Water (NJPDES/DGW) permit. The permit that was to be renewed was originally a surface water permit (No. NJ0001074), that was modified to include ground water monitoring requirements. The ground water portion of the permit was later split from Permit No. NJ0001074 and given a new permit number, No. NJ0078981, which is the current NJPDES/DGW permit number. Although NJPDES/DGW Permit No. NJ0078981 was never renewed, Becton Dickinson has continued to operate the ground water remediation system and perform ground water monitoring in accordance with the DGW permit and the May 7, 1990 renewal application.

The permit issued by the Department approved the implementation of a detection ground water monitoring program at Becton Dickinson to investigate impacts to, or monitor the effect of remediation on, the ground water quality. The Department has determined that the activities formerly regulated under the NJPDES/DGW permit meet the NJPDES permit exemption criteria established under the NJPDES rule amendments, specifically N.J.A.C. 7:14A-6.14(b), adopted on July 28, 1994. As explained in the summary to the rule proposal (published in the New Jersey Register on January 3, 1994), the Department has revised its strategy for management of contaminated sites and will no longer use the NJPDES permit as the oversight mechanism for approval of these monitoring, investigative or remedial programs.

The permit revocation applies exclusively to NJPDES/DGW permit No. NJ0078981 and has no bearing on NJPDES/Discharge to Surface Water permit NJ0001074.

Becton Dickinson shall continue to operate the ground water remediation system and perform ground water monitoring in accordance with the May 7, 1990 permit renewal application and the approved Remedial Action Workplan.

III General Requirements

1. Becton Dickinson shall submit the results or additional work plans, in triplicate, in accordance with the approved schedule. Please note that only one copy of the Quality Assurance/Quality Control Deliverables is needed.

2. Becton Dickinson shall submit a revised Remedial Action Schedule, pursuant to N.J.A.C. 7:26E-6.5, for NJDEP approval which includes all tasks associated with the remediation of the site within thirty (30) calendar days of the receipt of this letter.

3. Becton Dickinson shall submit summarized analytical results in accordance with the Technical Requirements For Site Remediation, N.J.A.C. 7:26E.

4. Becton Dickinson shall collect all samples in accordance with the sampling protocol outlined in the May, 1992 edition of the NJDEP's "Field Sampling Procedures Manual".

5. Becton Dickinson shall notify the assigned BEECRA Case Manager at least 14 calendar days prior to implementation of all field activities included in the Remedial Action Workplan. If Becton Dickinson fails to initiate sampling within 30 calendar days of the receipt of this approval, any requests for an extension of the required time frames may be denied.

6. On February 22, 1994, the New Jersey Department of Environmental Protection (NJDEP) promulgated the ISRA Fee Rule amendments at 26 N.J.R. 1142, which were proposed on April 5, 1993 at 25 N.J.R. 1375. Pursuant to the fee rule amendments, the NJDEP will bill an owner or operator according to the direct billing formula at N.J.A.C. 7:26B-1.10(f)2. At this time, the NJDEP intends to process bills on a semi-annual basis. The NJDEP encourages responsible parties to use the "Technical Requirements for Site Remediation" (N.J.A.C. 7:26E) as well as any other current NJDEP guidance documents to assist in remediation activities and thereby minimize NJDEP review time. The complexity of the environmental contamination at the site and the quality of the workplans and reports submitted to the NJDEP will dictate the oversight costs to the regulated community.

7. Pursuant to N.J.S.A. 58:10B-3, a remediation funding source is to be established in an amount equal to or greater than the cost estimate of the implementation of the remediation and shall be in effect for a term not less than the actual time necessary to perform the remediation at the site. N.J.S.A. 58:10B-3 allows for a change of the amount in the remediation funding source as the cost estimate changes. Please provide the current estimated cost of the remaining remediation required at the site. Any increases in the estimated cost estimate will require an increase in the amount in the Remediation Funding Source to an amount at least equal to the new estimate. Any requests to decrease the amount in the remediation funding source will be reviewed and approved by the NJDEP upon a finding that the current remediation cost estimate will be sufficient to fund all necessary remediation.

If you have any questions, please contact the Case Manager, Patrick Cotter, at (609) 633-1427.

Sincerely,

John Graham, Supervisor
Bureau of Environmental Evaluation
and Cleanup Responsibility Assessment

c: Chris Lacey, BEERA
Joel Fradel, BGWPA
North Arlington Health Department
James Rocco, ERM
Domenick Gasbarro, Becton Dickinson

ERM-Northeast

175 Froehlich Farm Blvd.
Woodbury, NY 11797
(516) 921-4300
(516) 921-5637 (Fax)

11 January, 1996

Mr. Patrick B. Cotter
New Jersey Department of
Environmental Protection
Site Remediation Program
Division of Responsible Party
Site Remediation
Industrial Site Evaluation/BEECRA
401 E. State Street
CN-028
Trenton, New Jersey 08625

ERM

Re: Becton Dickinson and Company (BD)
East Rutherford, Bergen County
ISRA Case No. 87577

Dear Patrick:

Based on telephone conversations between NJDEP and ERM-Northeast on 1 November 1995, 14 November 1995, and 3 January 1996, Becton Dickinson and Company (BD) would like to propose the use of alternative residential soil cleanup levels for mercury and nickel at their East Rutherford site. The purpose of this letter is to document that use of alternative residential cleanup levels is consistent with the Industrial Site Recovery Act (ISRA) and to present the derivation of appropriate alternative cleanup levels.

Section 35f(1) of the approved version of S-1070 (ISRA) states that:

> A person performing a remediation of contaminated real property, in lieu of using the established minimum soil remediation standard for either residential use or nonresidential use adopted by the department pursuant to subsection c. of this section, may submit to the department a request to use an alternative residential use or nonresidential use soil remediation standard. The use of an alternative soil remediation standard shall be based upon site specific factors which may include (1) physical site characteristics which may vary from those used by the department in the development of the soil remediation standards adopted pursuant to this section; or (2) a site specific risk assessment. If a person performing a remediation requests to use an alternative soil

> remediation standard based upon a site specific risk assessment, that person shall demonstrate to the department that the requested deviation from the risk assessment protocol used by the department in the development of soil remediation standards pursuant to this section is consistent with the guidance and regulations for exposure assessment developed by the U.S. EPA pursuant to CERCLA of 1980.

ERM

In accordance with this provision of ISRA, BD proposes to use alternative residential soil cleanup levels for mercury and nickel using a site specific risk assessment that is consistent with EPA CERCLA protocols. The only pathway of concern at the site for mercury and nickel in soil is direct contact (incidental ingestion). Impacts to groundwater have been evaluated extensively in prior reports submitted to and approved by NJDEP, and these reports have not identified either mercury or nickel as chemicals of concern in groundwater. (The groundwater remediation program implemented at the site which was approved by NJDEP does not address these chemicals). Therefore, leaching of mercury or nickel in soil to groundwater is not a pathway of concern. Inhalation of these two inorganics via fugitive dust (wind-borne or vehicular-generated) is also not a pathway of concern at this site. In developing the NJDEP residential soil cleanup levels for mercury and nickel (as presented in NJDEP's "Technical Basis and Background for Cleanup Standards for Contaminated Sites"), both inhalation and incidental ingestion pathways were evaluated, and the final cleanup levels for both chemicals were based on incidental ingestion. ERM's telephone conversation with NJDEP on 3 January 1996 confirmed that the inhalation pathway is not an issue at this site. Therefore, the only pathway of concern at the site is incidental ingestion, and alternative cleanup levels based on this pathway using EPA protocols are developed below.

Alternative residential cleanup levels for mercury and nickel based on incidental ingestion were derived using EPA's Soil Screening Guidance document (EPA/540/R-94/101). The equation for developing an acceptable level in soil based on incidental ingestion as listed in that document is:

$$\text{Screening level (mg/kg)} = \frac{\text{THQ x BW x AT x 365 d/yr}}{\text{1/RfDo x } 10^{-6} \text{ kg/mg x EF x ED x IR}}$$

Where:
THQ/target hazard quotient (unitless) = 1
BW/body weight (kg) = 15
AT/averaging time (yr) = 6
RfDo/oral reference dose (mg/kg-d) = $3x10^{-4}$ (mercury)
$2x10^{-2}$ (nickel)
EF/exposure frequency (d/yr) = 350
ED/exposure duration (yr) = 6
IR/soil ingestion rate (mg/d) = 200

ERM

The values listed above for each parameter (except RfDo) are the default values provided in EPA's soil screening guidance. The oral reference doses (RfDo) are those cited in EPA Region III's "Risk-Based Concentration Table" and are the same as those used by NJDEP in developing their soil cleanup levels.

Using this equation and the default values listed above, the alternative residential cleanup level for mercury is 23 mg/kg and that for nickel is 1600 mg/kg.

Therefore, on the basis of a site-specific risk assessment, BD proposes that alternative residential soil cleanup levels for mercury and nickel of 23 mg/kg and 1600 mg/kg, respectively, be applied to the East Rutherford site.

If you have any questions, please do not hesitate to call.

Very truly yours,

Diane E. Heim

Diane E. Heim
Manager of Risk Assessment

cc: D. Gasbarro, BD
D. Scari, ERM-Northeast

VERIFICATION REPORT FOR ECRA SOIL REMEDIATION PARCEL 5 SUB-BUILDING SOIL

ECRA Case No. 87577
Becton Dickinson and Company
East Rutherford, Bergen County, New Jersey

December 1996

Prepared for:

Becton Dickinson and Company
1Becton Drive
Franklin Lakes, New Jersey

Prepared by:

ERM-NORTHEAST, INC.
175 Froehlich Farm Blvd.
Woodbury, NY 11797

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18612307.144

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1.0 INTRODUCTION

1.1 BACKGROUND

Becton Dickinson and Company (BD) owns a former manufacturing facility in the Borough of East Rutherford, Bergen County, New Jersey. BD discontinued manufacturing operations at this facility in 1988 and vacated the site in December 1992. The location of the site is shown on the general vicinity map provided as Figure 1-1. Figure 1-2 provides a plan view of the site. In June 1987, BD prepared and submitted an initial Environmental Cleanup Responsibility Act (ECRA) notice to the New Jersey Department of Environmental Protection (NJDEP). The site was divided into six parcels (Parcel Nos. 1 through 6) each having separate tax lot and block numbers. Six separate ECRA submissions were made. Each submission was subsequently assigned an individual ECRA case number by the NJDEP. BD conducted a series of comprehensive environmental investigations and made various additional ECRA submissions.

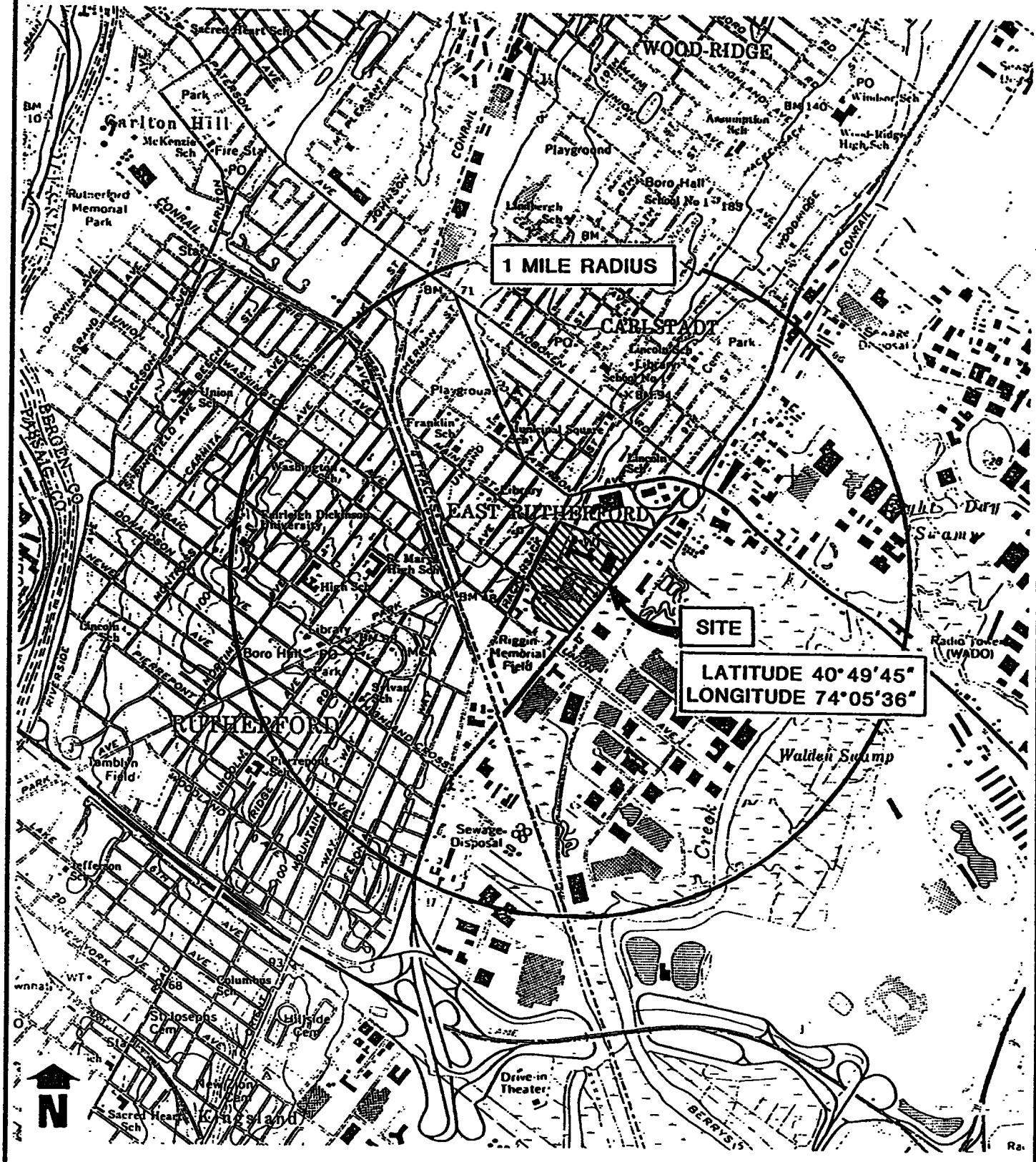
Environmental investigations of Parcel No. 1, 2 and 3 were conducted on an expedited schedule from October 1987 through December 1987. BD subsequently prepared and submitted Remedial Action Plans (RAP) for these three parcels in July 1988. The Remedial Action Plans were approved by the NJDEP in October 1988 and the soil cleanup in Parcel Nos. 1 and 2 was completed in November 1989. NJDEP issued Full Compliance Letters for the Parcel Nos. 1 and 2 ECRA Cases in May 1991 and for the Parcel No. 3 ECRA/ISRA Case in July 1993. Parcel Nos. 1 and 2 were sold in 1989, and Parcel No. 3 was sold in 1993.

Environmental investigations were conducted in Parcel Nos. 4, 5 and 6 from February to May 1988. The Remedial Action Plans for these Parcels were submitted to DEP in March 1989 and were approved in September 1989. At that time, the Site Redevelopment Plan under consideration

FIGURE 1-1

General Vicinity Map – Becton, Dickinson & Co.

East Rutherford, New Jersey

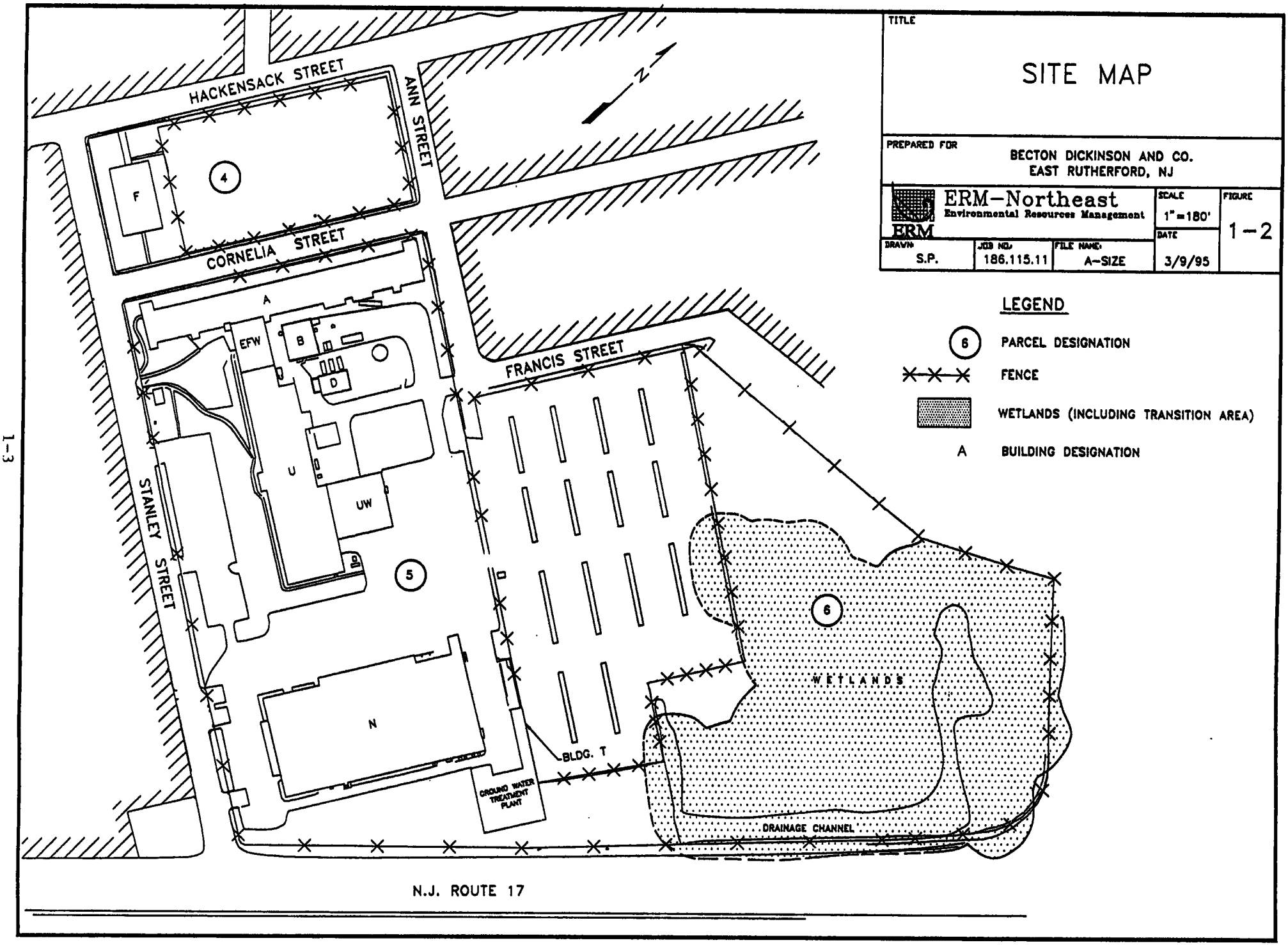


Source: Weehawken Quadrangle, N.J./N.,Y.

Scale: 1"=2000'

ERM–Northeast
Environmental Resources Management

145621


TITLE
SITE MAP
PREPARED FOR
BECTON DICKINSON AND CO.
EAST RUTHERFORD, NJ
ERM-Northeast
Environmental Resources Management
SCALE
1" = 180'
FIGURE
1-2
DRAWN
S.P.
JOB NO.
186.115.11
FILE NAME:
A-SIZE
DATE
3/9/95
LEGEND
PARCEL DESIGNATION
FENCE
WETLANDS (INCLUDING TRANSITION AREA)
BUILDING DESIGNATION
HACKENSACK STREET
ANN STREET
CORNELIA STREET
FRANCIS STREET
STANLEY STREET
N.J. ROUTE 17
WETLANDS
DRAINAGE CHANNEL
BLDG. T
GROUND WATER TREATMENT PLANT
EFW
UW

included re-use of the existing buildings and, therefore, required the buildings to remain intact. As a result, previous site investigations and RAPs for Parcel Nos. 4 and 5 addressed soil only in areas outside the buildings. Remediation of soil in Parcel Nos. 4 and 5 was completed in December 1991 and soil remediation of Parcel No. 6 was completed in September 1992. The Soil Remediation Reports for Parcel Nos. 4 and 5 and Parcel No. 6 were submitted to NJDEP in June 1992 and December 1992, respectively. NJDEP issued an ISRA Full Compliance Letter for the Parcel No. 6 Case in September 1993. In February 1994, the Department issued an ISRA Full Compliance Letter for the Parcel No. 4 Case and for the Parcel No. 5 Soil Remediation.

As previously discussed, ECRA soil investigations of Parcel No.5 were limited to outdoor areas because, according to the Site Redevelopment Plan at that time (which is summarized in the Soil and Ground Water Remedial Action Plan, Parcel No. 5, ERM, March 1989), the existing buildings were to remain in place. However, due to recent negotiations regarding the sale of the BD property, the redevelopment plan has changed. Currently, redevelopment of the BD site will require the demolition of all site buildings on Parcel Nos. 4 and 5, except for the ground water treatment plant. This necessitated an assessment of soils beneath buildings that will be demolished.

The Site Investigation (SI) of sub-building soil on Parcel No. 5 was conducted in April, 1994. The SI identified sub-building locations where RAP soil criteria is exceeded and therefore, require remedial action (RA). The results of the Soil Investigation are documented in the ISRA Site Investigation Report, Sub-Building Soils Investigation, Parcel No. 5 (ERM, October 1994).

A Remedial Investigation (RI) was conducted on the Parcel No. 5 Sub-building soil RA locations identified by the SI in order to delineate the horizontal and vertical extent of contamination. The findings of the RI

were documented in the ISRA Remedial Investigation Report and Remedial Action Plan Addendum, Sub-Building Soils, Parcel No. 5, ISRA Case No. 87577 (ERM, March 1995

Table 1-1 provides a summary listing of the project documents previously submitted to the NJDEP.

1.2 *OVERVIEW OF REMEDIAL PROJECT*

The Parcel No. 5 Sub-Building Remedial Action was completed in two phases. Phase I consisted of the removal and decontamination of the building floor slabs. This task was completed in May 1996. Phase II was the actual excavation and off-site disposal of the impacted soils. This phase was completed in September 1996. A total of approximately 2,000 cubic yards of soil was excavated and disposed of off-site.

1.3 *OVERVIEW OF REPORT*

The remainder of the report is organized into the following sections:

Section 2.0 Summary of Remedial Action Plan Implementation - This section describes remedial procedures and activities completed to date related to the sub-building soil cleanup of Parcel No. 5.

Section 3.0 Summary of Remedial Project Costs - This section summarizes expenditures for the remediation of sub-building soils in Parcels No. 5.

TABLE 1-1

SUMMARY OF PROJECT DOCUMENTS PREVIOUSLY SUBMITTED TO NJDEP

Report Title	Report Summary	Submission Date
ECRA - Sampling and Analysis Plan, Volume I Parcel Nos. 1, 2, 3, 4, 5, and 6	Presents site information for the initial ECRA notice and the Sampling and Analysis Plan common to each of the 6 parcels	June 1987
ECRA - Sampling and Analysis Plan, Volume II Parcel Nos. 1, 2, 3, 4, 5, and 6	Presents parcel specific information for the Sampling and Analysis Plan including results of the Phase 1a Preliminary Environmental Investigation. Includes the GIS and SES ECRA forms for each parcel and supporting information.	June 1987
ECRA - Supplementary Information, Volume III Parcel Nos. 5 and 6	Presents the results of the Phase 1b and 1c Preliminary Environmental Investigations conducted in Parcel Nos. 5 and 6 and amends the June 1987 Sampling and Analysis Plans.	December 1987
ECRA - Environmental Assessment Program Parcels 1, 2, and 3	Presents results of the comprehensive environmental program conducted in Parcel Nos. 1, 2, and 3 along with the results of the Phase 1b and 1c preliminary environmental investigations.	February 1988
Soil and Ground Water Remedial Action Plan(s) Parcel No. 3	Presents additional results of environmental investigations and procedures to remediate soil and ground water contamination in Parcel No. 3.	July 1988
ECRA Environmental Assessment Program Parcel Nos. 4, 5 and 6	Presents results of the comprehensive environmental program conducted in Parcel Nos. 4, 5 and 6	August 1988

TABLE 1-1 (continued)

Soil and Ground Water Remedial Action Plan(s) Parcel Nos. 4 and 5, and Parcel No. 6	Presents procedures to remediate soil and ground water contamination in Parcel Nos. and 5, and Parcel No. 6, respectively.	March 1989
Verification Report for ECRA Site Remediation Parcel Nos. 1 and 2	Documents the implementation of the Soil Remedial Action in Parcel Nos. 1 and 2.	November 1989
Verification Report for ECRA Soil Remediation Parcel Nos. 4 and 5	Documents the implementation of the Soil Remedial Action in Parcel Nos. 4 and 5.	June 1992
Verification Report for ECRA Soil Remediation Parcel No. 6	Documents the implementation of the Soil Remedial Action in Parcel No. 6.	December 1992
ISRA Site Investigation Report, Sub-Building Soil Investigation, Parcel No. 5	Presents the results of the investigation of sub-building soil in Parcel No. 5	October 1994
ISRA Remedial Investigation Report and Remedial Action Plan Addendum Sub-Building Soils Parcel No. 5, ISRA Case No. 87577	Presents the findings of the Remedial Investigation which delineates the areal extents of contamination	March 1995

2.0 *SUMMARY OF REMEDIAL ACTION PLAN IMPLEMENTATION*

2.1 *REVIEW OF REMEDIAL ACTION CRITERIA*

The development of soil remedial action criteria for the BD East Rutherford site is documented in the Soil and Ground Water Remedial Action Plans for Parcel Nos. 5, March 1989. Remedial action criteria was developed for the site based upon the ECRA recommended cleanup levels (RCLs). The criteria considered the existing site conditions, the environmental setting, environmental and health based risk assessments, the toxicity and mobility of certain contaminants, surface water discharge limitations to Berry's Creek, and the permeability of soil cover anticipated after site development. Starting with NJDEP's RCLs, a series of alternative concentration limits (generally expressed as multiples of the RCLs) were considered. These criteria were then evaluated through a quantitative risk assessment to determine the health and environmental effects resulting from implementation of these alternate criteria. A final set of criteria were selected at a level that presented no adverse health or environmental affects.

The soil remedial action criteria and the methodology used to evaluate them are presented in the Soil and Ground Water Remedial Action Plan (RAP) for Becton Dickinson and Company, East Rutherford site (ERM, July 1988). The criteria in this RAP were used throughout Parcels 1, 2, 3, 4, 5 and 6.

2.1.1 *Revisions to Remedial Action Plan*

The approved Remedial Action Plan (RAP) specified that verification end-point soil samples would be taken at each Remedial Action (RA) location after the soil was excavated. However, in letters to DEP dated February 8 and March 7, 1991, ERM proposed to conduct the end-point sampling before the soil was excavated. This was intended to expedite the remedial project by obtaining disposal acceptance before work began and by avoiding delays of the excavation work caused by waiting for analytical results. The results of

the delineation sampling were submitted to DEP with the March 7 letter. During a meeting on May 7, 1991, DEP gave authorization to BD to use the delineation sampling results in place of post-excavation verification data.

In correspondence to the BEECRA Case Manager, Mr. Patrick Cotter, on 8 December 1995, BD proposed the use of NJDEP Residential Direct Contact Soil Cleanup Criteria (RDCSCC) for all constituents of concern under the building slabs. This revision necessitated the further investigation of some of the sub-slab locations. The findings of this investigation are presented in Section 2.2. In addition, in the correspondence of 11 January 1996, BD proposed the use of alternate site specific residential soil cleanup levels for mercury and nickel, 23 mg/kg and 1600 mg/kg respectively. Approval of the alternate soil cleanup criteria was granted on 15 March 1996 via a letter from Mr. John Graham, BEECRA Supervisor. Appendix A contains copies of these three letters. Table 2.1 presents the Soil Cleanup Criteria used during the RAP implementation for the Parcel No. 5 sub-building soils and lists the RA locations.

TABLE 2-1

SUMMARY OF REMEDIAL ACTION PLAN
PARCEL NO. 5 SUB-BUILDING SOIL
BECTON DICKINSON AND COMPANY
EAST RUTHERFORD, BERGEN COUNTY
ISRA CASE NO. 87577

Soil Cleanup Criteria (ppm)

Cadmium	1	(NJDEP RDCSCC)
Copper	600	(NJDEP RDCSCC)
Lead	400	(NJDEP RDCSCC)
Mercury	23	(alternative residential cleanup criteria/ USEPA RBC)
Nickel	1600	(alternative residential cleanup criteria/ USEPA RBC)
Zinc	1500	(NJDEP RDCSCC)

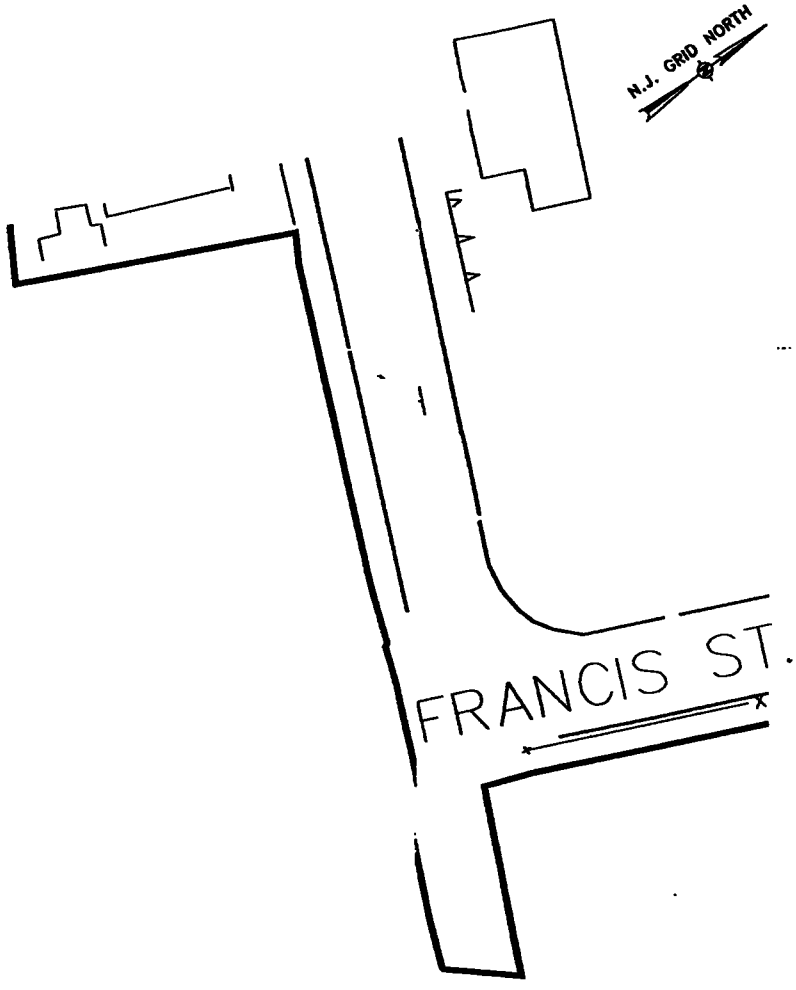
Remedial Action Location	Contaminant of Concern
A-FPA-5	Nickel
U-MMD-2	Mercury
U-MMD-3	Lead
U-MMD-4	Lead
U-MP-1	Copper, Lead and Mercury
U-MP-2	Lead and Mercury
U-MP-3	Lead

2.2 *Delineation Sampling Procedures and Results*

Prior to initiating the soil remedial project, an initial borehole sampling investigation was conducted at several locations in the buildings of Parcel No. 5. At seven locations (as shown in Figure 2-1), the concentration of one or more metals exceeded the NJDEP RDCSCC. This figure indicates the elevation of the top of the soil at each RA location. These RA locations were used to completely delineate the horizontal and vertical extent of the contamination. The objectives of this sampling effort were to establish the limits of excavation at each location and determine the volume of soil for disposal. Conducting the "end-point" sampling before soil excavation expedited the project schedule considerably. Acceptance for disposal was obtained from the landfill in advance of the soil excavation activities. In addition, repetitive re-sampling and re-excavation of RA locations was avoided.

The delineation sampling was conducted by ERM-Northeast. The drilling subcontractor for this project was Aquifer Drilling and Testing of Long Island City, NY and the samples were analyzed by Envirotest Laboratories of Newburgh, NY (New Jersey Certification number 73507). All sampling activities and procedures were documented by ERM-Northeast field personnel.

At each RA location, soil samples were taken to establish the horizontal and vertical limits of the volume to be excavated. The original "X-samples" (e.g., UMP-1-X) were the samples taken previously during the initial borehole sampling investigations that identified the locations of contamination. During the delineation sampling, all sample locations were referenced from the original X-sample location. As shown in Figure 2-2, the excavation depth was delineated by the samples denoted as "X1, X2 etc.", taken at 1-foot intervals (eg: X1,X2,X3, etc.). Perimeter samples, which are designated T, U,



SOIL BORING SAMPLE LOCATION

ELEVATION, IN FEET, BASED ON THE NATIONAL GEODETIC VERTICAL DATUM, MEAN SEA LEVEL, 1929 AT SANDY HOOK.

REMEDIAL ACTION LOCATION.

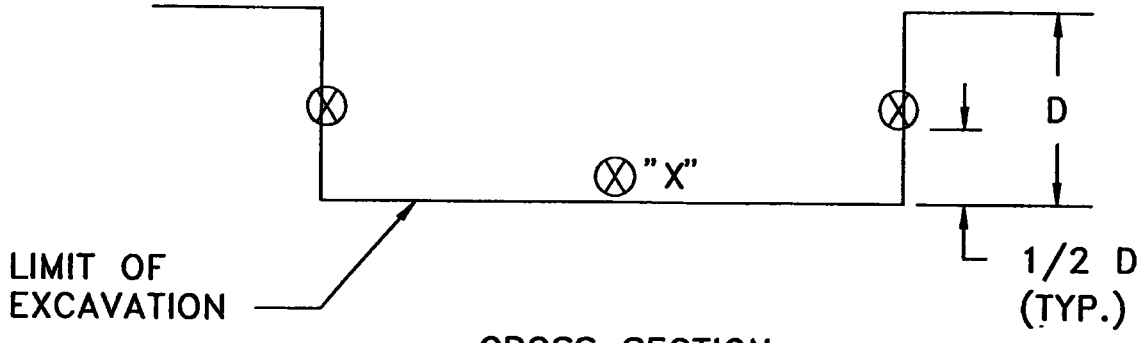
E

REMEDIAL ACTION AREAS
PARCEL NO. 5 SUB-BUILDING INVESTIGATION
EAST RUTHERFORD, NJ

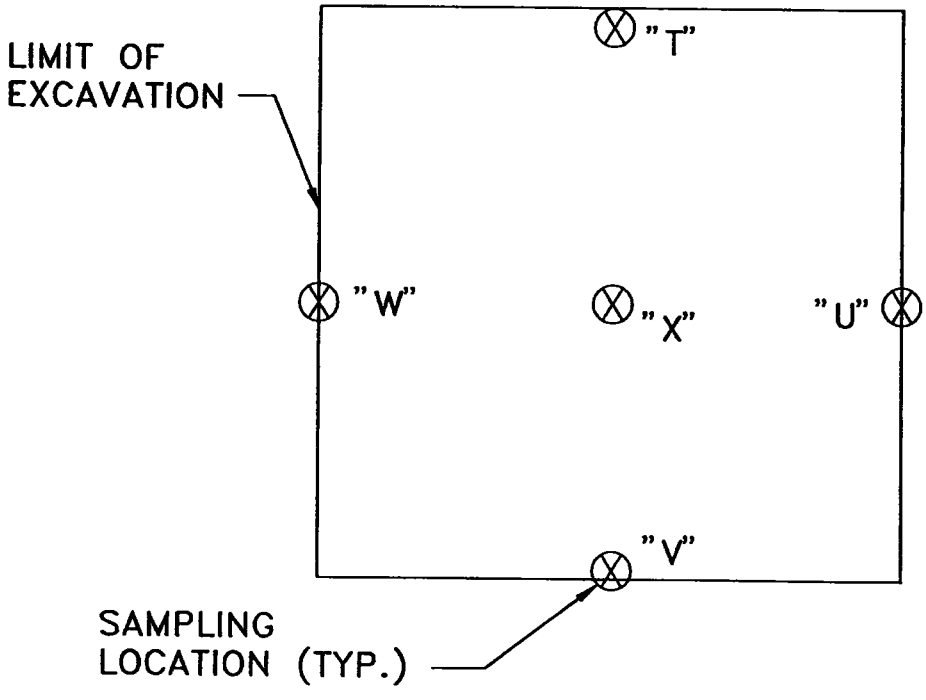
PARED FOR

BECTON DICKINSON AND CO.

ERM–Northeast Environmental Resources Management			SCALE 1"=60'	FIGURE 2–1
M			DATE 12/2/96	
Y.Z.	JOB NO.: 186.094.10	FILE NAME: 1861232B		



CROSS SECTION



PLAN VIEW

TITLE

TYPICAL RA LOCATION

PREPARED FOR
BECTON DICKINSON AND CO.
EAST RUTHERFORD, N.J.

ERM-Northeast
Environmental Resources Management

SCALE	FIGURE
NONE	2-2

DRAWN:	JOB NO.:	FILE NAME:	DATE
S.P.	186.094.11	BDRA	11/22/96

V and W, were taken at a depth equal to one-half the excavation depth. These perimeter samples were taken at 5-foot increments (e.g., T,T5,T10, etc.) laterally from the original "X-sample" location. The analytical results of each sample were compared to the remedial action criteria to determine if the next incremental sample was needed. In accordance with the RAP, sampling at each location was advanced until the limits of the contamination were delineated, or ground water, buildings, property lines, or adjoining RA-excavation areas were encountered. A summary of the "clean" end-point sample data is provided in Table 2-2, and is graphically presented in Figure 2-3 thru 2-9. The laboratory reports of the Parcel No. 5 sub-building delineation samples were submitted to NJDEP in March, 1995. Final delineation sample results, from additional delineation sampling, conducted during March and April 1996, can be found in Appendix B.

All delineation sampling and analysis was conducted in accordance with the requirements of the approved Sampling Analysis Plan, Environmental Assessment Report and Remedial Action Plan (RAP). Quality assurance procedures were followed during all activities of the sampling investigation. Duplicate and Field Blank samples (designated "D" and "FB", respectively) were prepared each day sampling was performed. In addition, matrix spike and matrix spike duplicate samples were prepared and analyzed by the laboratory.

Field blanks were prepared on each day of sampling and were analyzed for all the same parameters as those analyzed for the soil samples collected that day. Each field blank was prepared by collecting laboratory-prepared blank water poured over decontaminated field sampling equipment.

Soil samples were collected with stainless steel split-spoon samplers and stainless steel spoons. The concrete floor was opened by using a concrete coring machine. Once the concrete core was removed the decontaminated split-spoon was driven by a hand-held sledge hammer to the appropriate

TABLE 2-2: FINAL DELINEATION DATA
REMEDIAL INVESTIGATION OF
PARCEL NO. 5 SUB-BUILDING SOIL
BECTON DICKINSON AND COMPANY, EAST RUTHERFORD, NEW JERSEY
ISRA CASE NO. 87577

CONCENTRATIONS OF

PARAMETERS OF CONCERN: (ppm)

* = Exceeds NJDEP Residential Soil Cleanup Criteria (RDCSCC)

LOCATION:	DEPTH OF SAMPLE: (ft.)	Cd	Cr	Cu	Pb	Ni	Zn	Hg
A-FPA-5-X1	0-0.5					488		
A-FPA-5-X2	0.5-1.5					70.7		
A-FPA-5-X3	1.5-2.5					61.9		
A-FPA-5-T	0.25		10.6		44.5	9280 *		
A-FPA-5-U	0.25					2840 *		
A-FPA-5-V	0.25					813		
A-FPA-5-W	0.25					16.8		
A-FPA-5-T5	0.25					7.5		
A-FPA-5-U5	0.25					152		
A-FPA-5-V5	0.25					56.2		
U-MMD-2-X1	0-0.5							40.2 *
U-MMD-2-X2	0.5-1.5							0.65
U-MMD-2-X3	1.5-2.5							11.1
U-MMD-2-T	0.25							3.3
U-MMD-2-U	0.25							1.96
U-MMD-2-V	0.25							3.9
U-MMD-2-W	0.25							1.8
U-MMD-3-X1	0-0.5				763 *			
U-MMD-3-X2	0.5-1.5				1010 *			
U-MMD-3-X3	1.5-2.5				298			
U-MMD-3-T	0.75				99.0			
U-MMD-3-U	0.75				81.1			
U-MMD-3-V	0.75				372			
U-MMD-3-W	0.75				45.7			
U-MMD-4-X1	0-0.5				505 *			
U-MMD-4-X2	0.5-1.5				453 *			
U-MMD-4-X3	1.5-2.5				315			
U-MMD-4-T	0.25				399			

TABLE 2-2: FINAL DELINEATION DATA
REMEDIAL INVESTIGATION OF
PARCEL NO. 5 SUB-BUILDING SOIL
BECTON DICKINSON AND COMPANY, EAST RUTHERFORD, NEW JERSEY
ISRA CASE NO. 87577

CONCENTRATIONS OF

PARAMETERS OF CONCERN: (ppm)

* = Exceeds NJDEP Residential Soil Cleanup Criteria (RDCSCC)

LOCATION:	DEPTH OF SAMPLE: (ft.)	Cd	Cr	Cu	Pb	Ni	Zn	Hg
U-MMD-4-T	0.75				178			
U-MMD-4-U	0.25				340			
U-MMD-4-U	0.75				387			
U-MMD-4-V	0.25				695 *			
U-MMD-4-V	0.75				410 *			
U-MMD-4-W	0.25				435 *			
U-MMD-4-W	0.75				337			
U-MMD-4-V5	0.25				699 *			0.69
U-MMD-4-V5	0.75				439			
U-MMD-4-V10	0.25				148			
U-MMD-4-V10	0.75				347			
U-MMD-4-W15	0.25				97.2			
U-MP-1-X1	0-0.5			376	669 *		852	22
U-MP-1-X2	0.5-1.5			399	109		311	26.7*
U-MP-1-X3	1.5-2.5			348	88.4		414	33.3*
U-MP-1-X4	2.5-3.5			200				12.0
U-MP-1-X5	3.5-4.5			137				4.0
U-MP-1-T	0.5				312			
U-MP-1-T	1.25			495	93.5		295	73.2*
U-MP-1-U	0.5				45.3			
U-MP-1-U	1.25			775 *	169		521	35.2*
U-MP-1-V	1.25			244	940 *		253	27.5*
U-MP-1-W	0.5				89.8			
U-MP-1-W	1.25			232	92.7		184	32.2*
U-MP-1-T-5	0.5				98.7			
U-MP-1-T-5	1.25			317	368	38.5		32.1*
U-MP-1-U-5	1.25			9.5				1.8
U-MP-1-V-5	0.5				2300 *			
U-MP-1-V-5	1.25				191			30.1*
U-MP-1-W-5	1.25							39.0*

TABLE 2-2: FINAL DELINEATION DATA
REMEDIAL INVESTIGATION OF
PARCEL NO. 5 SUB-BUILDING SOIL
BECTON DICKINSON AND COMPANY, EAST RUTHERFORD, NEW JERSEY
ISRA CASE NO. 87577

CONCENTRATIONS OF

PARAMETERS OF CONCERN: (ppm)

* = Exceeds NJDEP Residential Soil Cleanup Criteria (RDCSCC)

LOCATION:	DEPTH OF SAMPLE: (ft.)	Cd	Cr	Cu	Pb	Ni	Zn	Hg
U-MP-1-T-10	1.25			447	256			36.5*
U-MP-1-V-10	0.5				193			
U-MP-1-V-10	1.25							15.4
U-MP-1-W-10	1.25							39.2*
U-MP-1-T-15	1.25							25.6*
U-MP-1-V-15	1.25							41.2*
U-MP-1-W-15	1.25							18.7
U-MP-1-T-20	1.25							39.2*
U-MP-1-V-20	1.25							1.6
U-MP-1-W-20	1.25							31.8*
U-MP-1-T-25	1.25							105*
U-MP-1-W-25	1.25							56.8*
U-MP-1-T-30	1.25							247*
U-MP-1-W-30	1.25							64.7*
U-MP-1-T-35	1.25							65.0*
U-MP-1-W-35	1.25							63.9*
U-MP-1-T-40	1.25							39.6*
U-MP-1-W-40	1.25							1.8
U-MP-1-T-45	1.25							45.2*
U-MP-1-W-45	1.25							9.7
U-MP-1-T-50	1.25							67.2*
U-MP-1-W-50	1.25							19.7
U-MP-1-T-55	1.25							24.4*
U-MP-1-W-55	1.25							23.7*
U-MP-1-T-60	1.25							59.9*
U-MP-1-W-60	1.25							2.6
U-MP-1-T-65	1.25			117				5.7
U-MP-2-X1	0-0.5				816 *			14.5
U-MP-2-X2	0.5-1.5				143			76.5*
U-MP-2-X3	1.5-2.5				231			57.5*

TABLE 2-2: FINAL DELINEATION DATA
REMEDIAL INVESTIGATION OF
PARCEL NO. 5 SUB-BUILDING SOIL
BECTON DICKINSON AND COMPANY, EAST RUTHERFORD, NEW JERSEY
ISRA CASE NO. 87577

CONCENTRATIONS OF

PARAMETERS OF CONCERN: (ppm)

* = Exceeds NJDEP Residential Soil Cleanup Criteria (RDCSCC)

LOCATION:	DEPTH OF SAMPLE: (ft.)	Cd	Cr	Cu	Pb	Ni	Zn	Hg
U-MP-2-X4	2.5-3.5							11.2
U-MP-2-X5	3.5-4.5							19.4
U-MP-2-X6	4.5-5.5							71.0*
U-MP-2-X7	5.5-6.5							64.3*
U-MP-2-X8	6.5-7.5							0.09
U-MP-2-T	2.25				847 *			2.1
U-MP-2-U	0.5				229			
U-MP-2-U	2.25				242			61.4*
U-MP-2-V	0.5				283			
U-MP-2-V	2.25				138			73.1*
U-MP-2-W	0.5				274			
U-MP-2-W	2.25				98.9			29.1*
U-MP-2-T-5	2.25				1170 *			
U-MP-2-U-5	0.5				656 *			
U-MP-2-U-5	2.25							59.5*
U-MP-2-V-5	2.25							99.2*
U-MP-2-W-5	2.25							65.2*
U-MP-2-T-10	2.25				1400 *			
U-MP-2-T-10	0.5				2900 *			
U-MP-2-U-10	3.25							2.9
U-MP-2-V-10	NO SAMPLE DUE TO END OF BUILDING							
U-MP-2-W-10	2.25							83.3*
U-MP-2-T-15	0.5				155			
U-MP-2-T-15	2.25				121			
U-MP-2-T-15	3.25							6.9
U-MP-2-U-15	0.5				126			
U-MP-2-U-15	2.25							194*
U-MP-2-V-15	2.25							4.2
U-MP-2-V-15	3.25							11.7
U-MP-2-W-15	2.25				0.89			19.5
U-MP-2-W-20	2.25							9.8

TABLE 2-2: FINAL DELINEATION DATA
REMEDIAL INVESTIGATION OF
PARCEL NO. 5 SUB-BUILDING SOIL
BECTON DICKINSON AND COMPANY, EAST RUTHERFORD, NEW JERSEY
ISRA CASE NO. 87577

CONCENTRATIONS OF

PARAMETERS OF CONCERN: (ppm)

* = Exceeds NJDEP Residential Soil Cleanup Criteria (RDCSCC)

LOCATION:	DEPTH OF SAMPLE: (ft.)	Cd	Cr	Cu	Pb	Ni	Zn	Hg
U-MP-2-W-20	3.25							12.4
U-MP-2-U-20	2.25							182*
U-MP-2-U-25	2.25							27.6*
U-MP-2-U-30	2.25							118*
U-MP-2-U-35	2.25							27.3*
U-MP-2-U-40	2.25							2.9
U-MP-3-X1	0-0.5				4120 *			
U-MP-3-X2	0.5-1.5				661 *			
U-MP-3-X3	1.5-2.5				667 *			
U-MP-3-X4	2.5-3.5				1050 *			
U-MP-3-X5	3.5-4.5				523 *			
U-MP-3-X6	4.5-5.5				2000 *			
U-MP-3-X7	5.5-6.5				158			
U-MP-3-T	2.75				1620 *			
U-MP-3-U	2.75				1210 *			
U-MP-3-V	2.75			26.7	2560 *	8.4		
U-MP-3-W	2.75				1880 *			
U-MP-3-T	0.5				1600 *			
U-MP-3-U	0.5				2500 *			
U-MP-3-V	0.5				2690 *			
U-MP-3-W	0.5				3160 *			
U-MP-3-T-5	0.5				2920 *	8.3		
U-MP-3-U-5	0.5				1640 *			
U-MP-3-V-5	2.75			33.8	2680 *			
U-MP-3-W-5	0.5				2380 *			
U-MP-3-T-10	0.5				930 *			
U-MP-3-T-10	2.75				3970 *			
U-MP-3-U-10	0.5				2240 *			
U-MP-3-U-10	2.75				4380 *			
U-MP-3-V-10	2.75				2660 *			

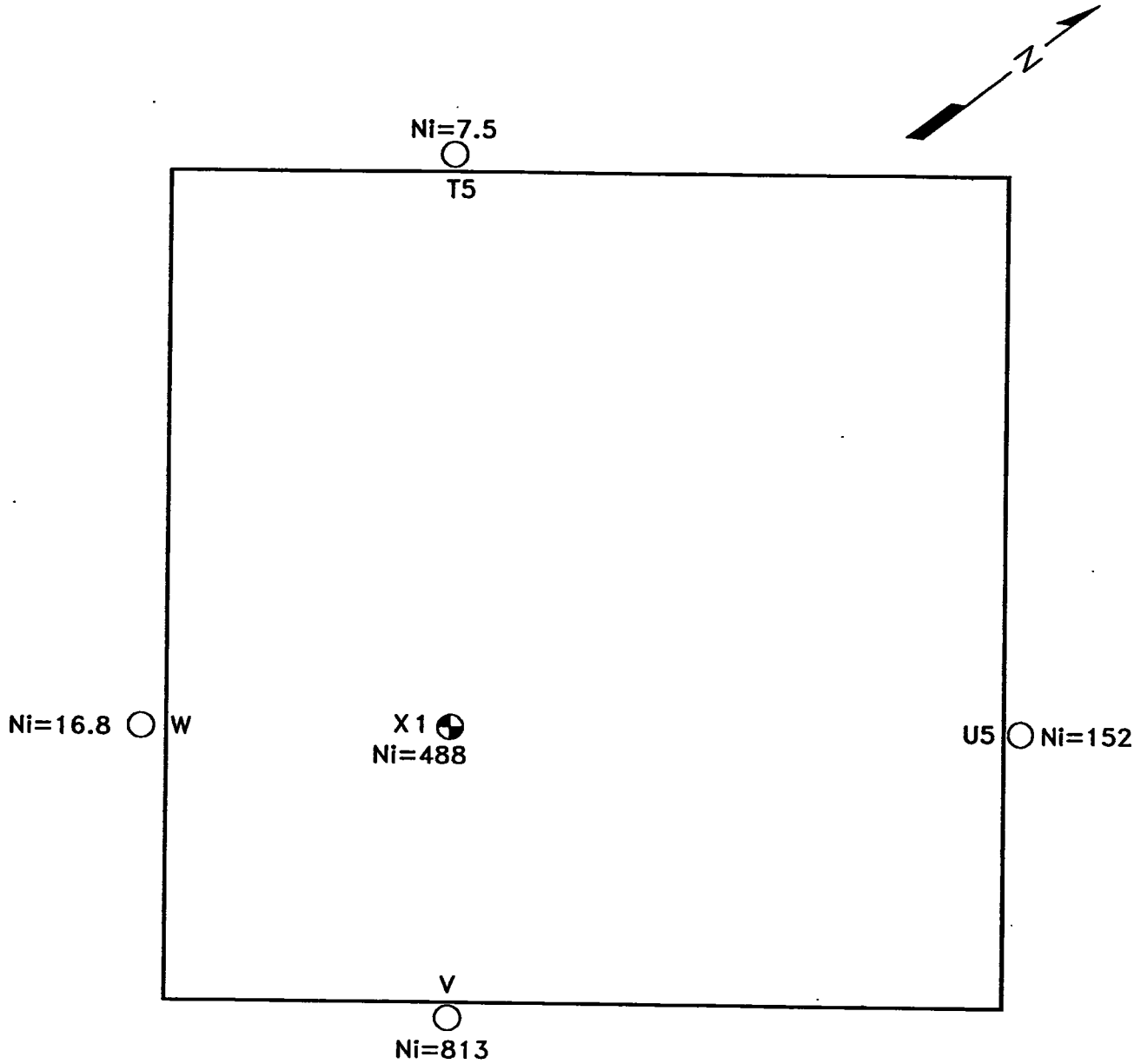
TABLE 2-2: FINAL DELINEATION DATA
REMEDIAL INVESTIGATION OF
PARCEL NO. 5 SUB-BUILDING SOIL
BECTON DICKINSON AND COMPANY, EAST RUTHERFORD, NEW JERSEY
ISRA CASE NO. 87577

CONCENTRATIONS OF

PARAMETERS OF CONCERN: (ppm)

* = Exceeds NJDEP Residential Soil Cleanup Criteria (RDCSCC)

LOCATION:	DEPTH OF SAMPLE: (ft.)	Cd	Cr	Cu	Pb	Ni	Zn	Hg
U-MP-3-W-10	2.75				1030 *			
U-MP-3-T-15	0.5				2070 *			
U-MP-3-T-15	2.75				3390 *			
U-MP-3-U-15	0.5				4390 *			
U-MP-3-U-15	2.75				1020 *			
U-MP-3-V-15	0.5				48.7			
U-MP-3-V-15	2.75				58.4			
U-MP-3-W-15	0.5				75.1			
U-MP-3-W-15	2.75				60.6			
U-MP-3-U-20	NO SAMPLE DUE TO LOCATION UMP-2							
U-MP-3-T-20	0.5				2260 *			
U-MP-3-T-20	2.75				1870 *			
U-MP-3-T-25	0.5				2350 *			
U-MP-3-T-25	2.75				2640 *			
U-MP-3-T-30	0.5				2530 *			
U-MP-3-T-30	2.75				713 *			
U-MP-3-T-35	0.5				1610 *			
U-MP-3-T-35	2.75				674 *			
U-MP-3-T-40	0.5				1270 *			
U-MP-3-T-40	2.75				294			
U-MP-3-T-45	0.5				587 *			
U-MP-3-T-45	2.75				138			
U-MP-3-T-50	0.5				737 *			
U-MP-3-T-50	2.75				58.9			
U-MP-3-T-55	0.5				201			
U-MP-3-T-55	2.75				230			



REMEDIAL INVESTIGATION SUMMARY

PARAMETER OF CONCERN: NICKEL (Ni)

DEPTH: 1.0 FT.

LEGEND

16.8 ○	LOCATION OF R.I. END-POINT SAMPLE BELOW REMEDIAL ACTION CRITERIA AND CONCENTRATION(S) OF PARAMETER(S) OF CONCERN IN PPM.
◔	LOCATION OF BASE SAMPLE
▭	AREA OF CONTAMINATED SOIL
T,U,V,W,X	SAMPLE IDENTIFICATION CODE

TITLE

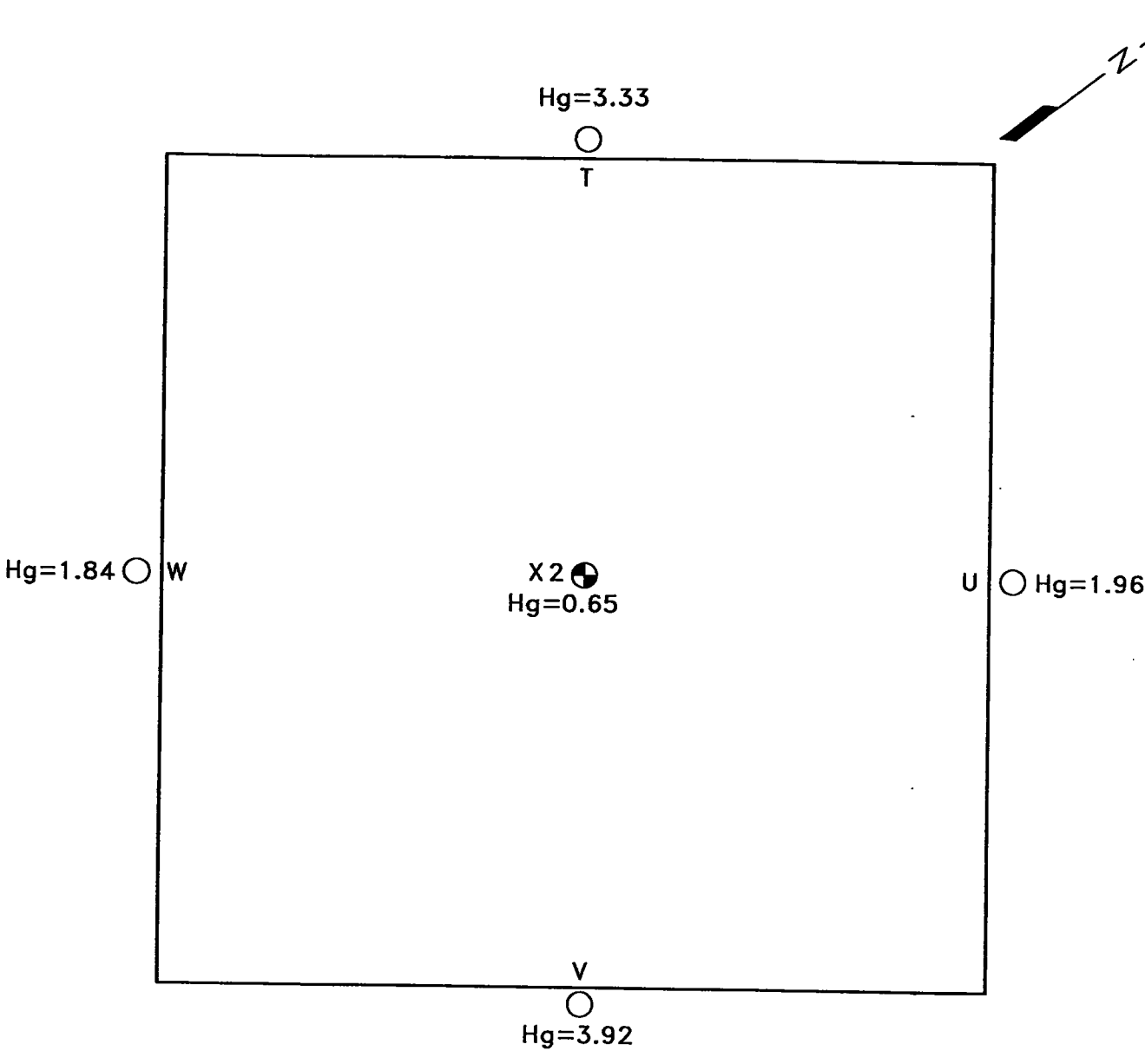
REMEDIAL ACTION LOCATION A-FPA-5

PREPARED FOR
BECTON DICKINSON AND CO.
EAST RUTHERFORD, NJ

ERM-Northeast
Environmental Resources Management

SCALE	FIGURE
1"=3'	2-3

DRAWN:	JOB NO.:	FILE NAME:	DATE
S.P./Y.Z.	186.23.1	A-FPA-5	11/22/96



REMEDIAL INVESTIGATION SUMMARY

PARAMETER OF CONCERN: MERCURY (Hg)

DEPTH: 1.0 FT.

LEGEND

3.92 ○	LOCATION OF R.I. END-POINT SAMPLE BELOW REMEDIAL ACTION CRITERIA AND CONCENTRATION(S) OF PARAMETER(S) OF CONCERN IN PPM.
◓	LOCATION OF BASE SAMPLE
▭	AREA OF CONTAMINATED SOIL
T,U,V,W,X	SAMPLE IDENTIFICATION CODE

TITLE

REMEDIAL ACTION LOCATION U-MMD-2

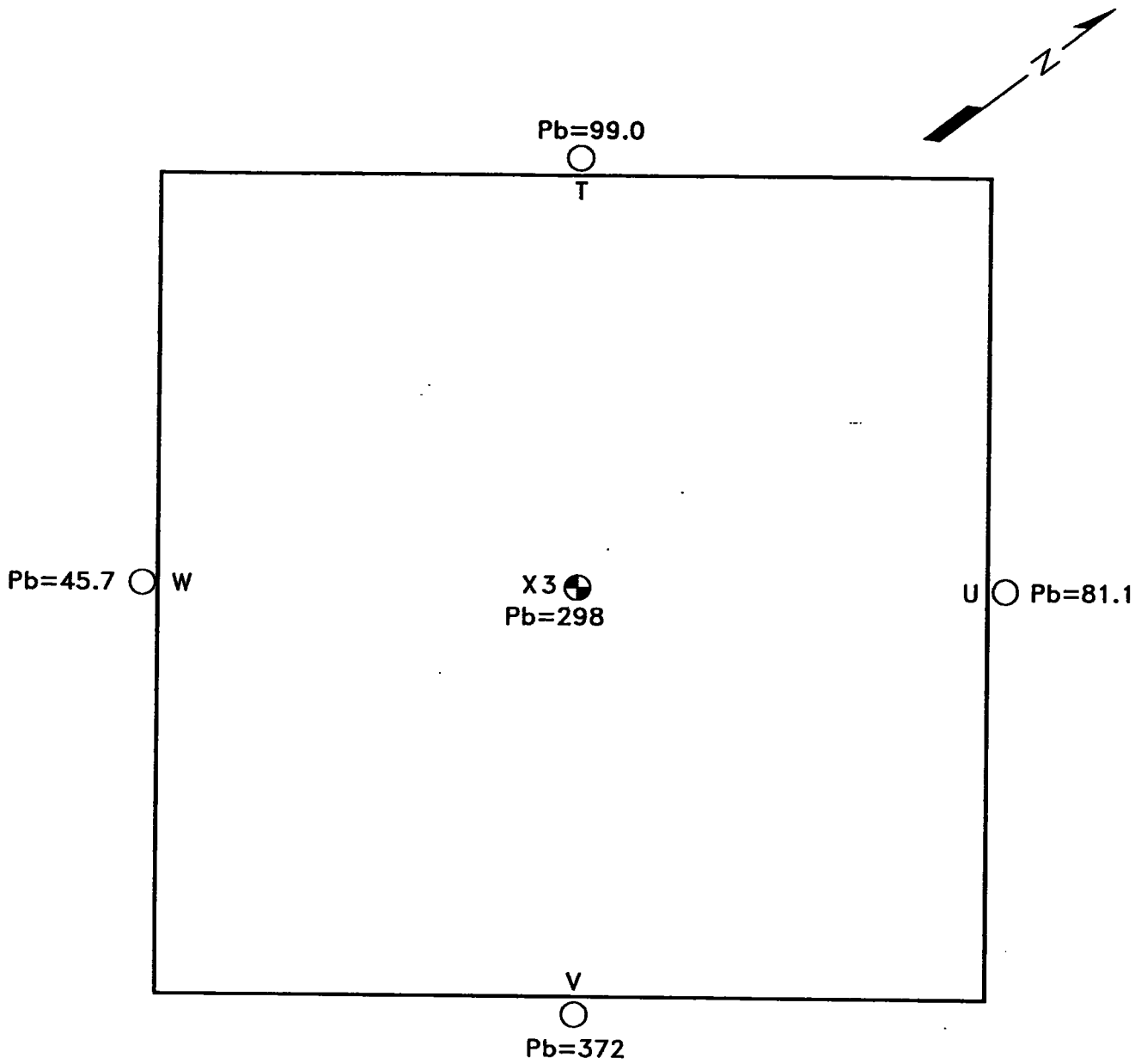
PREPARED FOR

BECTON DICKINSON AND CO.
EAST RUTHERFORD, NJ

ERM-Northeast
Environmental Resources Management

SCALE	FIGURE
1"=4'	2-4

DRAWN:	JOB NO.:	FILE NAME:	DATE
S.P./Y.Z.	186.123.1	UMMD2-95	11/22/96



REMEDIAL INVESTIGATION SUMMARY

PARAMETER OF CONCERN: LEAD (Pb)

DEPTH: 1.5 FT.

LEGEND

45.7 ○	LOCATION OF R.I. END-POINT SAMPLE BELOW REMEDIAL ACTION CRITERIA AND CONCENTRATION(S) OF PARAMETER(S) OF CONCERN IN PPM.
◔	LOCATION OF BASE SAMPLE
▭	AREA OF CONTAMINATED SOIL
T,U,V,W,X	SAMPLE IDENTIFICATION CODE

TITLE

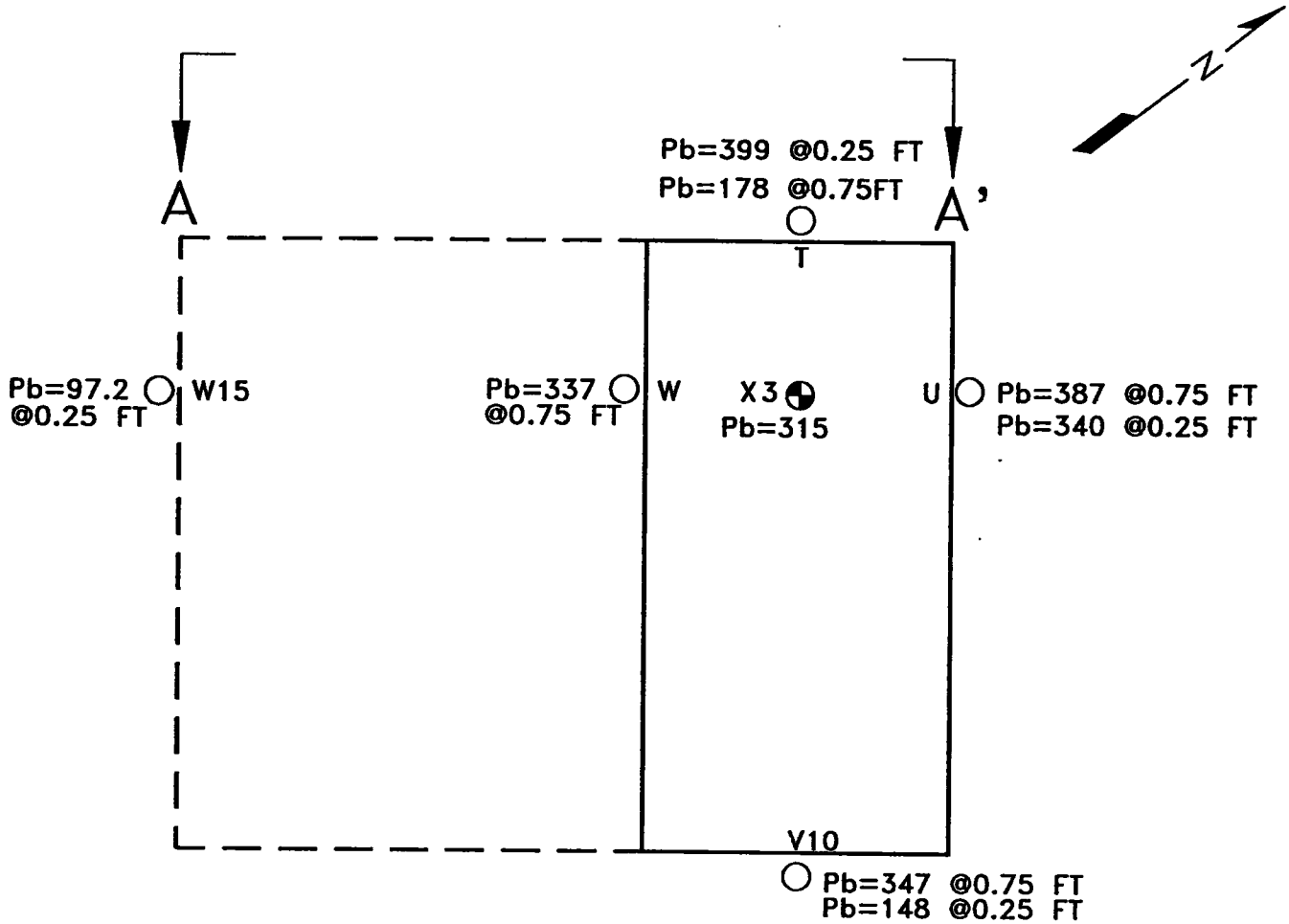
REMEDIAL ACTION LOCATION U-MMD-3

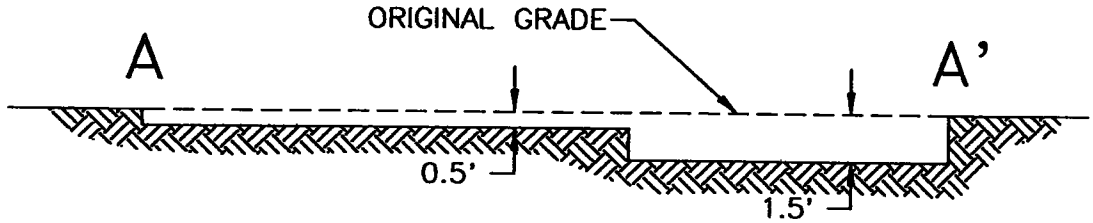
PREPARED FOR
BECTON DICKINSON AND CO.
EAST RUTHERFORD, NJ

ERM-Northeast
Environmental Resources Management

SCALE	FIGURE
1" =2'	2-5

DRAWN:	JOB NO.:	FILE NAME:	DATE
S.P.	186.123.1	U-MMD-3	11/22/96





EXCAVATION PROFILE A–A'

REMEDIAL INVESTIGATION SUMMARY

PARAMETER OF CONCERN: LEAD (Pb)

DEPTH: 1.5 FT. AND 0.5 FT

LEGEND

97.2 ○	LOCATION OF R.I. END–POINT SAMPLE BELOW REMEDIAL ACTION CRITERIA AND CONCENTRATION(S) OF PARAMETER(S) OF CONCERN IN PPM.
◒	LOCATION OF BASE SAMPLE
▭	AREA OF CONTAMINATED SOIL AT DEPTH OF 1.5 FT
▭ (dashed)	AREA OF CONTAMINATED SOIL AT DEPTH OF 0.5 FT
T,U,V,W,X	SAMPLE IDENTIFICATION CODE

TITLE

REMEDIAL ACTION LOCATION U–MMD–4

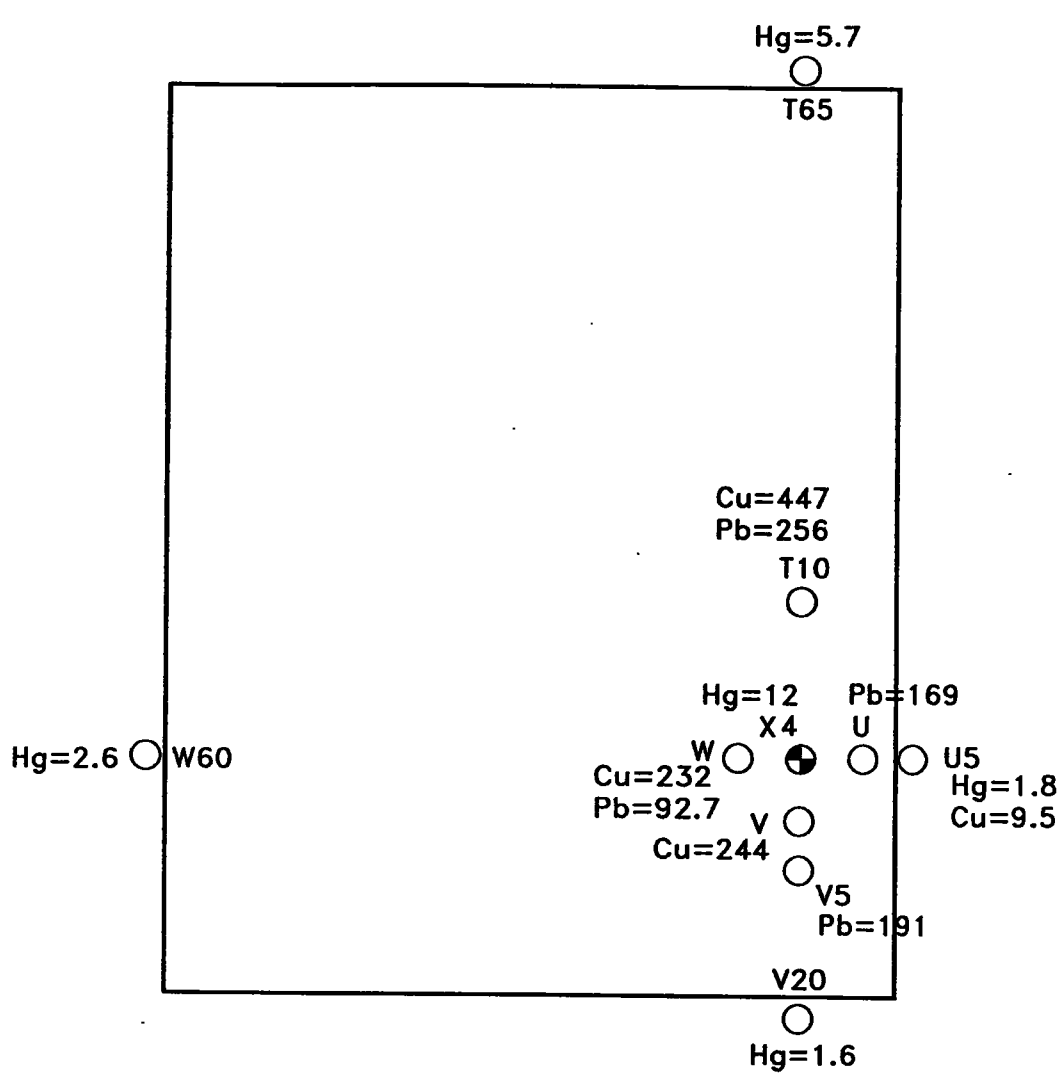
PREPARED FOR

BECTON DICKINSON AND CO.
EAST RUTHERFORD, NJ

ERM–Northeast
Environmental Resources Management

SCALE	FIGURE
1"=6'	2–6

DRAWN:	JOB NO.:	FILE NAME:	DATE
S.P./Y.Z.	186.123.1	U–MMD–4	11/22/96



REMEDIAL INVESTIGATION SUMMARY

PARAMETERS OF CONCERN: MERCURY (Hg), LEAD (Pb), COPPER (Cu)

DEPTH: 2.5 FT.

SURFACE: 8" CONCRETE

LEGEND

1.8 ○ — LOCATION OF R.I. END-POINT SAMPLE BELOW REMEDIAL ACTION CRITERIA AND CONCENTRATION(S) OF PARAMETER(S) OF CONCERN IN PPM.

◓ — LOCATION OF BASE SAMPLE

▭ — AREA OF CONTAMINATED SOIL

T,U,V,W,X — SAMPLE IDENTIFICATION CODE

TITLE

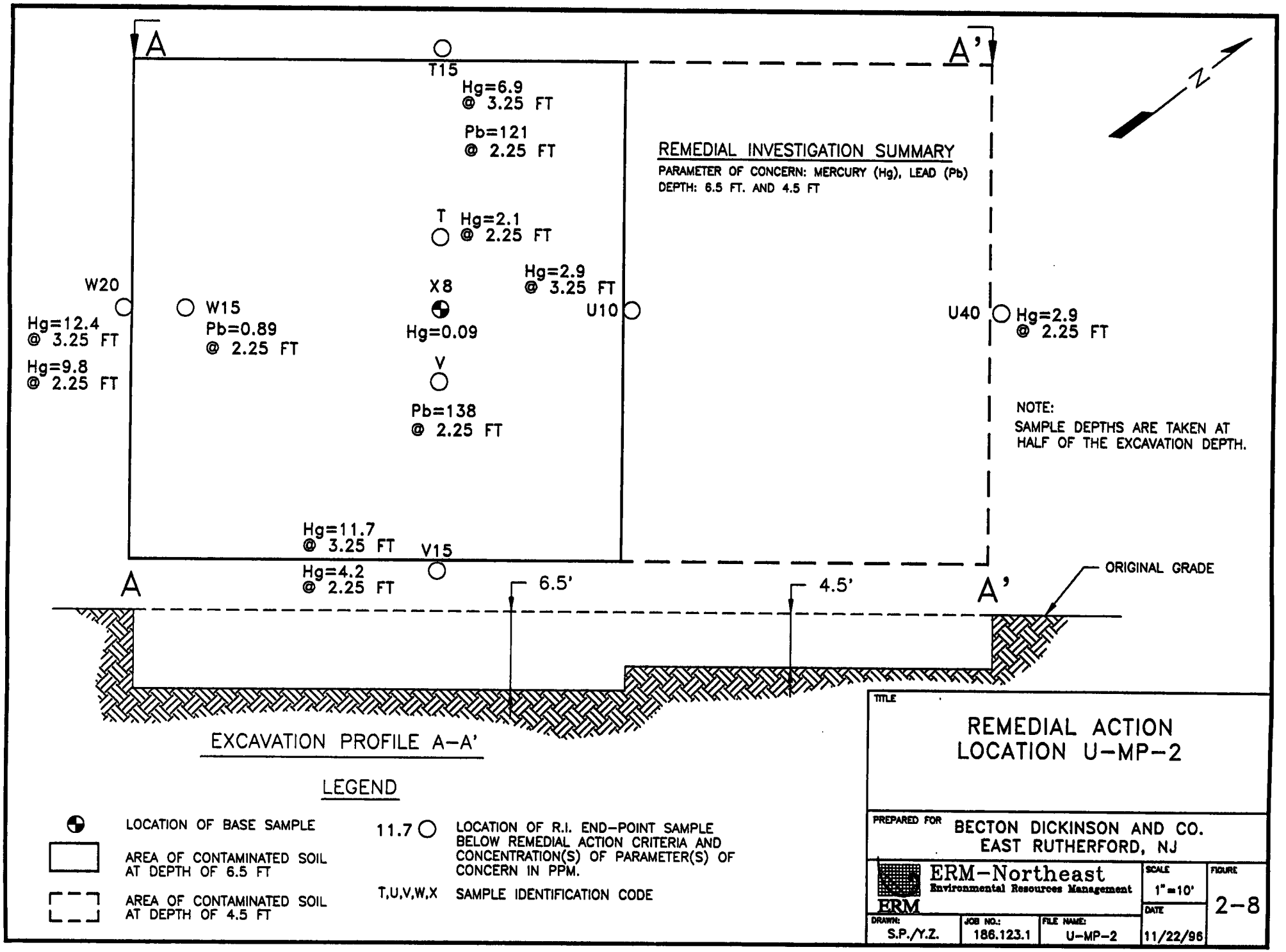
REMEDIAL ACTION LOCATION U-MP-1

PREPARED FOR
BECTON DICKINSON AND CO.
EAST RUTHERFORD, NJ

ERM-Northeast
Environmental Resources Management

SCALE	FIGURE
1"=20'	2-7

DRAWN:	JOB NO.:	FILE NAME:	DATE
S.P./S.P.	186.123.1	U-MP1-95	11/22/96


A
A'
T15
Hg=6.9
@ 3.25 FT
Pb=121
@ 2.25 FT
T
Hg=2.1
@ 2.25 FT
Hg=2.9
@ 3.25 FT
W20
X8
U10
U40
Hg=2.9
@ 2.25 FT
W15
Pb=0.89
@ 2.25 FT
Hg=0.09
Hg=12.4
@ 3.25 FT
Hg=9.8
@ 2.25 FT
V
Pb=138
@ 2.25 FT
Hg=11.7
@ 3.25 FT
V15
Hg=4.2
@ 2.25 FT
N
REMEDIAL INVESTIGATION SUMMARY
PARAMETER OF CONCERN: MERCURY (Hg), LEAD (Pb)
DEPTH: 6.5 FT. AND 4.5 FT
NOTE:
SAMPLE DEPTHS ARE TAKEN AT
HALF OF THE EXCAVATION DEPTH.
A
6.5'
4.5'
A'
ORIGINAL GRADE
EXCAVATION PROFILE A–A'
LEGEND
LOCATION OF BASE SAMPLE
AREA OF CONTAMINATED SOIL AT DEPTH OF 6.5 FT
AREA OF CONTAMINATED SOIL AT DEPTH OF 4.5 FT
11.7 LOCATION OF R.I. END–POINT SAMPLE BELOW REMEDIAL ACTION CRITERIA AND CONCENTRATION(S) OF PARAMETER(S) OF CONCERN IN PPM.
T,U,V,W,X SAMPLE IDENTIFICATION CODE
TITLE
REMEDIAL ACTION
LOCATION U–MP–2
PREPARED FOR BECTON DICKINSON AND CO.
EAST RUTHERFORD, NJ
ERM–Northeast
Environmental Resources Management
ERM
SCALE 1"=10'
FIGURE 2–8
DRAWN: S.P./Y.Z.
JOB NO.: 186.123.1
FILE NAME: U–MP–2
DATE 11/22/96

depth. The split soon sampler was then removed and opened. The soil sample was taken from the sampler with a decontaminated spoon and placed in a laboratory-prepared sample jar. In order to prepare a duplicate sample, the soil was first placed in a clean stainless steel bowl and mixed thoroughly before being divided into two separate samples and placed in sample jars.

Each soil sample was visually examined by the ERM field engineer and a description (eg: color, geologic characteristics, moisture content, etc.) was documented in the field log, along with the sample location and depth. The information on the sample jar label and the information that was recorded in the field log included the sample date, time, identification number, engineering company name (ERM-Northeast), project number, field engineer's name and analytical parameters. This information was also recorded on the chain-of-custody form that accompanied the sample from the time the sample was obtained until it was received by the laboratory.

All soil samples, duplicate sample and field blank samples were placed in a "cooler" with ice and taken to the on-site ground water treatment plant where they were then placed in a refrigerator. At the end of each day, the samples were transported in sealed coolers to the laboratory by an overnight courier provided by the lab. Any samples that were not immediately shipped to the lab (i.e.: held awaiting analytical results of previous samples) were stored in the refrigerator in the on-site treatment plant. Custody of the stored samples was ensured because only ERM-personnel have access to the treatment plant.

Each piece of sampling equipment was decontaminated prior to each use. The specific decontamination procedures performed depended on the chemical parameters that the sample was to be analyzed for. The decontamination procedures used during the delineation sampling investigation are as follows:

1. Soap Wash and Water Rinse

   Sampling equipment was washed with tap water and laboratory detergent, and scrubbed with a brush. The equipment was then rinsed with tap water.

2. Solvent Rinse

   Reagent grade acetone was used to clean sampling devices used for taking samples analyzed for organic compounds. Equipment used for samples analyzed for metals were rinsed with a 10% solution of nitric acid.

3. Final Rinse

   All sampling equipment was rinsed with bottled distilled water as a final decontamination step.

2.3 *SOIL REMEDIATION PROCEDURES*

The first task to be completed as part of the Parcel No. 5 Sub-Building Soil Remedial Project involved marking the boundaries of the areas to be excavated. The "X-sample" location for each RA location was identified by ERM engineers using survey maps that were generated during the initial site investigations. As outlined in Section 2.2, the original X-sample locations were used as the reference points for the RA locations. Each X-location was marked with a wooden stake and orange paint. The results of the delineation sampling were then used to define the limits (i.e., perimeter and depth) of each excavation site. Flagging, stakes and/or orange paint were used to establish excavation boundaries.

As outlined in the approved RI and RAP Addendum, EnviroClean-Northeast (ECNE), the remedial contractor, mobilized to the site in late May 1996, and under the supervision of ERM, began preparations for the soil excavation. The buildings in Parcel No. 5 had been demolished by Otillio Contracting. However, the concrete floor slabs and the foundation walls of the Parcel No. 5 building were still in place. Phase I of ENCE's work was the removal of the floor slabs. This involved cutting the floor slab with a power saw into several

sections, each approximately 10 ft. by 10 ft. These sections were decontaminated by scraping and brushing all soil from the bottom of the slabs into the soil below. The concrete sections were crushed and removed by the demolition contractor. During this procedure, plastic sheeting was placed over all areas of exposed soil. Also, additional flagging, stakes, and orange paint was used to maintain the excavation boundaries during the concrete floor slab removal. The foundation walls were left in place until the excavation was completed. Final soil classification sampling was conducted once the floor slabs were removed, as outlined in Section 2.4.

ECNE remobilized to the site in late July 1996 to begin the soil excavation. ENCE's preparatory tasks included establishing work zones, decontamination areas and stock-pile areas. Each of the four work zones was comprised of one or more RA-excavation sites, and were enclosed with bright orange fencing and warning signs. Within the work zones, plastic sheeting was placed on the ground next to the excavation area(s), and decontamination areas were assembled. Two separate stockpile areas for the excavated hazardous and nonhazardous material were fenced and lined with plastic sheeting.

Project activities were limited to one Work Zone at a time. The RA locations were excavated with a track-hoe. All excavated soil and materials were removed from each RA location and placed directly onto plastic sheeting in one of the two stockpiles. All soil adhering to the remaining building foundation walls were scraped and brushed clean. Surficial and subsurface material such as rubble, tree roots, and abandoned underground pipes were removed, crushed, if necessary, and stockpiled with the excavated soil. Excavating at each location was continued until contamination limits were encountered. After each day's operation, the stockpiles were covered with plastic sheeting and surrounded with orange fencing. The individual RA excavation sites are shown on Figures 2-3 through 2-9 which indicate the extents of each excavation and post excavation soil quality.

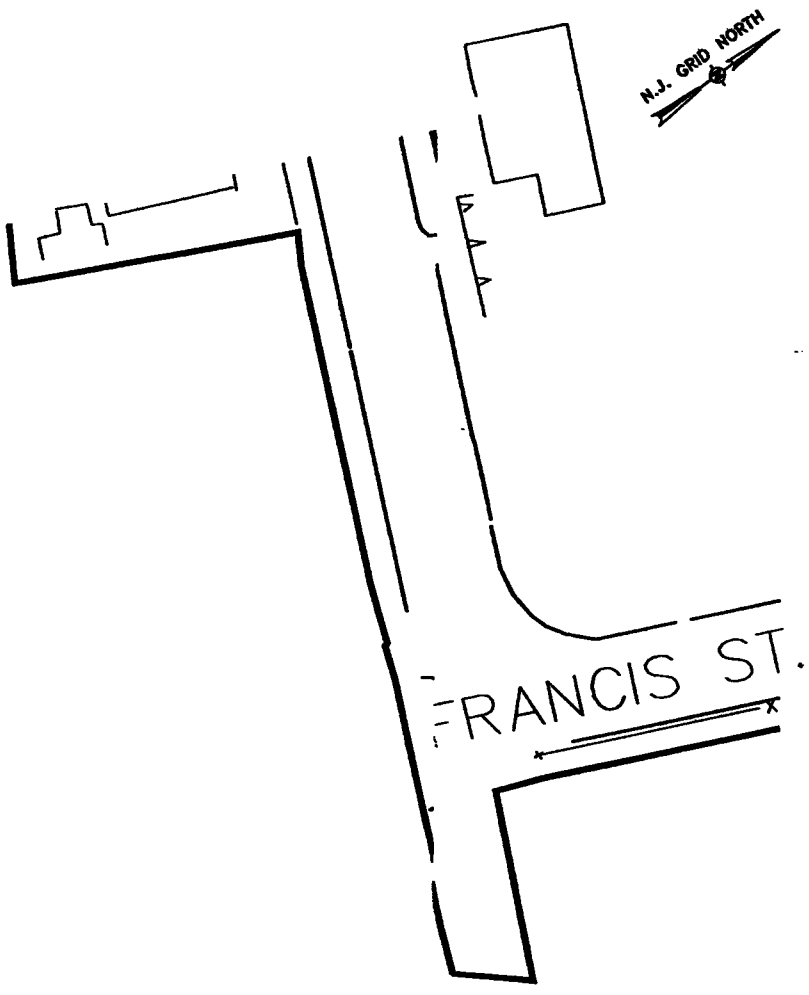
Once stockpiles were large enough, dump trucks were brought to the site to transport the excavated soil. Plastic sheeting was placed on the ground surface between the stockpile and the transport truck to contain spilled material.

One of the metals of concern during the soil excavation was mercury. Consequently, the ERM engineer monitored for mercury vapor throughout the excavation procedures, during loading of transporter trucks, and in the excavated areas. The monitoring was performed with a Jerome mercury vapor analyzer. Mercury vapor was not detected at any time.
When excavation of an RA Location was completed, the ERM engineer recorded the dimensions, volume of soil excavated, and types of materials encountered. The excavated areas were surveyed by Howard F. Greenspan Surveyors of Montclair, NJ. Final elevations and horizontal extents of each RA excavation are shown in Figure 2-10.

Once the final elevations and horizontal extents of each RA excavation were surveyed and compared to the final RI delineation data, the demolition contractor removed the foundation walls and leveled the site using existing site soil.

2.3.1 *Underground Tank Discovery*

During soil excavation efforts in RA UMP-2, a 500 gallon underground storage tank (UST) was discovered. It is believed that this tank was a cooling tower water holding tank used during cooling tower maintenance. The integrity of the tank was sound based on visual inspections. The tank was free of liquids and was removed from the area. The tank rested on a concrete slab approximately 5-6 feet below grade. The tank had straps anchored to the slab due to the close proximity of the ground water table. The concrete slab and underlying pea gravel were



OIL BORING SAMPLE LOCATION

TTOM OF EXCAVATION
EVATION, IN FEET, BASED ON THE
TIONAL GEODETIC VERTICAL DATUM,
AN SEA LEVEL, 1929 AT SANDY HOOK.

MEDIAL ACTION LOCATION,
ST EXCAVATION.

OVERLAPPED, THE SOIL
TO THE MAXIMUM DEPTH.

FINAL ELEVATIONS AND HORIZONTAL
EXTENTS OF RA EXCAVATIONS
PARCEL NO. 5 SUB-BUILDING INVESTIGATION
EAST RUTHERFORD, NJ

RED FOR

BECTON DICKINSON AND CO.

ERM–Northeast Environmental Resources Management			SCALE 1"=60'	FIGURE 2-10
Y.Z.	JOB NO. 186.094.10	FILE NAME 1861232A	DATE 12/2/96	

removed. The soil beneath the slab was tested for Total Petroleum Hydrocarbons (TPH) in accordance with NJDEP guidelines. Four soil samples were collected from the excavation using dedicated disposable steel spoons. Two sidewall samples and two bottom centerline samples were collected. A duplicate sample of one of the bottom centerline samples was also collected and analyzed for TPH. Results from this sampling event can be found in Appendix C.

It should be noted that the bottom of the excavation was at the top of the ground water table and any contaminant encountered in the soil may be attributed to ground water contamination from the dissolved contaminant plume currently being controlled and remediated by the ground water treatment system. The sample results showed no significant impact to the soil. Only one of the samples indicated the presence of TPH at an elevated level. This sample had a TPH concentration of 349 mg/kg. This is below the action levels indicated in NJDEP Technical Requirements for Site Remediation NJAC7:26E and is below the current NJDEP Soil Cleanup Criteria (for TPH) of 10,000 mg/kg. Moreover, a visual inspection of the tank at the time of removal indicated that the tank's integrity did not appear to have been compromised. Based on the visual observations, the fact that the tank was believed to have been used for storage of cooling tower water and not bulk storage of petroleum product, and that the relatively low detected concentration of TPH is attributable to the ground water plume, no further analyses were performed on the post-remedial soil samples.

Upon receipt of the laboratory data, the BEECRA Case Manager, Ms. Kathleen Schrier was contacted. On 9 September 1996, during a telephone conversation with Ms. Schrier, it was determined that no further actions or NJDEP notification regarding this tank, other than documentation in this report, would be required.

All of the soil removed during the excavation of the tank was stockpiled in a separate area. Upon receipt of the laboratory analysis and discussions with the Case Manager, this soil was then disposed of with the soil excavated during the remedial action in this area. The tank was crushed and taken off-site by the demolition contractor as scrap metal.

2.4 *SOIL CLASSIFICATION*

Prior to the removal of the Parcel No. 5 building floor slabs and before excavation of the Parcel No. 5 sub-building soil, samples were collected for appropriate waste classification and disposal procedure determination. The lab analysis from this sampling effort, conducted in April 1996, can be found in Appendix D. As per NJDEP guidelines one composite sample was collected for every 1,000 cu.yds. of soil to be excavated. Samples were collected using properly decontaminated sampling equipment as outlined in Section 2.2, and composited in stainless steel bowls using dedicated disposable spoons. These composite samples, WCS-1 and WCS-2, consisted of grab samples obtained on a volume proportioned basis from the seven RA areas. Each grab sample was collected at a depth of approximately one-half the depth of excavation in that RA area. The waste classification samples were analyzed for appropriate RCRA waste disposal classification. Both of these samples had Toxicity Characteristics Leaching Procedure (TCLP) extraction levels of lead above the RCRA hazardous waste classification level of 5 mg/L. Therefore, additional waste classification sampling was conducted to separate any RCRA non-hazardous soil from the RCRA hazardous soil for lead. The cost difference between the disposal of hazardous an nonhazardous waste is significant. Therefore, by collecting multiple samples, a potential for significant cost savings existed, as well as the opportunity to limit the amount of soil going to hazardous waste landfills.

Based on a review of the RI delineation data it was suspected that the soil in RA location UMP-3 was the cause of the elevated levels of lead in the TCLP analysis of samples WCS-1 and WCS-2. The additional waste classification samples were collected in May 1996, and the description of this sampling event is outlined below.

At UMP-3, two distinct composite samples were collected from outside the foundation walls, WCSUMP3-1 and WCSUMP3-2. Inside the foundation walls, the RA location was divided into a grid of four cells by seven cells. Each cell contained approximately 25 cubic yards of soil. In each row of four cells, a composite of four grab samples was obtained. These seven composite samples were identified as WCSUMP-3A through WCSUMP-3G. Therefore, at UMP-3, a total of nine (9) composite samples were collected and analyzed by the TCLP for lead. The lab analysis indicates that the soil outside the foundation walls is classified as RCRA non-hazardous for lead and the soil inside the foundation walls is classified as RCRA hazardous for lead.

A composite sample consisting of three grab samples from RA location AFPA-5 was also collected. This sample indicated that this location was RCRA non-hazardous for lead. Three additional composite samples were also obtained from the remaining RA areas. The first composite sample, WCS-3, consisted of three grab samples from each RA location, UMMD-2, 3 and 4. The second composite sample, WCS-4, consisted of (40) forty grab samples from RA location UMP-1. The third composite sample WCS-5 was obtained by compositing (35) thirty-five grab sample from RA location UMP-2. All three of these samples, WCS-3 4, and 5 exhibited elevated levels of lead in the TCLP analysis. Based on these results ERM conducted further waste characterization sampling in June 1996 as discussed below.

ERM collected three grab samples from each of the remaining smaller RA locations (i.e., UMMD-2, UMMD-3, and UMMD-4) For each location, the grab samples were composited into one sample. These samples were

analyzed by the TCLP for lead. At each RA location, the soil was classified as a RCRA nonhazardous waste, except location UMMD-4. This location was classified as a RCRA hazardous waste for lead. The soil from locations UMMD-2, and UMMD-3 were classified as NJ CN 306 N.O.S., hazardous waste for lead, not otherwise specified.

A different procedure was used for the two larger RA locations (i.e., UMP-1, and UMP-2). Multiple samples were collected from within the RA locations. In this manner, sections of the RA locations could possibly be classified as RCRA nonhazardous waste. The cost difference between the disposal of hazardous and nonhazardous waste is significant. Therefore, by collecting multiple samples, a potential for significant cost savings existed, as well as the opportunity to limit the amount of soil going to hazardous waste landfills.

UMP-1 was divided into a grid of eight cells by five cells. Each cell contained approximately 25 cubic yards. A grab sample was collected from each of the thirty-two (32) cells. (Eight cells were not sampled as they coincided with samples collected from UMP-3.) These grab samples were identified as UMP-1A through UMP-8E. These samples were also analyzed by the TCLP for lead. The analysis indicated that all of the soil in this location was RCRA hazardous for lead.

At UMP-2, a grid of five cells by five cells was created inside the foundation walls. Each cell contained approximately 25 cubic yards of soil. From each cell, a grab sample was collected. Samples were not taken from three cells due to the presence of a solid, concrete, staircase. There was no soil to be excavated from these three cells. These twenty-two (22) grab samples were identified as UMP-2-1A through UMP-2-5B. Outside the foundation walls two separate composite samples were obtained, WCSUMP-2V and WCSUMP-2U. Therefore, at UMP-2, twenty-four (24) samples were analyzed by the TCLP for lead. The lab analysis indicates that the soil outside

the foundation walls is classified as RCRA non-hazardous for lead and the soil inside the foundation walls is classified as RCRA hazardous for lead.

In summary, the results indicated that all of the soil inside the building walls in RA locations UMP-1, UMP-2, UMP-3 and all of the soil at RA location UMMD-4, exceeded the TCLP for lead, and, therefore, are classified as RCRA hazardous wastes, D008. The soil outside the building walls at RA locations UMP-2 and UMP-3 and all of the soil at RA locations AFPA-5, UMMD-2 and UMMD-3, are classified as a RCRA nonhazardous waste. This soil was classified as NJ CN 306 N.O.S., hazardous waste for lead, not otherwise specified. Results of the TCLP characterization sampling are presented in Appendix D.

2.5 *CONTAMINATED SOIL DISPOSAL PROCEDURES*

The excavated soil was classified before excavation as either a RCRA nonhazardous waste, or as a RCRA hazardous waste, D008. A total of approximately 1,500 cubic yards of RCRA hazardous waste soil was shipped for disposal to Envirosafe Services of Ohio in Oregon, Ohio. The soil was stabilized for lead at this facility and then shipped to the BFI Vienna Junction Landfill in Erie, MI. A total of approximately 500 cubic yards of RCRA nonhazardous waste soil was shipped for disposal to American Landfill, Inc. in Waynesburg, Ohio.

The waste disposal dump truck bodies were lined with 6 mil poly and were filled using a 3 cu.yd. bucket loader. The filled dump truck bodies were then covered with a tarp for transport. The ERM engineer on-site completed and signed the hazardous and non-hazardous waste manifests as required. Copies of these manifests can be found in Appendix E.

3.0 *SUMMARY OF REMEDIAL PROJECT COSTS*

A summary of costs for the BD Parcel No. 5 Sub-Building Soil Remedial Project is provided in Table 3-1. These costs include engineering, laboratory, remedial contractor, transportation and disposal costs. Remedial contractor costs are for soil excavation and disposal truck loading. The costs presented in Table 3-1 are only for soil remedial activities completed on Parcel No. 5, sub-building soils. These costs do not include costs for remedial work performed on Parcel Nos. 1, 2 and 6, water cleanup activities, or building decontamination.

TABLE 3-1

REMEDIAL PROJECT COSTS
PARCEL NO. 5 SUB-BUILDING SOILS

COST ITEM:	*APPROXIMATE COSTS:*
Engineering	$ 25,000
Laboratory	$ 30,000
Remedial Contractor	$ 50,000
Transportation/Disposal	$330,000
Total Project Costs:	$435,000

A MEMBER OF THE ENVIRONMENTAL RESOURCES MANAGEMENT GROUP

BD responses to EPA Request for Information

Nos. 14

VERIFICATION REPORT FOR ECRA SOIL REMEDIATION PARCEL 5 SUB-BUILDING SOIL

APPENDICES

ECRA Case No. 87577
Becton Dickinson and Company
East Rutherford, Bergen County, New Jersey

December 1996

Prepared for:

Becton Dickinson and Company
1Becton Drive
Franklin Lakes, New Jersey

Prepared by:

ERM-NORTHEAST, INC.
175 Froehlich Farm Blvd.
Woodbury, NY 11797

ERM

ERM-Northeast's Commitment to Quality

Our Quality Policy

We will fully understand and document our clients' requirements for each assignment.

We will conform to those requirements at all times and satisfy the requirements in the most efficient and cost effective manner.

Our quality policy and procedures include an absolute commitment to provide superior service and responsiveness to our clients

Our Quality Goals

To serve you.

To serve you well.

To continually improve that service.

Our Quality Improvement Process

Train each employee.

Establish and implement requirements based on a preventative approach.

Maintain a standing Quality Improvement Team to ensure continuous improvement.

Empower Corrective Action Teams to analyze, correct and eliminate problems.

Continually strive to improve our client relationships.

John A. DeFilippi, P.E.
Chairman

Howard Wiseman, P.E.
President

APPENDIX A

NJDEP/BD Correspondence

ERM-Northeast

175 Froehlich Farm Blvd.
Woodbury, NY 11797
(516) 921-4300
(516) 921-5637 (Fax)

8 December 1995

Mr. Patrick B. Cotter
New Jersey Department of Environmental Protection
Site Remediation Program
Division of Responsible Party Site Remediation
Industrial Site Evaluations/BEECRA
401 E. State Street
CN-028
Trenton, New Jersey 08625

Re: Becton Dickinson and Company (BD)
East Rutherford, Bergen County
ISRA Case No. 87577

Dear Patrick:

As we discussed during our phone conversation of 28 November 1995, the soil cleanup criteria for the March 1995 Remedial Action Plan (RAP) Addendum for the BD East Rutherford Parcel No. 5 sub-building soils, have been revised in accordance with current NJDEP policy. Based on the 14 November telephone conversation between Diane Heim of ERM-Northeast and Bill Lowry of NJDEP, the alternative residential cleanup criteria will be 23 mg/kg for mercury and 1600 mg/kg for nickel. The NJDEP Residential Direct Contact Soil Cleanup Criteria (RDCSCC), as summarized on the attached table, will be used for all other constituents of concern at the BD site. As we previously discussed, this revision of the cleanup criteria necessitates further investigation of some sub-building locations in order to completely delineate the areas requiring remediation. The locations requiring additional sampling are listed on the attached table. The investigation of these areas will begin after building demolition has been completed. Building demolition is tentatively scheduled to begin this month and is expected to be completed in March 1996. Upon completion of the sampling investigation, BD will submit an implementation schedule for the soil remediation.

Based on previous discussions with the Department, it is BD's understanding that these cleanup criteria satisfy all of NJDEP's requirements for soil quality at BD's East Rutherford site, such that engineering and/or institutional controls (i.e., a DER) will not be

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A member of the Environmental Resources Management Group

imposed after implementation of the RAP Addendum is completed in accordance with the criteria specified herein. Therefore, BD requests the Department's approval to proceed in accordance with the above understanding.

If you require additional information, please contact me.

Very truly yours,

ERM

Dean J. Scari

Dean J. Scari
Project Manager

cc: D. Gasbarro, BD
G. Barbi, BD
B. Hector, BD

18611506.332/lc/tm

SUMMARY OF REMEDIAL ACTION PLAN
PARCEL NO. 5 SUB-BUILDING SOIL
BECTON DICKINSON AND COMPANY
EAST RUTHERFORD, BERGEN COUNTY
ISRA CASE NO. 87577

Soil Cleanup Criteria (ppm)

Cadmium	1	(NJDEP RDCSCC)
Copper	600	(NJDEP RDCSCC)
Lead	400	(NJDEP RDCSCC)
Mercury	23	(alternative residential cleanup criteria/ USEPA RBC)
Nickel	1600	(alternative residential cleanup criteria/ USEPA RBC)
Zinc	1500	(NJDEP RDCSCC)

Remedial Action Location	Contaminant of Concern
A-FPA-5	Nickel
U-MMD-2	Mercury
U-MMD-3	Lead
U-MMD-4	Lead
U-MP-1	Copper, Lead and Mercury
U-MP-2	Lead and Mercury
U-MP-3	Lead

Locations Requiring Further Investigation:

A-FPA-4-V
U-MMD-2-U
U-MMD-4-W5
U-MP-1-T, U, V5 and W for lead, at 0-0.5 feet
U-MP-2-U, V and W for lead, at 0-0.5 feet
U-MP-2-V10
U-MP-3-V10 and W10

ERM-Northeast

175 Froehlich Farm Blvd.
Woodbury, NY 11797
(516) 921-4300
(516) 921-5637 (Fax)

11 January, 1996

Mr. Patrick B. Cotter
New Jersey Department of
Environmental Protection
Site Remediation Program
Division of Responsible Party
Site Remediation
Industrial Site Evaluation/BEECRA
401 E. State Street
CN-028
Trenton, New Jersey 08625

ERM

Re: Becton Dickinson and Company (BD)
East Rutherford, Bergen County
ISRA Case No. 87577

Dear Patrick:

Based on telephone conversations between NJDEP and ERM-Northeast on 1 November 1995, 14 November 1995, and 3 January 1996, Becton Dickinson and Company (BD) would like to propose the use of alternative residential soil cleanup levels for mercury and nickel at their East Rutherford site. The purpose of this letter is to document that use of alternative residential cleanup levels is consistent with the Industrial Site Recovery Act (ISRA) and to present the derivation of appropriate alternative cleanup levels.

Section 35f(1) of the approved version of S-1070 (ISRA) states that:

> A person performing a remediation of contaminated real property, in lieu of using the established minimum soil remediation standard for either residential use or nonresidential use adopted by the department pursuant to subsection c. of this section, may submit to the department a request to use an alternative residential use or nonresidential use soil remediation standard. The use of an alternative soil remediation standard shall be based upon site specific factors which may include (1) physical site characteristics which may vary from those used by the department in the development of the soil remediation standards adopted pursuant to this section; or (2) a site specific risk assessment. If a person performing a remediation requests to use an alternative soil

> remediation standard based upon a site specific risk assessment, that person shall demonstrate to the department that the requested deviation from the risk assessment protocol used by the department in the development of soil remediation standards pursuant to this section is consistent with the guidance and regulations for exposure assessment developed by the U.S. EPA pursuant to CERCLA of 1980.

ERM

In accordance with this provision of ISRA, BD proposes to use alternative residential soil cleanup levels for mercury and nickel using a site specific risk assessment that is consistent with EPA CERCLA protocols. The only pathway of concern at the site for mercury and nickel in soil is direct contact (incidental ingestion). Impacts to groundwater have been evaluated extensively in prior reports submitted to and approved by NJDEP, and these reports have not identified either mercury or nickel as chemicals of concern in groundwater. (The groundwater remediation program implemented at the site which was approved by NJDEP does not address these chemicals). Therefore, leaching of mercury or nickel in soil to groundwater is not a pathway of concern. Inhalation of these two inorganics via fugitive dust (wind-borne or vehicular-generated) is also not a pathway of concern at this site. In developing the NJDEP residential soil cleanup levels for mercury and nickel (as presented in NJDEP's "Technical Basis and Background for Cleanup Standards for Contaminated Sites"), both inhalation and incidental ingestion pathways were evaluated, and the final cleanup levels for both chemicals were based on incidental ingestion. ERM's telephone conversation with NJDEP on 3 January 1996 confirmed that the inhalation pathway is not an issue at this site. Therefore, the only pathway of concern at the site is incidental ingestion, and alternative cleanup levels based on this pathway using EPA protocols are developed below.

Alternative residential cleanup levels for mercury and nickel based on incidental ingestion were derived using EPA's Soil Screening Guidance document (EPA/540/R-94/101). The equation for developing an acceptable level in soil based on incidental ingestion as listed in that document is:

$$\text{Screening level (mg/kg)} = \frac{\text{THQ x BW x AT x 365 d/yr}}{\text{1/RfDo x } 10^{-6} \text{ kg/mg x EF x ED x IR}}$$

Where:
THQ/target hazard quotient (unitless) = 1
BW/body weight (kg) = 15
AT/averaging time (yr) = 6
RfDo/oral reference dose (mg/kg-d) = 3×10^{-4} (mercury)
2×10^{-2} (nickel)
EF/exposure frequency (d/yr) = 350
ED/exposure duration (yr) = 6
IR/soil ingestion rate (mg/d) = 200

ERM

The values listed above for each parameter (except RfDo) are the default values provided in EPA's soil screening guidance. The oral reference doses (RfDo) are those cited in EPA Region III's "Risk-Based Concentration Table" and are the same as those used by NJDEP in developing their soil cleanup levels.

Using this equation and the default values listed above, the alternative residential cleanup level for mercury is 23 mg/kg and that for nickel is 1600 mg/kg.

Therefore, on the basis of a site-specific risk assessment, BD proposes that alternative residential soil cleanup levels for mercury and nickel of 23 mg/kg and 1600 mg/kg, respectively, be applied to the East Rutherford site.

If you have any questions, please do not hesitate to call.

Very truly yours,

Diane E. Heim

Diane E. Heim
Manager of Risk Assessment

cc: D. Gasbarro, BD
D. Scari, ERM-Northeast

18611506.458\pak

State of New Jersey

Christine Todd Whitman
Governor

Department of Environmental Protection

Robert C. Shinn, Jr.
Commissioner

MAR 15 1996

Glenn Barbi
Becton Dickinson & Co.
One Becton Drive
Franklin Lakes, New Jersey

Re: Remediation Agreement In the Matter of Becton Dickinson & Co. (Parcel 5)
Stanley Street, E. Rutherford, Bergen County
ISRA Case # 87577
Proposed Additional Soil Remedial Investigation Dated: December 11, 1995
Proposed Alternate Cleanup Criteria Dated: January 11, 1996

Dear Mr. Barbi:

Please be advised that the New Jersey Department of Environmental Protection (NJDEP) has completed its review of the above referenced proposed additional soil investigation and the proposed alternate cleanup criteria. The NJDEP's comments regarding the referenced submittals are noted below:

II Soils

1. Alternate Cleanup Criteria

Becton Dickinson submitted a proposal to use alternate site specific residential soil cleanup criteria for mercury and nickel. The alternate criteria for mercury and nickel were based on incidental ingestion and derived using the most recent Environmental Protection Agency guidance criteria.

The proposed site specific alternate residential soil cleanup criteria for mercury and nickel are acceptable. The site specific criteria are:

Mercury	23 parts per million (ppm)
Nickel	1600 ppm

2. Additional Remedial Investigation Sampling

Becton Dickinson seeks confirmation from the NJDEP that the proposed remedial action locations and sample locations are acceptable. In each case the sample locations are based on previous remedial investigation sampling results and the delineation criteria specified in the Technical Requirements for Site Remediation, N.J.A.C. 7:26E.

The proposed sub-building locations requiring further remedial action are A-FPA-5 for nickel, U-MMD-2 for mercury, U-MMD-3 for lead, U-MMD-4 for lead, U-MP-1 for copper, lead, and mercury, U-MP-2 for lead and mercury, and U-MP-3 for lead. The proposed locations are acceptable.

The proposed locations, which require further delineation soil sampling are listed below:

A-FPA-4-V
U-MMD-2-U
U-MMD-4-W5
U-MP-1-T, U, V5, and W for lead at 0-0.5 feet
U-MP-2-U, V, and W for lead at 0-0.5 feet

U-MP-2-V10
U-MP-3-V10 and W10

These proposed sampling locations are acceptable.

II Ground Water Conditions

Becton Dickinson submitted a renewal application in May 1990 for their New Jersey Pollutant Discharge Elimination System/Discharge to Ground Water (NJPDES/DGW) permit. The permit that was to be renewed was originally a surface water permit (No. NJ0001074), that was modified to include ground water monitoring requirements. The ground water portion of the permit was later split from Permit No. NJ0001074 and given a new permit number, No. NJ0078981, which is the current NJPDES/DGW permit number. Although NJPDES/DGW Permit No. NJ0078981 was never renewed, Becton Dickinson has continued to operate the ground water remediation system and perform ground water monitoring in accordance with the DGW permit and the May 7, 1990 renewal application.

The permit issued by the Department approved the implementation of a detection ground water monitoring program at Becton Dickinson to investigate impacts to, or monitor the effect of remediation on, the ground water quality. The Department has determined that the activities formerly regulated under the NJPDES/DGW permit meet the NJPDES permit exemption criteria established under the NJPDES rule amendments, specifically N.J.A.C. 7:14A-6.14(b), adopted on July 28, 1994. As explained in the summary to the rule proposal (published in the New Jersey Register on January 3, 1994), the Department has revised its strategy for management of contaminated sites and will no longer use the NJPDES permit as the oversight mechanism for approval of these monitoring, investigative or remedial programs.

The permit revocation applies exclusively to NJPDES/DGW permit No. NJ0078981 and has no bearing on NJPDES/Discharge to Surface Water permit NJ0001074.

Becton Dickinson shall continue to operate the ground water remediation system and perform ground water monitoring in accordance with the May 7, 1990 permit renewal application and the approved Remedial Action Workplan.

III General Requirements

1. Becton Dickinson shall submit the results or additional work plans, in triplicate, in accordance with the approved schedule. Please note that only one copy of the Quality Assurance/Quality Control Deliverables is needed.

2. Becton Dickinson shall submit a revised Remedial Action Schedule, pursuant to N.J.A.C. 7:26E-6.5, for NJDEP approval which includes all tasks associated with the remediation of the site within thirty (30) calendar days of the receipt of this letter.

3. Becton Dickinson shall submit summarized analytical results in accordance with the Technical Requirements For Site Remediation, N.J.A.C. 7:26E.

4. Becton Dickinson shall collect all samples in accordance with the sampling protocol outlined in the May, 1992 edition of the NJDEP's "Field Sampling Procedures Manual".

5. Becton Dickinson shall notify the assigned BEECRA Case Manager at least 14 calendar days prior to implementation of all field activities included in the Remedial Action Workplan. If Becton Dickinson fails to initiate sampling within 30 calendar days of the receipt of this approval, any requests for an extension of the required time frames may be denied.

6. On February 22, 1994, the New Jersey Department of Environmental Protection (NJDEP) promulgated the ISRA Fee Rule amendments at 26 N.J.R. 1142, which were proposed on April 5, 1993 at 25 N.J.R. 1375. Pursuant to the fee rule amendments, the NJDEP will bill an owner or operator according to the direct billing formula at N.J.A.C. 7:26B-1.10(f)2. At this time, the NJDEP intends to process bills on a semi-annual basis. The NJDEP encourages responsible parties to use the "Technical Requirements for Site Remediation" (N.J.A.C. 7:26E) as well as any other current NJDEP guidance documents to assist in remediation activities and thereby minimize NJDEP review time. The complexity of the environmental contamination at the site and the quality of the workplans and reports submitted to the NJDEP will dictate the oversight costs to the regulated community.

7. Pursuant to N.J.S.A. 58:10B-3, a remediation funding source is to be established in an amount equal to or greater than the cost estimate of the implementation of the remediation and shall be in effect for a term not less than the actual time necessary to perform the remediation at the site. N.J.S.A. 58:10B-3 allows for a change of the amount in the remediation funding source as the cost estimate changes. Please provide the current estimated cost of the remaining remediation required at the site. Any increases in the estimated cost estimate will require an increase in the amount in the Remediation Funding Source to an amount at least equal to the new estimate. Any requests to decrease the amount in the remediation funding source will be reviewed and approved by the NJDEP upon a finding that the current remediation cost estimate will be sufficient to fund all necessary remediation.

If you have any questions, please contact the Case Manager, Patrick Cotter, at (609) 633-1427.

Sincerely,

John Graham, Supervisor
Bureau of Environmental Evaluation
and Cleanup Responsibility Assessment

c: Chris Lacey, BEERA
Joel Fradel, BGWPA
North Arlington Health Department
James Rocco, ERM
Domenick Gasbarro, Becton Dickinson

APPENDIX B

Final Delineation Laboratory Analysis

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

March 20, 1996

ERM Northeast
175 Froehlich Farm Blvd.
Woodbury, NY 11797

Attn.: Mr. Jim Rocco

SUBJECT: CASE NARRATIVE, 186.123.1,
ETL NUMBER 159049.

Dear Mr. Rocco:

Enclosed are the analytical results for the 186.123.1 project. The samples were received on March 19, 1996 and were prepared and analyzed according to EPA established methodologies and protocols. The reports were completed according to NJDEP reduced laboratory data deliverable reporting requirements.

Your evaluation of the enclosed data should incorporate the use of the attached case narrative.

I certify that this package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release has been authorized by the Laboratory Manager or his designee, as verified by the following signature.

ENVIROTEST LABORATORIES, INC.

Ronald A. Bayer
Laboratory Director

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315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

CASE NARRATIVE
Client: ERM Northeast
Date: 3/20/96
ETL Lab No. 159049

Inorganics

No comments necessary.

EnviroTest Laboratories Inc.
315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

5/18/96

ERM-Northeast
Environmental Resources Management
175 Froehlich Farm Boulevard • Woodbury, New York 11797 • (516) 921-4300 • Telefax (516) 921-5679 • (516) 921-5637

ERM-Northeast
Chain of Custody

Project Name / No. BD Soils / 186.123.1
Project Coordinator / Contact Jim Rocco
Sampler(s) John Sheehan
Bottles Supplied By Enviro Test
Sheet No. 1 of 1

159049
ISRA
24 hr. TAT

Date	Time	Comp.	Grab	Sample Identification	Soil	Water	Total No. of Containers	Type and No. of Containers: 250 ML Amber Glass	Analysis Requested
3/8/96	10:45 AM		✓	U-MP-1-T5 (0.5')	✓		1	1	Pb * 24 Hr TAT psol
3/7/96	2:55 PM		✓	U-MP-1-V10 (0.5')	✓		1	1	Pb
3/7/96	4:35 PM		✓	U-MP-2-U5 (0.5')	✓		1	1	Pb
3/7/96	1:25 PM		✓	U-MP-3-V15 (2.75')	✓		1	1	Pb
3/7/96	12:10 PM		✓	U-MP-3-W15 (2.75')	✓		1	1	Pb

* Note: ISRA Report Type - Reduced Deliverables 24 Hr TAT w/ Fax Results to Jim R. (516) 921-5637

000002

Relinquished By (Signature)	Date/Time	Received By (Signature)	Date/Time	Reason for Transfer
Jim Rocco	3/18/96 4:00 PM	[illegible]	3/19/96 9:18	

146621

INORGANIC LABORATORY CHRONICLE--ENVIROTEST LABORATORIES, INC.

ETL Laboratory Number: 159049
Client Project Number: 186.123.1

Date Receipt/Refrigeration: 3/19/96
Date Sampled: 3/7 - 3/8/96
Preservative: 4°C

Sample Relinquished by	Sample Received by	Date	Time	Reason for Change of Custody
[signature]	[signature]	3/19		metals digestion
	[signature]	3/19		ICP metal
	[signature]	3/19	16:30	PSOL

INORGANICS

Digestion:
Metals: 3/19/96
Mercury:

Re-Digestion:
Metals:
Mercury:

Analysis:
Metals: 3/19/96
Mercury:

Re-analysis:
Metals:
Mercury:

Other analysis:

Other Re-analysis:

Section Supervisor Review and Approval: [signature]

doc. 1.0 12/7/89 ETL, Inc.

000003

EnviroTest Laboratories Inc.
315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

SUMMARY OF METHODOLOGY

Analysis	Aqueous	Ground Water Liquid/Solid Matrices
ICP Metals	EPA 200.7(1)	SW846-6010(2)
% Solid	EPA 160.3(1)	

References

1. "Methods for Chemical Analysis of Water and Wastewater", EPA-600/4-79-020, March 1983.
2. "Test Methods for Evaluating Solid Waste",USEPA-SW846, Third Edition, September 1986 with all current revisions.
3. Atomic Absorption - Direct Aspiration
4. Atomic Absorption - Furnace Technique
5. Federal Register, V. 50 No. 3, January 4, 1985.
6. Federal Register, V. 49, No. 209, October 26, 1984.
7. "Standard Methods for the Examination of Water and Wastewater", 16th Edition, 1986.
8. "Methods for the Determination of Organic Compounds in Drinking Water, EPA/600/4-88/039, December 1988.
9. The Anaylsis of Trihalomethanes in Finished Waters by the Purge and Trap Method, EMSL, Cincinnati, Ohio 45268, November 6, 1979.
10. Volatile Aromatic and Unsaturated Organic Compounds in Water by Purge and Trap Gas Chromatography, EMSL, Cincinnati, Ohio, 45268, Revision 2.0, (1989).
11. Volatile Organic Compounds in Water by Purge and Trap Capillary Column Gas Chromatography with Photoionization and Electrolytic Conductivity Detectors in Series, EMSL, Cincinnati, Ohio, 45268, Revision 2.0 (1989).
12. Determination of Chlorinated Acids in Water by Gas Chromatography with an Electron Capture Detector, EMSL, Cincinnati, Ohio, 45628, Revision 4.0 (1989).
13. "New York State Department of Environmental Conservation Analytical Services Protocol, Vol. 2, December 1991.
14. "Standard Methods for the Examination of Water and Wastewater", 17th Edition, 1989.
15. "ASTM, Petroleum Products, Lubricants, and Fossil Fuels, Vol. 5.01 D56-D1947, 1990.
16. " Analytical Handbook for the Laboratory of Organic Analytical Chemistry", Wadsworth Center for Laboratories and Research, New york State Department of Health, August, 1991.

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

DATA REPORTING QUALIFIERS

Data qualifiers are used in the analytical report for organics and inorganics. The qualifiers are equivalent to those used by the USEPA in its Contract Laboratory Program.

ORGANIC QUALIFIERS

U - Indicates that the compound was analyzed for but not detected. The sample detection limit is corrected for dilution and percent moisture. This detection limit is not necessarily the instrument detection limit.

J - Indicates an estimated value. This qualifier is used when mass spectral data indicates the presence of a compound that meets the identification criteria and the result is less than the specified detection limit but greater than zero.

B - Indicates that the analyte was found in both the sample and its associated laboratory blank. It indicates possible/probable blank contamination and warns the data user to take appropriate action.

C - This qualifier applies to pesticide parameters where the identification has been confirmed by gas chromatography/mass spectrometry.

E - This qualifier indicates compounds whose concentrations exceed the calibration range of the instrument for the specific analysis.

D - Indicates all compounds identified in an analysis at a secondary dilution factor.

DL - This suffix indicates a diluted sample and is appended to the sample number on the result form.

N - Indicates presumptive evidence of a compound. This flag is only used for tentatively identified compounds, where the identification is based on a mass spectral library search. It is applied to all TIC results.

P - This flag is used for a pesticide/Aroclor target analyte when there is greater than 25% difference for detected concentration between the two GC columns (see Form X). The lower of the two values is reported on Form I and flagged with an "P".

A - This flag indicates that a TIC is a suspected aldol-condensation product.

RE - This suffix indicates a re-analyzed sample and is appended to the sample number on the result form.

RR - This suffix indicates a re-extracted and re-analyzed sample and is appended to the sample number on the result form.

EnviroTest Laboratories Inc.
315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

DATA REPORTING QUALIFIERS

INORGANICS

Concentration Qualifiers (C)

U - Indicates that the analyte was analyzed for but not detected.

B - The reported value is less than the Contract Required Detection Limit (CRDL), but greater than the Instrument Detection Limit (IDL).

Quality Qualifiers (Q)

E - Indicates an estimated value because of the presence of interference.

M - Duplicate injection precision not met.

N - Spiked sample recovery not within control limits.

S - The reported value was determined by the Method of Standard Additions (MSA).

W - Post digestion spike for furnace AA analysis is out of control limits (85-115%), while sample absorbance is less than 50% of spike absorbance.

* - Duplicate analysis not within control limits.

+ - Correlation coefficient for the MSA is less than 0.995.

Method Qualifiers (M)

P - for ICP.
A - for Flame AA.
F - for Furnace AA.
PM - for ICP when Microwave Digestion is used.
AM - for Flame AA when Microwave Digestion is used.
FM - for Furnace AA when Microwave Digestion is used.
CV - for Manual Cold Vapor AA.
AV - for Automated Cold Vapor AA.
AS - for Semi-Automated Spectrophotometric
C - for Manual Spectrophotometric
T - for Titrimetric.
NR - if the analyte is not required to be analyzed.

000006

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

Inorganics Analysis Data Sheet
Form I - IN

Client Name: ERM Northeast - Woodbury
Project Name: 186.123.1
ETL Sample Number: 159049-01
Client I.D.: V-MP-1-TS(0.5') U-MP-1-TS (0.5')
Date Collected: 08-MAR-96
Matrix: 3 Soil/Sldg
Date Received: 19-MAR-96
Comments:

Analysis	Result	Units	Method	Analyzed
Lead	98.7	MG/KG DRY	200.7	19-MAR-96
Percent Solids	88.0	%	160.3	19-MAR-96

Remarks:

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

Inorganics Analysis Data Sheet
Form I - IN

Client Name: ERM Northeast - Woodbury
Project Name: 186.123.1

ETL Sample Number: 159049-02

Client I.D.: MW-MP-1-V10(0.5')

Date Collected: 07-MAR-96
Matrix: 3 Soil/Sldg

Date Received: 19-MAR-96

Comments:

Analysis	Result	Units	Method	Analyzed
Lead	193	MG/KG DRY	200.7	19-MAR-96
Percent Solids	88.4	%	160.3	19-MAR-96

Remarks:

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

Inorganics Analysis Data Sheet
Form I - IN

Client Name: ERM Northeast - Woodbury
Project Name: 186.123.1

ETL Sample Number: 159049-03

Client I.D.: GX-MP-2-U5(0.5')

Date Collected: 07-MAR-96
Matrix: 3 Soil/Sldg

Date Received: 19-MAR-96

Comments:

Analysis	Result	Units	Method	Analyzed
Lead	656	MG/KG DRY	200.7	19-MAR-96
Percent Solids	91.0	%	160.3	19-MAR-96

Remarks:

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

Inorganics Analysis Data Sheet
Form I - IN

Client Name: ERM Northeast - Woodbury
Project Name: 186.123.1

ETL Sample Number: 159049-04

Client I.D.: ~~W~~-MP-3-V15(2.75')

Date Collected: 07-MAR-96
Matrix: 3 Soil/Sldg

Date Received: 19-MAR-96

Comments:

Analysis	Result	Units	Method	Analyzed
Lead	58.4	MG/KG DRY	200.7	19-MAR-96
Percent Solids	88.4	%	160.3	19-MAR-96

Remarks:

EnviroTest Laboratories Inc
315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

Inorganics Analysis Data Sheet
Form I - IN

Client Name: ERM Northeast - Woodbury
Project Name: 186.123.1

ETL Sample Number: 159049-05

Client I.D.: U-MP-3-W15(2.75')

Date Collected: 07-MAR-96
Matrix: 3 Soil/Sldg

Date Received: 19-MAR-96

Comments:

Analysis	Result	Units	Method	Analyzed
Lead	60.6	MG/KG DRY	200.7	19-MAR-96
Percent Solids	90.7	%	160.3	19-MAR-96

Remarks:

EnviroTest Laboratories Inc
315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Envirotest Labs Contract: 186.123.1

Lab Code: 10142 SDG No.: ERM049

Initial Calibration Source: Spex

Continuing Calibration Source: Spex

Concentration Units: ug/l

	Initial Calibration			Continuing Calibration					
Analyte	True	Found	%Rec(1)	True	Found	%Rec(1)	Found	%Rec(1)	M
Aluminum	5000.0	5099.39	102.0	6000.0	6142.68	102.4	5931.39	98.9	P
Antimony	1600.0			2000.0					P
Arsenic	30.0			20.0					P
Barium	1600.0			2000.0					P
Beryllium	1600.0			2000.0					P
Cadmium	1600.0			2000.0					P
Calcium	60000.0	61593.02	102.7	50000.0	51506.13	103.0	50236.60	100.5	P
Chromium	1600.0			2000.0					P
Cobalt	1600.0			2000.0					P
Copper	1600.0			2000.0					P
Iron	5000.0	4962.25	99.2	6000.0	6055.56	100.9	5882.80	98.0	P
Lead	1600.0	1674.52	104.7	2000.0	2050.23	102.5	2077.30	103.9	P
Magnesium	60000.0	61187.39	102.0	50000.0	50667.06	101.3	50336.81	100.7	P
Manganese	1600.0			2000.0					P
Mercury	3.5			3.5					CV
Nickel	1600.0			2000.0					P
Potassium	60000.0			50000.0					P
Selenium	50.0			50.0					F
Silver	400.0			500.0					P
Sodium	60000.0			50000.0					P
Thallium	40.0			40.0					P
Vanadium	1600.0			2000.0					P
Zinc	1600.0			2000.0					P
Cyanide	50.0			50.0					C

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2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Envirotest Labs Contract: 186.123.1

Lab Code: 10142 SDG No.: ERM049

Initial Calibration Source: Spex

Continuing Calibration Source: Spex

Concentration Units: ug/l

	Initial Calibration			Continuing Calibration					
Analyte	True	Found	%Rec(1)	True	Found	%Rec(1)	Found	%Rec(1)	M
Aluminum	5000.0			6000.0	6097.90	101.6			P
Antimony	1600.0			2000.0					P
Arsenic	30.0			20.0					P
Barium	1600.0			2000.0					P
Beryllium	1600.0			2000.0					P
Cadmium	1600.0			2000.0					P
Calcium	60000.0			50000.0	51795.16	103.6			P
Chromium	1600.0			2000.0					P
Cobalt	1600.0			2000.0					P
Copper	1600.0			2000.0					P
Iron	5000.0			6000.0	6009.00	100.2			P
Lead	1600.0			2000.0	2048.30	102.4			P
Magnesium	60000.0			50000.0	50735.90	101.5			P
Manganese	1600.0			2000.0					P
Mercury	3.5			3.5					CV
Nickel	1600.0			2000.0					P
Potassium	60000.0			50000.0					P
Selenium	50.0			50.0					F
Silver	400.0			500.0					P
Sodium	60000.0			50000.0					P
Thallium	40.0			40.0					P
Vanadium	1600.0			2000.0					P
Zinc	1600.0			2000.0					P
Cyanide	50.0			50.0					C

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3
BLANK

Lab Name: Envirotest Labs
Lab Code: 10142
Sample Blank Matrix (Soil/Water): SOIL
Preparation Blank Concentration Units (ug/l or mg/kg): MG/KG

Contract: 186.123.1
SDG No.: ERM049

Analyte	Initial Calib. Blank (ug/l)	C	Continuing Calibration Blanks 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum	20.8	U	20.8	U	-41.0	B	33.4	B			P
Antimony											P
Arsenic											P
Barium											P
Beryllium											P
Cadmium											P
Calcium	19.3	U	19.3	U	19.3	U	40.8	B			P
Chromium											P
Cobalt											P
Copper											P
Iron	7.2	U	7.2	U	7.2	U	12.8	B			P
Lead	125.0	U	125.0	U	125.0	U	125.0	U	25.000	U	P
Magnesium	21.0	U	21.0	U	21.0	U	46.0	B			P
Manganese											P
Mercury											CV
Nickel											P
Potassium											P
Selenium											F
Silver											P
Sodium											P
Thallium											F
Vanadium											P
Zinc											P
Cyanide											C

FORM III - IN

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ICP INTERFERENCE CHECK SAMPLE

Lab Name: ENVIROTEST LABS
Lab Code: 10142
ICP ID Number: ICP-2

Contract: 186.123.1
SDG No.: ERM049
SPEX

Concentration Units: ug/l

Analyte	True Sol.A	True Sol.AB	Initial Sol.A	Initial Sol.AB	%Rec.	Final Sol.A	Final Sol.AB	%Rec.
Aluminum	500000	500000	485099	487164.3	97.4	489745	485424.8	97.1
Barium	0	500						
Beryllium	0	500						
Cadmium	0	1000						
Calcium	500000	500000	500971	500349.8	100.1	508333	498380.1	99.7
Chromium	0	500						
Cobalt	0	500						
Copper	0	500						
Iron	200000	200000	191642	191304.5	95.7	192237	187909.9	94.0
Magnesium	500000	500000	508389	510089.3	102.0	508333	498381.1	99.7
Manganese	0	500						
Nickel	0	1000						
Silver	0	1000						
Vanadium	0	500						
Zinc	0	1000						

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5A

SPIKE SAMPLE RECOVERY

Lab Name: Envirotest Labs
Client Contract: 186.123.1
Lab Code: 10142
SDG.No.: ERM049
Client ID#: U-MP--1-T5
Matrix (soil/water): SOIL
Level (low/med): LOW
%Solids: 88.0
Concentration Units (ug/l mg/kg): MG/KG

Analyte	Control Limit %Rec.	Spiked Sample Result	C	Sample Result	C	Spike Added	%Rec.	Q	M
Aluminum	75-125%								P
Antimony	75-125%								P
Arsenic	75-125%								F
Barium	75-125%								P
Beryllium	75-125%								P
Cadmium	75-125%								P
Calcium									P
Chromium	75-125%								P
Cobalt	75-125%								P
Copper	75-125%								P
Iron	75-125%								P
Lead	75-125%	216.3000		98.7100		113.60	103.5		P
Magnesium									P
Manganese	75-125%								P
Mercury	75-125%								CV
Nickel	75-125%								P
Potassium									P
Selenium	75-125%								F
Silver	75-125%								P
Sodium									P
Thallium	75-125%								F
Vanadium	75-125%								P
Zinc	75-125%								P
Cyanide	75-125%								C

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DUPLICATES

Lab Name: EnviroTest L abs
Contract: 186.123.1

Client ID: U-MP-1-T5

Lab Code: 10142
SDG.No.: ERM049

Sample Matrix: SOIL
Level (Low/Med): LOW

%Solids for Sample: 88.0
%Solids for or Duplicate: 91.2

Concentration Units (ug/l or mg/kg): SOIL

Analyte	Control Limit	Sample	C	Duplicate	C	%RSD	Q	M	
Aluminum								P	
Antimony								P	
Arsenic								P	
Barium								P	
Beryllium								P	
Cadmium								P	
Calcium								P	
Chromium								P	
Cobalt								P	
Copper								P	
Iron								P	
Lead		98.7100		89.8200		9.4		P	
Magnesium								P	
Manganese								P	
Mercury								CV	
Nickel								P	
Potassium								P	
Selenium								F	
Silver								P	
Sodium								P	
Thallium								F	
Vanadium								P	
Zinc								P	
Cyanide								C	

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LABORATORY CONTROL SAMPLE

Lab Name: Envirotest Labs Contract: 186.123.1

Lab Code: 10142 SDG No.: ERM049

Solid LCS Source: ERA

Aqueous LCS Source: :Spex

	Aqueous (ug/l)			Solid (mg/kg)					
Analyte	True	Found	%Rec(1)	True	Found	C	Limits		%Rec.
Aluminum	2000.0		0.0	6070.0			2730.0	8680.0	
Antimony	500.0		0.0	38.1			11.4	68.6	
Arsenic	20.0		0.0	65.4			32.0	97.4	
Barium	1000.0		0.0	161.0			113.0	211.0	
Beryllium	2000.0		0.0	122.0			78.1	171.0	
Cadmium	1000.0		0.0	85.4			44.4	123.0	
Calcium	2000.0		0.0	3710.0			2340.0	5230.0	
Chromium	500.0		0.0	71.6			38.7	101.0	
Cobalt	1000.0		0.0	94.2			56.5	134.0	
Copper	2000.0		0.0	173.0			98.6	251.0	
Iron	2000.0		0.0	12500.0			6380.0	18800.0	
Lead	20.0		0.0	70.4	78.4		37.3	100.0	111.3
Magnesium	2000.0		0.0	2490.0			1490.0	3590.0	
Manganese	1000.0		0.0	298.0			209.0	402.0	
Mercury	2.5		0.0	13.1			6.3	20.5	
Nickel	2000.0		0.0	68.5			37.7	100.0	
Potassium	5000.0		0.0	3250.0			2010.0	4290.0	
Selenium	50.0		0.0	152.0			79.0	226.0	
Silver	50.0		0.0	89.0			40.5	130.0	
Sodium	8100.0		0.0	167.0			71.1	262.0	
Thallium	20.0		0.0	71.8			26.4	117.0	
Vanadium	1000.0		0.0	105.0			73.5	142.0	
Zinc	1000.0		0.0	110.0			59.4	164.0	
Cyanide	50.0		0.0						

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ICP SERIAL DILUTIONS

Lab Name: ENVIROTEST LABORATORIES
Lab Code: 10142 SDG No.: ERM049
Matrix (soil/Water) : SOIL Level (low/med): LOW

Concentration Units: UG/L

Analyte	Initial Sample Result	C	Serial Dilution Result	C	% Differ-ence	Q	M
Aluminum							P
Antimony							P
Arsenic							P
Barium							P
Beryllium							P
Cadmium							P
Calcium							P
Chromium							P
Cobalt							P
Copper							P
Iron							P
Lead	434.33		625.00	U	NC		P
Magnesium							P
Manganese							P
Mercury							CV
Nickel							P
Potassium							P
Selenium							F
Silver							P
Sodium							P
Thallium							F
Vanadium							P
Zinc							P

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INSTRUMENT DETECTION LIMITS (quarterly)

Lab Name: EnviroTest Laboratories
ICP ID No.: ICP-2
Flame AA ID Number:
Furnace ID No.: F-1
HG Analyzer ID Number: CV-1

Contract: 186.123.1
SDG No.: ERM049
Date: 3/20/96
ICP : 1/16/96
GFAA: 1/29/96

Analyte	Wave-length nm	Back-ground	CRDL (ug/l)	IDL (ug/l)	M
Aluminum	308.22		200	20.8	P
Antimony	206.83		60	25.3	P
Arsenic	193.7	BZ	10	1.5	F
Barium	455.4		200	2.3	P
Beryllium	313.04		5	0.9	P
Cadmium	226.5		5	3.0	P
Calcium	317.93		5000	19.3	P
Chromium	267.72		10	9.1	P
Cobalt	200.0		50	6.5	P
Copper	324.75		25	4.6	P
Iron	259.94		100	7.2	P
Lead	220.35		3	125	P
Magnesium	279.08		5000	21.0	P
Manganese	257.61		15	0.76	P
Mercury	257.9		0.2	0.2	CV
Nickel	231.6		40	11.3	P
Potassium	766.49		5000	70.0	P
Selenium	196.0	BZ	1.3	1.5	F
Silver	328.07		10	4.5	P
Sodium	589.59		5000	30.4	P
Thallium	276.8		10		F
Vanadium	292.4		50	5.8	P
Zinc	213.86		20	1.4	P

FORM X -IN

000020

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Fax (914) 562-0841

March 22, 1996

ERM Northeast
175 Froehlich Farm Blvd.
Woodbury, New York 11797

Attn: Mr. Jim Rocco

SUBJECT: CASE NARRATIVE, 186.123.1,
ETL NUMBER 158764.

Dear Mr. Rocco:

Enclosed are the analytical results for the 186.123.1 project. The samples were received on March 9, 1996 and were prepared and analyzed according to EPA established methodologies and protocols. The reports were completed according to NJDEP reduced laboratory data deliverable reporting requirements.

Your evaluation of the enclosed data should incorporate the use of the attached case narrative.

I certify that this package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release has been authorized by the Laboratory Manager or his designee, as verified by the following signature.

ENVIROTEST LABORATORIES, INC.

Ronald A. Bayer
Laboratory Director

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CASE NARRATIVE
Client: ERM Northeast
Date: 3/22/96
ETL Lab No. 158764

Inorganics

Sample Dilution

The following samples were diluted on the ICP at the indicated amount due to the presence of the interferent iron in the undiluted analysis at a concentration that exceeds the linear calibration range of the instrument:

Duplicate #1 (158764-08): 2x

The following samples were diluted for mercury at the indicated amount due to concentrations that exceed the calibration range of the instrument:

U-MP-2-V-15(3.25') (158764-15): 20x
U-MP-2-V-15(3.25')D (!58764-15D): 20x
U-MP-2-V-15(3.25')S (158764-15S): 20x
U-MMD-2-U(.25') (158764-16): 4x

Matrix Duplicate

The duplicate %RPD for the following samples contain the indicated parameters that fall outside the established control limit:

U-MMD-4-W-15(.25')D (158764-01D): lead
U-MP-2-V-15(3.25')D (!58764-15D): mercury

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CHAIN OF CUSTODY RECORD

Page 1 of 2

CUSTOMER NAME: ERM-NORTHEAST

ADDRESS: 175 Froehlich Farm BLVD.

CITY, STATE, ZIP: WOODBURY NEW YORK

NAME OF CONTACT: JIM ROCCO / JOHN SHEEHAN PHONE NO. 516 921-4300

PROJECT LOCATION: EAST RUTHERFORD, N.J.

PROJECT NUMBER / PO NO.: 186.123.1

REPORT TYPE
STANDARD ☐ ISRA ☑
NYASP A ☐ B ☐ CLP ☐
OTHER ____

TURNAROUND
☐ NORMAL ____
☑ QUICK 1 week DUE 3/18
☐ VERBAL ____

LABORATORY # (Lab Use Only)
158764
TEMP BLANK Y ✓ N ____ 4 C°
pH CHECK Y ____ N ____
REVIEWED BY: JK

NY PUBLIC WATER SUPPLIES
SOURCE ID ____
ELRP TYPE ____
FEDERAL ID ____

ANALYSIS REQUESTED

ETL#	SAMPLING DATE	TIME AM PM	COMP	GRAB	MATRIX	CLIENT I.D.	Total Number of Containers	40ml Glass HCL	Liter Amber Sulfuric Acid	Liter Amber Organic Washed	Liter Plastic Nitric Acid	Liter Plastic Sodium Hydroxide	Liter Plastic	Liter Plastic Sulfuric Acid	250ml Plastic	125ml Plastic Sterile	250ml Amber	2 oz. Qorpak	ANALYSIS REQUESTED
01	3-7-96	10:15A		✓	Soil	U-MMD-4-W-15(2.5')	1										✓		Pb Lead, PSOL
02	3-7-96	12:25P		✓	H_2O	FB #1	1				✓								Pb, Hg
03	3-7-96	2:15P		✓	Soil	U-MP-3-W-10(2.75')	1										✓		Pb, PSOL
04	3-7-96	2:25P		✓	Soil	U-MP-3-V-10(2.75')	1										✓		Pb
05	3-7-96	2:45P		✓	Soil	U-MP-1-V-5(.5')	1										✓		Pb
06	3-7-96	3:15P		✓	Soil	U-MP-2-W(.5')	1										✓		Pb
07	3-7-96	3:55P		✓	Soil	U-MP-2-V(.5')	1										✓		Pb
08	3-7-96	3:55P		✓	Soil	DUPLICATE #1	1										✓		Pb
09	3-7-96	4:15P		✓	Soil	U-MP-2-V(.5')	1										✓		Pb
10	3-8-96	10:15A		✓	Soil	U-MP-1-W(.5')	1										✓		Pb
11	3-8-96	10:35A		✓	Soil	U-MP-1-V(.5')	1										✓		Pb
12	3-8-96	10:35A		✓	Soil	DUPLICATE #2	1										✓		Pb

RELINQUISHED BY: Lauren M. Ofeldt	COMPANY: ERM-NE	DATE: 3/5/96	TIME: 3:45	RECEIVED BY: John C. Sheehan	COMPANY: ERM	DATE: 3-7-96	TIME: Noon
RELINQUISHED BY:	COMPANY:	DATE:	TIME:	RECEIVED BY:	COMPANY:	DATE:	TIME:
RELINQUISHED BY: John C. Sheehan	COMPANY: ERM-NE	DATE: 3-8-96	TIME: 3:55P	RECEIVED BY: J.P. Mgby	COMPANY: ETL	DATE: 3/8/96	TIME: 10:20
RELINQUISHED BY:	COMPANY:	DATE:	TIME:	RECEIVED BY:	COMPANY:	DATE:	TIME:

COMMENTS: Samples require a 1 week verbal turnaround time, and require a NJDEPE reduced Deliverables Package. Please send report via fax result to Jim Rocco.

NYSDOH 10142 NJDEP 73507 CTDOHS PH-0054 EPA NY049

000002

EnviroTest Laboratories Inc.

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CHAIN OF CUSTODY RECORD

CUSTOMER NAME: ERM-NORTHEAST

ADDRESS: 175 FROEHLICH FARM BLVD

CITY, STATE, ZIP: WOODBURY, NEW YORK

NAME OF CONTACT / PHONE NO.: JIM ROCCO / JOHN C. SHEEHAN

PROJECT LOCATION: EXIT RUTHERFORD, NEW JERSEY

PROJECT NUMBER / PO NO.: 186.123.1

REPORT TYPE

STANDARD ☐ ISRA ☑

NYASP A ☐ B ☐ CLP ☐

OTHER ____

TURNAROUND

☐ NORMAL ____

☐ QUICK ____

☑ VERBAL / week

LABORATORY # (Lab Use Only)

158764

TEMP BLANK Y ✓ N ____ 4 C°

pH CHECK Y ____ N ____

REVIEWED BY: ✓

NY PUBLIC WATER SUPPLIES

SOURCE ID ____

ELRP TYPE ____

FEDERAL ID ____

ETL#	SAMPLING DATE	TIME AM PM	COMP	GRAB	MATRIX	CLIENT I.D.	Total Number of Containers	40ml Glass HCL	Liter Amber Sulfuric Acid	Liter Amber Organic Washed	Liter Plastic Nitric Acid	Liter Plastic Sodium Hydroxide	Liter Plastic	Liter Plastic Sulfuric Acid	250ml Plastic	125ml Plastic Sterile	250ml Amber	2 oz. Qorpak	ANALYSIS REQUESTED
13	3.8.96	11:15a		✓	Soil	U-MP-1-U (.5')	1										✓		Pb, lead, PSOL
14	3.8.96	11:35a		✓	H_2O	FB #2	1				✓								Pb, Hg
15	3.8.96	1:25p		✓	Soil	U-MP-2-V-15(3.25')	1										✓		Hg, PSOL
16	3.8.96	2:15p		✓	Soil	U-MMO-2-U (.25')	1										✓		Hg
						TEMP. BLANK													TEMP.

000003

RELINQUISHED BY	COMPANY	DATE	TIME	RECEIVED BY	COMPANY	DATE	TIME
[signature]	PR	3.8.96	3:45	John C. Sheehan	ERM	3.7.96	Noon
RELINQUISHED BY	COMPANY	DATE	TIME	RECEIVED BY	COMPANY	DATE	TIME
John C. Sheehan	ERM	3.8.96	3:55p	[signature]	ETL	3.9.96	10:20
RELINQUISHED BY	COMPANY	DATE	TIME	RECEIVED BY	COMPANY	DATE	TIME

COMMENTS: See page 1 of 2 for Sample requirements

INORGANIC LABORATORY CHRONICLE--ENVIROTEST LABORATORIES, INC.

ETL Laboratory Number: 1558764
Client Project Number: 186.123.1

Date Receipt/Refrigeration: 3-9-96
Date Sampled: 3-7-96
Preservative: 4°C

Sample Relinquished by	Sample Received by	Date	Time	Reason for Change of Custody
J. P. Murphy	[illegible]	3-11		Metals Dig.
	L. Wiseman	3/13		RP Metals
	Carol A. Werner	3/12	8:00A	Hg
	L. Wiseman	3/11		% Solid

INORGANICS

Digestion:
Metals: 3/11/96
Mercury: 3/12/96

Re-Digestion:
Metals:
Mercury:

Analysis:
Metals: 3/13/96
Mercury: 3/12/96

Re-analysis:
Metals:
Mercury:

Other analysis:

Other Re-analysis:

Section Supervisor Review and Approval: [signature]

doc. 1.0 12/7/89 ETL, Inc.

000004

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SUMMARY OF METHODOLOGY

Analysis	Aqueous	Ground Water Liquid/Solid Matrices
ICP Metals	EPA 200.7(1)	SW846-6010(2)
Mercury	EPA 245.1(1)	SW846-7471(2)
		SW846-7470(2)
% Solid	EPA 160.3(1)	

References

1. "Methods for Chemical Analysis of Water and Wastewater", EPA-600/4-79-020, March 1983.
2. "Test Methods for Evaluating Solid Waste",USEPA-SW846, Third Edition, September 1986 with all current revisions.
3. Atomic Absorption - Direct Aspiration
4. Atomic Absorption - Furnace Technique
5. Federal Register, V. 50 No. 3, January 4, 1985.
6. Federal Register, V. 49, No. 209, October 26, 1984.
7. "Standard Methods for the Examination of Water and Wastewater", 16th Edition, 1986.
8. "Methods for the Determination of Organic Compounds in Drinking Water, EPA/600/4-88/039, December 1988.
9. The Anaylsis of Trihalomethanes in Finished Waters by the Purge and Trap Method, EMSL, Cincinnati, Ohio 45268, November 6, 1979.
10. Volatile Aromatic and Unsaturated Organic Compounds in Water by Purge and Trap Gas Chromatography, EMSL, Cincinnati, Ohio, 45268, Revision 2.0, (1989).
11. Volatile Organic Compounds in Water by Purge and Trap Capillary Column Gas Chromatography with Photoionization and Electrolytic Conductivity Detectors in Series, EMSL, Cincinnati, Ohio, 45268, Revision 2.0 (1989).
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13. "New York State Department of Environmental Conservation Analytical Services Protocol, Vol. 2, December 1991.
14. "Standard Methods for the Examination of Water and Wastewater", 17th Edition, 1989.
15. "ASTM, Petroleum Products, Lubricants, and Fossil Fuels, Vol. 5.01 D56-D1947, 1990.
16. " Analytical Handbook for the Laboratory of Organic Analytical Chemistry", Wadsworth Center for Laboratories and Research, New york State Department of Health, August, 1991.

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DATA REPORTING QUALIFIERS

Data qualifiers are used in the analytical report for organics and inorganics. The qualifiers are equivalent to those used by the USEPA in its Contract Laboratory Program.

ORGANIC QUALIFIERS

U - Indicates that the compound was analyzed for but not detected. The sample detection limit is corrected for dilution and percent moisture. This detection limit is not necessarily the instrument detection limit.

J - Indicates an estimated value. This qualifier is used when mass spectral data indicates the presence of a compound that meets the identification criteria and the result is less than the specified detection limit but greater than zero.

B - Indicates that the analyte was found in both the sample and its associated laboratory blank. It indicates possible/probable blank contamination and warns the data user to take appropriate action.

C - This qualifier applies to pesticide parameters where the identification has been confirmed by gas chromatography/mass spectrometry.

E - This qualifier indicates compounds whose concentrations exceed the calibration range of the instrument for the specific analysis.

D - Indicates all compounds identified in an analysis at a secondary dilution factor.

DL - This suffix indicates a diluted sample and is appended to the sample number on the result form.

N - Indicates presumptive evidence of a compound. This flag is only used for tentatively identified compounds, where the identification is based on a mass spectral library search. It is applied to all TIC results.

P - This flag is used for a pesticide/Aroclor target analyte when there is greater than 25% difference for detected concentration between the two GC columns (see Form X). The lower of the two values is reported on Form I and flagged with an "P".

A - This flag indicates that a TIC is a suspected aldol-condensation product.

RE - This suffix indicates a re-analyzed sample and is appended to the sample number on the result form.

RR - This suffix indicates a re-extracted and re-analyzed sample and is appended to the sample number on the result form.

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INORGANICS

Concentration Qualifiers (C)

U - Indicates that the analyte was analyzed for but not detected.

B - The reported value is less than the Contract Required Detection Limit (CRDL), but greater than the Instrument Detection Limit (IDL).

Quality Qualifiers (Q)

E - Indicates an estimated value because of the presence of interference.

M - Duplicate injection precision not met.

N - Spiked sample recovery not within control limits.

S - The reported value was determined by the Method of Standard Additions (MSA).

W - Post digestion spike for furnace AA analysis is out of control limits (85-115%), while sample absorbance is less than 50% of spike absorbance.

* - Duplicate analysis not within control limits.

+ - Correlation coefficient for the MSA is less than 0.995.

Method Qualifiers (M)

P - for ICP.
A - for Flame AA.
F - for Furnace AA.
PM - for ICP when Microwave Digestion is used.
AM - for Flame AA when Microwave Digestion is used.
FM - for Furnace AA when Microwave Digestion is used.
CV - for Manual Cold Vapor AA.
AV - for Automated Cold Vapor AA.
AS - for Semi-Automated Spectrophotometric
C - for Manual Spectrophotometric
T - for Titrimetric.
NR - if the analyte is not required to be analyzed.

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Inorganics Analysis Data Sheet
Form I - IN

Client Name: ERM Northeast - Woodbury
Project Name: B-D 186.123.1

ETL Sample Number: 158764-01
Client I.D.: U-MMD-4-15(.25') W

Date Collected: 07-MAR-96
Matrix: 3 Soil/Sldg

Date Received: 09-MAR-96

Comments:

Analysis	Result	Units	Method	Analyzed
Lead	97.2 *	MG/KG DRY	200.7	13-MAR-96
Percent Solids	83.5	%	160.3	11-MAR-96

Remarks:

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Inorganics Analysis Data Sheet
Form I - IN

Client Name: ERM Northeast - Woodbury
Project Name: B-D 186.123.1
ETL Sample Number: 158764-02
Client I.D.: FB#1
Date Collected: 07-MAR-96
Matrix: 2 GW/WW
Date Received: 09-MAR-96
Comments:

Analysis	Result	Units	Method	Analyzed
Lead	125 U	UG/L	200.7	13-MAR-96
Mercury	0.2 U	UG/L	245.1	12-MAR-95

Remarks:

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Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	B-D 186.123.1
ETL Sample Number:	158764-03		
Client I.D.:	U-MP-3-W-10(2.75')		
Date Collected:	07-MAR-96	Matrix:	3 Soil/Sldg
Date Received:	09-MAR-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead	1030 *	MG/KG DRY	200.7	13-MAR-96
Percent Solids	84.7	%	160.3	11-MAR-96

Remarks:

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Inorganics Analysis Data Sheet
Form I - IN

Client Name: ERM Northeast - Woodbury
Project Name: B-D 186.123.1

ETL Sample Number: 158764-04
Client I.D.: U-MP-3-V-10(2.75)
Matrix: 3 Soil/Sldg
Date Collected: 07-MAR-96
Date Received: 09-MAR-96
Comments:

Analysis	Result	Units	Method	Analyzed
Lead	2660 *	MG/KG DRY	200.7	13-MAR-96
Percent Solids	85.6	%	160.3	11-MAR-96

Remarks:

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Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	B-D 186.123.1
ETL Sample Number:	158764-05		
Client I.D.:	U-MP-1-V-5(.5')		
Date Collected:	07-MAR-96	Matrix:	3 Soil/Sldg
Date Received:	09-MAR-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead	2300 *	MG/KG DRY	200.7	13-MAR-96
Percent Solids	84.7	%	160.3	11-MAR-96

Remarks:

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Inorganics Analysis Data Sheet
Form I - IN

Client Name: ERM Northeast - Woodbury
Project Name: B-D 186.123.1

ETL Sample Number: 158764-06

Client I.D.: U-MP-2-W(.5')

Date Collected: 07-MAR-96
Matrix: 3 Soil/Sldg

Date Received: 09-MAR-96

Comments:

Analysis	Result	Units	Method	Analyzed
Lead	274 *	MG/KG DRY	200.7	13-MAR-96
Percent Solids	88.8	%	160.3	11-MAR-96

Remarks:

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Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	B-D 186.123.1
ETL Sample Number:	158764-07		
Client I.D.:	U-MP-2-U(.5')		
Date Collected:	07-MAR-96	Matrix:	3 Soil/Sldg
Date Received:	09-MAR-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead	229 *	MG/KG DRY	200.7	13-MAR-96
Percent Solids	87.6	%	160.3	11-MAR-96

Remarks:

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Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	B-D 186.123.1
ETL Sample Number:	158764-08		
Client I.D.:	DUPLICATE #1		
Date Collected:	07-MAR-96	Matrix:	3 Soil/Sldg
Date Received:	09-MAR-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead	498 *	MG/KG DRY	200.7	13-MAR-96
Percent Solids	88.7	%	160.3	11-MAR-96

Remarks:

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Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	B-D 186.123.1
ETL Sample Number:	158764-09		
Client I.D.:	U-MP-2-V(.5')		
Date Collected:	07-MAR-96	Matrix:	3 Soil/Sldg
Date Received:	09-MAR-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead	283 *	MG/KG DRY	200.7	13-MAR-96
Percent Solids	87.0	%	160.3	11-MAR-96

Remarks:

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Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	B-D 186.123.1
ETL Sample Number:	158764-10		
Client I.D.:	U-MP-1-W(.5')		
Date Collected:	08-MAR-96	Matrix:	3 Soil/Sldg
Date Received:	09-MAR-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead	89.8 *	MG/KG DRY	200.7	13-MAR-96
Percent Solids	89.6	%	160.3	11-MAR-96

Remarks:

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Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	B-D 186.123.1
ETL Sample Number:	158764-11		
Client I.D.:	U-MP-1-T(.5')		
Date Collected:	08-MAR-96	Matrix:	3 Soil/Sldg
Date Received:	09-MAR-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead	312 *	MG/KG DRY	200.7	13-MAR-96
Percent Solids	86.1	%	160.3	11-MAR-96

Remarks:

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Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	B-D 186.123.1
ETL Sample Number:	158764-12		
Client I.D.:	DUPLICATE #2		
Date Collected:	08-MAR-96	Matrix:	3 Soil/Sldg
Date Received:	09-MAR-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead	799 *	MG/KG DRY	200.7	13-MAR-96
Percent Solids	85.1	%	160.3	11-MAR-96

Remarks:

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Inorganics Analysis Data Sheet
Form I - IN

Client Name: ERM Northeast - Woodbury
Project Name: B-D 186.123.1

ETL Sample Number: 158764-13

Client I.D.: U-MP-1-U(.5')

Date Collected: 08-MAR-96
Matrix: 3 Soil/Sldg

Date Received: 09-MAR-96

Comments:

Analysis	Result	Units	Method	Analyzed
Lead	45.3 *	MG/KG DRY	200.7	13-MAR-96
Percent Solids	89.3	%	160.3	11-MAR-96

Remarks:

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Inorganics Analysis Data Sheet
Form I - IN

Client Name: ERM Northeast - Woodbury
Project Name: B-D 186.123.1
ETL Sample Number: 158764-14
Client I.D.: FB#2
Date Collected: 08-MAR-96
Matrix: 2 GW/WW
Date Received: 09-MAR-96
Comments:

Analysis	Result	Units	Method	Analyzed
Lead	125 U	UG/L	200.7	13-MAR-96
Mercury	0.2 U	UG/L	245.1	12-MAR-95

Remarks:

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Inorganics Analysis Data Sheet
Form I - IN

Client Name: ERM Northeast - Woodbury
Project Name: B-D 186.123.1
ETL Sample Number: 158764-15
Client I.D.: U-MP-2-V-15(3.25')
Date Collected: 08-MAR-96
Matrix: 3 Soil/Sldg
Date Received: 09-MAR-96
Comments:

Analysis	Result	Units	Method	Analyzed
Mercury	11.7 *	MG/KG DRY	245.5	12-MAR-95
Percent Solids	88.1	%	160.3	11-MAR-96

Remarks:

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Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	B-D 186.123.1
ETL Sample Number:	158764-16		
Client I.D.:	U-MMD-2-U(.25)		
Date Collected:	08-MAR-96	Matrix:	3 Soil/Sldg
Date Received:	09-MAR-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Mercury	1.96 *	MG/KG DRY	245.5	12-MAR-95
Percent Solids	87.9	%	160.3	11-MAR-96

Remarks:

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2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Envirotest Labs Contract: 186.123.1

Lab Code: 10142 SDG No.: ERM764

Initial Calibration Source: Spex

Continuing Calibration Source: Spex

Concentration Units: ug/l

	Initial Calibration			Continuing Calibration					
Analyte	True	Found	%Rec(1)	True	Found	%Rec(1)	Found	%Rec(1)	M
Aluminum	5000.0	5165.76	103.3	6000.0	6149.80	102.5	6200.27	103.3	P
Antimony	1600.0			2000.0					P
Arsenic	30.0			20.0					P
Barium	1600.0			2000.0					P
Beryllium	1600.0			2000.0					P
Cadmium	1600.0			2000.0					P
Calcium	60000.0	62714.79	104.5	50000.0	52748.84	105.5	53802.24	107.6	P
Chromium	1600.0			2000.0					P
Cobalt	1600.0			2000.0					P
Copper	1600.0			2000.0					P
Iron	5000.0	5021.59	100.4	6000.0	6175.91	102.9	6214.07	103.6	P
Lead	1600.0	1685.05	105.3	2000.0	2077.46	103.9	2129.63	106.5	P
Magnesium	60000.0	61394.24	102.3	50000.0	51295.81	102.6	51132.07	102.3	P
Manganese	1600.0	1673.18	104.6	2000.0	2065.73	103.3	2091.92	104.6	P
Mercury	1.5	1.54	104.9	3.0	2.97	99.1	2.99	99.5	CV
Nickel	1600.0			2000.0					P
Potassium	60000.0			50000.0					P
Selenium	50.0			50.0					F
Silver	400.0			500.0					P
Sodium	60000.0			50000.0					P
Thallium	40.0			40.0					F
Vanadium	1600.0			2000.0					P
Zinc	1600.0			2000.0					P
Cyanide	50.0			50.0					C

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2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Envirotest Labs Contract: 186.123.1

Lab Code: 10142 SDG No.: ERM764

Initial Calibration Source: Spex

Continuing Calibration Source: Spex

Concentration Units: ug/l

Analyte	Initial Calibration True	Found	%Rec(1)	Continuing Calibration True	Found	%Rec(1)	Found	%Rec(1)	M
Aluminum	5000.0			6000.0	6136.52	102.3	6217.69	103.6	P
Antimony	1600.0			2000.0					P
Arsenic	30.0			20.0					P
Barium	1600.0			2000.0					P
Beryllium	1600.0			2000.0					P
Cadmium	1600.0			2000.0					P
Calcium	60000.0			50000.0	53764.61	107.5	54387.53	108.8	P
Chromium	1600.0			2000.0					P
Cobalt	1600.0			2000.0					P
Copper	1600.0			2000.0					P
Iron	5000.0			6000.0	6120.03	102.0	6183.78	103.1	P
Lead	1600.0			2000.0	2145.04	107.3	2102.39	105.1	P
Magnesium	60000.0			50000.0	51074.99	102.1	51462.85	102.9	P
Manganese	1600.0			2000.0	2105.91	105.3	2091.31	104.6	P
Mercury	1.5			3.0	3.017	100.6			CV
Nickel	1600.0			2000.0					P
Potassium	60000.0			50000.0					P
Selenium	50.0			50.0					F
Silver	400.0			500.0					P
Sodium	60000.0			50000.0					P
Thallium	40.0			40.0					F
Vanadium	1600.0			2000.0					P
Zinc	1600.0			2000.0					P
Cyanide	50.0			50.0					C

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3
BLANK

Lab Name: Envirotest Labs
Lab Code: 10142
Contract: 186.123.1
SDG No.: ERM764
Sample Blank Matrix (Soil/Water): SOIL
Preparation Blank Concentration Units (ug/l or mg/kg): MG/KG

Analyte	Initial Calib. Blank (ug/l)	C	Continuing Calibration Blanks 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum	20.8	U	20.8	U	38.1	B	20.8	U			P
Antimony											P
Arsenic											P
Barium											P
Beryllium											P
Cadmium											P
Calcium	19.3	U	19.3	U	28.8	B	22.9	B			P
Chromium											P
Cobalt											P
Copper											P
Iron	7.2	U	7.2	U	7.2	U	7.2	U			P
Lead	125.0	U	125.0	U	125.0	U	125.0	U	25.0	U	P
Magnesium	21.0	U	21.0	U	28.5	B	21.0	U			P
Manganese	0.8	U	0.8	U	0.8	U	0.8	U			P
Mercury	0.2	U	0.2	U	0.2	U	0.2	U	0.040	U	CV
Nickel											P
Potassium											P
Selenium											F
Silver											P
Sodium											P
Thallium											F
Vanadium											P
Zinc											P
Cyanide											C

FORM III - IN

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3
BLANK

Lab Name: Envirotest Labs
Lab Code: 10142
Sample Blank Matrix (Soil/Water): SOIL
Preparation Blank Concentration Units (ug/l or mg/kg): MG/KG

Contract: 186.123.1
SDG No.: ERM764

Analyte	Initial Calib. Blank (ug/l)	C	Continuing Calibration Blanks 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum			20.8	U							P
Antimony											P
Arsenic											P
Barium											P
Beryllium											P
Cadmium											P
Calcium			40.6	B							P
Chromium											P
Cobalt											P
Copper											P
Iron			7.2	U							P
Lead			125.0	U							P
Magnesium			30.0	B							P
Manganese			0.8	U							P
Mercury											CV
Nickel											P
Potassium											P
Selenium											F
Silver											P
Sodium											P
Thallium											F
Vanadium											P
Zinc											P
Cyanide											C

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4

ICP INTERFERENCE CHECK SAMPLE

Lab Name: ENVIROTEST LABS
Lab Code: 10142
ICP ID Number: ICP-2

Contract: 186.123.1
SDG No.: ERM764
SPEX

Concentration Units: ug/l

Analyte	True Sol.A	True Sol.AB	Initial Sol.A	Initial Sol.AB	%Rec.	Final Sol.A	Final Sol.AB	%Rec.
Aluminum	500000	500000	490944	491046.1	98.2	492864	490401.5	98.1
Barium	0	500						
Beryllium	0	500						
Cadmium	0	1000						
Calcium	500000	500000	503721	510161.4	102.0	528279	520501.1	104.1
Chromium	0	500						
Cobalt	0	500						
Copper	0	500						
Iron	200000	200000	189924	192819.6	96.4	192288	191018.6	95.5
Magnesium	500000	500000	502955	512249.6	102.4	504448	510241.5	102.0
Manganese	0	500	-2	495.3	99.1	0	501.2	100.2
Nickel	0	1000						
Silver	0	1000						
Vanadium	0	500						
Zinc	0	1000						

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5A

SPIKE SAMPLE RECOVERY

Lab Name: Envirotest Labs
Client Contract: 186.123.1
Lab Code: 10142
SDG.No.: ERM764
Client ID#: U-MMD-4-W-15
Matrix (soil/water): SOIL
Level (low/med): LOW
%Solids: 83.5
Concentration Units (ug/l mg/kg): MG/KG

Analyte	Control Limit %Rec.	Spiked Sample Result	C	Sample Result	C	Spike Added	%Rec.	Q	M
Aluminum	75-125%								P
Antimony	75-125%								P
Arsenic	75-125%								F
Barium	75-125%								P
Beryllium	75-125%								P
Cadmium	75-125%								P
Calcium									P
Chromium	75-125%								P
Cobalt	75-125%								P
Copper	75-125%								P
Iron	75-125%								P
Lead	75-125%	209.1000		97.1700		119.80	93.4		P
Magnesium									P
Manganese	75-125%								P
Mercury	75-125%								CV
Nickel	75-125%								P
Potassium									P
Selenium	75-125%								F
Silver	75-125%								P
Sodium									P
Thallium	75-125%								F
Vanadium	75-125%								P
Zinc	75-125%								P
Cyanide	75-125%								C

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5A

SPIKE SAMPLE RECOVERY

Lab Name: Envirotest Labs
Client Contract: 186.123.1
Lab Code: 10142
SDG.No.: ERM764
Client ID#: U-MP-2-W-15
Matrix (soil/water): SOIL
Level (low/med): LOW
%Solids: 88.1
Concentration Units (ug/l mg/kg): MG/KG

Analyte	Control Limit %Rec.	Spiked Sample Result	C	Sample Result	C	Spike Added	%Rec.	Q	M
Aluminum	75-125%								P
Antimony	75-125%								P
Arsenic	75-125%								F
Barium	75-125%								P
Beryllium	75-125%								P
Cadmium	75-125%								P
Calcium									P
Chromium	75-125%								P
Cobalt	75-125%								P
Copper	75-125%								P
Iron	75-125%								P
Lead	75-125%								P
Magnesium									P
Manganese	75-125%								P
Mercury	75-125%	13.9000		11.7000		0.56	395.7		CV
Nickel	75-125%								P
Potassium									P
Selenium	75-125%								F
Silver	75-125%								P
Sodium									P
Thallium	75-125%								F
Vanadium	75-125%								P
Zinc	75-125%								P
Cyanide	75-125%								C

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DUPLICATES

Lab Name: EnviroTest L abs
Client ID: U-MMD-4-W-15
Lab Code: 10142
Sample Matrix: SOIL

Contract: 186.123.1
SDG.No.: ERM764
Level (Low/Med): LOW

%Solids for Sample: 83.5

%Solids for or Duplicate:

Concentration Units (ug/l or mg/kg): MG/KG

Analyte	Control Limit	Sample	C	Duplicate	C	RPD	Q	M	
Aluminum								P	
Antimony								P	
Arsenic								F	
Barium								P	
Beryllium								P	
Cadmium								P	
Calcium								P	
Chromium								P	
Cobalt								P	
Copper								P	
Iron								P	
Lead		97.1700		162.2000		50.1	*	P	
Magnesium								P	
Manganese								P	
Mercury								CV	
Nickel								P	
Potassium								P	
Selenium								F	
Silver								P	
Sodium								P	
Thallium								F	
Vanadium								P	
Zinc								P	
Cyanide								C	

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DUPLICATES

Lab Name: EnviroTest L abs
Contract: 186.123.1

Client ID: U-MP-2-V-15

Lab Code: 10142
SDG.No.: ERM764

Sample Matrix: SOIL
Level (Low/Med): LOW

%Solids for Sample: 88.1
%Solids for or Duplicate:

Concentration Units (ug/l or mg/kg): MG/KG

Analyte	Control Limit	Sample	C	Duplicate	C	RPD	Q	M	
Aluminum								P	
Antimony								P	
Arsenic								F	
Barium								P	
Beryllium								P	
Cadmium								P	
Calcium								P	
Chromium								P	
Cobalt								P	
Copper								P	
Iron								P	
Lead								P	
Magnesium								P	
Manganese								P	
Mercury		11.7000		18.2000		43.5	*	CV	
Nickel								P	
Potassium								P	
Selenium								F	
Silver								P	
Sodium								P	
Thallium								F	
Vanadium								P	
Zinc								P	
Cyanide								C	

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LABORATORY CONTROL SAMPLE

Lab Name: Envirotest Labs Contract: 186.123.1

Lab Code: 10142 SDG No.: ERM764

Solid LCS Source: ERA

Aqueous LCS Source: :Spex

	Aqueous (ug/l)			Solid (mg/kg)					
Analyte	True	Found	%Rec(1)	True	Found	C	Limits		%Rec.
Aluminum	2000.0			6070.0			2730.0	8680.0	
Antimony	500.0			38.1			11.4	68.6	
Arsenic	20.0			65.4			32.0	97.4	
Barium	1000.0			161.0			113.0	211.0	
Beryllium	2000.0			122.0			78.1	171.0	
Cadmium	1000.0			85.4			44.4	123.0	
Calcium	2000.0			3710.0			2340.0	5230.0	
Chromium	500.0			71.6			38.7	101.0	
Cobalt	1000.0			94.2			56.5	134.0	
Copper	2000.0			173.0			98.6	251.0	
Iron	2000.0			12500.0			6380.0	18800.0	
Lead	20.0			70.4	77.3		37.3	100.0	109.7
Magnesium	2000.0			2490.0			1490.0	3590.0	
Manganese	1000.0			298.0			209.0	402.0	
Mercury	2.5			13.1	12.8		6.3	20.5	97.7
Nickel	2000.0			68.5			37.7	100.0	
Potassium	5000.0			3250.0			2010.0	4290.0	
Selenium	50.0			152.0			79.0	226.0	
Silver	50.0			89.0			40.5	130.0	
Sodium	8100.0			167.0			71.1	262.0	
Thallium	20.0			71.8			26.4	117.0	
Vanadium	1000.0			105.0			73.5	142.0	
Zinc	1000.0			110.0			59.4	164.0	
Cyanide	50.0								

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ICP SERIAL DILUTIONS

Lab Name: ENVIROTEST LABORATORIES
Lab Code: 10142 SDG No.: ERM764
Matrix (soil/Water) : SOIL Level (low/med): LOW

Concentration Units: UG/L

Analyte	Initial Sample Result	C	Serial Dilution Result	C	% Differ-ence	Q	M
Aluminum							P
Antimony							P
Arsenic							P
Barium							P
Beryllium							P
Cadmium							P
Calcium							P
Chromium							P
Cobalt							P
Copper							P
Iron							P
Lead	405.71		446.46		10.0		P
Magnesium							P
Manganese							P
Mercury							CV
Nickel							P
Potassium							P
Selenium							F
Silver							P
Sodium							P
Thallium							F
Vanadium							P
Zinc							P

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INSTRUMENT DETECTION LIMITS (quarterly)

Lab Name: EnviroTest Laboratories
ICP ID No.: ICP-2
Flame AA ID Number:
Furnace ID No.: F-1
HG Analyzer ID Number: CV-1

Contract: 186.123.1
SDG No.: ERM764
Date: 3/15/96
ICP : 1/16/96
GFAA: 1/29/96

Analyte	Wave-length nm	Back-ground	CRDL (ug/l)	IDL (ug/l)	M
Aluminum	308.22		200	20.8	P
Antimony	206.83		60	25.3	P
Arsenic	193.7	BZ	10	1.5	F
Barium	455.4		200	2.3	P
Beryllium	313.04		5	0.9	P
Cadmium	226.5		5	3.0	P
Calcium	317.93		5000	19.3	P
Chromium	267.72		10	9.1	P
Cobalt	200.0		50	6.5	P
Copper	324.75		25	4.6	P
Iron	259.94		100	7.2	P
Lead	220.35		3	125	P
Magnesium	279.08		5000	21.0	P
Manganese	257.61		15	0.76	P
Mercury	257.9		0.2	0.2	CV
Nickel	231.6		40	11.3	P
Potassium	766.49		5000	70.0	P
Selenium	196.0	BZ	1.3	1.5	F
Silver	328.07		10	4.5	P
Sodium	589.59		5000	30.4	P
Thallium	276.8		10		F
Vanadium	292.4		50	5.8	P
Zinc	213.86		20	1.4	P

FORM X -IN

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NYSDOH 10142 NJDEP 73507 CTDOHS PH-0554 EPA NY049

Inorganics Analysis Data Sheet
Form I - IN

Client Name: ERM Northeast - Woodbury
Project Name: 186.123
ETL Sample Number: 159563-02
Client I.D.: U-MP-2-U-20(2.25')
Date Collected: 28-MAR-96
Matrix: 3 Soil/Sldg
Date Received: 03-APR-96
Comments:

?? Duplicate had 20% difference but ±36 ppmw and sample is still over 23 ppmw 1.m.

Analysis	Result	Units	Method	Analyzed
Mercury	182 *	MG/KG DRY	7471	03-APR-96
Percent Solids	86.2	%	160.3	03-APR-96

Remarks:

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Inorganics Analysis Data Sheet
Form I - IN

Client Name: ERM Northeast - Woodbury

Project Name: 186.173

ETL Sample Number: 159563-01

Client I.D.: U-MMP-4-V-5(0.75')

Date Collected: 28-MAR-96

Matrix: 3 Soil/Sldg

Date Received: 03-APR-96

Comments:

Analysis	Result	Units	Method	Analyzed
Lead	439	MG/KG DRY	200.7	04-APR-96
Percent Solids	86.7	%	160.3	03-APR-96

Remarks:

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April 24, 1996

ERM Northeast
175 Froehlich Farm Blvd.
Woodbury, New York 11797

Attn.: Mr. Jim Rocco

SUBJECT: CASE NARRATIVE, 186.123,
ETL NUMBER 159563.

Dear Mr. Rocco:

Enclosed are the analytical results for the 186.123 project. The samples were received on April 3, 1996 and were prepared and analyzed according to EPA established methodologies and protocols. The reports were completed according to NJDEP reduced laboratory data deliverable reporting requirements.

Your evaluation of the enclosed data should incorporate the use of the attached case narrative.

I certify that this package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release has been authorized by the Laboratory Manager or his designee, as verified by the following signature.

ENVIROTEST LABORATORIES, INC.

Ronald A. Bayer
Laboratory Director

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CASE NARRATIVE
Client: ERM Northeast
Date: 4/24/96
ETL Lab No. 159563

Inorganics

Sample Dilution

The following sample was initially diluted for mercury at the indicated amount due to suspected high concentrations of method analyte:

U-MP-2-U-20(2.25') (159563-02): 100x
U-MP-2-U-20(2.25')D (159563-02D): 100x
U-MP-2-U-20(2.25')S (159563-02S): 100x

Matrix Duplicate

The %RPD for mercury in sample number U-MP-2-U-20(2.25')D (159563-02D) exceeds the acceptable limit. The data is qualified accordingly.

Matrix Spike

The matrix spike recovery for lead in sample number U-MMD-4-V-5(.75')S (159563-01S) falls outside the established control limits. The data is qualified accordingly.

Post Digestion Spike

A post digestion spike was analyzed for sample number U-MMD-4-V-5(.75')P (159563-01P) due to lead recovery outside the acceptable limit in the predigestion spike.

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ERM-Northeast
Environmental Resources Management
ERM
175 Froehlich Farm Boulevard • Woodbury, New York 11797 • (516) 921-4300 • Telefax (516) 921-6679 • (516) 921-5637

ISRA

ERM-Northeast Chain of Custody

Project Name / No. BD Soils / 186.123
Project Coordinator / Contact Jim Rucci
Sampler(s) John Sheehan
Bottles Supplied By Enviro test Labs
Sheet No. 1

Type and No. of Containers

* Need Res. by 4/5/96 (48 hr TAT)

Date	Time	Comp.	Grab	Sample Identification	Soil	Water	Total No. of Containers										Analysis Requested
3/26/96	11:15 AM		✓	U-MMD-4-V-5 (0.75')	✓		1			1							Pb
3/28/96	3.30 PM		✓	U-MP-2-U-20 (2.25')	✓		1			1							Hg

Relinquished By (Signature)	Date/Time	Received By (Signature)	Date/Time	Reason for Transfer
	4/2/96 4:00		4/3/96 10:00	

200000

146021

INORGANIC LABORATORY CHRONICLE--ENVIROTEST LABORATORIES, INC.

ETL Laboratory Number: 159563
Client Project Number: 186.123

Date Receipt/Refrigeration: 4/3/96
Date Sampled: 3/28/96
Preservative: 4°C

Sample Relinquished by	Sample Received by	Date	Time	Reason for Change of Custody
[illegible]	[illegible]	4/3	16:30	PSO1
	Carol A. Werner	4/3/96	8:00A	Hg
	[illegible]	4/4	8:30A	Pb
	C. Pillar	4/3		Metals dig

INORGANICS

Digestion:
Metals: 4/3/96
Mercury: 4/3/96

Re-Digestion:
Metals:
Mercury:

Analysis:
Metals: 4/4/96
Mercury:

Re-analysis:
Metals:
Mercury:

Other analysis:

Other Re-analysis:

Section Supervisor Review and Approval: Renée Cusack

doc. 1.0 12/7/89 ETL, Inc.

000003

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SUMMARY OF METHODOLOGY

Analysis	Aqueous	Ground Water Liquid/Solid Matrices
ICP Metals	EPA 200.7(1)	SW846-6010(2)
Mercury	EPA 245.5(1)	SW846-7471(2) SW846-7470(2)
% Solid	EPA 160.3(1)	

References

1. "Methods for Chemical Analysis of Water and Wastewater", EPA-600/4-79-020, March 1983.
2. "Test Methods for Evaluating Solid Waste",USEPA-SW846, Third Edition, September 1986 with all current revisions.
3. Atomic Absorption - Direct Aspiration
4. Atomic Absorption - Furnace Technique
5. Federal Register, V. 50 No. 3, January 4, 1985.
6. Federal Register, V. 49, No. 209, October 26, 1984.
7. "Standard Methods for the Examination of Water and Wastewater", 16th Edition, 1986.
8. "Methods for the Determination of Organic Compounds in Drinking Water, EPA/600/4-88/039, December 1988.
9. The Anaylsis of Trihalomethanes in Finished Waters by the Purge and Trap Method, EMSL, Cincinnati, Ohio 45268, November 6, 1979.
10. Volatile Aromatic and Unsaturated Organic Compounds in Water by Purge and Trap Gas Chromatography, EMSL, Cincinnati, Ohio, 45268, Revision 2.0, (1989).
11. Volatile Organic Compounds in Water by Purge and Trap Capillary Column Gas Chromatography with Photoionization and Electrolytic Conductivity Detectors in Series, EMSL, Cincinnati, Ohio, 45268, Revision 2.0 (1989).
12. Determination of Chlorinated Acids in Water by Gas Chromatography with an Electron Capture Detector, EMSL, Cincinnati, Ohio, 45628, Revision 4.0 (1989).
13. "New York State Department of Environmental Conservation Analytical Services Protocol, Vol. 2, December 1991.
14. "Standard Methods for the Examination of Water and Wastewater", 17th Edition, 1989.
15. "ASTM, Petroleum Products, Lubricants, and Fossil Fuels, Vol. 5.01 D56-D1947, 1990.
16. " Analytical Handbook for the Laboratory of Organic Analytical Chemistry", Wadsworth Center for Laboratories and Research, New york State Department of Health, August, 1991.

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DATA REPORTING QUALIFIERS

Data qualifiers are used in the analytical report for organics and inorganics. The qualifiers are equivalent to those used by the USEPA in its Contract Laboratory Program.

ORGANIC QUALIFIERS

U - Indicates that the compound was analyzed for but not detected. The sample detection limit is corrected for dilution and percent moisture. This detection limit is not necessarily the instrument detection limit.

J - Indicates an estimated value. This qualifier is used when mass spectral data indicates the presence of a compound that meets the identification criteria and the result is less than the specified detection limit but greater than zero.

B - Indicates that the analyte was found in both the sample and its associated laboratory blank. It indicates possible/probable blank contamination and warns the data user to take appropriate action.

C - This qualifier applies to pesticide parameters where the identification has been confirmed by gas chromatography/mass spectrometry.

E - This qualifier indicates compounds whose concentrations exceed the calibration range of the instrument for the specific analysis.

D - Indicates all compounds identified in an analysis at a secondary dilution factor.

DL - This suffix indicates a diluted sample and is appended to the sample number on the result form.

N - Indicates presumptive evidence of a compound. This flag is only used for tentatively identified compounds, where the identification is based on a mass spectral library search. It is applied to all TIC results.

P - This flag is used for a pesticide/Aroclor target analyte when there is greater than 25% difference for detected concentration between the two GC columns (see Form X). The lower of the two values is reported on Form I and flagged with an "P".

A - This flag indicates that a TIC is a suspected aldol-condensation product.

RE - This suffix indicates a re-analyzed sample and is appended to the sample number on the result form.

RR - This suffix indicates a re-extracted and re-analyzed sample and is appended to the sample number on the result form.

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DATA REPORTING QUALIFIERS

INORGANICS

Concentration Qualifiers (C)

U - Indicates that the analyte was analyzed for but not detected.

B - The reported value is less than the Contract Required Detection Limit (CRDL), but greater than the Instrument Detection Limit (IDL).

Quality Qualifiers (Q)

E - Indicates an estimated value because of the presence of interference.

M - Duplicate injection precision not met.

N - Spiked sample recovery not within control limits.

S - The reported value was determined by the Method of Standard Additions (MSA).

W - Post digestion spike for furnace AA analysis is out of control limits (85-115%), while sample absorbance is less than 50% of spike absorbance.

* - Duplicate analysis not within control limits.

+ - Correlation coefficient for the MSA is less than 0.995.

Method Qualifiers (M)

P - for ICP.
A - for Flame AA.
F - for Furnace AA.
PM - for ICP when Microwave Digestion is used.
AM - for Flame AA when Microwave Digestion is used.
FM - for Furnace AA when Microwave Digestion is used.
CV - for Manual Cold Vapor AA.
AV - for Automated Cold Vapor AA.
AS - for Semi-Automated Spectrophotometric
C - for Manual Spectrophotometric
T - for Titrimetric.
NR - if the analyte is not required to be analyzed.

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Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123
ETL Sample Number:	159563-01		
Client I.D.:	U-MW4D-4-V-5(0.75')		
Date Collected:	28-MAR-96	Matrix:	3 Soil/Sldg
Date Received:	03-APR-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead	439 N	MG/KG DRY	200.7	04-APR-96
Percent Solids	86.7	%	160.3	03-APR-96

Remarks:

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Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123
ETL Sample Number:	159563-02		
Client I.D.:	U-MP-2-U-20(2.25')		
Date Collected:	28-MAR-96	Matrix:	3 Soil/Sldg
Date Received:	03-APR-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Mercury	182 *	MG/KG DRY	245.5	03-APR-96
Percent Solids	86.2	%	160.3	03-APR-96

Remarks:

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2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Envirotest Labs Contract: 186.123

Lab Code: 10142 SDG No.: ERM563

Initial Calibration Source: Spex

Continuing Calibration Source: Spex

Concentration Units: ug/l

	Initial Calibration			Continuing Calibration					
Analyte	True	Found	%Rec(1)	True	Found	%Rec(1)	Found	%Rec(1)	M
Aluminum	5000.0	5213.68	104.3	6000.0	6164.72	102.7	6105.67	101.8	P
Antimony	1600.0			2000.0					P
Arsenic	30.0			20.0					P
Barium	1600.0			2000.0					P
Beryllium	1600.0			2000.0					P
Cadmium	1600.0			2000.0					P
Calcium	60000.0	61563.95	102.6	50000.0	50854.67	101.7	49808.96	99.6	P
Chromium	1600.0			2000.0					P
Cobalt	1600.0			2000.0					P
Copper	1600.0			2000.0					P
Iron	5000.0	5084.16	101.7	6000.0	6039.89	100.7	5905.83	98.4	P
Lead	1600.0	1697.86	106.1	2000.0	2082.43	104.1	2083.96	104.2	P
Magnesium	60000.0	62506.19	104.2	50000.0	51207.45	102.4	50959.92	101.9	P
Manganese	1600.0			2000.0					P
Mercury	1.47	1.24	84.4	3.0	2.60	86.7	2.59	86.3	CV
Nickel	1600.0			2000.0					P
Potassium	60000.0			50000.0					P
Selenium	50.0			50.0					F
Silver	400.0			500.0					P
Sodium	60000.0			50000.0					P
Thallium	40.0			40.0					F
Vanadium	1600.0			2000.0					P
Zinc	1600.0			2000.0					P
Cyanide	50.0			50.0					C

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3
BLANK

Lab Name: Envirotest Labs
Lab Code: 10142
Sample Blank Matrix (Soil/Water): SOIL
Preparation Blank Concentration Units (ug/l or mg/kg): MG/KG

Contract: 186.123
SDG No.: ERM563

Analyte	Initial Calib. Blank (ug/l)	C	Continuing Calibration Blanks 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum	20.8	U	32.8	B	20.8	U					P
Antimony											P
Arsenic											F
Barium											P
Beryllium											P
Cadmium											P
Calcium	19.3	U	19.6	B	30.3	B					P
Chromium											P
Cobalt											P
Copper											P
Iron	7.2	U	7.2	U	11.8	B					P
Lead	125.0	U	125.0	U	125.0	U			25.000	U	P
Magnesium	21.0	U	21.0	U	39.7	B					P
Manganese											P
Mercury	0.2	U	0.2	U	0.2	U			0.040	U	CV
Nickel											P
Potassium											P
Selenium											F
Silver											P
Sodium											P
Thallium											P
Vanadium											P
Zinc											P
Cyanide											C

FORM III - IN

EnviroTest Laboratories Inc.
315 Fullerton Avenue
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ICP INTERFERENCE CHECK SAMPLE

Lab Name: ENVIROTEST LABS
Lab Code: 10142
ICP ID Number: ICP-2

Contract: 186.123
SDG No.: ERM563
SPEX

Concentration Units: ug/l

Analyte	True Sol.A	True Sol.AB	Initial Sol.A	Initial Sol.AB	%Rec.	Final Sol.A	Final Sol.AB	%Rec.
Aluminum	500000	500000	485936	481445.3	96.3	485956	482115.4	96.4
Barium	0	500						
Beryllium	0	500						
Cadmium	0	1000						
Calcium	500000	500000	480164	482702.2	96.5	484945	488609.7	97.7
Chromium	0	500						
Cobalt	0	500						
Copper	0	500						
Iron	200000	200000	188817	191474.9	95.7	189257	192464.8	96.2
Magnesium	500000	500000	500709	509772.6	102.0	501442	511389.3	102.3
Lead	0	1000	114	1086.3	108.6	110	1074.0	107.4
Nickel	0	1000						
Silver	0	1000						
Vanadium	0	500						
Zinc	0	1000						

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5A

SPIKE SAMPLE RECOVERY

Lab Name: Envirotest Labs
Client Contract: 186.123
Lab Code: 10142
SDG.No.: ERM563
Client ID#: U-MMD-V-5
Matrix (soil/water): SOIL
Level (low/med): LOW
%Solids: 86.7
Concentration Units (ug/l mg/kg): MG/KG

Analyte	Control Limit %Rec.	Spiked Sample Result	C	Sample Result	C	Spike Added	%Rec.	Q	M
Aluminum	75-125%								P
Antimony	75-125%								P
Arsenic	75-125%								F
Barium	75-125%								P
Beryllium	75-125%								P
Cadmium	75-125%								P
Calcium									P
Chromium	75-125%								P
Cobalt	75-125%								P
Copper	75-125%								P
Iron	75-125%								P
Lead	75-125%	718.1200		439.2450		115.34	241.8	N	P
Magnesium									P
Manganese	75-125%								P
Mercury	75-125%								CV
Nickel	75-125%								P
Potassium									P
Selenium	75-125%								F
Silver	75-125%								P
Sodium									P
Thallium	75-125%								F
Vanadium	75-125%								P
Zinc	75-125%								P
Cyanide	75-125%								C

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5A

SPIKE SAMPLE RECOVERY

Lab Name: Envirotest Labs
Client Contract: 186.123
Lab Code: 10142
SDG.No.: ERM563
Client ID#: U-MP-2-U-20
Matrix (soil/water): SOIL
Level (low/med): LOW
%Solids: 86.2
Concentration Units (ug/l mg/kg): MG/KG

Analyte	Control Limit %Rec.	Spiked Sample Result	C	Sample Result	C	Spike Added	%Rec.	Q	M
Aluminum	75-125%								P
Antimony	75-125%								P
Arsenic	75-125%								F
Barium	75-125%								P
Beryllium	75-125%								P
Cadmium	75-125%								P
Calcium									P
Chromium	75-125%								P
Cobalt	75-125%								P
Copper	75-125%								P
Iron	75-125%								P
Lead	75-125%								P
Magnesium									P
Manganese	75-125%								P
Mercury	75-125%	123.0000		182.0000		0.58	-10172.4		CV
Nickel	75-125%								P
Potassium									P
Selenium	75-125%								F
Silver	75-125%								P
Sodium									P
Thallium	75-125%								F
Vanadium	75-125%								P
Zinc	75-125%								P
Cyanide	75-125%								C

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DUPLICATES

Lab Name: EnviroTest L abs
Contract: 186.123

Client ID: U-MMD-4-V-5

Lab Code: 10142
SDG.No.: ERM563

Sample Matrix: SOIL
Level (Low/Med): LOW

%Solids for Sample: 86.7
%Solids for or Duplicate: 86.6

Concentration Units (ug/l or mg/kg): MG/KG

Analyte	Control Limit	Sample	C	Duplicate	C	RPD	Q	M	
Aluminum								P	
Antimony								P	
Arsenic								P	
Barium								P	
Beryllium								P	
Cadmium								P	
Calcium								P	
Chromium								P	
Cobalt								P	
Copper								P	
Iron								P	
Lead		439.2450		499.2430		12.8		P	
Magnesium								P	
Manganese								P	
Mercury								CV	
Nickel								P	
Potassium								P	
Selenium								F	
Silver								P	
Sodium								P	
Thallium								F	
Vanadium								P	
Zinc								P	
Cyanide								C	

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DUPLICATES

Lab Name: EnviroTest L abs
Client ID: U-MMD-4-V-5
Lab Code: 10142
Sample Matrix: SOIL

Contract: 186.123
SDG.No.: ERM563
Level (Low/Med): LOW

%Solids for Sample: 86.7

%Solids for or Duplicate: 86.6

Concentration Units (ug/l or mg/kg): MG/KG

Analyte	Control Limit	Sample	C	Duplicate	C	RPD	Q	M	
Aluminum								P	
Antimony								P	
Arsenic								P	
Barium								P	
Beryllium								P	
Cadmium								P	
Calcium								P	
Chromium								P	
Cobalt								P	
Copper								P	
Iron								P	
Lead								P	
Magnesium								P	
Manganese								P	
Mercury		182.0000		123.0000		38.7	*	CV	
Nickel								P	
Potassium								P	
Selenium								F	
Silver								P	
Sodium								P	
Thallium								F	
Vanadium								P	
Zinc								P	
Cyanide								C	

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LABORATORY CONTROL SAMPLE

Lab Name: Envirotest Labs Contract: 186.123

Lab Code: 10142 SDG No.: ERM563

Solid LCS Source: ERA

Aqueous LCS Source: :Spex

Analyte	Aqueous (ug/l) True	Found	%Rec(1)	Solid (mg/kg) True	Found	C	Limits		%Rec.
Aluminum	2000.0			6070.0			2730.0	8680.0	
Antimony	500.0			38.1			11.4	68.6	
Arsenic	20.0			65.4			32.0	97.4	
Barium	1000.0			161.0			113.0	211.0	
Beryllium	2000.0			122.0			78.1	171.0	
Cadmium	1000.0			85.4			44.4	123.0	
Calcium	2000.0			3710.0			2340.0	5230.0	
Chromium	500.0			71.6			38.7	101.0	
Cobalt	1000.0			94.2			56.5	134.0	
Copper	2000.0			173.0			98.6	251.0	
Iron	2000.0			12500.0			6380.0	18800.0	
Lead	20.0			70.4	79.4		37.3	100.0	112.8
Magnesium	2000.0			2490.0			1490.0	3590.0	
Manganese	1000.0			298.0			209.0	402.0	
Mercury	2.5			13.1	11.1		6.3	20.5	84.7
Nickel	2000.0			68.5			37.7	100.0	
Potassium	5000.0			3250.0			2010.0	4290.0	
Selenium	50.0			152.0			79.0	226.0	
Silver	50.0			89.0			40.5	130.0	
Sodium	8100.0			167.0			71.1	262.0	
Thallium	20.0			71.8			26.4	117.0	
Vanadium	1000.0			105.0			73.5	142.0	
Zinc	1000.0			110.0			59.4	164.0	
Cyanide	50.0								

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ICP SERIAL DILUTIONS

Lab Name: ENVIROTEST LABORATORIES

Lab Code: 10142 SDG No.: ERM563

Matrix (soil/Water) : SOIL Level (low/med): LOW

Concentration Units: UG/L

Analyte	Initial Sample Result	C	Serial Dilution Result	C	% Differ-ence	Q	M
Aluminum							P
Antimony							P
Arsenic							P
Barium							P
Beryllium							P
Cadmium							P
Calcium							P
Chromium							P
Cobalt							P
Copper							P
Iron							P
Lead	1904.13		2032.35		6.7		P
Magnesium							P
Manganese							P
Mercury							CV
Nickel							P
Potassium							P
Selenium							F
Silver							P
Sodium							P
Thallium							F
Vanadium							P
Zinc							P

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INSTRUMENT DETECTION LIMITS (quarterly)

Lab Name: EnviroTest Laboratories Contract: 186.123
ICP ID No.: ICP-2 SDG No.: ERM563
Flame AA ID Number: ICP: 1/16/96
Furnace ID No.: F-1 GFAA: 1/29/96
HG Analyzer ID Number: CV-1

Analyte	Wave-length nm	Back-ground	CRDL (ug/l)	IDL (ug/l)	M
Aluminum	308.22		200	20.8	P
Antimony	206.83		60	25.3	P
Arsenic	193.7	BZ	10	1.5	F
Barium	455.4		200	2.3	P
Beryllium	313.04		5	0.9	P
Cadmium	226.5		5	3.0	P
Calcium	317.93		5000	19.3	P
Chromium	267.72		10	9.1	P
Cobalt	200.0		50	6.5	P
Copper	324.75		25	4.6	P
Iron	259.94		100	7.2	P
Lead	220.35		3	25.0	P
Magnesium	279.08		5000	21.0	P
Manganese	257.61		15	0.76	P
Mercury	257.9		0.2	0.2	CV
Nickel	231.6		40	11.3	P
Potassium	766.49		5000	70.0	P
Selenium	196.0	BZ	1.3	1.5	F
Silver	328.07		10	4.5	P
Sodium	589.59		5000	30.4	P
Thallium	276.8		10		F
Vanadium	292.4		50	5.8	P
Zinc	213.86		20	1.4	P

FORM X -IN

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April 24, 1996

ERM Northeast
175 Froehlich Farm Blvd.
Woodbury, New York 11797

Attn.: Mr. Jim Rocco

SUBJECT: CASE NARRATIVE, 186.123.1,
ETL NUMBER 159709.

Dear Mr. Rocco:

Enclosed are the analytical results for the 186.123.1 project. The samples were received on April 8, 1996 and were prepared and analyzed according to EPA established methodologies and protocols. The reports were completed according to NJDEP reduced laboratory data deliverable reporting requirements.

Your evaluation of the enclosed data should incorporate the use of the attached case narrative.

I certify that this package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release has been authorized by the Laboratory Manager or his designee, as verified by the following signature.

ENVIROTEST LABORATORIES, INC.

Ronald A. Bayer
Laboratory Director

New York State Department of Health Approved

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CASE NARRATIVE
Client: ERM Northeast
Date: 4/24/96
ETL Lab No. 159709

Inorganics

Sample Dilution

The following sample was initially diluted for mercury at the indicated amount due to suspected high concentrations of method analyte:

U-MP-2-U-25(2.25') (159709-02): 100x
U-MP-2-U-25(2.25')D (159709-02D): 100x
U-MP-2-U-25(2.25')S (159709-02S): 100x

Matrix Spike

The matrix spike recovery for lead in sample number U-MMD-4-V-10(.75')S (159709-01S) falls outside the established control limits. The data is qualified accordingly.

Post Digestion Spike

A post digestion spike was analyzed for sample number U-MMD-4-V-10(.75')P (159709-01P) due to lead recovery outside the acceptable limit in the predigestion spike.

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ERM-Northeast
Environmental Resources Management
ERM
175 Froehlich Farm Boulevard • Woodbury, New York 11797 • (516) 921-4300 • Telefax (516) 921-6679 • (516) 921-5637

ERM-Northeast
Chain of Custody

159709
4/9/96
ISRP

Project Name / No. BD Soils / 186.123.1
Project Coordinator / Contact Jim Rocco
Sampler(s) John Sheehan
Bottles Supplied By Envirotest
Sheet No. 1 of 1

Type and No. of Containers

Date	Time	Comp.	Grab	Sample Identification	Soil	Water	Total No. of Containers	Glass	Plastic								Analysis Requested
3/28/96	11 AM		X	U-MMD-4-V10 (0.75')	X		1	1									Pb psol
3/28/96	3:50PM		X	U-MP-2-U25 (2.25')	X		1		1								Hg psol

Relinquished By (Signature)	Date/Time	Received By (Signature)	Date/Time	Reason for Transfer
John Mahy	4/5/96 10 AM		4/8/96 13:31	[signature]

000002

140821

INORGANIC LABORATORY CHRONICLE--ENVIROTEST LABORATORIES, INC.

ETL Laboratory Number: 159709
Client Project Number: 186.123.1

Date Receipt/Refrigeration: 4/8/96
Date Sampled: 3/28/96
Preservative: 4°C

Sample Relinquished by	Sample Received by	Date	Time	Reason for Change of Custody
[signature]	[signature]	4-8		Metals Dig.
	[signature]	4-9		Pb
	Carol A. Werner	4-9	8:00	Hg

INORGANICS

Digestion: 4/8/96
Metals:
Mercury: 4/9/96

Re-Digestion:
Metals:
Mercury:

Analysis: 4/9/96
Metals:
Mercury: 4/9/96

Re-analysis:
Metals:
Mercury:

Other analysis:

Other Re-analysis:

Section Supervisor Review and Approval: [signature]

doc. 1.0 12/7/89 ETL, Inc.

000003

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SUMMARY OF METHODOLOGY

Analysis	Aqueous	Ground Water Liquid/Solid Matrices
ICP Metals	EPA 200.7(1)	SW846-6010(2)
Mercury	EPA 245.5(1)	SW846-7471(2) SW846-7470(2)
% Solid	EPA 160.3(1)	

References

1. "Methods for Chemical Analysis of Water and Wastewater", EPA-600/4-79-020, March 1983.
2. "Test Methods for Evaluating Solid Waste",USEPA-SW846, Third Edition, September 1986 with all current revisions.
3. Atomic Absorption - Direct Aspiration
4. Atomic Absorption - Furnace Technique
5. Federal Register, V. 50 No. 3, January 4, 1985.
6. Federal Register, V. 49, No. 209, October 26, 1984.
7. "Standard Methods for the Examination of Water and Wastewater", 16th Edition, 1986.
8. "Methods for the Determination of Organic Compounds in Drinking Water, EPA/600/4-88/039, December 1988.
9. The Anaylsis of Trihalomethanes in Finished Waters by the Purge and Trap Method, EMSL, Cincinnati, Ohio 45268, November 6, 1979.
10. Volatile Aromatic and Unsaturated Organic Compounds in Water by Purge and Trap Gas Chromatography, EMSL, Cincinnati, Ohio, 45268, Revision 2.0, (1989).
11. Volatile Organic Compounds in Water by Purge and Trap Capillary Column Gas Chromatography with Photoionization and Electrolytic Conductivity Detectors in Series, EMSL, Cincinnati, Ohio, 45268, Revision 2.0 (1989).
12. Determination of Chlorinated Acids in Water by Gas Chromatography with an Electron Capture Detector, EMSL, Cincinnati, Ohio, 45628, Revision 4.0 (1989).
13. "New York State Department of Environmental Conservation Analytical Services Protocol, Vol. 2, December 1991.
14. "Standard Methods for the Examination of Water and Wastewater", 17th Edition, 1989.
15. "ASTM, Petroleum Products, Lubricants, and Fossil Fuels, Vol. 5.01 D56-D1947, 1990.
16. " Analytical Handbook for the Laboratory of Organic Analytical Chemistry", Wadsworth Center for Laboratories and Research, New york State Department of Health, August, 1991.

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DATA REPORTING QUALIFIERS

Data qualifiers are used in the analytical report for organics and inorganics. The qualifiers are equivalent to those used by the USEPA in its Contract Laboratory Program.

ORGANIC QUALIFIERS

U - Indicates that the compound was analyzed for but not detected. The sample detection limit is corrected for dilution and percent moisture. This detection limit is not necessarily the instrument detection limit.

J - Indicates an estimated value. This qualifier is used when mass spectral data indicates the presence of a compound that meets the identification criteria and the result is less than the specified detection limit but greater than zero.

B - Indicates that the analyte was found in both the sample and its associated laboratory blank. It indicates possible/probable blank contamination and warns the data user to take appropriate action.

C - This qualifier applies to pesticide parameters where the identification has been confirmed by gas chromatography/mass spectrometry.

E - This qualifier indicates compounds whose concentrations exceed the calibration range of the instrument for the specific analysis.

D - Indicates all compounds identified in an analysis at a secondary dilution factor.

DL - This suffix indicates a diluted sample and is appended to the sample number on the result form.

N - Indicates presumptive evidence of a compound. This flag is only used for tentatively identified compounds, where the identification is based on a mass spectral library search. It is applied to all TIC results.

P - This flag is used for a pesticide/Aroclor target analyte when there is greater than 25% difference for detected concentration between the two GC columns (see Form X). The lower of the two values is reported on Form I and flagged with an "P".

A - This flag indicates that a TIC is a suspected aldol-condensation product.

RE - This suffix indicates a re-analyzed sample and is appended to the sample number on the result form.

RR - This suffix indicates a re-extracted and re-analyzed sample and is appended to the sample number on the result form.

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DATA REPORTING QUALIFIERS

INORGANICS

Concentration Qualifiers (C)

U - Indicates that the analyte was analyzed for but not detected.

B - The reported value is less than the Contract Required Detection Limit (CRDL), but greater than the Instrument Detection Limit (IDL).

Quality Qualifiers (Q)

E - Indicates an estimated value because of the presence of interference.

M - Duplicate injection precision not met.

N - Spiked sample recovery not within control limits.

S - The reported value was determined by the Method of Standard Additions (MSA).

W - Post digestion spike for furnace AA analysis is out of control limits (85-115%), while sample absorbance is less than 50% of spike absorbance.

* - Duplicate analysis not within control limits.

+ - Correlation coefficient for the MSA is less than 0.995.

Method Qualifiers (M)

P - for ICP.
A - for Flame AA.
F - for Furnace AA.
PM - for ICP when Microwave Digestion is used.
AM - for Flame AA when Microwave Digestion is used.
FM - for Furnace AA when Microwave Digestion is used.
CV - for Manual Cold Vapor AA.
AV - for Automated Cold Vapor AA.
AS - for Semi-Automated Spectrophotometric
C - for Manual Spectrophotometric
T - for Titrimetric.
NR - if the analyte is not required to be analyzed.

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Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	159709-01		
Client I.D.:	U-MMD-4-V10(0.75')		
Date Collected:	28-MAR-96	Matrix:	3 Soil/Sldg
Date Received:	08-APR-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead	347 N	MG/KG DRY	200.7	09-APR-96
Percent Solids	87.1	%	160.3	08-APR-96

Remarks:

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Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	159709-02		
Client I.D.:	U-MP-U25(2.25')		
Date Collected:	28-MAR-96	Matrix:	3 Soil/Sldg
Date Received:	08-APR-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Mercury	27.6	MG/KG DRY	245.5	09-APR-96
Percent Solids	87.3	%	160.3	08-APR-96

Remarks:

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2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Envirotest Labs Contract: 186.123

Lab Code: 10142 SDG No.: ERM709

Initial Calibration Source: Spex

Continuing Calibration Source: Spex

Concentration Units: ug/l

	Initial Calibration			Continuing Calibration					
Analyte	True	Found	%Rec(1)	True	Found	%Rec(1)	Found	%Rec(1)	M
Aluminum	5000.0	5210.79	104.2	6000.0	6180.43	103.0	6161.85	102.7	P
Antimony	1600.0			2000.0					P
Arsenic	30.0			20.0					P
Barium	1600.0			2000.0					P
Beryllium	1600.0			2000.0					P
Cadmium	1600.0			2000.0					P
Calcium	60000.0	62079.58	103.5	50000.0	51027.33	102.1	51367.06	102.7	P
Chromium	1600.0			2000.0					P
Cobalt	1600.0			2000.0					P
Copper	1600.0			2000.0					P
Iron	5000.0	5077.42	101.5	6000.0	5981.20	99.7	5972.85	99.5	P
Lead	1600.0	1647.10	102.9	2000.0	2040.12	102.0	2019.18	101.0	F
Magnesium	60000.0	62387.94	104.0	50000.0	51130.91	102.3	50988.54	102.0	P
Manganese	1600.0			2000.0					P
Mercury	1.47	1.40	95.2	3.0	2.72	90.7	2.62	87.3	CV
Nickel	1600.0			2000.0					P
Potassium	60000.0			50000.0					P
Selenium	50.0			50.0					F
Silver	400.0			500.0					P
Sodium	60000.0			50000.0					P
Thallium	40.0			40.0					F
Vanadium	1600.0			2000.0					P
Zinc	1600.0			2000.0					P
Cyanide	50.0			50.0					C

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3
BLANK

Lab Name: Envirotest Labs
Lab Code: 10142
Sample Blank Matrix (Soil/Water): SOIL
Preparation Blank Concentration Units (ug/l or mg/kg): MG/KG

Contract: 186.123.1
SDG No.: ERM709

Analyte	Initial Calib. Blank (ug/l)	C	Continuing Calibration Blanks 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum	20.8	U	20.8	U	20.8	U					P
Antimony											P
Arsenic											F
Barium											P
Beryllium											P
Cadmium											P
Calcium	23.0	B	19.3	U	29.5	B					P
Chromium											P
Cobalt											P
Copper											P
Iron	7.2	U	7.2	U	9.1	B					P
Lead	125.0	U	125.0	U	125.0	U			25.000	U	P
Magnesium	28.0	B	21.0	B	32.1	B					P
Manganese											P
Mercury	0.2	U	0.2	U	0.2	U			0.040	U	CV
Nickel											P
Potassium											P
Selenium											F
Silver											P
Sodium											P
Thallium											F
Vanadium											P
Zinc											P
Cyanide											C

FORM III - IN

000010

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ICP INTERFERENCE CHECK SAMPLE

Lab Name: ENVIROTEST LABS
Lab Code: 10142
ICP ID Number: ICP-2

Contract: 186.123.1
SDG No.: ERM709
SPEX

Concentration Units: ug/l

Analyte	True Sol.A	True Sol.AB	Initial Sol.A	Initial Sol.AB	%Rec.	Final Sol.A	Final Sol.AB	%Rec.
Aluminum	500000	500000	486164	485498.5	97.1	486535	483491.1	96.7
Barium	0	500						
Beryllium	0	500						
Cadmium	0	1000						
Calcium	500000	500000	483861	487716.2	97.5	481068	486041.5	97.2
Chromium	0	500						
Cobalt	0	500						
Copper	0	500						
Iron	200000	200000	188085	191600.5	95.8	186240	190182.1	95.1
Magnesium	500000	500000	497508	512089.5	102.4	497503	509553.2	101.9
Lead	0	1000	101	1069.4	106.9	42	1033.2	103.3
Nickel	0	1000						
Silver	0	1000						
Vanadium	0	500						
Zinc	0	1000						

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5A

SPIKE SAMPLE RECOVERY

Lab Name: Envirotest Labs
Client Contract: 186.123.1
Lab Code: 10142
SDG.No.: ERM709
Client ID#: U-MMD-4-V10
Matrix (soil/water): SOIL
Level (low/med): LOW
%Solids: 87.1
Concentration Units (ug/l mg/kg): MG/KG

Analyte	Control Limit %Rec.	Spiked Sample Result	C	Sample Result	C	Spike Added	%Rec.	Q	M
Aluminum	75-125%								P
Antimony	75-125%								P
Arsenic	75-125%								F
Barium	75-125%								P
Beryllium	75-125%								P
Cadmium	75-125%								P
Calcium									P
Chromium	75-125%								P
Cobalt	75-125%								P
Copper	75-125%								P
Iron	75-125%								P
Lead	75-125%	516.5486		347.3047		114.81	147.4	N	P
Magnesium									P
Manganese	75-125%								P
Mercury	75-125%								CV
Nickel	75-125%								P
Potassium									P
Selenium	75-125%								F
Silver	75-125%								P
Sodium									P
Thallium	75-125%								F
Vanadium	75-125%								P
Zinc	75-125%								P
Cyanide	75-125%								C

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5A

SPIKE SAMPLE RECOVERY

Lab Name: Envirotest Labs
Client Contract: 186.123.1
Lab Code: 10142
SDG.No.: ERM709
Client ID#: U-MP-2-U25
Matrix (soil/water): SOIL
Level (low/med): LOW
%Solids: 87.3
Concentration Units (ug/l mg/kg): MG/KG

Analyte	Control Limit %Rec.	Spiked Sample Result	C	Sample Result	C	Spike Added	%Rec.	Q	M
Aluminum	75-125%								P
Antimony	75-125%								P
Arsenic	75-125%								F
Barium	75-125%								P
Beryllium	75-125%								P
Cadmium	75-125%								P
Calcium									P
Chromium	75-125%								P
Cobalt	75-125%								P
Copper	75-125%								P
Iron	75-125%								P
Lead	75-125%								P
Magnesium									P
Manganese	75-125%								P
Mercury	75-125%	31.3000		27.6000		0.57	645.7		CV
Nickel	75-125%								P
Potassium									P
Selenium	75-125%								F
Silver	75-125%								P
Sodium									P
Thallium	75-125%								F
Vanadium	75-125%								P
Zinc	75-125%								P
Cyanide	75-125%								C

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DUPLICATES

Lab Name: EnviroTest L abs
Contract: 186.123

Client ID: U-MMD-4-V10

Lab Code: 10142
SDG.No.: ERM709

Sample Matrix: SOIL
Level (Low/Med): LOW

%Solids for Sample: 87.1
%Solids for or Duplicate: 86.3

Concentration Units (ug/l or mg/kg): MG/KG

Analyte	Control Limit	Sample	C	Duplicate	C	RPD	Q	M	
Aluminum								P	
Antimony								P	
Arsenic								P	
Barium								P	
Beryllium								P	
Cadmium								P	
Calcium								P	
Chromium								P	
Cobalt								P	
Copper								P	
Iron								P	
Lead		347.3047		339.2021		2.4		P	
Magnesium								P	
Manganese								P	
Mercury								CV	
Nickel								P	
Potassium								P	
Selenium								F	
Silver								P	
Sodium								P	
Thallium								F	
Vanadium								P	
Zinc								P	
Cyanide								C	

000014

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6

DUPLICATES

Lab Name: EnviroTest L abs
Client ID: U-MMD-4-V10
Lab Code: 10142
Sample Matrix: SOIL

Contract: 186.123.1
SDG.No.: ERM709
Level (Low/Med): LOW

%Solids for Sample: 87.1

%Solids for or Duplicate: 86.3

Concentration Units (ug/l or mg/kg): MG/KG

Analyte	Control Limit	Sample	C	Duplicate	C	RPD	Q	M	
Aluminum								P	
Antimony								P	
Arsenic								P	
Barium								P	
Beryllium								P	
Cadmium								P	
Calcium								P	
Chromium								P	
Cobalt								P	
Copper								P	
Iron								P	
Lead								P	
Magnesium								P	
Manganese								P	
Mercury		27.6000		29.7000		7.3		CV	
Nickel								P	
Potassium								P	
Selenium								F	
Silver								P	
Sodium								P	
Thallium								F	
Vanadium								P	
Zinc								P	
Cyanide								C	

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LABORATORY CONTROL SAMPLE

Lab Name: Envirotest Labs Contract: 186.123.1

Lab Code: 10142 SDG No.: ERM709

Solid LCS Source: ERA

Aqueous LCS Source: :Spex

Analyte	Aqueous (ug/l) True	Found	%Rec(1)	Solid (mg/kg) True	Found	C	Limits		%Rec.
Aluminum	2000.0			6070.0			2730.0	8680.0	
Antimony	500.0			38.1			11.4	68.6	
Arsenic	20.0			65.4			32.0	97.4	
Barium	1000.0			161.0			113.0	211.0	
Beryllium	2000.0			122.0			78.1	171.0	
Cadmium	1000.0			85.4			44.4	123.0	
Calcium	2000.0			3710.0			2340.0	5230.0	
Chromium	500.0			71.6			38.7	101.0	
Cobalt	1000.0			94.2			56.5	134.0	
Copper	2000.0			173.0			98.6	251.0	
Iron	2000.0			12500.0			6380.0	18800.0	
Lead	20.0			70.4	75.6		37.3	100.0	107.4
Magnesium	2000.0			2490.0			1490.0	3590.0	
Manganese	1000.0			298.0			209.0	402.0	
Mercury	2.5			13.1	11.4		6.3	20.5	87.0
Nickel	2000.0			68.5			37.7	100.0	
Potassium	5000.0			3250.0			2010.0	4290.0	
Selenium	50.0			152.0			79.0	226.0	
Silver	50.0			89.0			40.5	130.0	
Sodium	8100.0			167.0			71.1	262.0	
Thallium	20.0			71.8			26.4	117.0	
Vanadium	1000.0			105.0			73.5	142.0	
Zinc	1000.0			110.0			59.4	164.0	
Cyanide	50.0								

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ICP SERIAL DILUTIONS

Lab Name: ENVIROTEST LABORATORIES
Lab Code: 10142 SDG No.: ERM709
Matrix (soil/Water) : SOIL Level (low/med): LOW

Concentration Units: UG/L

Analyte	Initial Sample Result	C	Serial Dilution Result	C	% Difference	Q	M
Aluminum							P
Antimony							P
Arsenic							P
Barium							P
Beryllium							P
Cadmium							P
Calcium							P
Chromium							P
Cobalt							P
Copper							P
Iron							P
Lead	1512.51		1431.64		5.3		P
Magnesium							P
Manganese							P
Mercury							CV
Nickel							P
Potassium							P
Selenium							F
Silver							P
Sodium							P
Thallium							F
Vanadium							P
Zinc							P

000017

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INSTRUMENT DETECTION LIMITS (quarterly)

Lab Name: EnviroTest Laboratories Contract: 186.123
ICP ID No.: ICP-2 SDG No.: ERM709
Flame AA ID Number: ICP: 1/16/96
Furnace ID No.: F-1 GFAA: 1/29/96
HG Analyzer ID Number: CV-1

Analyte	Wave-length nm	Back-ground	CRDL (ug/l)	IDL (ug/l)	M
Aluminum	308.22		200	20.8	P
Antimony	206.83		60	25.3	P
Arsenic	193.7	BZ	10	1.5	F
Barium	455.4		200	2.3	P
Beryllium	313.04		5	0.9	P
Cadmium	226.5		5	3.0	P
Calcium	317.93		5000	19.3	P
Chromium	267.72		10	9.1	P
Cobalt	200.0		50	6.5	P
Copper	324.75		25	4.6	P
Iron	259.94		100	7.2	P
Lead	220.35		3	25.0	P
Magnesium	279.08		5000	21.0	P
Manganese	257.61		15	0.76	P
Mercury	257.9		0.2	0.2	CV
Nickel	231.6		40	11.3	P
Potassium	766.49		5000	70.0	P
Selenium	196.0	BZ	1.3	1.5	F
Silver	328.07		10	4.5	P
Sodium	589.59		5000	30.4	P
Thallium	276.8		10		F
Vanadium	292.4		50	5.8	P
Zinc	213.86		20	1.4	P

FORM X -IN

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NYSDOH 10142 NJDEP 73507 CTDOHS PH-0554 EPA NY049

ANALYTICAL REPORT

ERM Northeast
JIM ROCCO
175 Froehlich Farm Blvd.
Woodbury NY 11797

Report Date:	29-APR-96
Project:	186.123.1
Lab Number:	160246
Sample Number(s):	160246-01 to 160246-01

Ronald A. Bayer
Laboratory Director

EnviroTest Laboratories Inc.
315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	159942-03		
Client I.D.:	FIELD BLANK #1		
Date Collected:	12-APR-96	Matrix:	2 GW/WW
Date Received:	15-APR-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Mercury	0.2 U	UG/L	245.1	17-APR-96

Remarks:

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Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	159942-04		
Client I.D.:	U-MP-2-U-30 (2.25)		
Date Collected:	12-APR-96	Matrix:	3 Soil/Sldg
Date Received:	15-APR-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Mercury	118	MG/KG DRY	7471	17-APR-96
Percent Solids	89.4	%	160.3	15-APR-95

Remarks:

EnviroTest Laboratories Inc.

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ANALYTICAL REPORT

ERM Northeast
JIM ROCCO
175 Froehlich Farm Blvd.
Woodbury NY 11797

Report Date:	25-APR-96
Project:	186.123.1
Lab Number:	160135
Sample Number(s):	160135-01 to 160135-01

Ronald A. Bayer
Laboratory Director

EnviroTest Laboratories Inc
315 Fullerton Avenue
Newburgh, NY 12550
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ERM-Northeast
Environmental Resources Management

175 Froehlich Farm Boulevard • Woodbury, New York 11797 • (516) 921-4300 • Telefax (516) 921-6679 • (516) 921-5637

ERM-Northeast
Chain of Custody

BD

Project Name / No. Subbldg Soil Remediation / 186.123.1

Project Coordinator / Contact Jim Rocco

Sampler(s) JS

Bottles Supplied By

Sheet No. 1 of 1

48 hour turnaround time
4/23/96
160135

Date	Time	Comp.	Grab	Sample Identification	Soil	Water	Total No. of Containers	Type and No. of Containers: Jar	Analysis Requested
4/12/96	1:16 PM		X	UMP-2-U35 (2.25 ft)	X		1	1	Hg PSDI

Relinquished By (Signature)	Date/Time	Received By (Signature)	Date/Time	Reason for Transfer
	4/18/96 4PM		4/19/96 10:22	Lab Analysis

146021

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	EKM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	160135-01		
Client I.D.:	UMP-2-U35 (2.25 FT)		
Date Collected:	12-APR-96	Matrix:	3 Soil/Sldg
Date Received:	19-APR-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Mercury	27.3	MG/KG DRY	7471	22-APR-96
Percent Solids	83.7	%	160.3	19-APR-95

Remarks:

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Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	159942-05		
Client I.D.:	DUPLICATE #1		
Date Collected:	12-APR-96	Matrix:	3 Soil/Sldg
Date Received:	15-APR-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Mercury	102	MG/KG DRY	7471	17-APR-96
Percent Solids	88.2	%	160.3	15-APR-95

Remarks:

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Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	160246-01		
Client I.D.:	U-MP-2-U-40 (2.25)		
Date Collected:	12-APR-96	Matrix:	3 Soil/Sldg
Date Received:	24-APR-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Mercury	2.9	MG/KG DRY	7471	25-APR-96
Percent Solids	89.4	%	160.3	24-APR-96

Remarks:

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4/23/96

ERM-Northeast
Environmental Resources Management
ERM
175 Froehlich Farm Boulevard • Woodbury, New York 11797 • (516) 921-4300 • Telefax (516) 921-5679 • (516) 921-5637

48 hr TAT 4/26

ERM-Northeast
Chain of Custody
160246

Attention: Doug T.

Project Name / No. BD Soils / 186.123.
Project Coordinator / Contact Jim Rocco
Sampler(s)
Bottles Supplied By
Sheet No.

Type and No. of Containers

Date	Time	Comp.	Grab	Sample Identification	Soil	Water	Total No. of Containers	250 ml Amber							Analysis Requested
4/12/96	1:45 PM		✓	U-MP-2-U-40 (2.25')	✓		1	1							Hg, PSOL * 48 Hour TAT Fax Results

Relinquished By (Signature)	Date/Time	Received By (Signature)	Date/Time	Reason for Transfer
Jim Rocco	4/23/96 4:30 PM	[signature]	4/24/96 9:12	

146621

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	159942-03		
Client I.D.:	FIELD BLANK #1		
Date Collected:	12-APR-96	Matrix:	2 GW/WW
Date Received:	15-APR-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Mercury	0.2 U	UG/L	245.1	17-APR-96

Remarks:

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Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	159942-04		
Client I.D.:	U-MP-2-U-30 (2.25)		
Date Collected:	12-APR-96	Matrix:	3 Soil/Sldg
Date Received:	15-APR-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Mercury	118	MG/KG DRY	7471	17-APR-96
Percent Solids	89.4	%	160.3	15-APR-96

Remarks:

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Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	159942-05		
Client I.D.:	DUPLICATE #1		
Date Collected:	12-APR-96	Matrix:	3 Soil/Sldg
Date Received:	15-APR-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Mercury	102	MG/KG DRY	7471	17-APR-96
Percent Solids	88.2	%	160.3	15-APR-96

Remarks:

EnviroTest
Laboratories Inc.

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EnviroTest Laboratories Inc.

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Fax (914) 562-0841

April 11, 1996

ERM Northeast
175 Froehlich Farm Blvd.
Woodbury, New York 11797

Attn.: Mr. Jim Rocco

SUBJECT: CASE NARRATIVE, 186.123.1,
ETL NUMBER 159439.

Dear Mr. Rocco:

Enclosed are the analytical results for the 186.123.1 project. The samples were received on March 29, 1995 and were prepared and analyzed according to EPA established methodologies and protocols. The reports were completed according to NJDEP reduced laboratory data deliverable reporting requirements.

Your evaluation of the enclosed data should incorporate the use of the attached case narrative.

I certify that this package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release has been authorized by the Laboratory Manager or his designee, as verified by the following signature.

ENVIROTEST LABORATORIES, INC.

Ronald A. Bayer
Laboratory Director

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QC Data	18
Verification of Instrument Parameters	28

CASE NARRATIVE
Client: ERM Norhteast
Date: 4/11/96
ETL Lab No. 159439

Inorganics

Sample Dilution

The following samples were diluted for mercury at the indicated amount due to concentrations that exceed the calibration range of the instrument in the initial analysis:

U-MP-2-V-15(2.25') (159439-08): 10x
U-MP-2-V-15(2.25')D (159439-08D): 10x
U-MP-2-V-15(2.25')S (159439-08S): 10x
DUPLICATE #1 (159439-09): 4x
U-MP-2-U-15(2.25') (159439-11): 100x

Continuing Calibration Verification

The following samples were reanalyzed for mercury due to the failure of continuing calibration number 3 (CCV3).

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Enviroiest Laboratories Inc.

315 Fullerton Avenue, Newburgh, NY 12550 (914) 562-0890 FAX (914) 562-0841

CHAIN OF CUSTODY RECORD

AIR BILL # 3117506555

CUSTOMER NAME: ERM - NORTHEAST
ADDRESS: 175 FROEHLICH FARM BLVD.
CITY, STATE, ZIP: WOODBURY, NEW YORK
NAME OF CONTACT: JIM ROCCO / JOHN SHEEHAN PHONE NO. 516 921 4300
PROJECT LOCATION: BTD EAST RUTHERFORD, N.J.
PROJECT NUMBER / PO NO.: 186.123.1

REPORT TYPE
STANDARD ☐ ISRA ☑
NYASP A ☐ B ☐ CLP ☐
OTHER ____

TURNAROUND
☐ NORMAL ____
☐ QUICK Pb 4hr Hg 4hr
☑ VERBAL 48 hrs

LABORATORY # (Lab Use Only)
59439
TEMP BLANK Y ✓ N ____ 4 C°
pH CHECK Y ____ N ____
REVIEWED BY: ____

NY PUBLIC WATER SUPPLIES
SOURCE ID ____
ELRP TYPE ____
FEDERAL ID ____

ETL#	SAMPLING DATE	SAMPLING TIME AM PM	COMP	GRAB	MATRIX	CLIENT I.D.	Total Number of Containers	40ml Glass HCL	1 Liter Amber Sulfuric Acid	1 Liter Amber Organic Washed	1 Liter Plastic Nitric Acid	1 Liter Plastic Sodium Hydroxide	1 Liter Plastic	1 Liter Plastic Sulfuric Acid	250ml Plastic	125ml Plastic Sterile	250ml Amber	2 oz. Dorpak	ANALYSIS REQUESTED
01	3.28.96	0855		✓	SOIL	U-MMD-4-T (0.75')	1										✓		Pb (Lead)
02	3.28.96	1025		✓	SOIL	U-MMD-4-U (0.75')	1										✓		Pb
03	3.28.96	1045		✓	SOIL	U-MMD-4-W (0.75')	1										✓		Pb
04	3.28.96	1145		✓	SOIL	U-MMD-4-V (0.75')	1										✓		Pb
05	3.28.96	12.00		✓	H_2O	FIELD BLANK #1	1				✓								Pb, Hg
06	3.28.96	1:00		✓	Soil	U-MP-3-W-15 (0.5')	1										✓		Pb
07	3.28.96	1:45		✓	Soil	U-MP-3-V-15 (0.5')	1										✓		Pb
08	3.28.96	2:25		✓	Soil	U-MP-2-V-15 (2.25')	1										✓		Hg (Mercury)
09	3.28.96	2:35		✓	Soil	DUPLICATE #1	1										✓		Hg
10	3.28.96	3:00		✓	Soil	U-MP-2-U-15 (0.5')	1										✓		Pb
11	3.28.96	3:05		✓	Soil	U-MP-2-U-15 (2.25')	1										✓		Hg
					H_2O	TEMP. BLANK	1	✓											TEMPERATURE

RELINQUISHED BY	COMPANY	DATE	TIME	RECEIVED BY	COMPANY	DATE	TIME
Jane Opeldt	ETL	3/26/96	12:11				
John C. Sheehan	ERM-NE	3/28/96	4:15pm				
				Jane Opeldt	ER	3/29/96	9:15

COMMENTS: Please fax Report and verbal results to Jim Rocco.
Samples require NJDEP Reduced Deliverable Package
Any questions call Jim Rocco @ 516-921-4300

NYSDOH 10142 NJDEP 73507 CTDOHS PH-0054 EPA NY049

000002

INORGANIC LABORATORY CHRONICLE--ENVIROTEST LABORATORIES, INC.

ETL Laboratory Number: 159439
Client Project Number: 186.123.1

Date Receipt/Refrigeration: 3/29/96
Date Sampled: 3/28/96
Preservative: Y°C

Sample Relinquished by	Sample Received by	Date	Time	Reason for Change of Custody
[illegible]	[illegible]	3/29		Metals Dig.
	Carol A. Werner	4/1/96	8:00	Hg
	L Wiseman	3/29		Pb.

INORGANICS

Digestion:
Metals: 3/29/96
Mercury: 4/1/96

Re-Digestion:
Metals:
Mercury:

Analysis:
Metals: 3/29/96
Mercury: 4/1/96

Re-analysis:
Metals:
Mercury:

Other analysis:

Other Re-analysis:

Section Supervisor Review and Approval: Renée Lusack

doc. 1.0 12/7/89 ETL, Inc.

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FAX (914) 562-0841

NYSDOH 10142 NJDEP 73507 CTDOHS PH 0054 EPA NY049

SUMMARY OF METHODOLOGY

Analysis	Aqueous	Ground Water Liquid/Solid Matrices
ICP Metals	EPA 200.7(1)	SW846-6010(2)
Mercury	EPA 245.1(1)	SW846-7471(2) SW846-7470(2)
% Solid	EPA 160.3(1)	

References

1. "Methods for Chemical Analysis of Water and Wastewater", EPA-600/4-79-020, March 1983.
2. "Test Methods for Evaluating Solid Waste",USEPA-SW846, Third Edition, September 1986 with all current revisions.
3. Atomic Absorption - Direct Aspiration
4. Atomic Absorption - Furnace Technique
5. Federal Register, V. 50 No. 3, January 4, 1985.
6. Federal Register, V. 49, No. 209, October 26, 1984.
7. "Standard Methods for the Examination of Water and Wastewater", 16th Edition, 1986.
8. "Methods for the Determination of Organic Compounds in Drinking Water, EPA/600/4-88/039, December 1988.
9. The Anaylsis of Trihalomethanes in Finished Waters by the Purge and Trap Method, EMSL, Cincinnati, Ohio 45268, November 6, 1979.
10. Volatile Aromatic and Unsaturated Organic Compounds in Water by Purge and Trap Gas Chromatography, EMSL, Cincinnati, Ohio, 45268, Revision 2.0, (1989).
11. Volatile Organic Compounds in Water by Purge and Trap Capillary Column Gas Chromatography with Photoionization and Electrolytic Conductivity Detectors in Series, EMSL, Cincinnati, Ohio, 45268, Revision 2.0 (1989).
12. Determination of Chlorinated Acids in Water by Gas Chromatography with an Electron Capture Detector, EMSL, Cincinnati, Ohio, 45628, Revision 4.0 (1989).
13. "New York State Department of Environmental Conservation Analytical Services Protocol, Vol. 2, December 1991.
14. "Standard Methods for the Examination of Water and Wastewater", 17th Edition, 1989.
15. "ASTM, Petroleum Products, Lubricants, and Fossil Fuels, Vol. 5.01 D56-D1947, 1990.
16. " Analytical Handbook for the Laboratory of Organic Analytical Chemistry", Wadsworth Center for Laboratories and Research, New york State Department of Health, August, 1991.

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DATA REPORTING QUALIFIERS

Data qualifiers are used in the analytical report for organics and inorganics. The qualifiers are equivalent to those used by the USEPA in its Contract Laboratory Program.

ORGANIC QUALIFIERS

U - Indicates that the compound was analyzed for but not detected. The sample detection limit is corrected for dilution and percent moisture. This detection limit is not necessarily the instrument detection limit.

J - Indicates an estimated value. This qualifier is used when mass spectral data indicates the presence of a compound that meets the identification criteria and the result is less than the specified detection limit but greater than zero.

B - Indicates that the analyte was found in both the sample and its associated laboratory blank. It indicates possible/probable blank contamination and warns the data user to take appropriate action.

C - This qualifier applies to pesticide parameters where the identification has been confirmed by gas chromatography/mass spectrometry.

E - This qualifier indicates compounds whose concentrations exceed the calibration range of the instrument for the specific analysis.

D - Indicates all compounds identified in an analysis at a secondary dilution factor.

DL - This suffix indicates a diluted sample and is appended to the sample number on the result form.

N - Indicates presumptive evidence of a compound. This flag is only used for tentatively identified compounds, where the identification is based on a mass spectral library search. It is applied to all TIC results.

P - This flag is used for a pesticide/Aroclor target analyte when there is greater than 25% difference for detected concentration between the two GC columns (see Form X). The lower of the two values is reported on Form I and flagged with an "P".

A - This flag indicates that a TIC is a suspected aldol-condensation product.

RE - This suffix indicates a re-analyzed sample and is appended to the sample number on the result form.

RR - This suffix indicates a re-extracted and re-analyzed sample and is appended to the sample number on the result form.

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DATA REPORTING QUALIFIERS

INORGANICS

Concentration Qualifiers (C)

U - Indicates that the analyte was analyzed for but not detected.

B - The reported value is less than the Contract Required Detection Limit (CRDL), but greater than the Instrument Detection Limit (IDL).

Quality Qualifiers (Q)

E - Indicates an estimated value because of the presence of interference.

M - Duplicate injection precision not met.

N - Spiked sample recovery not within control limits.

S - The reported value was determined by the Method of Standard Additions (MSA).

W - Post digestion spike for furnace AA analysis is out of control limits (85-115%), while sample absorbance is less than 50% of spike absorbance.

* - Duplicate analysis not within control limits.

+ - Correlation coefficient for the MSA is less than 0.995.

Method Qualifiers (M)

P - for ICP.
A - for Flame AA.
F - for Furnace AA.
PM - for ICP when Microwave Digestion is used.
AM - for Flame AA when Microwave Digestion is used.
FM - for Furnace AA when Microwave Digestion is used.
CV - for Manual Cold Vapor AA.
AV - for Automated Cold Vapor AA.
AS - for Semi-Automated Spectrophotometric
C - for Manual Spectrophotometric
T - for Titrimetric.
NR - if the analyte is not required to be analyzed.

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Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	159439-01		
Client I.D.:	U-MMD-4-T(0.75)		
Date Collected:	28-MAR-96	Matrix:	3 Soil/Sldg
Date Received:	29-MAR-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead	178	MG/KG DRY	200.7	29-MAR-96
Percent Solids	85.8	%	160.3	29-MAR-96

Remarks:

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Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	159439-02		
Client I.D.:	U-MMD-4-U(0.75)		
Date Collected:	28-MAR-96	Matrix:	3 Soil/Sldg
Date Received:	29-MAR-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead	387	MG/KG DRY	200.7	29-MAR-96
Percent Solids	85.7	%	160.3	29-MAR-96

Remarks:

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Inorganics Analysis Data Sheet
Form I - IN

Client Name: ERM Northeast - Woodbury
Project Name: 186.123.1

ETL Sample Number: 159439-03

Client I.D.: U-MMD-4-W(0.75)

Date Collected: 28-MAR-96
Matrix: 3 Soil/Sldg

Date Received: 29-MAR-96

Comments:

Analysis	Result	Units	Method	Analyzed
Lead	337	MG/KG DRY	200.7	29-MAR-96
Percent Solids	85.9	%	160.3	29-MAR-96

Remarks:

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Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	159439-04		
Client I.D.:	U-MMD-4-V(0.75)		
Date Collected:	28-MAR-96	Matrix:	3 Soil/Sldg
Date Received:	29-MAR-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead	410	MG/KG DRY	200.7	29-MAR-96
Percent Solids	85.4	%	160.3	29-MAR-96

Remarks:

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Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	159439-05		
Client I.D.:	FIELD BLANK #1		
Date Collected:	28-MAR-96	Matrix:	2 GW/WW
Date Received:	29-MAR-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead	125 U	UG/L	200.7	29-MAR-96
Mercury	0.2 U	UG/L	245.5	01-APR-96

Remarks:

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Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	159439-06		
Client I.D.:	U-MP-3-W-15(0.5)		
Date Collected:	28-MAR-96	Matrix:	3 Soil/Sldg
Date Received:	29-MAR-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead	75.1	MG/KG DRY	200.7	29-MAR-96
Percent Solids	90.3	%	160.3	29-MAR-96

Remarks:

000012

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Inorganics Analysis Data Sheet
Form I - IN

Client Name: ERM Northeast - Woodbury
Project Name: 186.123.1

ETL Sample Number: 159439-07

Client I.D.: U-MP-3-V-15(0.5)

Date Collected: 28-MAR-96
Matrix: 3 Soil/Sldg

Date Received: 29-MAR-96

Comments:

Analysis	Result	Units	Method	Analyzed
Lead	48.7	MG/KG DRY	200.7	29-MAR-96
Percent Solids	89.8	%	160.3	29-MAR-96

Remarks:

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Inorganics Analysis Data Sheet
Form I - IN

Client Name: ERM Northeast - Woodbury
Project Name: 186.123.1

ETL Sample Number: 159439-08

Client I.D.: U-MP-2-V-15(2.25)

Date Collected: 28-MAR-96
Matrix: 3 Soil/Sldg

Date Received: 29-MAR-96

Comments:

Analysis	Result	Units	Method	Analyzed
Mercury	4.2	MG/KG DRY	7471	01-APR-96
Percent Solids	88.0	%	160.3	29-MAR-96

Remarks:

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Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	159439-09		
Client I.D.:	DUPLICATE #1		
Date Collected:	28-MAR-96	Matrix:	3 Soil/Sldg
Date Received:	29-MAR-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Mercury	2.0	MG/KG DRY	7471	01-APR-96
Percent Solids	88.1	%	160.3	29-MAR-96

Remarks:

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Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	159439-10		
Client I.D.:	U-MP-2-U-15(0.5)		
Date Collected:	28-MAR-96	Matrix:	3 Soil/Sldg
Date Received:	29-MAR-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead	126	MG/KG DRY	200.7	29-MAR-96
Percent Solids	84.8	%	160.3	29-MAR-96

Remarks:

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Inorganics Analysis Data Sheet
Form I - IN

Client Name: ERM Northeast - Woodbury
Project Name: 186.123.1

ETL Sample Number: 159439-11

Client I.D.: U-MP-2-U-15(2.25)

Date Collected: 28-MAR-96
Matrix: 3 Soil/Sldg

Date Received: 29-MAR-96

Comments:

Analysis	Result	Units	Method	Analyzed
Mercury	194	MG/KG DRY	7471	01-APR-96
Percent Solids	87.7	%	160.3	29-MAR-96

Remarks:

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2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Envirotest Labs Contract: 186.123.1

Lab Code: 10142 SDG No.: ERM439

Initial Calibration Source: Spex

Continuing Calibration Source: Spex

Concentration Units: ug/l

	Initial Calibration			Continuing Calibration					
Analyte	True	Found	%Rec(1)	True	Found	%Rec(1)	Found	%Rec(1)	M
Aluminum	5000.0	5191.02	103.8	6000.0	6054.17	100.9	6129.06	102.2	P
Antimony	1600.0			2000.0					P
Arsenic	30.0			20.0					F
Barium	1600.0			2000.0					P
Beryllium	1600.0			2000.0					P
Cadmium	1600.0			2000.0					P
Calcium	60000.0	62850.08	104.8	50000.0	50622.78	101.2	51711.17	103.4	P
Chromium	1600.0			2000.0					P
Cobalt	1600.0			2000.0					P
Copper	1600.0			2000.0					P
Iron	5000.0	5101.84	102.0	6000.0	5989.58	99.8	6012.49	100.2	P
Lead	1600.0	1679.64	105.0	2000.0	2021.69	101.1	1994.99	99.7	P
Magnesium	60000.0	60524.87	100.9	50000.0	50121.98	100.2	50076.12	100.2	P
Manganese	1600.0			2000.0					P
Mercury	1.5	1.51	102.7	3.0	2.91	97.0	2.58	86.0	CV
Nickel	1600.0			2000.0					P
Potassium	60000.0			50000.0					P
Selenium	50.0			50.0					F
Silver	400.0			500.0					P
Sodium	60000.0			50000.0					P
Thallium	40.0			40.0					P
Vanadium	1600.0			2000.0					P
Zinc	1600.0			2000.0					P
Cyanide	50.0			50.0					C

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2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Envirotest Labs Contract: 186.123.1

Lab Code: 10142 SDG No.: ERM439

Initial Calibration Source: Spex

Continuing Calibration Source: Spex

Concentration Units: ug/l

	Initial Calibration			Continuing Calibration					
Analyte	True	Found	%Rec(1)	True	Found	%Rec(1)	Found	%Rec(1)	M
Aluminum	5000.0			6000.0	6128.37	102.1			P
Antimony	1600.0			2000.0					P
Arsenic	30.0			20.0					P
Barium	1600.0			2000.0					P
Beryllium	1600.0			2000.0					P
Cadmium	1600.0			2000.0					P
Calcium	60000.0			50000.0	50916.42	101.8			P
Chromium	1600.0			2000.0					P
Cobalt	1600.0			2000.0					P
Copper	1600.0			2000.0					P
Iron	5000.0			6000.0	5996.93	99.9			P
Lead	1600.0			2000.0	2035.41	101.8			P
Magnesium	60000.0			50000.0	50548.52	101.1			P
Manganese	1600.0			2000.0					P
Mercury	1.5			3.0	205	68.3	287	95.7	CV 4/11/9 ui
Nickel	1600.0			2000.0					P
Potassium	60000.0			50000.0					P
Selenium	50.0			50.0					F
Silver	400.0			500.0					P
Sodium	60000.0			50000.0					P
Thallium	40.0			40.0					F
Vanadium	1600.0			2000.0					P
Zinc	1600.0			2000.0					P
Cyanide	50.0			50.0					C

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2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Envirotest Labs Contract: 186.123.1

Lab Code: 10142 SDG No.: ERM439

Initial Calibration Source: Spex

Continuing Calibration Source: Spex

Concentration Units: ug/l

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %Rec(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %Rec(1)	Continuing Calibration Found	Continuing Calibration %Rec(1)	M
Aluminum	5000.0			6000.0					P
Antimony	1600.0			2000.0					P
Arsenic	30.0			20.0					P
Barium	1600.0			2000.0					P
Beryllium	1600.0			2000.0					P
Cadmium	1600.0			2000.0					P
Calcium	60000.0			50000.0					P
Chromium	1600.0			2000.0					P
Cobalt	1600.0			2000.0					P
Copper	1600.0			2000.0					P
Iron	5000.0			6000.0					P
Lead	1600.0			2000.0					P
Magnesium	60000.0			50000.0					P
Manganese	1600.0			2000.0					P
Mercury	1.5			3.0	2.96	98.7			CV
Nickel	1600.0			2000.0					P
Potassium	60000.0			50000.0					P
Selenium	50.0			50.0					F
Silver	400.0			500.0					P
Sodium	60000.0			50000.0					P
Thallium	40.0			40.0					F
Vanadium	1600.0			2000.0					P
Zinc	1600.0			2000.0					P
Cyanide	50.0			50.0					C

4/11/96 [illegible]

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3
BLANK

Lab Name: Envirotest Labs
Lab Code: 10142
Contract: 186.123.1
SDG No.: ERM439
Sample Blank Matrix (Soil/Water): SOIL
Preparation Blank Concentration Units (ug/l or mg/kg): MG/KG

Analyte	Initial Calib. Blank (ug/l)	C	Continuing Calibration Blanks 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum	20.8	U	20.8	U	20.8	U	20.8	U			P
Antimony											F
Arsenic											F
Barium											P
Beryllium											P
Cadmium											P
Calcium	19.4	B	19.3	U	19.3	U	19.3	U			P
Chromium											P
Cobalt											P
Copper											P
Iron	7.2	U	7.2	U	7.2	U	7.2	U			P
Lead	125.0	U	125.0	U	125.0	U	125.0	U	25.000	U	F
Magnesium	21.0	U	21.0	U	21.0	U	21.0	U			P
Manganese											P
Mercury	0.2	U	0.2	U	0.2	U	0.2	U	0.040	U	CV
Nickel											P
Potassium											P
Selenium											F
Silver											P
Sodium											P
Thallium											F
Vanadium											P
Zinc											P
Cyanide											C

FORM III - IN

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3
BLANK

Lab Name: Envirotest Labs
Lab Code: 10142
Sample Blank Matrix (Soil/Water): SOIL
Preparation Blank Concentration Units (ug/l or mg/kg): MG/KG

Contract: 186.123.1
SDG No.: ERM439

Analyte	Initial Calib. Blank (ug/l)	C	Continuing Calibration Blanks 1	C	2	C	3	C	Preparation Blank	C	M
Aluminum											P
Antimony											F
Arsenic											F
Barium											P
Beryllium											P
Cadmium											P
Calcium											P
Chromium											P
Cobalt											P
Copper											P
Iron											F
Lead											P
Magnesium											P
Manganese											CV
Mercury			0.2	U							P
Nickel											P
Potassium											F
Selenium											P
Silver											P
Sodium											F
Thallium											P
Vanadium											P
Zinc											C
Cyanide											

4/11/90 VT

FORM III - IN

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ICP INTERFERENCE CHECK SAMPLE

Lab Name: ENVIROTEST LABS
Lab Code: 10142
ICP ID Number: ICP-2

Contract: 186.123.1
SDG No.: ERM439
SPEX

Concentration Units: ug/l

Analyte	True Sol.A	True Sol.AB	Initial Sol.A	Initial Sol.AB	%Rec.	Final Sol.A	Final Sol.AB	%Rec.
Aluminum	500000	500000	484475	488436	97.7	489688	493323	98.7
Barium	0	500						
Beryllium	0	500						
Cadmium	0	1000						
Calcium	500000	500000	484629	481307	96.3	486258	496177	99.2
Chromium	0	500						
Cobalt	0	500						
Copper	0	500						
Iron	200000	200000	187227	188629	94.3	187418	192644	96.3
Magnesium	500000	500000	483681	497989	99.6	489064	502461	100.5
Manganese	0	500						
Lead	0	1000	0	1064.9	106.5	0	1073.3	107.3
Nickel	0	1000						
Silver	0	1000						
Vanadium	0	500						
Zinc	0	1000						

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5A

SPIKE SAMPLE RECOVERY

Lab Name: Envirotest Labs
Client Contract: 186.123.1
Lab Code: 10142
SDG.No.: ERM439
Client ID#: U-MMD-4-T(0.75)
Matrix (soil/water): SOIL
Level (low/med): LOW
%Solids: 85.8
Concentration Units (ug/l mg/kg): MG/KG

Analyte	Control Limit %Rec.	Spiked Sample Result	C	Sample Result	C	Spike Added	%Rec.	Q	M
Aluminum	75-125%								P
Antimony	75-125%								P
Arsenic	75-125%								P
Barium	75-125%								P
Beryllium	75-125%								P
Cadmium	75-125%								P
Calcium									P
Chromium	75-125%								P
Cobalt	75-125%								P
Copper	75-125%								P
Iron	75-125%								P
Lead	75-125%	295.1832		178.0422		116.55	100.5		P
Magnesium									P
Manganese	75-125%								CV
Mercury	75-125%	4.9300		4.2200		0.21	331.8		P
Nickel	75-125%								P
Potassium									P
Selenium	75-125%								P
Silver	75-125%								P
Sodium									P
Thallium	75-125%								P
Vanadium	75-125%								P
Zinc	75-125%								C
Cyanide	75-125%								

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6
DUPLICATES

Lab Name: EnviroTest L abs
Contract: 186.123.1
Client ID:
Lab Code: 10142
SDG.No.: ERM439
Sample Matrix: SOIL
Level (Low/Med): LOW

%Solids for Sample: 85.8
%Solids for or Duplicate: ~~85.8~~ LLT. 85.2

Concentration Units (ug/l or mg/kg): MG/KG

Analyte	Control Limit	Sample	C	Duplicate	C	RPD	Q	M
Aluminum								P
Antimony								P
Arsenic								F
Barium								P
Beryllium								P
Cadmium								P
Calcium								P
Chromium								P
Cobalt								P
Copper								P
Iron								P
Lead		178.0422		149.3557		17.5		P
Magnesium								P
Manganese								P
Mercury		4.2200		7.4700		55.6	*	CV
Nickel								P
Potassium								P
Selenium								F
Silver								P
Sodium								P
Thallium								P
Vanadium								P
Zinc								P
Cyanide								C

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LABORATORY CONTROL SAMPLE

Lab Name: Envirotest Labs Contract: 186.123.1

Lab Code: 10142 SDG No.: ERM439

Solid LCS Source: ERA

Aqueous LCS Source: :Spex

Analyte	Aqueous (ug/l) True	Found	%Rec(1)	Solid (mg/kg) True	Found	C	Limits		%Rec.
Aluminum	2000.0			6070.0			2730.0	8680.0	
Antimony	500.0			38.1			11.4	68.6	
Arsenic	20.0			65.4			32.0	97.4	
Barium	1000.0			161.0			113.0	211.0	
Beryllium	2000.0			122.0			78.1	171.0	
Cadmium	1000.0			85.4			44.4	123.0	
Calcium	2000.0			3710.0			2340.0	5230.0	
Chromium	500.0			71.6			38.7	101.0	
Cobalt	1000.0			94.2			56.5	134.0	
Copper	2000.0			173.0			98.6	251.0	
Iron	2000.0			12500.0			6380.0	18800.0	
Lead	20.0			70.4	78.1		37.3	100.0	110.9
Magnesium	2000.0			2490.0			1490.0	3590.0	
Manganese	1000.0			298.0			209.0	402.0	
Mercury	2.5			13.1	13.3		6.3	20.5	101.5
Nickel	2000.0			68.5			37.7	100.0	
Potassium	5000.0			3250.0			2010.0	4290.0	
Selenium	50.0			152.0			79.0	226.0	
Silver	50.0			89.0			40.5	130.0	
Sodium	8100.0			167.0			71.1	262.0	
Thallium	20.0			71.8			26.4	117.0	
Vanadium	1000.0			105.0			73.5	142.0	
Zinc	1000.0			110.0			59.4	164.0	
Cyanide	50.0								

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ICP SERIAL DILUTIONS

Lab Name: ENVIROTEST LABORATORIES

Lab Code: 10142 SDG No.: ERM439

Matrix (soil/Water) : SOIL Level (low/med): LOW

Concentration Units: UG/L

Analyte	Initial Sample Result	C	Serial Dilution Result	C	% Difference	Q	M
Aluminum							P
Antimony							P
Arsenic							P
Barium							P
Beryllium							P
Cadmium							P
Calcium							P
Chromium							P
Cobalt							P
Copper							P
Iron							P
Lead	763.80		734.35		3.9		P
Magnesium							P
Manganese							P
Mercury							CV
Nickel							P
Potassium							P
Selenium							F
Silver							P
Sodium							P
Thallium							F
Vanadium							P
Zinc							P

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INSTRUMENT DETECTION LIMITS (quarterly)

Lab Name: EnviroTest Laboratories Contract: 186.123.1
ICP ID No.: ICP-2 SDG No.: ERM439
Flame AA ID Number: Date: 4/4/96
Furnace ID No.: F-1 ICP : 1/16/96
HG Analyzer ID Number: CV-1 GFAA: 1/29/96

Analyte	Wave-length nm	Back-ground	CRDL (ug/l)	IDL (ug/l)	M
Aluminum	308.22		200	20.8	P
Antimony	206.83		60	25.3	P
Arsenic	193.7	BZ	10	1.5	F
Barium	455.4		200	2.3	P
Beryllium	313.04		5	0.9	P
Cadmium	226.5		5	3.0	P
Calcium	317.93		5000	19.3	P
Chromium	267.72		10	9.1	P
Cobalt	200.0		50	6.5	P
Copper	324.75		25	4.6	P
Iron	259.94		100	7.2	P
Lead	220.35		3	25.0	P
Magnesium	279.08		5000	21.0	P
Manganese	257.61		15	0.76	P
Mercury	257.9		0.2	0.2	CV
Nickel	231.6		40	11.3	P
Potassium	766.49		5000	70.0	P
Selenium	196.0	BZ	1.3	1.5	F
Silver	328.07		10	4.5	P
Sodium	589.59		5000	30.4	P
Thallium	276.8		10		F
Vanadium	292.4		50	5.8	P
Zinc	213.86		20	1.4	P

FORM X -IN

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APPENDIX D

TCLP Analysis

ANALYTICAL REPORT

ERM Northeast
JIM ROCCO
175 Froehlich Farm Blvd.
Woodbury NY 11797

14 APR 96

Report Date:	29-APR-96
Project:	186.123.1
Lab Number:	159942
Sample Number(s):	159942-01 to 159942-05

Ronald A. Bayer
Laboratory Director

EnviroTest Laboratories Inc.

315 Fullerton Avenue, Newburgh, NY 12550 (914) 562-0890 FAX (914) 562-0841

CHAIN OF CUSTODY RECORD

AIR BILL # 3117506652

CUSTOMER NAME: ERM-NORTHEAST

ADDRESS: 175 FROEHLICH FARM BLVD.

CITY, STATE, ZIP: WOODBURY, N.Y 11797

NAME OF CONTACT: JIM ROCCO / JOHN SHEEHAN PHONE NO.: 516-921-9300

PROJECT LOCATION: BECTON-DICKINSON, EAST RUTHERFORD, N.J.

PROJECT NUMBER / PO NO.: #186.123.1

REPORT TYPE

STANDARD ☑ ISRA ☐

NYASP A ☐ B ☐ CLP ☐

OTHER ____

TURNAROUND

☑ NORMAL 2 week

☑ QUICK 3 Day

☐ VERBAL ____

LABORATORY # (Lab Use Only)

5994

TEMP. BLANK: Y ___ N ___ ___ C°

PH CHECK: Y ___ N ___

REVIEWED BY: ___

NY PUBLIC WATER SUPPLIES

SOURCE ID ___

ELRP TYPE ___

FEDERAL ID ___

ETL#	SAMPLING DATE	SAMPLING TIME AM PM	COMP	GRAB	MATRIX	CLIENT I.D.	Total Number of Containers	40ml Glass HCL	Liter Amber Sulfuric Acid	Liter Amber Organic Washed	Liter Plastic Nitric Acid	Liter Plastic Sodium Hydroxide	Liter Plastic	Liter Plastic Sulfuric Acid	250ml Plastic	125ml Plastic Sterile	250ml Amber	2 oz. Qorpak	ANALYSIS REQUESTED
	4.12.96	11:55	✓		SOIL	WCS-1	2			✓								✓	Both: TCLP Metals, TCLP VOA, TCLP Semi-VOA, Total PCB, pH, Flash Point, Reactivity, TPH.
	4.12.96	1:45	✓		SOIL	WCS-2	2			✓								✓	
	4.12.96	12:55		✓	WATER	FIELD BLANK #1	1										✓		Hg
	4.12.96	1:00		✓	SOIL	U-MP-2-U-30 (2.25')	1										✓		Hg
	4.12.96	1:00		✓	SOIL	DUPLICATE #1	1										✓		Hg

Note: 2 week turnaround time For the waste Charg. Samples (WCS-1 and WCS-2).
3 Days Turnaround For Hg Samples.

RELINQUISHED BY	COMPANY	DATE	TIME	RECEIVED BY	COMPANY	DATE	TIME
Joyce Ofelt	ER	4/10/96	10:37				
	COMPANY	DATE	TIME	RECEIVED BY	COMPANY	DATE	TIME
Jim Rocco - ERM		4/16/96	3:45pm				
	COMPANY	DATE	TIME	RECEIVED BY	COMPANY	DATE	TIME
					ETL	4/13 PM	
	COMPANY	DATE	TIME	RECEIVED BY	COMPANY	DATE	TIME

COMMENTS: Please send results to Jim Rocco @ ERM-NE.

Inorganics Analysis Data Sheet
Form I - IN

Client Name: ERM Northeast - Woodbury
Project Name: 186.123.1
ETL Sample Number: 159942-01
Client I.D.: WCS-1
Date Collected: 12-APR-96
Matrix: 3 Soil/Sldg
Date Received: 15-APR-96
Comments:

Analysis	Result	Units	Method	Analyzed
Arsenic	0.22 U	MG/L	6010	18-APR-96
Barium	0.53	MG/L	6010	18-APR-96
Cadmium	0.01 U	MG/L	6010	18-APR-96
Chromium	0.01 U	MG/L	6010	18-APR-96
Cyanide, Total	1.1 U	MG/KG DRY	9010	23-APR-96
Flash Point	> 200	F	1010	15-APR-95
Lead	7.8	MG/L	6010	18-APR-96
Mercury	0.2 U	UG/L	7470	22-APR-96
Percent Solids	89.4	%	160.3	15-APR-95
Reactivity	Not React.			
Selenium	0.37 U	MG/L	6010	18-APR-96
Silver	0.01 U	MG/L	6010	18-APR-96
Sulfide	5.6 U	MG/KG DRY	4500 S E	18-APR-96
TCLP Extraction			1311	18-APR-96
Total Petroleum Hydrocarbons	39.2 U	MG/KG DRY	418.1	15-APR-96
pH	7.6		9045	16-APR-96

Remarks:

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Volatile Organics Analysis Data Sheet
Form I VOA
TCLP-8240

Client ID:	WCS-1	Date Collected:	12-APR-96
ETL Sample Number:	159942-01	Date Received:	15-APR-96
Client Name:	ERM Northeast - Woodbury	Date Extracted:	
Project Name:	186.123.1	Date Analyzed:	26-APR-96
% Solid:	89.4	Report Date:	29-APR-96
Matrix:	3 Soil/Sldg	Column:	DB-624
Sample Wt/Vol:	5ml	Lab File Id:	V5468.D
Level:	LOW	Dilution Factor:	1.00

CAS NO.	Compound	Detection Limit ug/l	Conc. ug/l	Data Qualifier
71-43-2	Benzene	10		U
78-93-3	2-Butanone	10		U
56-23-5	Carbon Tetrachloride	10		U
108-90-7	Chlorobenzene	10		U
67-66-3	Chloroform	10		U
107-06-2	1,2-Dichloroethane	10		U
75-35-4	1,1-Dichloroethene	10		U
127-18-4	Tetrachloroethene	10		U
79-01-6	Trichloroethene	10	2.2	J
75-01-4	Vinyl Chloride	10		U

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Semi-Volatile Organics Analysis Data Sheet
Form I SV
TCLP-8270

Client ID:	WCS-1	Date Collected:	12-APR-96
ETL Sample Number:	159942-01	Date Received:	15-APR-96
Client Name:	ERM Northeast - Woodbury	Date Extracted:	18-APR-96
Project Name:	186.123.1	Date Analyzed:	18-APR-96
% Solid:	89.4	Report Date:	29-APR-96
Matrix:	3 Soil/Sldg	Column:	DB-5
Sample Wt/Vol:	1000ml	Lab File Id:	S2918.D
Level:	LOW	Dilution Factor:	1.00

CAS NO.	Compound	Detection Limit ug/l	Conc. ug/l	Data Qualifier
106-46-7	1,4-Dichlorobenzene	10		U
121-14-2	2,4-Dinitrotoluene	10		U
118-74-1	Hexachlorobenzene	10		U
87-68-3	Hexachlorobutadiene	10		U
67-72-1	Hexachloroethane	10		U
95-48-7	o-methylphenol	10		U
98-95-3	Nitrobenzene	10		U
87-86-5	Pentachlorophenol	50		U
106-44-5	m, p-methylphenol	10		U
110-86-1	Pyridine	10		U
95-95-4	2,4,5-Trichlorophenol	10		U
88-06-2	2,4,6-Trichlorophenol	10		U

Pesticide/PCB Organics Analysis Data Sheet
Form I PEST
8080-PCB

Client ID:	WCS-1	Date Collected:	12-APR-96
ETL Sample Number:	159942-01	Date Received:	15-APR-96
Client Name:	ERM Northeast - Woodbury	Date Extracted:	16-APR-96
Project Name:	186.123.1	Date Analyzed:	18-APR-96
% Solid:	89.4	Report Date:	29-APR-96
Matrix:	3 Soil/Sldg	Column:	DB-5
Sample Wt/Vol:	30g	Lab File Id:	34P1728P.D
Level:	LOW	Dilution Factor:	1.00

CAS NO.	Compound	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
12674-11-2	Aroclor - 1016	19		U
11104-28-2	Aroclor - 1221	19		U
11141-16-5	Aroclor - 1232	19		U
53469-21-9	Aroclor - 1242	19		U
12672-29-6	Aroclor - 1248	19		U
11097-69-1	Aroclor - 1254	37		U
11096-82-5	Aroclor - 1260	37		U

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Inorganics Analysis Data Sheet
Form I - IN

Client Name: ERM Northeast - Woodbury
Project Name: 186.123.1
ETL Sample Number: 159942-02
Client I.D.: WCS-2
Date Collected: 12-APR-96
Matrix: 3 Soil/Sldg
Date Received: 15-APR-96
Comments:

Analysis	Result	Units	Method	Analyzed
Arsenic	0.22 U	MG/L	6010	18-APR-96
Barium	0.58	MG/L	6010	18-APR-96
Cadmium	0.01 U	MG/L	6010	18-APR-96
Chromium	0.01 U	MG/L	6010	18-APR-96
Cyanide, Total	1.1 U	MG/KG DRY	9010	23-APR-96
Flash Point	> 200	F	1010	15-APR-95
Lead	13.3	MG/L	6010	18-APR-96
Mercury	0.35	UG/L	7470	22-APR-96
Percent Solids	89.7	%	160.3	15-APR-95
Reactivity	Not React.			
Selenium	0.37 U	MG/L	6010	18-APR-96
Silver	0.01 U	MG/L	6010	18-APR-96
Sulfide	5.6 U	MG/KG DRY	4500 S E	18-APR-96
TCLP Extraction			1311	18-APR-96
Total Petroleum Hydrocarbons	39.0 U	MG/KG DRY	418.1	15-APR-96
pH	7.2		9045	16-APR-96

Remarks:

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315 Fullerton Avenue
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Volatile Organics Analysis Data Sheet
Form I VOA
TCLP-8240

Client ID:	WCS-2	Date Collected:	12-APR-96
ETL Sample Number:	159942-02	Date Received:	15-APR-96
Client Name:	ERM Northeast - Woodbury	Date Extracted:	
Project Name:	186.123.1	Date Analyzed:	26-APR-96
% Solid:	89.7	Report Date:	29-APR-96
Matrix:	3 Soil/Sldg	Column:	DB-624
Sample Wt/Vol:	5ml	Lab File Id:	V5469.D
Level:	LOW	Dilution Factor:	1.00

CAS NO.	Compound	Detection Limit ug/l	Conc. ug/l	Data Qualifier
71-43-2	Benzene	10		U
78-93-3	2-Butanone	10		U
56-23-5	Carbon Tetrachloride	10		U
108-90-7	Chlorobenzene	10		U
67-66-3	Chloroform	10		U
107-06-2	1,2-Dichloroethane	10		U
75-35-4	1,1-Dichloroethene	10		U
127-18-4	Tetrachloroethene	10		U
79-01-6	Trichloroethene	10	1.7	J
75-01-4	Vinyl Chloride	10		U

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Semi-Volatile Organics Analysis Data Sheet
Form I SV
TCLP-8270

Client ID:	WCS-2	Date Collected:	12-APR-96
ETL Sample Number:	159942-02	Date Received:	15-APR-96
Client Name:	ERM Northeast - Woodbury	Date Extracted:	18-APR-96
Project Name:	186.123.1	Date Analyzed:	18-APR-96
% Solid:	89.7	Report Date:	29-APR-96
Matrix:	3 Soil/Sldg	Column:	DB-5
Sample Wt/Vol:	1000ml	Lab File Id:	S2919.D
Level:	LOW	Dilution Factor:	1.00

CAS NO.	Compound	Detection Limit ug/l	Conc. ug/l	Data Qualifier
106-46-7	1,4-Dichlorobenzene	10		U
121-14-2	2,4-Dinitrotoluene	10		U
118-74-1	Hexachlorobenzene	10		U
87-68-3	Hexachlorobutadiene	10		U
67-72-1	Hexachloroethane	10		U
95-48-7	o-methylphenol	10		U
98-95-3	Nitrobenzene	10		U
87-86-5	Pentachlorophenol	50		U
106-44-5	m, p-methylphenol	10		U
110-86-1	Pyridine	10		U
95-95-4	2,4,5-Trichlorophenol	10		U
88-06-2	2,4,6-Trichlorophenol	10		U

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Pesticide/PCB Organics Analysis Data Sheet
Form I PEST
8080-PCB

Client ID:	WCS-2	Date Collected:	12-APR-96
ETL Sample Number:	159942-02	Date Received:	15-APR-96
Client Name:	ERM Northeast - Woodbury	Date Extracted:	16-APR-96
Project Name:	186.123.1	Date Analyzed:	18-APR-96
% Solid:	89.7	Report Date:	29-APR-96
Matrix:	3 Soil/Sldg	Column:	DB-5
Sample Wt/Vol:	30g	Lab File Id:	34P1729P.D
Level:	LOW	Dilution Factor:	1.00

CAS NO.	Compound	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
12674-11-2	Aroclor - 1016	18		U
11104-28-2	Aroclor - 1221	18		U
11141-16-5	Aroclor - 1232	18		U
53469-21-9	Aroclor - 1242	18		U
12672-29-6	Aroclor - 1248	18		U
11097-69-1	Aroclor - 1254	37		U
11096-82-5	Aroclor - 1260	37		U

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ANALYTICAL REPORT

ERM Northeast
JIM ROCCO
175 Froehlich Farm Blvd.
Woodbury NY 11797

Report Date:	13-JUN-96
Project:	186.115
Lab Number:	161303
Sample Number(s):	161303-01 to 161303-13

Ronald A. Bayer
Laboratory Director

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EnviroTest Laboratories Inc.

315 Fullerton Avenue, Newburgh, NY 12550 (914) 562-0890 FAX (914) 562-0841

CHAIN OF CUSTODY RECORD

air bill # 3117506733

CUSTOMER NAME: ERM-NORTHEAST

ADDRESS: 175 FRONTAGE ROAD BLVD.

CITY, STATE, ZIP: WOODBURY NY 11797

NAME OF CONTACT: JIM ROCCO / JOHN SHEEHAN PHONE NO. 516-921-9300

PROJECT LOCATION: BECTON-DICKINSON, EAST RUTHERFORD

PROJECT NUMBER / PO NO.: 186.115

REPORT TYPE
STANDARD ☑ ISRA ☐
NYASP A ☐ B ☐ CLP ☐
OTHER TCLP Disposal

TURNAROUND
☑ NORMAL 2 weeks
☐ QUICK (call)
☐ VERBAL

LABORATORY # (Lab Use Only)
16303
TEMP BLANK Y ___ N ___ ___ C°
PH CHECK Y ___ N ___
REVIEWED BY ___

NY PUBLIC WATER SUPPLIES
SOURCE ID ___ 1/2
ELRP TYPE ___
FEDERAL ID ___

ETL#	SAMPLING DATE	TIME AM PM	COMP	GRAB	MATRIX	CLIENT I.D.	Total Number of Containers	40ml Glass HCL	Liter Amber Sulfuric Acid	Liter Amber Organic Washed	Liter Plastic Nitric Acid	Liter Plastic Sodium Hydroxide	Liter Plastic	Liter Plastic Sulfuric Acid	250ml Plastic	125ml Plastic Sterile	250ml Amber	2 oz. Qorpak	ANALYSIS REQUESTED
01	5/24/96	9:00	✓		SOIL	WCSUMP3 A	1										✓		TCLP Pb
02	5/24/96	9:05	✓		SOIL	WCSUMP3B	1										✓		TCLP Pb
03	5/24/96	9:10	✓		SOIL	WCSUMP3C	1										✓		TCLP Pb
04	5/24/96	9:15	✓		SOIL	WCSUMP3D	1										✓		TCLP Pb
05	5/24/96	9:20	✓		SOIL	WCSUMP3E	1										✓		TCLP Pb
06	5/24/96	9:25	✓		SOIL	WCSUMP3F	1										✓		TCLP Pb
07	5/24/96	9:30	✓		SOIL	WCSUMP5G	1										✓		TCLP Pb
08	5/24/96	10:15	✓		SOIL	WCSAFPA-5	1										✓		TCLP RCRA Metals
09	5/24/96	11:15	✓		SOIL	WCS-4	1										✓		TCLP Pb
10	5/24/96	11:35	✓		SOIL	WCS-5	1										✓		TCLP Pb
11	5/24/96	12:15	✓		SOIL	WCS-3	2			✓								✓	TCLP Semi 8270 Voc TCLP 8240, TPH-418.1, PH, FP, Reactivity
12	5/24/96	1:15p	✓		SOIL	WCSUMP3-1	1										✓		TCLP Pb

RELINQUISHED BY	COMPANY	DATE	TIME	RECEIVED BY	COMPANY	DATE	TIME
[signature]	ETL	5/23/96		[signature]	ERM-NE	5/24/96	9:15A
RELINQUISHED BY	COMPANY	DATE	TIME	RECEIVED BY	COMPANY	DATE	TIME
RELINQUISHED BY	COMPANY	DATE	TIME	RECEIVED BY	COMPANY	DATE	TIME
[signature]	ERM-NE	5/24/96	1:55	[signature]	ETL	5/25/96	9:45
RELINQUISHED BY	COMPANY	DATE	TIME	RECEIVED BY	COMPANY	DATE	TIME

COMMENTS: please send report to Jim Rocco @ ERM.

EnviroTest Laboratories Inc.

315 Fullerton Avenue Newburgh, NY 12550 (914) 562-0890 FAX (914) 562-0841

CHAIN OF CUSTODY RECORD

CUSTOMER NAME: ERM-NORTHEAST

ADDRESS: 175 FROEHLICH FARM BLVD.

CITY, STATE, ZIP: WOODBURY N.Y. 11797

NAME OF CONTACT: JIM ROCCO / JOHN SHEEHAN PHONE NO. 516 921-4300

PROJECT LOCATION: BECTON-DICKINSON, EAST RUTHERFORD

PROJECT NUMBER / PO NO: 186.115

REPORT TYPE
STANDARD ☑ ISRA ☐
NYASP A ☐ B ☐ CLP ☐
OTHER TCLP Dioxin

TURNAROUND
☑ NORMAL 2 weeks
☐ QUICK _____
☐ VERBAL _____

LABORATORY # (Lab Use Only)
16803
TEMP BLANK Y N °C
pH CHECK Y N
REVIEWED BY

NY PUBLIC WATER SUPPLIES
SOURCE ID
ELRP TYPE 2/2
FEDERAL ID

ETL#	SAMPLING DATE	TIME AM PM	COMP	GRAB	MATRIX	CLIENT I.D.	Total Number of Containers	40ml Glass HCL	Liter Amber Sulfuric Acid	Liter Amber Organic Washed	Liter Plastic Nitric Acid	Liter Plastic Sodium Hydroxide	Liter Plastic	Liter Plastic Sulfuric Acid	250ml Plastic	125ml Plastic Sterile	250ml Amber	2 oz. Oorpak	ANALYSIS REQUESTED
L3	5/24/96	1:25p	✓		Soil	WCSUMP3-2	1										✓		TCLP Pb

RELINQUISHED BY	COMPANY	DATE	TIME	RECEIVED BY	COMPANY	DATE	TIME
RELINQUISHED BY	COMPANY	DATE	TIME	RECEIVED BY	COMPANY	DATE	TIME
RELINQUISHED BY	COMPANY	DATE	TIME	RECEIVED BY	COMPANY	DATE	TIME
RELINQUISHED BY	COMPANY	DATE	TIME	RECEIVED BY	COMPANY	DATE	TIME

COMMENTS

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.115
ETL Sample Number:	161303-01		
Client I.D.:	WCSUMP3A		
Date Collected:	24-MAY-96	Matrix:	3 Soil/Sldg
Date Received:	28-MAY-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead	4.6	MG/L	6010	03-JUN-96
TCLP Extraction			1311	29-MAY-96

Remarks:

EnviroTest
Laboratories Inc
315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.115
ETL Sample Number:	161303-02		
Client I.D.:	WCSUMP3B		
Date Collected:	24-MAY-96	Matrix:	3 Soil/Sldg
Date Received:	28-MAY-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead	12.8	MG/L	6010	03-JUN-96
TCLP Extraction			1311	29-MAY-96

Remarks:

EnviroTest
Laboratories Inc

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.115
ETL Sample Number:	161303-03		
Client I.D.:	WCSUMP3C		
Date Collected:	24-MAY-96	Matrix:	3 Soil/Sldg
Date Received:	28-MAY-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead	11.2	MG/L	6010	03-JUN-96
TCLP Extraction			1311	29-MAY-96

Remarks:

EnviroTest
Laboratories Inc.
315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.115
ETL Sample Number:	161303-04		
Client I.D.:	WCSUMP3D		
Date Collected:	24-MAY-96	Matrix:	3 Soil/Sldg
Date Received:	28-MAY-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead	21.6	MG/L	6010	03-JUN-96
TCLP Extraction			1311	29-MAY-96

Remarks:

EnviroTest
Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.115
ETL Sample Number:	161303-05		
Client I.D.:	WCSUMP3E		
Date Collected:	24-MAY-96	Matrix:	3 Soil/Sldg
Date Received:	28-MAY-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead	12.8	MG/L	6010	03-JUN-96
TCLP Extraction			1311	29-MAY-96

Remarks:

EnviroTest
Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.115
ETL Sample Number:	161303-06		
Client I.D.:	WCSUMP3F		
Date Collected:	24-MAY-96	Matrix:	3 Soil/Sldg
Date Received:	28-MAY-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead	15.7	MG/L	6010	03-JUN-96
TCLP Extraction			1311	29-MAY-96

Remarks:

EnviroTest
Laboratories Inc.
315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.115
ETL Sample Number:	161303-07		
Client I.D.:	WCSUMPSG		
Date Collected:	24-MAY-96	Matrix:	3 Soil/Sldg
Date Received:	28-MAY-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead	1.8	MG/L	6010	03-JUN-96
TCLP Extraction			1311	29-MAY-96

Remarks:

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.115
ETL Sample Number:	161303-08		
Client I.D.:	WCSAFPA-5		
Date Collected:	24-MAY-96	Matrix:	3 Soil/Sldg
Date Received:	28-MAY-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Arsenic	0.11 U	MG/L	6010	03-JUN-96
Barium	0.52	MG/L	6010	03-JUN-96
Cadmium	0.01 U	MG/L	6010	03-JUN-96
Chromium	0.01 U	MG/L	6010	03-JUN-96
Lead	0.95	MG/L	6010	03-JUN-96
Mercury	0.29	UG/L	7470	31-MAY-96
Selenium	0.11 U	MG/L	6010	03-JUN-96
Silver	0.01 U	MG/L	6010	03-JUN-96
TCLP Extraction			1311	29-MAY-96

Remarks:

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.115
ETL Sample Number:	161303-09		
Client I.D.:	WCS-4		
Date Collected:	24-MAY-96	Matrix:	3 Soil/Sldg
Date Received:	28-MAY-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead	175	MG/L	6010	05-JUN-96
TCLP Extraction			1311	29-MAY-96

Remarks:

EnviroTest
Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.115
ETL Sample Number:	161303-10		
Client I.D.:	WCS-5		
Date Collected:	24-MAY-96	Matrix:	3 Soil/Sldg
Date Received:	28-MAY-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead	5.3	MG/L	6010	03-JUN-96
TCLP Extraction			1311	29-MAY-96

Remarks:

EnviroTest
Laboratories Inc.

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FAX (914) 562-0841

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.115
ETL Sample Number:	161303-11		
Client I.D.:	WCS-3		
Date Collected:	24-MAY-96	Matrix:	3 Soil/Sldg
Date Received:	28-MAY-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Cyanide, Total	1.1 U	MG/KG DRY	9010	29-MAY-96
Flash Point	> 200	F	1010	07-JUN-96
Percent Solids	89.3	%	160.3	28-MAY-96
Reactivity	notreact			04-JUN-96
Sulfide	5.6 U	MG/KG DRY	4500-SE	30-MAY-96
TCLP Extraction			1311	29-MAY-96
Total Petroleum Hydrocarbons	50.4	MG/KG DRY	418.1	28-MAY-96
pH	7.8		9040	31-MAY-96

Remarks:

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

Semi-Volatile Organics Analysis Data Sheet
Form I SV
TCLP-8270

Client ID:	WCS-3	Date Collected:	24-MAY-96
ETL Sample Number:	161303-11	Date Received:	28-MAY-96
Client Name:	ERM Northeast - Woodbury	Date Extracted:	31-MAY-96
Project Name:	186.115	Date Analyzed:	04-JUN-96
% Solid:	89.3	Report Date:	13-JUN-96
Matrix:	3 Soil/Sldg	Column:	DB-5
Sample Wt/Vol:	1000ml	Lab File Id:	E6791.D
Level:	LOW	Dilution Factor:	1.00

CAS NO.	Compound	Detection Limit ug/l	Conc. ug/l	Data Qualifier
106-46-7	1,4-Dichlorobenzene	10		U
121-14-2	2,4-Dinitrotoluene	10		U
118-74-1	Hexachlorobenzene	10		U
87-68-3	Hexachlorobutadiene	10		U
67-72-1	Hexachloroethane	10		U
95-48-7	o-methylphenol	10		U
98-95-3	Nitrobenzene	10		U
87-86-5	Pentachlorophenol	50		U
106-44-5	m, p-methylphenol	10		U
110-86-1	Pyridine	10		U
95-95-4	2,4,5-Trichlorophenol	10		U
88-06-2	2,4,6-Trichlorophenol	10		U

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562 0890
FAX (914) 562 0841

Volatile Organics Analysis Data Sheet
Form I VOA
TCLP-8240

Client ID:	WCS-3	Date Collected:	24-MAY-96
ETL Sample Number:	161303-11	Date Received:	28-MAY-96
Client Name:	ERM Northeast - Woodbury	Date Extracted:	
Project Name:	186.115	Date Analyzed:	07-JUN-96
% Solid:	89.3	Report Date:	13-JUN-96
Matrix:	3 Soil/Sldg	Column:	DB-624
Sample Wt/Vol:	5ml	Lab File Id:	V5883.D
Level:	LOW	Dilution Factor:	1.00

CAS NO.	Compound	Detection Limit ug/l	Conc. ug/l	Data Qualifier
71-43-2	Benzene	10		U
78-93-3	2-Butanone	10		U
56-23-5	Carbon Tetrachloride	10		U
108-90-7	Chlorobenzene	10		U
67-66-3	Chloroform	10		U
107-06-2	1,2-Dichloroethane	10		U
75-35-4	1,1-Dichloroethene	10		U
127-18-4	Tetrachloroethene	10		U
79-01-6	Trichloroethene	10	4	J
75-01-4	Vinyl Chloride	10		U

EnviroTest
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315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.115
ETL Sample Number:	161303-12		
Client I.D.:	WCSUMP3-1		
Date Collected:	24-MAY-96	Matrix:	3 Soil/Sldg
Date Received:	28-MAY-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead	0.11 U	MG/L	6010	03-JUN-96
TCLP Extraction			1311	29-MAY-96

Remarks:

EnviroTest
Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.115
ETL Sample Number:	161303-13		
Client I.D.:	WCSUMP3-2		
Date Collected:	24-MAY-96	Matrix:	3 Soil/Sldg
Date Received:	28-MAY-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead	0.11 U	MG/L	6010	03-JUN-96
TCLP Extraction			1311	29-MAY-96

Remarks:

EnviroTest
Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562 0890
FAX (914) 562-0841

ANALYTICAL REPORT

ERM Northeast
JIM ROCCO
175 Froehlich Farm Blvd.
Woodbury NY 11797

Report Date:	13-JUN-96
Project:	186.123.1
Lab Number:	161684
Sample Number(s):	161684-01 to 161684-59

Ronald A. Bayer
Laboratory Director

EnviroTest
Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

EnviroTest Laboratories Inc.

315 Fullerton Avenue, Newburgh, NY 12550 (914) 562-0890 FAX (914) 562-0841

CHAIN OF CUSTODY RECORD

CUSTOMER NAME: ERM-NE

ADDRESS: 175 Froehlich Farm Blvd.

CITY, STATE, ZIP: Woodbury NY 11797

NAME OF CONTACT: Jim Rocco/John Sheehan — PHONE NO. 516-921-4300

PROJECT LOCATION: Becton Dickinson E. Rutherford, NJ

PROJECT NUMBER / PO NO.: 186123.1

REPORT TYPE D.I. 6/8

STANDARD ☒ ISRA ☐

NYASP A☐ B☐ CLP☐

OTHER TCLP Disposal

TURNAROUND

☐ NORMAL

☒ QUICK 1 week

☐ VERBAL

LABORATORY # (Lab Use Only)

161684

TEMP BLANK Y ___ N ___ ___ C°

pH CHECK Y ✓ N ___

REVIEWED BY: ✓

NY PUBLIC WATER SUPPLIES

SOURCE ID ___

ELRP TYPE ___

FEDERAL ID ___

1/6

ETL#	SAMPLING DATE	TIME AM (PM)	COMP	GRAB	MATRIX	CLIENT I.D.	Total Number of Containers	40ml Glass HCL	Liter Amber Sulfuric Acid	Liter Amber Organic Washed	Liter Plastic Nitric Acid	Liter Plastic Sodium Hydroxide	Liter Plastic	Liter Plastic Sulfuric Acid	250ml Plastic	125ml Plastic Sterile	250ml Amber	2 oz. Qorpak	ANALYSIS REQUESTED
01	6/6/96	12:00		X	Soil	UMP-2-1A ✓	1										X		TCLP-Pb
02		12:03		X		UMP-2-2A ✓	1										X		TCLP-Pb
03		12:06		X		UMP-2-3A ✓	1										X		TCLP-Pb
04		12:09		X		UMP-2-4A ✓	1										X		TCLP-Pb
05		12:12		X		UMP-2-5A ✓	1										X		TCLP-Pb
06		12:15		X		UMP-2-~~6A~~ 1B ✓	1										X		TCLP-Pb
07		12:18		X		UMP-2-2B ✓	1										X		TCLP-Pb
08		12:21		X		UMP-2-3B ✓	1										X		TCLP-Pb
09		12:24		X		UMP-2-4B ✓	1										X		TCLP-Pb
10		12:27		X		UMP-2-5B ✓	1										X		TCLP-Pb
11		12:30		X		UMP-2-1C ✓	1										X		TCLP-Pb
12		12:33		X		UMP-2-2C ✓	1										X		TCLP-Pb

RELINQUISHED BY	COMPANY	DATE	TIME	RECEIVED BY	COMPANY	DATE	TIME
[signature]	ETL	6/5/96		[signature]	ERM	6/6/96	10:35
[signature]	ERM-NE	6/6/96	7:00	[signature]	ETL	6/7/96	10:00

COMMENTS

NYSDOH 10142 NJDEP 73507 CTDOHS PH-0054 EPA NY049

EnviroTest Laboratories Inc.

315 Fullerton Avenue, Newburgh, NY 12550 (914) 562-0890 FAX (914) 562-0841

CHAIN OF CUSTODY RECORD

CUSTOMER NAME: ERM-NE

ADDRESS: 175 FROEHLICH FARM BLVD.

CITY, STATE, ZIP: WOODBURY N.Y. 11797

NAME OF CONTACT: Jim Rocco / John Sheehan PHONE NO. 516 921-4300

PROJECT LOCATION: Becton-Dickinson, East Rutherford, N.J.

PROJECT NUMBER / PO NO.: 186.123.1

REPORT TYPE (DUE 6/8)
STANDARD ☑ ISRA ☐
NYASP A ☐ B ☐ CLP ☐
OTHER full DISPOSAL

TURNAROUND
☐ NORMAL _____
☑ QUICK 1 week
☐ VERBAL _____

LABORATORY # (Lab Use Only)
161684
TEMP BLANK Y ___ N ___ ___ C°
pH CHECK Y ___ N ___
REVIEWED BY: _____

NY PUBLIC WATER SUPPLIES
SOURCE ID ___ ___ ___
ELRP TYPE ___ ___ ___ 2/6
FEDERAL ID ___ ___ ___ ___ ___ ___ ___

ANALYSIS REQUESTED

ETL#	SAMPLING DATE	TIME AM PM	COMP	GRAB	MATRIX	CLIENT I.D.	Total Number of Containers	40ml Glass HCl	Liter Amber Sulfuric Acid	Liter Amber Organic Washed	Liter Plastic Nitric Acid	Liter Plastic Sodium Hydroxide	Liter Plastic	Liter Plastic Sulfuric Acid	250ml Plastic	125ml Plastic Sterile	250ml Amber	2 oz. Dorpak	ANALYSIS REQUESTED
13	6/4/96	12:36		✓	Soil	U-MP-2-3C ✓	1										✓		TCLP Pb
14	6/4/96	12:39		✓	Soil	U-MP-2-4C ✓	1										✓		TCLP Pb
15	6/4/96	12:45		✓	Soil	U-MP-2-1D ✓	1										✓		TCLP Pb
16	6/4/96	12:49		✓	Soil	U-MP-2-2D ✓	1										✓		TCLP Pb
17	6/4/96	12:51		✓	Soil	U-MP-2-3D ✓	1										✓		TCLP Pb
18	6/4/96	12:54		✓	Soil	U-MP-2-4D ✓	1										✓		TCLP Pb
19	6/4/96	1:00		✓	Soil	U-MP-2-1E ✓	1										✓		TCLP Pb
20	6/4/96	1:03		✓	Soil	U-MP-2-2E ✓	1										✓		TCLP Pb
21	6/4/96	1:06		✓	Soil	U-MP-2-3E ✓	1										✓		TCLP Pb
22	6/4/96	1:09		/	Soil	U-MP-2-4E /	1										✓		TCLP Pb

RELINQUISHED BY	COMPANY	DATE	TIME	RECEIVED BY	COMPANY	DATE	TIME
RELINQUISHED BY	COMPANY	DATE	TIME	RECEIVED BY	COMPANY	DATE	TIME
RELINQUISHED BY	COMPANY	DATE	TIME	RECEIVED BY	COMPANY	DATE	TIME
RELINQUISHED BY	COMPANY	DATE	TIME	RECEIVED BY	COMPANY	DATE	TIME
	ERM	6/5/96			ET	6/7/96	10:00

COMMENTS _____

NYSDOH 10142 NJDEP 73507 CTDOHS PH-0054 EPA NY049

EnviroTest Laboratories Inc.

315 Fullerton Avenue, Newburgh, NY 12550 (914) 562-0890 FAX (914) 562-0841

CHAIN OF CUSTODY RECORD

CUSTOMER NAME	ERM-NE
ADDRESS	175 Froehlich Farm Blvd.
CITY, STATE, ZIP	Woodbury NY 11797
NAME OF CONTACT	Jim Rocco/John Sheehan
PHONE NO.	516-921-4300
PROJECT LOCATION	Becton Dickinson E. Rutherford NJ
PROJECT NUMBER / PO NO.	186.123.1

REPORT TYPE DT 218:
STANDARD [X] ISRA [ ]
NYASP A [ ] B [ ] CLP [ ]
OTHER TCLP Disposal

TURNAROUND
[ ] NORMAL ____
[X] QUICK 1 Week
[ ] VERBAL ____

LABORATORY # (Lab Use Only)
161684
TEMP BLANK Y ___ N ___ ___ C°
pH CHECK Y ___ N ___
REVIEWED BY: [illegible]

NY PUBLIC WATER SUPPLIES
SOURCE ID ___ 3/6
ELRP TYPE ___
FEDERAL ID ___

ETL#	SAMPLING DATE	TIME (AM/PM)	COMP	GRAB	MATRIX	CLIENT I.D.	Total Number of Containers	40ml Glass HCL	Liter Amber Sulfuric Acid	Liter Amber Organic Washed	Liter Plastic Nitric Acid	Liter Plastic Sodium Hydroxide	Liter Plastic	Liter Plastic Sulfuric Acid	250ml Plastic	125ml Plastic Sterile	250ml Amber	2 oz. Qorpak	ANALYSIS REQUESTED
23	6/6/96	11:00		X		WCS UMMD-2	1										X		TCLP-Pb
24	6/6/96	11:10		X		WCSUMMD-3	1										X		TCLP-Pb
25	6/6/96	11:20		X		WCSUMMD-4	1										X		TCLP-Pb
26	6/6/96	11:30	X			UMP-2U	1										X		TCLP-Pb
27	6/6/96	11:45	X			UMP-2V	1										X		TCLP-Pb

RELINQUISHED BY	COMPANY	DATE	TIME	RECEIVED BY	COMPANY	DATE	TIME
[signature]	ETL	6/5/96					
RELINQUISHED BY	COMPANY	DATE	TIME	RECEIVED BY	COMPANY	DATE	TIME
RELINQUISHED BY	COMPANY	DATE	TIME	RECEIVED BY	COMPANY	DATE	TIME
RELINQUISHED BY	COMPANY	DATE	TIME	RECEIVED BY [signature]	COMPANY ETL	DATE 6/7/96	TIME 10:00

COMMENTS

NYSDOH 10142 NJDEP 73507 CTDOHS PH-0054 EPA NY049

EnviroTest Laboratories Inc.

315 Fullerton Avenue, Newburgh, NY 12550 (914) 562-0890 FAX (914) 562-0841

CHAIN OF CUSTODY RECORD

AIRBILL #

CUSTOMER NAME: ERM-NE

ADDRESS: 175 FROEHLICH FARM BLVD.

CITY, STATE, ZIP: WOODBURY NY. 11797

NAME OF CONTACT: Jim Rocco / John Sheehan PHONE NO. 56 921-4300

PROJECT LOCATION: Becton-Dickinson, East Rutherford

PROJECT NUMBER / PO NO.: 186.123.1

REPORT TYPE 618

STANDARD ☒ ISRA ☒

NYASP A☐ B☐ CLP☐

OTHER tclp Disposal

TURNAROUND

☐ NORMAL

☑ QUICK 1 week

☐ VERBAL

LABORATORY # (Lab Use Only)

161684

TEMP BLANK Y ___ N ___ ___ C°

pH CHECK ✓ N ___

REVIEWED BY:

NY PUBLIC WATER SUPPLIES

SOURCE ID

ELRP TYPE

FEDERAL ID

4/6

ETL#	SAMPLING DATE	TIME AM PM	COMP	GRAB	MATRIX	CLIENT I.D.	Total Number of Containers	40ml Glass HCL	Liter Amber Sulfuric Acid	Liter Amber Organic Washed	Liter Plastic Nitric Acid	Liter Plastic Sodium Hydroxide	Liter Plastic	Liter Plastic Sulfuric Acid	250ml Plastic	125ml Plastic Sterile	250ml Amber	2 oz. Qorpak	ANALYSIS REQUESTED
28	6/6/96	2:25		✓	Soil	U-MP-1-5A ✓	1										✓		tclp Pb
29	6/6/96	2:35		✓	Soil	U-MP-1-5B ✓	1										✓		tclp Pb
30	6/6/96	2:41		✓	Soil	U-MP-1-5C ✓	1										✓		tclp Pb
31	6/6/96	2:42		✓	Soil	U-MP-1-5D ✓	1										✓		tclp Pb
32	6/6/96	2:47		✓	Soil	U-MP-1-5E ✓	1										✓		tclp Pb
33	6/6/96	2:55		✓	Soil	U-MP-1-6A ✓	1										✓		tclp Pb
34	6/6/96	3:01		✓	Soil	U-MP-1-6B ✓	1										✓		tclp Pb
35	6/6/96	3:09		✓	Soil	U-MP-1-6C ✓	1										✓		tclp Pb
36	6/6/96	3:15		✓	Soil	U-MP-1-6D ✓	1										✓		tclp Pb
37	6/6/96	3:19		✓	Soil	U-MP-1-6E ✓	1										✓		tclp Pb
38	6/6/96	3:22		✓	Soil	U-MP-1-7A ✓	1										✓		tclp Pb
39	6/6/96	3:35		✓	Soil	U-MP-1-7B ✓	1										✓		tclp Pb

RELINQUISHED BY	COMPANY	DATE	TIME	RECEIVED BY	COMPANY	DATE	TIME
J. R. Murphy	ETL	6/5/96		John C. Sheehan	ERM	6/6/96	10:35
John C. Sheehan	ERM	6/6/96	7:00	J. R. Murphy	ETL	6/7/96	10:00

COMMENTS: please send report to Jim Rocco. One week turnaround for verbal/fax is required if possible.

EnviroTest Laboratories Inc.

315 Fullerton Avenue, Newburgh, NY 12550 (914) 562-0890 FAX (914) 562-0841

CHAIN OF CUSTODY RECORD

air bill #

CUSTOMER NAME: ERM-NE

ADDRESS: 175 FROEHLICH FARM BLVD.

CITY, STATE, ZIP: WOODBURY NY 11797

NAME OF CONTACT: JIM ROCCO / JOHN SHEEHAN PHONE NO. 516 921-4300

PROJECT LOCATION: BELTON-DICKINSON, EAST RUTHERFORD

PROJECT NUMBER / PO NO.: 186.123.1

REPORT TYPE CLP

STANDARD ☒ ISRA ☒

NYASP A ☐ B ☐ CLP ☐

OTHER tclp Disposal

TURNAROUND

☐ NORMAL

☑ QUICK 1 week

☐ VERBAL

LABORATORY # (Lab Use Only)

161684

TEMP BLANK Y ___ N ___ ___ C°

pH CHECK Y ___ N ___

REVIEWED BY: R

NY PUBLIC WATER SUPPLIES

SOURCE ID

ELRP TYPE

FEDERAL ID

5/6

ETL#	SAMPLING DATE	TIME AM PM	COMP	GRAB	MATRIX	CLIENT I.D.	Total Number of Containers	40ml Glass HCL	Liter Amber Sulfuric Acid	Liter Amber Organic Washed	Liter Plastic Nitric Acid	Liter Plastic Sodium Hydroxide	Liter Plastic	Liter Plastic Sulfuric Acid	250ml Plastic	125ml Plastic Sterile	250ml Amber	2 oz. Qorpak	ANALYSIS REQUESTED
40	6/6/96	1:45		✓	Soil	UMP-1-1A	1										✓		tclp Pb
41	6/6/96	1:49		✓	Soil	U-MP-1-1B	1										✓		tclp Pb
42	6/6/96	2:00		✓	Soil	U-MP-1-1C	1										✓		tclp Pb
43	6/6/96	2:01		✓	Soil	U-MP-1-2A	1										✓		tclp Pb
44	6/6/96	2:03		✓	Soil	U-MP-1-2B	1										✓		tclp Pb
45	6/6/96	2:06		✓	Soil	U-MP-1-2C	1										✓		tclp Pb
46	6/6/96	2:08		✓	Soil	U-MP-1-3A	1										✓		tclp Pb
47	6/6/96	2:10		✓	Soil	U-MP-1-3B	1										✓		tclp Pb
48	6/6/96	2:12		✓	Soil	U-MP-1-3C	1										✓		tclp Pb
49	6/6/96	2:15		✓	Soil	U-MP-1-4A	1										✓		tclp Pb
50	6/6/96	2:17		✓	Soil	U-MP-1-4B	1										✓		tclp Pb
51	6/6/96	2:19		✓	Soil	U-MP-1-4C	1										✓		tclp Pb

RELINQUISHED BY	COMPANY	DATE	TIME	RECEIVED BY	COMPANY	DATE	TIME
[signature]	ETL	6/5/96		[signature]			
				[signature]	ETL	6/7/96	

COMMENTS

EnviroTest Laboratories Inc.

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CHAIN OF CUSTODY RECORD

CUSTOMER NAME: ETRM-NE
ADDRESS: 175 FROCHLICH FARM BLVD.
CITY, STATE, ZIP: WOODBURY N.Y. 11797
NAME OF CONTACT: JIM ROCCO / JOHN SHEEHAN PHONE NO. 516 921-4300
PROJECT LOCATION: BECTON-DICKINSON, EAST RUTHERFORD, N.J.
PROJECT NUMBER / PO NO.: 186.123.1

REPORT TYPE
STANDARD ☑ ISRA ☐
NYASP A ☐ B ☐ CLP ☐
OTHER TCLP DISPOSAL

TURNAROUND
☐ NORMAL _____
☑ QUICK 1 week
☐ VERBAL _____

LABORATORY # (Lab Use Only)
161684
TEMP BLANK Y ___ N ___ ___ C°
pH CHECK Y ___ N ___
REVIEWED BY: _____

NY PUBLIC WATER SUPPLIES
SOURCE ID ___ 6/6
ELRP TYPE ___
FEDERAL ID ___

ETL#	SAMPLING DATE	TIME AM PM	COMP	GRAB	MATRIX	CLIENT I.D.	Total Number of Containers	40ml Glass HCL	Liter Amber Sulfuric Acid	Liter Amber Organic Washed	Liter Plastic Nitric Acid	Liter Plastic Sodium Hydroxide	Liter Plastic	Liter Plastic Sulfuric Acid	250ml Plastic	125ml Plastic Sterile	250ml Amber	2 oz. Qorpak	ANALYSIS REQUESTED
52	6/6/96	3:52		✓	Soil	U-MP-1-7C	1										✓		TCLP Pb
53	6/6/96	3:58		✓	Soil	U-MP-1-7D	1										✓		TCLP Pb
54	6/6/96	4:15		✓	Soil	U-MP-1-7E	1										✓		TCLP Pb
55	6/6/96	4:25		✓	Soil	U-MP-1-8A	1										✓		TCLP Pb
56	6/6/96	4:35		✓	Soil	U-MP-1-8B	1										✓		TCLP Pb
57	6/6/96	4:45		✓	Soil	U-MP-1-8C	1										✓		TCLP Pb
58	6/6/96	4:55		✓	Soil	U-MP-1-8D	1										✓		TCLP Pb
59	6/6/96	5:25		✓	Soil	U-MP-1-8E	1										✓		TCLP Pb

RELINQUISHED BY	COMPANY	DATE	TIME	RECEIVED BY	COMPANY	DATE	TIME
J.P. Mulry	ETR	6/5/96					
RELINQUISHED BY	COMPANY	DATE	TIME	RECEIVED BY	COMPANY	DATE	TIME
RELINQUISHED BY	COMPANY	DATE	TIME	RECEIVED BY	COMPANY	DATE	TIME
RELINQUISHED BY	COMPANY	DATE	TIME	RECEIVED BY J.P. Mulry	COMPANY ETR	DATE 6/7/96	TIME

COMMENTS _____

NYSDOH 10142 NJDEP 73507 CTDOHS PH-0054 EPA NY049

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	161684-01		
Client I.D.:	UMP-2-1A		
Date Collected:	06-JUN-96	Matrix:	3 Soil/Sldg
Date Received:	07-JUN-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead TCLP Extraction	9330	UG/L	6010	11-JUN-96

Remarks:

EnviroTest
Laboratories Inc.

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FAX (914) 562-0841

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	161684-02		
Client I.D.:	UMP-2-2A		
Date Collected:	06-JUN-96	Matrix:	3 Soil/Sldg
Date Received:	07-JUN-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead TCLP Extraction	2800	UG/L	6010	11-JUN-96

Remarks:

EnviroTest
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(914) 562-0890
FAX (914) 562-0841

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	161684-03		
Client I.D.:	UMP-2-3A		
Date Collected:	06-JUN-96	Matrix:	3 Soil/Sldg
Date Received:	07-JUN-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead TCLP Extraction	14600	UG/L	6010	11-JUN-96

Remarks:

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Laboratories Inc.

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FAX (914) 562-0841

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	161684-04		
Client I.D.:	UMP-2-4A		
Date Collected:	06-JUN-96	Matrix:	3 Soil/Sldg
Date Received:	07-JUN-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead TCLP Extraction	9970	UG/L	6010	11-JUN-96

Remarks:

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Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	161684-05		
Client I.D.:	UMP-2-5A		
Date Collected:	06-JUN-96	Matrix:	3 Soil/Sldg
Date Received:	07-JUN-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead TCLP Extraction	2570	UG/L	6010	11-JUN-96

Remarks:

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Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	161684-06		
Client I.D.:	UMP-2-1B		
Date Collected:	06-JUN-96	Matrix:	3 Soil/Sldg
Date Received:	07-JUN-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead TCLP Extraction	1000	UG/L	6010	11-JUN-96

Remarks:

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Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	161684-07		
Client I.D.:	UMP-2-2B		
Date Collected:	06-JUN-96	Matrix:	3 Soil/Sldg
Date Received:	07-JUN-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead TCLP Extraction	8740	UG/L	6010	11-JUN-96

Remarks:

EnviroTest
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FAX (914) 562-0841

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	161684-08		
Client I.D.:	UMP-2-3B		
Date Collected:	06-JUN-96	Matrix:	3 Soil/Sldg
Date Received:	07-JUN-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead TCLP Extraction	7840	UG/L	6010	11-JUN-96

Remarks:

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Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	161684-09		
Client I.D.:	UMP-2-4B		
Date Collected:	06-JUN-96	Matrix:	3 Soil/Sldg
Date Received:	07-JUN-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead TCLP Extraction	9410	UG/L	6010	11-JUN-96

Remarks:

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FAX (914) 562-0841

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	161684-10		
Client I.D.:	UMP-2-5B		
Date Collected:	06-JUN-96	Matrix:	3 Soil/Sldg
Date Received:	07-JUN-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead TCLP Extraction	797	UG/L	6010	11-JUN-96

Remarks:

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Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	161684-11		
Client I.D.:	UMP-2-1C		
Date Collected:	06-JUN-96	Matrix:	3 Soil/Sldg
Date Received:	07-JUN-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead TCLP Extraction	31300	UG/L	6010	11-JUN-96

Remarks:

EnviroTest
Laboratories Inc.

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FAX (914) 562-0841

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	161684-12		
Client I.D.:	UMP-2-2C		
Date Collected:	06-JUN-96	Matrix:	3 Soil/Sldg
Date Received:	07-JUN-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead TCLP Extraction	4780	UG/L	6010	11-JUN-96

Remarks:

EnviroTest
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(914) 562-0890
FAX (914) 562-0841

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	161684-13		
Client I.D.:	UMP-2-3C		
Date Collected:	06-JUN-96	Matrix:	3 Soil/Sldg
Date Received:	07-JUN-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead TCLP Extraction	5620	UG/L	6010	11-JUN-96

Remarks:

EnviroTest
Laboratories Inc.

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(914) 562-0890
FAX (914) 562-0841

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	161684-14		
Client I.D.:	UMP-2-4C		
Date Collected:	06-JUN-96	Matrix:	3 Soil/Sldg
Date Received:	07-JUN-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead TCLP Extraction	7430	UG/L	6010	11-JUN-96

Remarks:

EnviroTest
Laboratories Inc.

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(914) 562-0890
FAX (914) 562-0841

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	161684-15		
Client I.D.:	UMP-2-1D		
Date Collected:	06-JUN-96	Matrix:	3 Soil/Sldg
Date Received:	07-JUN-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead TCLP Extraction	12900	UG/L	6010	11-JUN-96

Remarks:

EnviroTest
Laboratories Inc.

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FAX (914) 562-0841

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	161684-16		
Client I.D.:	UMP-2-2D		
Date Collected:	06-JUN-96	Matrix:	3 Soil/Sldg
Date Received:	07-JUN-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead TCLP Extraction	187	UG/L	6010	11-JUN-96

Remarks:

EnviroTest
Laboratories Inc.

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FAX (914) 562-0841

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	161684-17		
Client I.D.:	UMP-2-3D		
Date Collected:	06-JUN-96	Matrix:	3 Soil/Sldg
Date Received:	07-JUN-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead TCLP Extraction	9380	UG/L	6010	11-JUN-96

Remarks:

EnviroTest
Laboratories Inc.

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FAX (914) 562-0841

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	161684-18		
Client I.D.:	UMP-2-4D		
Date Collected:	06-JUN-96	Matrix:	3 Soil/Sldg
Date Received:	07-JUN-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead TCLP Extraction	508	UG/L	6010	11-JUN-96

Remarks:

EnviroTest
Laboratories Inc.

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FAX (914) 562-0841

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	161684-19		
Client I.D.:	UMP-2-1E		
Date Collected:	06-JUN-96	Matrix:	3 Soil/Sldg
Date Received:	07-JUN-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead TCLP Extraction	2680	UG/L	6010	11-JUN-96

Remarks:

EnviroTest
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FAX (914) 562-0841

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	161684-20		
Client I.D.:	UMP-2-2E		
Date Collected:	06-JUN-96	Matrix:	3 Soil/Sldg
Date Received:	07-JUN-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead TCLP Extraction	208	UG/L	6010	11-JUN-96

Remarks:

EnviroTest
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FAX (914) 562-0841

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	161684-21		
Client I.D.:	UMP-2-3E		
Date Collected:	06-JUN-96	Matrix:	3 Soil/Sldg
Date Received:	07-JUN-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead TCLP Extraction	3830	UG/L	6010	11-JUN-96

Remarks:

EnviroTest
Laboratories Inc.

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(914) 562-0890
FAX (914) 562-0841

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	161684-22		
Client I.D.:	UMP-2-4E		
Date Collected:	06-JUN-96	Matrix:	3 Soil/Sldg
Date Received:	07-JUN-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead TCLP Extraction	1010	UG/L	6010	11-JUN-96

Remarks:

EnviroTest
Laboratories Inc.

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FAX (914) 562-0841

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	161684-23		
Client I.D.:	WCSUMMD-2		
Date Collected:	06-JUN-96	Matrix:	3 Soil/Sldg
Date Received:	07-JUN-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead TCLP Extraction	32800	UG/L	6010	11-JUN-96

Remarks:

EnviroTest
Laboratories Inc.

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FAX (914) 562-0841

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	161684-24		
Client I.D.:	WCSUMMD-3		
Date Collected:	06-JUN-96	Matrix:	3 Soil/Sldg
Date Received:	07-JUN-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead TCLP Extraction	2580	UG/L	6010	11-JUN-96

Remarks:

EnviroTest
Laboratories Inc.

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FAX (914) 562-0841

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	161684-25		
Client I.D.:	WCSUMMD-4		
Date Collected:	06-JUN-96	Matrix:	3 Soil/Sldg
Date Received:	07-JUN-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead TCLP Extraction	7220	UG/L	6010	11-JUN-96

Remarks:

EnviroTest
Laboratories Inc.

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FAX (914) 562-0841

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	161684-26		
Client I.D.:	UMP-2U		
Date Collected:	06-JUN-96	Matrix:	3 Soil/Sldg
Date Received:	07-JUN-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead TCLP Extraction	440 U	UG/L	6010	11-JUN-96

Remarks:

EnviroTest
Laboratories Inc.

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Newburgh, NY 12550
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FAX (914) 562-0841

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	161684-27		
Client I.D.:	UMP-2V		
Date Collected:	06-JUN-96	Matrix:	3 Soil/Sldg
Date Received:	07-JUN-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead TCLP Extraction	880 U	UG/L	6010	11-JUN-96

Remarks:

EnviroTest
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FAX (914) 562-0841

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	161684-28		
Client I.D.:	UMP-1-5A		
Date Collected:	06-JUN-96	Matrix:	3 Soil/Sldg
Date Received:	07-JUN-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead TCLP Extraction	2080	UG/L	6010	11-JUN-96

Remarks:

EnviroTest
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FAX (914) 562-0841

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	161684-29		
Client I.D.:	UMP-1-5B		
Date Collected:	06-JUN-96	Matrix:	3 Soil/Sldg
Date Received:	07-JUN-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead TCLP Extraction	5580	UG/L	6010	11-JUN-96

Remarks:

EnviroTest
Laboratories Inc.

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Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	161684-30		
Client I.D.:	UMP-1-5C		
Date Collected:	06-JUN-96	Matrix:	3 Soil/Sldg
Date Received:	07-JUN-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead TCLP Extraction	8090	UG/L	6010	11-JUN-96

Remarks:

EnviroTest
Laboratories Inc.

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FAX (914) 562-0841

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	161684-31		
Client I.D.:	UMP-1-5D		
Date Collected:	06-JUN-96	Matrix:	3 Soil/Sldg
Date Received:	07-JUN-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead TCLP Extraction	16600	UG/L	6010	11-JUN-96

Remarks:

EnviroTest
Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	161684-32		
Client I.D.:	UMP-1-5E		
Date Collected:	06-JUN-96	Matrix:	3 Soil/Sldg
Date Received:	07-JUN-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead TCLP Extraction	2690	UG/L	6010	11-JUN-96

Remarks:

EnviroTest
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(914) 562-0890
FAX (914) 562 0841

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	161684-33		
Client I.D.:	UMP-1-6A		
Date Collected:	06-JUN-96	Matrix:	3 Soil/Sldg
Date Received:	07-JUN-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead TCLP Extraction	21500	UG/L	6010	11-JUN-96

Remarks:

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FAX (914) 562-0841

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	161684-34		
Client I.D.:	UMP-1-6B		
Date Collected:	06-JUN-96	Matrix:	3 Soil/Sldg
Date Received:	07-JUN-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead TCLP Extraction	22800	UG/L	6010	11-JUN-96

Remarks:

EnviroTest
Laboratories Inc.

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(914) 562-0630
FAX (914) 562-0841

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	161684-35		
Client I.D.:	UMP-1-6C		
Date Collected:	06-JUN-96	Matrix:	3 Soil/Sldg
Date Received:	07-JUN-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead TCLP Extraction	10900	UG/L	6010	11-JUN-96

Remarks:

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	161684-36		
Client I.D.:	UMP-1-6D		
Date Collected:	06-JUN-96	Matrix:	3 Soil/Sldg
Date Received:	07-JUN-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead TCLP Extraction	11200	UG/L	6010	11-JUN-96

Remarks:

EnviroTest
Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	161684-37		
Client I.D.:	UMP-1-6E		
Date Collected:	06-JUN-96	Matrix:	3 Soil/Sldg
Date Received:	07-JUN-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead TCLP Extraction	899	UG/L	6010	11-JUN-96

Remarks:

EnviroTest
Laboratories Inc.

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FAX (914) 562-0841

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	161684-38		
Client I.D.:	UMP-1-7A		
Date Collected:	06-JUN-96	Matrix:	3 Soil/Sldg
Date Received:	07-JUN-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead TCLP Extraction	5530	UG/L	6010	11-JUN-96

Remarks:

EnviroTest
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FAX (914) 562-0841

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	161684-39		
Client I.D.:	UMP-1-7B		
Date Collected:	06-JUN-96	Matrix:	3 Soil/Sldg
Date Received:	07-JUN-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead TCLP Extraction	23100	UG/L	6010	11-JUN-96

Remarks:

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FAX (914) 562-0841

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	161684-40		
Client I.D.:	UMP-1-1A		
Date Collected:	06-JUN-96	Matrix:	3 Soil/Sldg
Date Received:	07-JUN-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead TCLP Extraction	2840	UG/L	6010	11-JUN-96

Remarks:

EnviroTest
Laboratories Inc

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FAX (914) 562-0841

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	161684-41		
Client I.D.:	UMP-1-1B		
Date Collected:	06-JUN-96	Matrix:	3 Soil/Sldg
Date Received:	07-JUN-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead TCLP Extraction	4360	UG/L	6010	11-JUN-96

Remarks:

EnviroTest
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FAX (914) 562-0841

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	161684-42		
Client I.D.:	UMP-1-1C		
Date Collected:	06-JUN-96	Matrix:	3 Soil/Sldg
Date Received:	07-JUN-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead TCLP Extraction	18400	UG/L	6010	11-JUN-96

Remarks:

EnviroTest
Laboratories Inc.

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FAX (914) 562-0841

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	161684-43		
Client I.D.:	UMP-1-2A		
Date Collected:	06-JUN-96	Matrix:	3 Soil/Sldg
Date Received:	07-JUN-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead TCLP Extraction	2900	UG/L	6010	11-JUN-96

Remarks:

EnviroTest
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FAX (914) 562-0841

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	161684-44		
Client I.D.:	UMP-1-2B		
Date Collected:	06-JUN-96	Matrix:	3 Soil/Sldg
Date Received:	07-JUN-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead TCLP Extraction	11100	UG/L	6010	11-JUN-96

Remarks:

EnviroTest
Laboratories Inc.

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FAX (914) 562-0841

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	161684-45		
Client I.D.:	UMP-1-2C		
Date Collected:	06-JUN-96	Matrix:	3 Soil/Sldg
Date Received:	07-JUN-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead TCLP Extraction	9570	UG/L	6010	11-JUN-96

Remarks:

EnviroTest
Laboratories Inc.

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FAX (914) 562-0841

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	161684-46		
Client I.D.:	UMP-1-3A		
Date Collected:	06-JUN-96	Matrix:	3 Soil/Sldg
Date Received:	07-JUN-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead TCLP Extraction	1220	UG/L	200.7	12-JUN-96

Remarks:

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FAX (914) 562-0841

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	161684-47		
Client I.D.:	UMP-1-3B		
Date Collected:	06-JUN-96	Matrix:	3 Soil/Sldg
Date Received:	07-JUN-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead TCLP Extraction	13800	UG/L	200.7	12-JUN-96

Remarks:

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Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	161684-48		
Client I.D.:	UMP-1-3C		
Date Collected:	06-JUN-96	Matrix:	3 Soil/Sldg
Date Received:	07-JUN-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead TCLP Extraction	12800	UG/L	200.7	12-JUN-96

Remarks:

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Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	161684-49		
Client I.D.:	UMP-1-4A		
Date Collected:	06-JUN-96	Matrix:	3 Soil/Sldg
Date Received:	07-JUN-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead TCLP Extraction	5980	UG/L	200.7	12-JUN-96

Remarks:

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Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	161684-50		
Client I.D.:	UMP-1-4B		
Date Collected:	06-JUN-96	Matrix:	3 Soil/Sldg
Date Received:	07-JUN-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead TCLP Extraction	10300	UG/L	200.7	12-JUN-96

Remarks:

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Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	161684-51		
Client I.D.:	UMP-1-4C		
Date Collected:	06-JUN-96	Matrix:	3 Soil/Sldg
Date Received:	07-JUN-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead TCLP Extraction	8910	UG/L	200.7	12-JUN-96

Remarks:

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FAX (914) 562-0841

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	161684-52		
Client I.D.:	UMP-1-7C		
Date Collected:	06-JUN-96	Matrix:	3 Soil/Sldg
Date Received:	07-JUN-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead TCLP Extraction	8190	UG/L	200.7	12-JUN-96

Remarks:

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FAX (914) 562-0841

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	161684-53		
Client I.D.:	UMP-1-7D		
Date Collected:	06-JUN-96	Matrix:	3 Soil/Sldg
Date Received:	07-JUN-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead TCLP Extraction	16500	UG/L	200.7	12-JUN-96

Remarks:

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FAX (914) 562-0841

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	161684-54		
Client I.D.:	UMP-1-7E		
Date Collected:	06-JUN-96	Matrix:	3 Soil/Sldg
Date Received:	07-JUN-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead TCLP Extraction	7990	UG/L	200.7	12-JUN-96

Remarks:

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FAX (914) 562-0841

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	161684-55		
Client I.D.:	UMP-1-8A		
Date Collected:	06-JUN-96	Matrix:	3 Soil/Sldg
Date Received:	07-JUN-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead TCLP Extraction	4120	UG/L	200.7	12-JUN-96

Remarks:

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FAX (914) 562-0841

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	161684-56		
Client I.D.:	UMP-1-8B		
Date Collected:	06-JUN-96	Matrix:	3 Soil/Sldg
Date Received:	07-JUN-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead TCLP Extraction	2370	UG/L	200.7	12-JUN-96

Remarks:

EnviroTest
Laboratories Inc.

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Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	161684-57		
Client I.D.:	UMP-1-8C		
Date Collected:	06-JUN-96	Matrix:	3 Soil/Sldg
Date Received:	07-JUN-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead TCLP Extraction	1270	UG/L	200.7	12-JUN-96

Remarks:

EnviroTest
Laboratories Inc.

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FAX (914) 562-0841

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	161684-58		
Client I.D.:	UMP-1-8D		
Date Collected:	06-JUN-96	Matrix:	3 Soil/Sldg
Date Received:	07-JUN-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead TCLP Extraction	880 U	UG/L	200.7	12-JUN-96

Remarks:

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Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123.1
ETL Sample Number:	161684-59		
Client I.D.:	UMP-1-8E		
Date Collected:	06-JUN-96	Matrix:	3 Soil/Sldg
Date Received:	07-JUN-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Lead TCLP Extraction	2010	UG/L	200.7	12-JUN-96

Remarks:

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FAX (914) 562-0841

APPENDIX C

UST Laboratory Analysis

ERM Northeast

Woodbury, New York
Project Number 186.123-2
ETL Lab. #: 165059
Matrix: Soil
1 of 1

EnviroTest Laboratories Inc

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Fax (914) 562-0841

October 21, 1996

ERM Northeast
175 Froehlich Farm Blvd.
Woodbury, New York 11797

Attn.: Mr. Jim Rocco

SUBJECT: CASE NARRATIVE, PROJECT NUMBER 186-123-2,
ETL NUMBER 165059.

Dear Mr. Rocco:

Enclosed are the analytical results for the 186.123-2 project. The samples were received on September 5, 1996 and were prepared and analyzed according to EPA established methodologies and protocols. The reports were completed according to NJDEP reduced laboratory data deliverable reporting requirements.

Your evaluation of the enclosed data should incorporate the use of the attached case narrative.

I certify that this package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release has been authorized by the Laboratory Manager or his designee, as verified by the following signature.

ENVIROTEST LABORATORIES, INC.

Ronald A. Bayer
Laboratory Director

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Sample Data	6-17
QC Data	18-22
Raw Data	23-29
Digestion Log	30

CASE NARRATIVE
Client: ERM Northeast, Inc.
Date: 10/21/96
ETL Lab No. 165059

TPH

No comments necessary.

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EnviroTest Laboratories Inc.

315 Fullerton Avenue, Newburgh, NY 12550 (914) 562-0890 FAX (914) 562-0841

CHAIN OF CUSTODY RECORD

9/4/96

CUSTOMER NAME	ERM - Northeast
ADDRESS	175 Froehlich Farm Blvd.
CITY, STATE, ZIP	Woodbury, NY 11797
NAME OF CONTACT	Jim Rocco
PHONE NO.	(516) 921-4300
PROJECT LOCATION	BD East Rutherford, NJ
PROJECT NUMBER / PO NO.	186.123-2

REPORT TYPE
STANDARD ☐ ISRA ☑
NYASP A ☐ B ☐ CLP ☐
OTHER ____

TURNAROUND
☐ NORMAL ____
☑ QUICK 24 HR
☐ VERBAL ____

LABORATORY # (Lab Use Only)
165059
TEMP BLANK Y ____ N ____ ____ C°
pH CHECK Y ____ N ____
REVIEWED BY: ____

NY PUBLIC WATER SUPPLIES
SOURCE ID ____
ELRP TYPE ____
FEDERAL ID ____

ETL#	SAMPLING DATE	TIME AM PM	COMP	GRAB	MATRIX	CLIENT I.D.	Total Number of Containers	40ml Glass HCL	Liter Amber Sulfuric Acid	Liter Amber Organic Washed	Liter Plastic Nitric Acid	Liter Plastic Sodium Hydroxide	Liter Plastic	Liter Plastic Sulfuric Acid	250ml Plastic	125ml Plastic Sterile	250ml Amber	2 oz. Oorpak	ANALYSIS REQUESTED
01	9/4	2:45 PM		✓	Soil	T-1	1			1									TPH - 24 hr. TAT
02		2:55 PM		✓		T-2	1			1									Attention: Doug T.
03		3:00 PM		✓		T-3	1			1									
04		3:05 PM		✓		T-4	1			1									
05		3:10 PM		✓		Duplicate	1			1									
																			Hold for possible analysis:
		2:45 PM		✓		T1	1												1 PVOA, BN, PCB's, Metals
		2:55 PM		✓		T2	#												From Above TPH Jar: Metals, BN, PCB
		3:00 PM		✓		T3	#												
						T4	#												
						Duplicate													
06		3:15 PM		✓	Aqueous	FB-1	6	2		3	1								TPH - 24hr TAT; Possible VOA, BN Metals, PCB
07						Trip Blank	#												Pesticides

RELINQUISHED BY	COMPANY	DATE	TIME	RECEIVED BY	COMPANY	DATE	TIME
	ERM	9/4/96			ETL	9/4/96	11:45 PM
RELINQUISHED BY	COMPANY	DATE	TIME	RECEIVED BY	COMPANY	DATE	TIME
RELINQUISHED BY	COMPANY	DATE	TIME	RECEIVED BY	COMPANY	DATE	TIME
	ETL	9/4/96	4:30 PM		ETL	9/5/96	10:00
RELINQUISHED BY	COMPANY	DATE	TIME	RECEIVED BY	COMPANY	DATE	TIME

COMMENTS ____

SEMI-VOLATILE ORGANIC LABORATORY CHRONICLE--ENVIROTEST LABORATORIES, INC.

ETL Laboratory Number: 165059
Client Project Number: 186.123-2

Date Receipt/Refrigeration: 9/5/96
Date Sampled: 9/4/96
Preservative: _____

Sample Relinquished by	Sample Received by	Date	Time	Reason for Change of Custody
J. Murphy				
	T. Reinhardt	9-5-96		Storage / extraction

ORGANICS

Extractions:
- Semi-volatiles _____
- Pesticides/PCB's _____
- Herbicides _____
- TPH 9-5-96 TR
- TCLP _____

Re-extractions:
- Semi-volatiles _____
- Pesticides/PCB's _____
- Herbicides _____
- TPH _____
- TCLP _____

Section Supervisor Review and Approval _____

Analysis:
- Semi-Volatiles _____
- Pesticides/PCB's _____
- Herbicides _____
- TPH 9-5-96 MAB

Re-Analysis:
- Semi-volatiles _____
- Pesticides/PCB's _____
- Herbicides _____
- TPH _____

Section Supervisor Review and Approval _____

loc. 1.1 12/7/89 ETL, Inc.

EnviroTest Laboratories Inc
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(914) 562-0890
FAX (914) 562-0841

SUMMARY OF METHODOLOGY

Analysis	Aqueous	Ground Water Liquid/Solid Matrices
TPH	EPA 418.1(1)	
% Solid	EPA 160.3(1)	

References

1. "Methods for Chemical Analysis of Water and Wastewater", EPA-600/4-79-020, March 1983.
2. "Test Methods for Evaluating Solid Waste",USEPA-SW846, Third Edition, September 1986 with all current revisions.
3. Atomic Absorption - Direct Aspiration
4. Atomic Absorption - Furnace Technique
5. Federal Register, V. 50 No. 3, January 4, 1985.
6. Federal Register, V. 49, No. 209, October 26, 1984.
7. "Standard Methods for the Examination of Water and Wastewater", 16th Edition, 1986.
8. "Methods for the Determination of Organic Compounds in Drinking Water, EPA/600/4-88/039, December 1988.
9. The Anaylsis of Trihalomethanes in Finished Waters by the Purge and Trap Method, EMSL, Cincinnati, Ohio 45268, November 6, 1979.
10. Volatile Aromatic and Unsaturated Organic Compounds in Water by Purge and Trap Gas Chromatography, EMSL, Cincinnati, Ohio, 45268, Revision 2.0, (1989).
11. Volatile Organic Compounds in Water by Purge and Trap Capillary Column Gas Chromatography with Photoionization and Electrolytic Conductivity Detectors in Series, EMSL, Cincinnati, Ohio, 45268, Revision 2.0 (1989).
12. Determination of Chlorinated Acids in Water by Gas Chromatography with an Electron Capture Detector, EMSL, Cincinnati, Ohio, 45628, Revision 4.0 (1989).
13. "New York State Department of Environmental Conservation Analytical Services Protocol, Vol. 2, December 1991.
14. "Standard Methods for the Examination of Water and Wastewater", 17th Edition, 1989.
15. "ASTM, Petroleum Products, Lubricants, and Fossil Fuels, Vol. 5.01 D56-D1947, 1990.
16. " Analytical Handbook for the Laboratory of Organic Analytical Chemistry", Wadsworth Center for Laboratories and Research, New york State Department of Health, August, 1991.
17. "Standard Methods for the Examination of Water and Wastewater", 18th Edition, 1992.

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FAX (914) 562-0841

DATA REPORTING QUALIFIERS

Data qualifiers are used in the analytical report for organics and inorganics. The qualifiers are equivalent to those used by the USEPA in its Contract Laboratory Program.

ORGANIC QUALIFIERS

U - Indicates that the compound was analyzed for but not detected. The sample detection limit is corrected for dilution and percent moisture. This detection limit is not necessarily the instrument detection limit.

J - Indicates an estimated value. This qualifier is used when mass spectral data indicates the presence of a compound that meets the identification criteria and the result is less than the specified detection limit but greater than zero.

B - Indicates that the analyte was found in both the sample and its associated laboratory blank. It indicates possible/probable blank contamination and warns the data user to take appropriate action.

C - This qualifier applies to pesticide parameters where the identification has been confirmed by gas chromatography/mass spectrometry.

E - This qualifier indicates compounds whose concentrations exceed the calibration range of the instrument for the specific analysis.

D - Indicates all compounds identified in an analysis at a secondary dilution factor.

DL - This suffix indicates a diluted sample and is appended to the sample number on the result form.

N - Indicates presumptive evidence of a compound. This flag is only used for tentatively identified compounds, where the identification is based on a mass spectral library search. It is applied to all TIC results.

P - This flag is used for a pesticide/Aroclor target analyte when there is greater than 25% difference for detected concentration between the two GC columns (see Form X). The lower of the two values is reported on Form I and flagged with an "P".

A - This flag indicates that a TIC is a suspected aldol-condensation product.

RE - This suffix indicates a re-analyzed sample and is appended to the sample number on the result form.

RR - This suffix indicates a re-extracted and re-analyzed sample and is appended to the sample number on the result form.

315 Fullerton Avenue
Newburgh, NY 12550
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FAX (914) 562-0841

DATA REPORTING QUALIFIERS

INORGANICS

Concentration Qualifiers (C)

U - Indicates that the analyte was analyzed for but not detected.

B - The reported value is less than the Contract Required Detection Limit (CRDL), but greater than the Instrument Detection Limit (IDL).

Quality Qualifiers (Q)

E - Indicates an estimated value because of the presence of interference.

M - Duplicate injection precision not met.

N - Spiked sample recovery not within control limits.

S - The reported value was determined by the Method of Standard Additions (MSA).

W - Post digestion spike for furnace AA analysis is out of control limits (85-115%), while sample absorbance is less than 50% of spike absorbance.

* - Duplicate analysis not within control limits.

+ - Correlation coefficient for the MSA is less than 0.995.

Method Qualifiers (M)

P - for ICP.
A - for Flame AA.
F - for Furnace AA.
PM - for ICP when Microwave Digestion is used.
AM - for Flame AA when Microwave Digestion is used.
FM - for Furnace AA when Microwave Digestion is used.
CV - for Manual Cold Vapor AA.
AV - for Automated Cold Vapor AA.
AS - for Semi-Automated Spectrophotometric
C - for Manual Spectrophotometric
T - for Titrimetric.
NR - if the analyte is not required to be analyzed.

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Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123-2
ETL Sample Number:	165059-01		
Client I.D.:	T1		
Date Collected:	04-SEP-96	Matrix:	3 Soil/Sldg
Date Received:	05-SEP-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Percent Solids	68.4	%	160.3	06-SEP-96
Total Petroleum Hydrocarbons	36.6 U	MG/KG DRY	418.1	05-SEP-96

Remarks:

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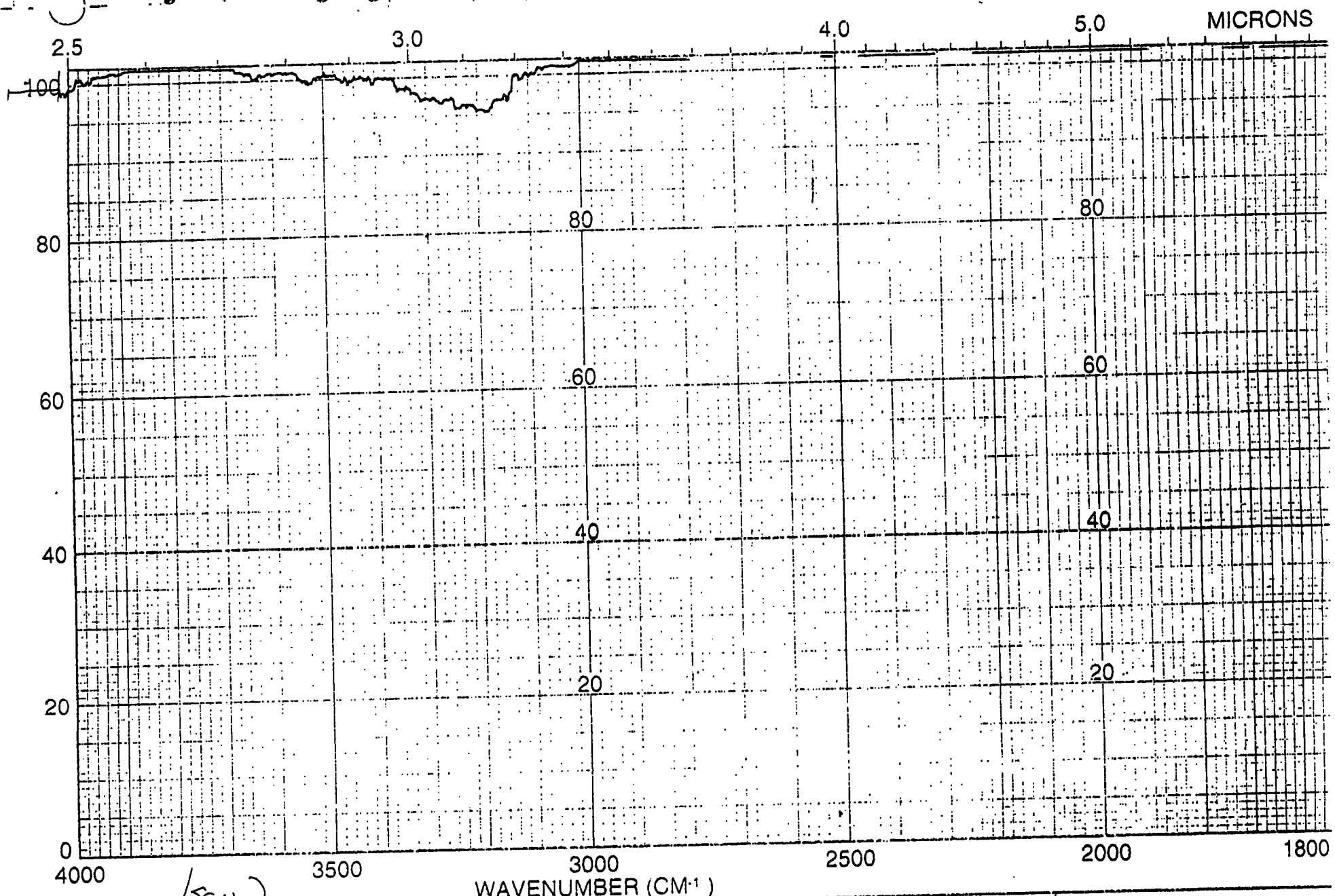
FAX (914) 562-0841



(SS:1)

SAMPLE 165059-1	SOLVENT	REMARKS
9-5-96	CONCENTRATION	
	CELL PATH	
ORIGIN	REFERENCE	

MADE IN U.S.A.

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123-2
ETL Sample Number:	165059-02		
Client I.D.:	T2		
Date Collected:	04-SEP-96	Matrix:	3 Soil/Sldg
Date Received:	05-SEP-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Percent Solids	79.7	%	160.3	06-SEP-96
Total Petroleum Hydrocarbons	31.4 U	MG/KG DRY	418.1	05-SEP-96

Remarks:

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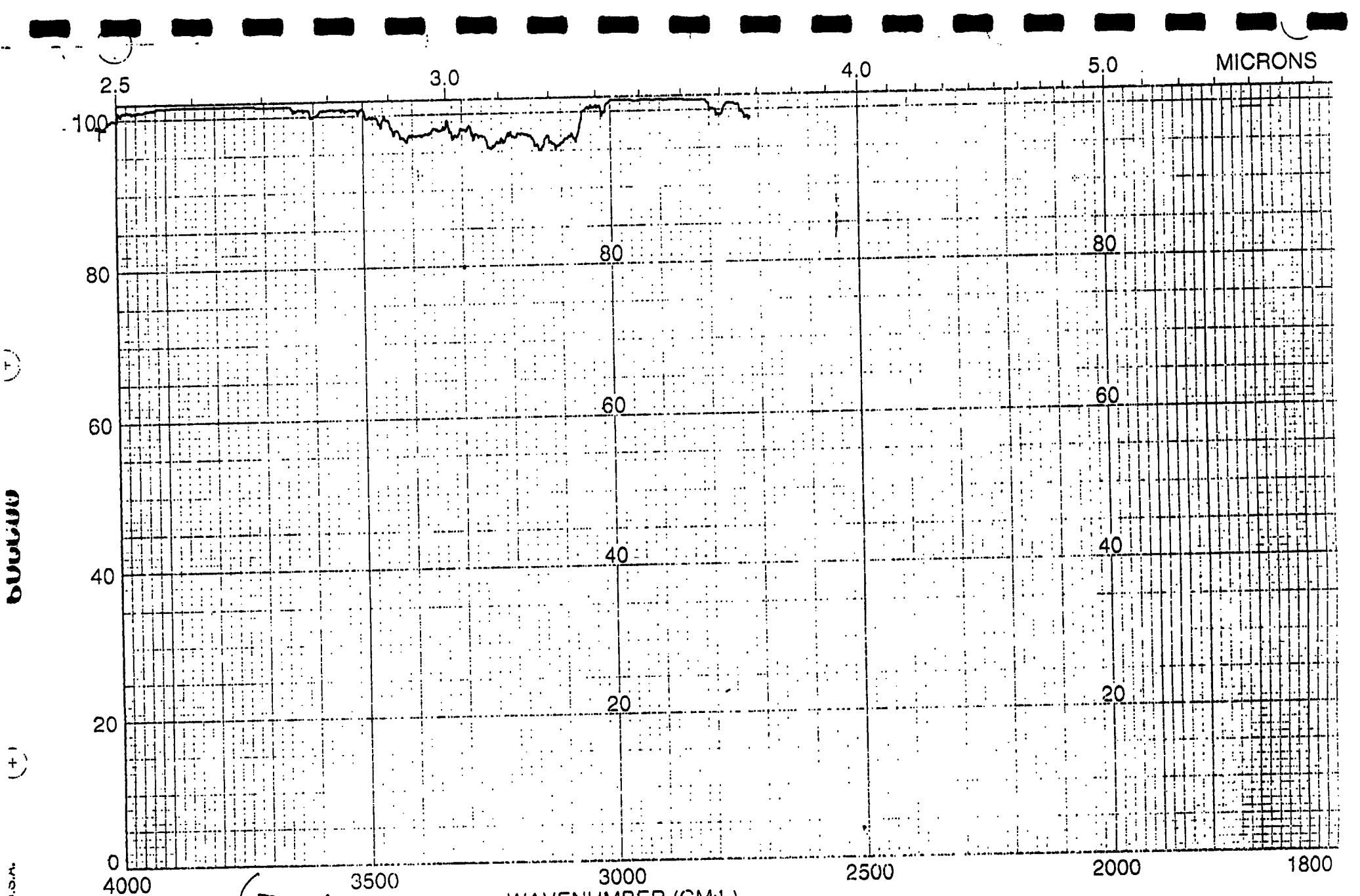
315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841



(Soil)

SAMPLE 165059-2	SOLVENT
	CONCENTRATION
	CELL PATH
ORIGIN 9-5-96	REFERENCE

REMARKS

MADE IN U.S.A.

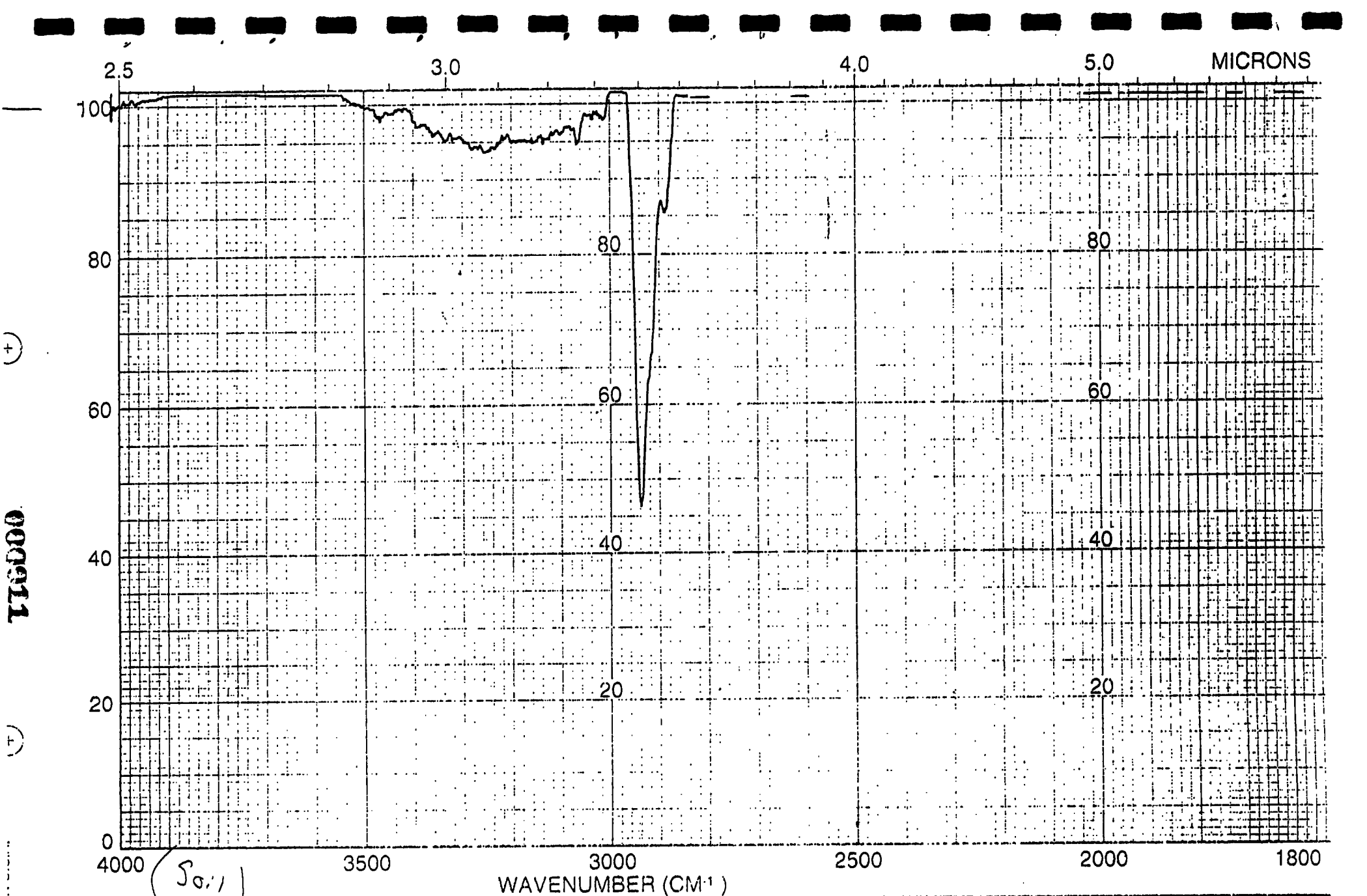
Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123-2
ETL Sample Number:	165059-03		
Client I.D.:	T3		
Date Collected:	04-SEP-96	Matrix:	3 Soil/Sldg
Date Received:	05-SEP-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Percent Solids	54.5	%	160.3	06-SEP-96
Total Petroleum Hydrocarbons	349	MG/KG DRY	418.1	05-SEP-96

Remarks:

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841


2.5
3.0
4.0
5.0
MICRONS
100
80
60
40
20
0
4000
3500
3000
2500
2000
1800
WAVENUMBER (CM-1)
(Soil)
SAMPLE 45559-3
9-5-94
ORIGIN
SOLVENT
CONCENTRATION
CELL PATH
REFERENCE
REMARKS

116000

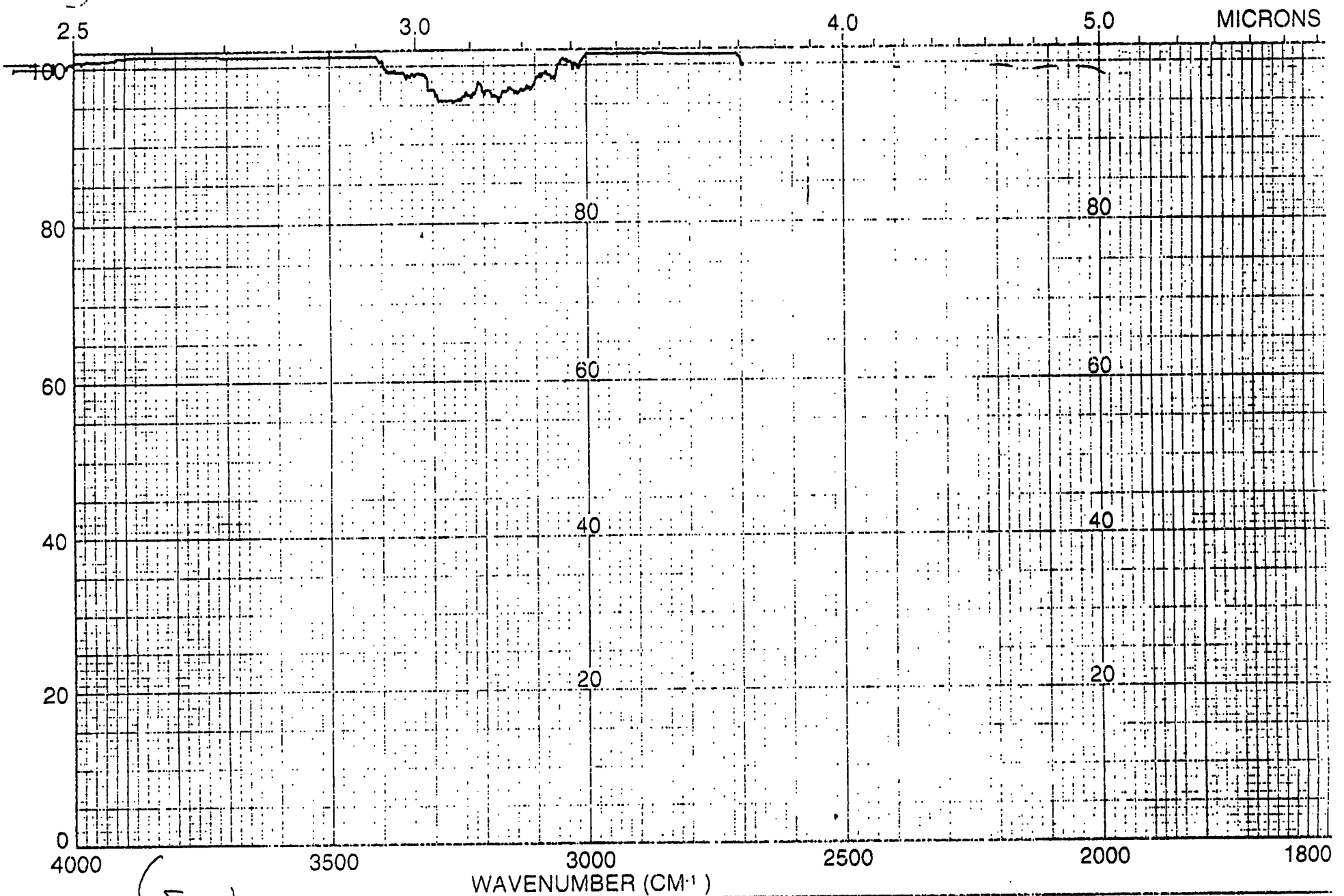
Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123-2
ETL Sample Number:	165059-04		
Client I.D.:	T4		
Date Collected:	04-SEP-96	Matrix:	3 Soil/Sldg
Date Received:	05-SEP-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Percent Solids	81.2	%	160.3	06-SEP-96
Total Petroleum Hydrocarbons	30.8 U	MG/KG DRY	418.1	05-SEP-96

Remarks:

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



SAMPLE (50:1) 165059-4 9-5-96	SOLVENT	REMARKS
	CONCENTRATION	
	CELL PATH	
ORIGIN	REFERENCE	

MADE IN U.S.A.

000013

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123-2
ETL Sample Number:	165059-05		
Client I.D.:	DUPLICATE		
Date Collected:	04-SEP-96	Matrix:	3 Soil/Sldg
Date Received:	05-SEP-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Percent Solids	79.9	%	160.3	06-SEP-96
Total Petroleum Hydrocarbons	31.3 U	MG/KG DRY	418.1	05-SEP-96

Remarks:

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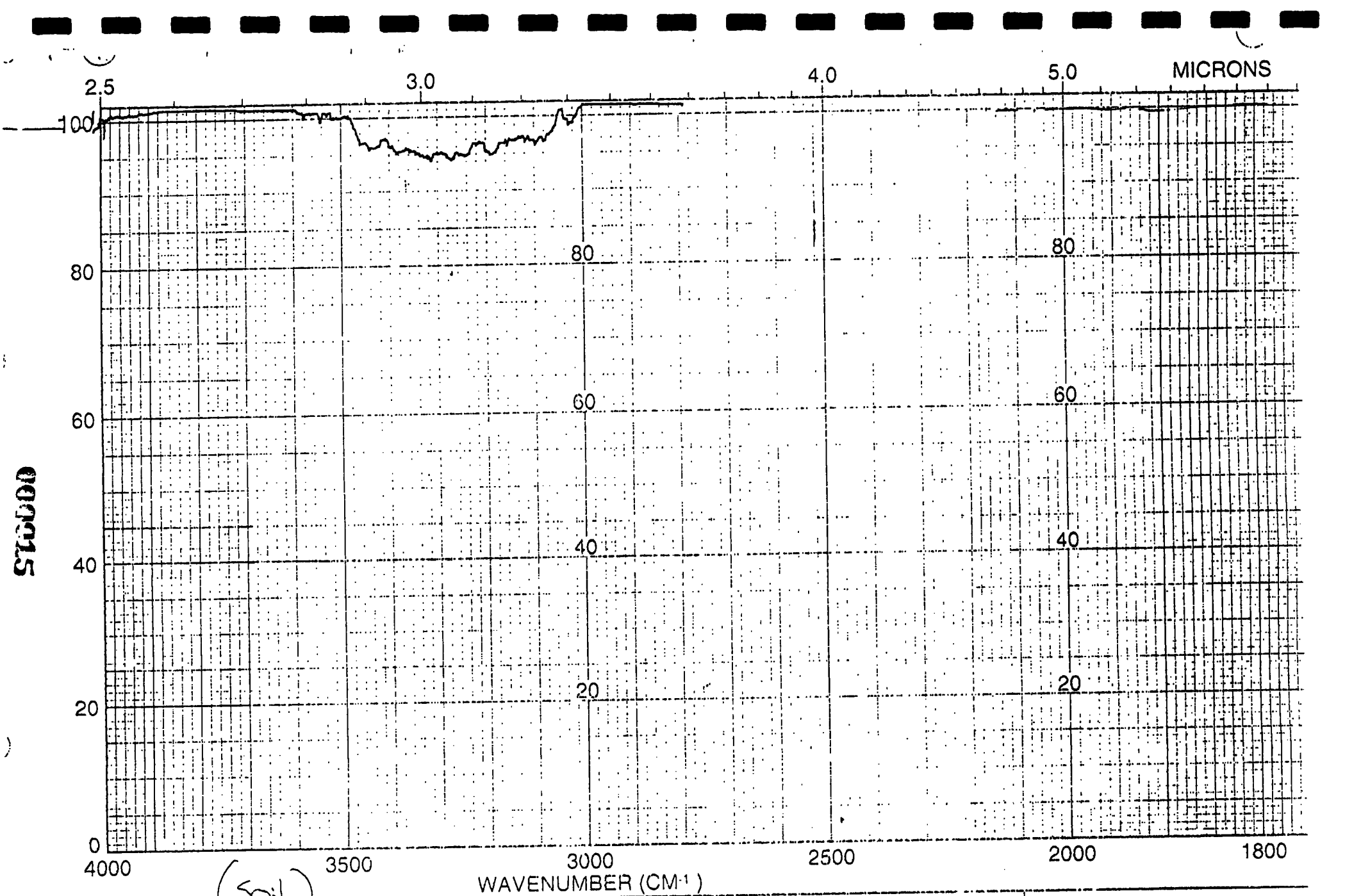
FAX (914) 562-0841



(Soil)

SAMPLE 145059-5	SOLVENT	REMARKS
9-5-96	CONCENTRATION	
	CELL PATH	
ORIGIN	REFERENCE	

Inorganics Analysis Data Sheet
Form I - IN

Client Name:	ERM Northeast - Woodbury	Project Name:	186.123-2
ETL Sample Number:	165059-06		
Client I.D.:	FB-1		
Date Collected:	04-SEP-96	Matrix:	2 GW/WW
Date Received:	05-SEP-96		
Comments:			

Analysis	Result	Units	Method	Analyzed
Total Petroleum Hydrocarbons	0.8 U	MG/L	418.1	05-SEP-96

Remarks:

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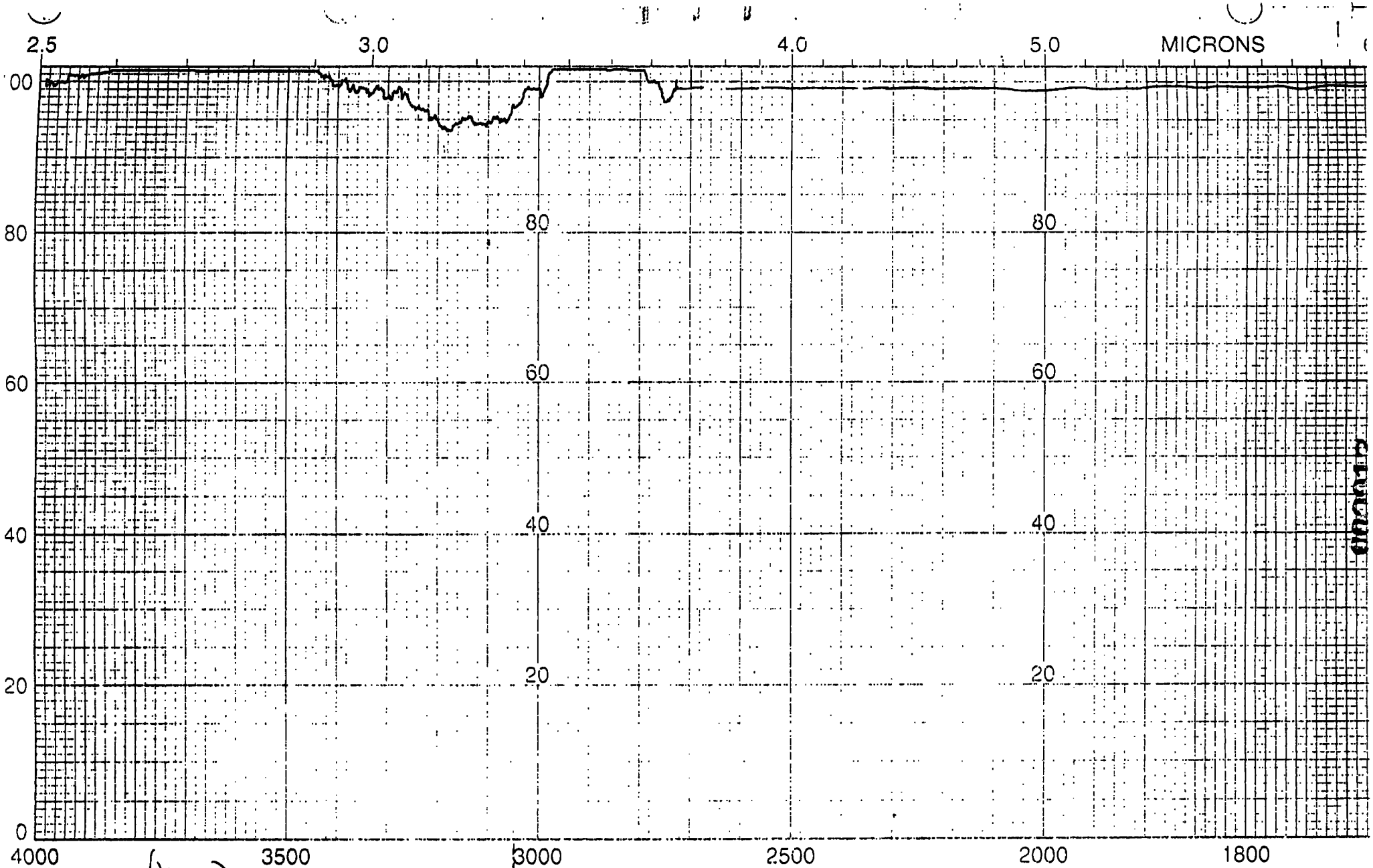
FAX (914) 562-0841



(H2O)

SAMPLE 165059-6	SOLVENT	REMARKS
9-5-96	CONCENTRATION	
	CELL PATH	
ORIGIN	REFERENCE	

BLANK DATA RESULT FORM

ETL Lab No.: Method Blank
Client Name: ERM Northeast
Project Name: 186.123-2
Matrix: Water

File Number: NA
Date Extracted: 9/5/96
Date Analyzed: 9/5/96
Report Date: 10/21/96

Concentration Units (mg/l or mg/kg dry weight): mg/l

TPH
0.4 U

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BLANK DATA RESULT FORM

ETL Lab No.: Method Blank
Client Name: ERM Northeast
Project Name: 186.123-2
Matrix: Soil

File Number: NA
Date Extracted: 9/5/96
Date Analyzed: 9/5/96
Report Date: 10/21/96

Concentration Units (mg/l or mg/kg dry weight): mg/kg

TPH

25.0 U

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TPH

TPH SOIL MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Client Name: ERM Northeast

Lab Name: EnviroTest Labs.

Matrix Spike ETL Sample:165059-01

Matrix Spike Client Sample ID.:T1

Date of Analysis: 9/5/96

Instrument ID: Perkin Elmer 1310

COMPOUND	SPIKE ADDED mg	SAMPLE CONCENTRATION mg	MS CONCENTRATION mg	MS % REC. #	QC LIMITS REC.
TPH	4.70	0	2.9	61.7	46-124

COMPOUND	SPIKE ADDED mg	MSD CONCENTRATION mg	MSD % REC. #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
TPH	4.70	2.7	57.4	7.14	41	46-124

Column to be used to flag recovery and RPD values with an asterisk.

* Values outside of QC limits

RPD:

Spike Recovery:

COMMENTS: _____

_____

FORM III TPH

315 Fullerton Avenue
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FAX (914) 562-0841

TPH

TPH WATER BLANK SPIKE RECOVERY

Client Name: ERM Northeast

Lab Name: EnviroTest Labs.

Matrix Spike ETL Sample: 165059

Matrix Spike Client Sample ID.:Blank Spike

Date of Analysis: 9/5/95

Instrument ID: Perkin Elmer 1310

COMPOUND	SPIKE ADDED mg	SAMPLE CONCENTRATION mg	MS CONCENTRATION mg	MS % REC. #	QC LIMITS REC.
TPH	4.70	0	3.6	76.6	40-170

Column to be used to flag recovery and RPD values with an asterisk.

* Values outside of QC limits

RPD:

Spike Recovery:

COMMENTS: _____

_____

FORM III TPH

EnviroTest Laboratories Inc.

315 Fullerton Avenue
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FAX (914) 562-0841

TPH

TPH SOIL BLANK SPIKE RECOVERY

Client Name: ERM Northeast

Lab Name: EnviroTest Labs.

Matrix Spike ETL Sample:165059

Matrix Spike Client Sample ID.:Blank Spike

Date of Analysis: 9/5/96

Instrument ID: Perkin Elmer 1310

COMPOUND	SPIKE ADDED mg	SAMPLE CONCENTRATION mg	MS CONCENTRATION mg	MS % REC. #	QC LIMITS REC.
TPH	4.70	0	2.6	55.3	46-124

Column to be used to flag recovery and RPD values with an asterisk.

* Values outside of QC limits

RPD:

Spike Recovery:

COMMENTS: _____

_____

FORM III TPH

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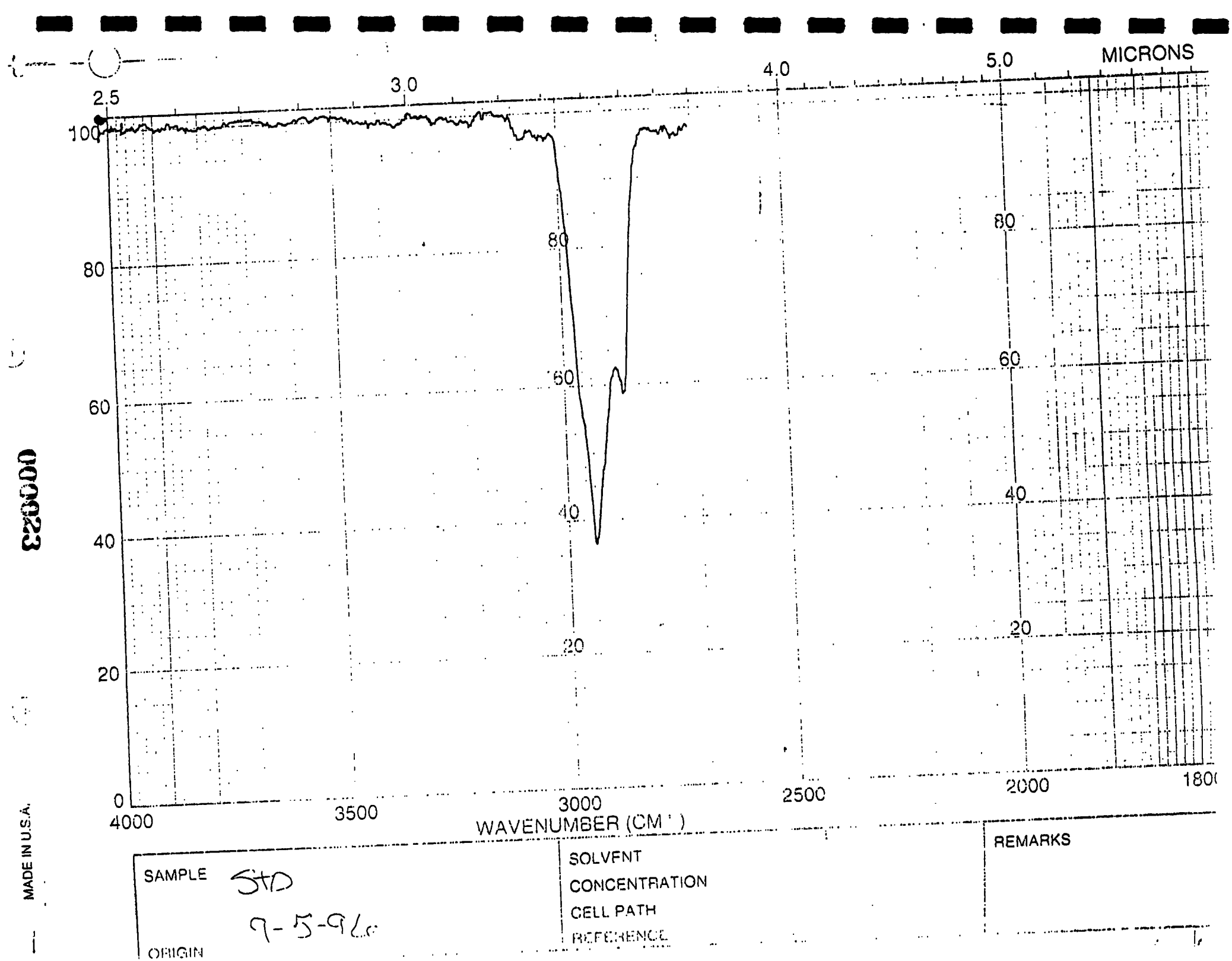
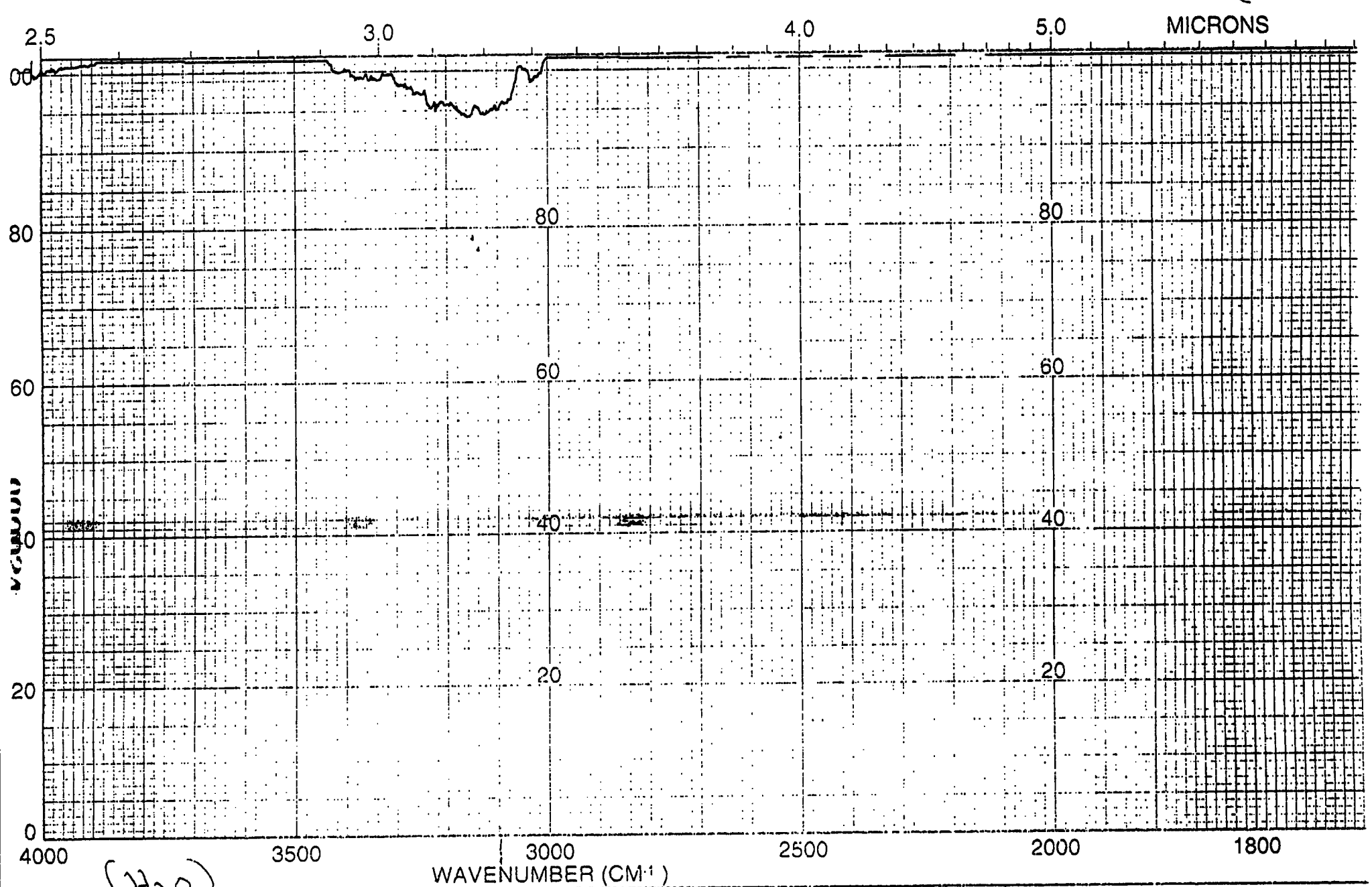
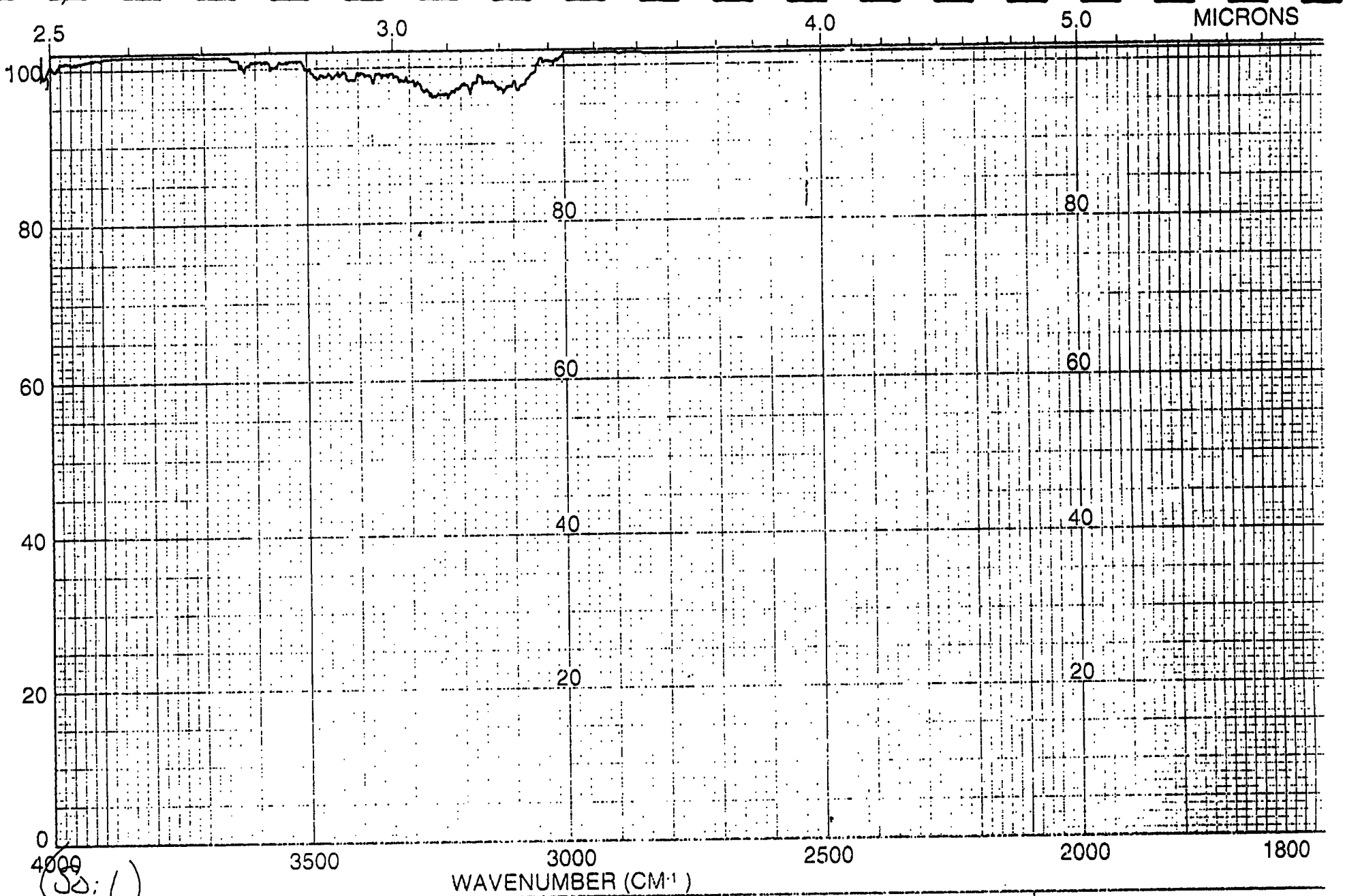

MICRONS
2.5
3.0
4.0
5.0
100
80
60
40
20
0
4000
3500
3000
2500
2000
1800
WAVENUMBER (CM⁻¹)
SAMPLE STD
9-5-96
ORIGIN
SOLVENT
CONCENTRATION
CELL PATH
REFERENCE
REMARKS
MADE IN U.S.A.



(H2O)

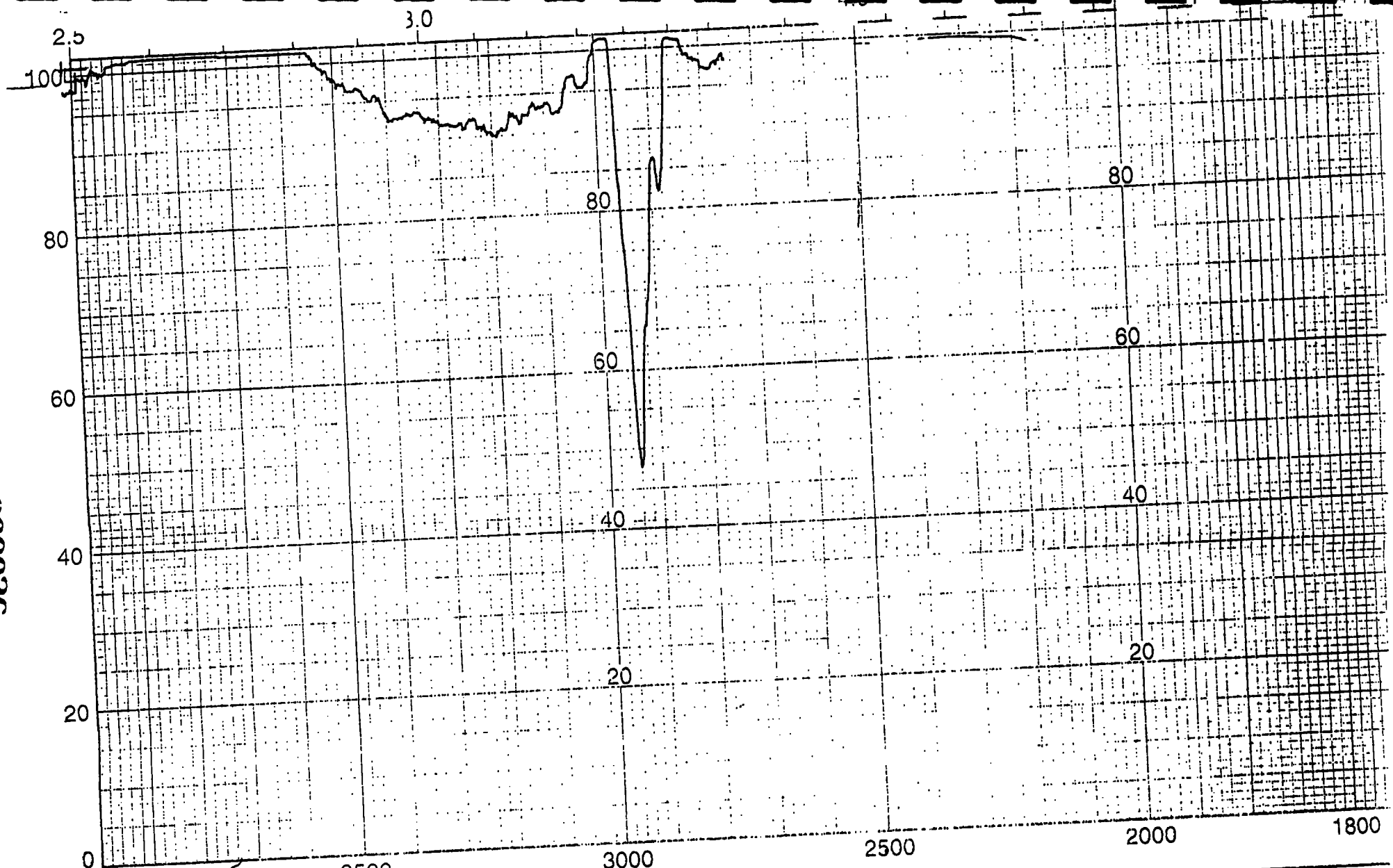
SAMPLE blk-165059 9-596	SOLVENT	REMARKS
	CONCENTRATION	
	CELL PATH	
ORIGIN	REFERENCE	



(SD: 1)

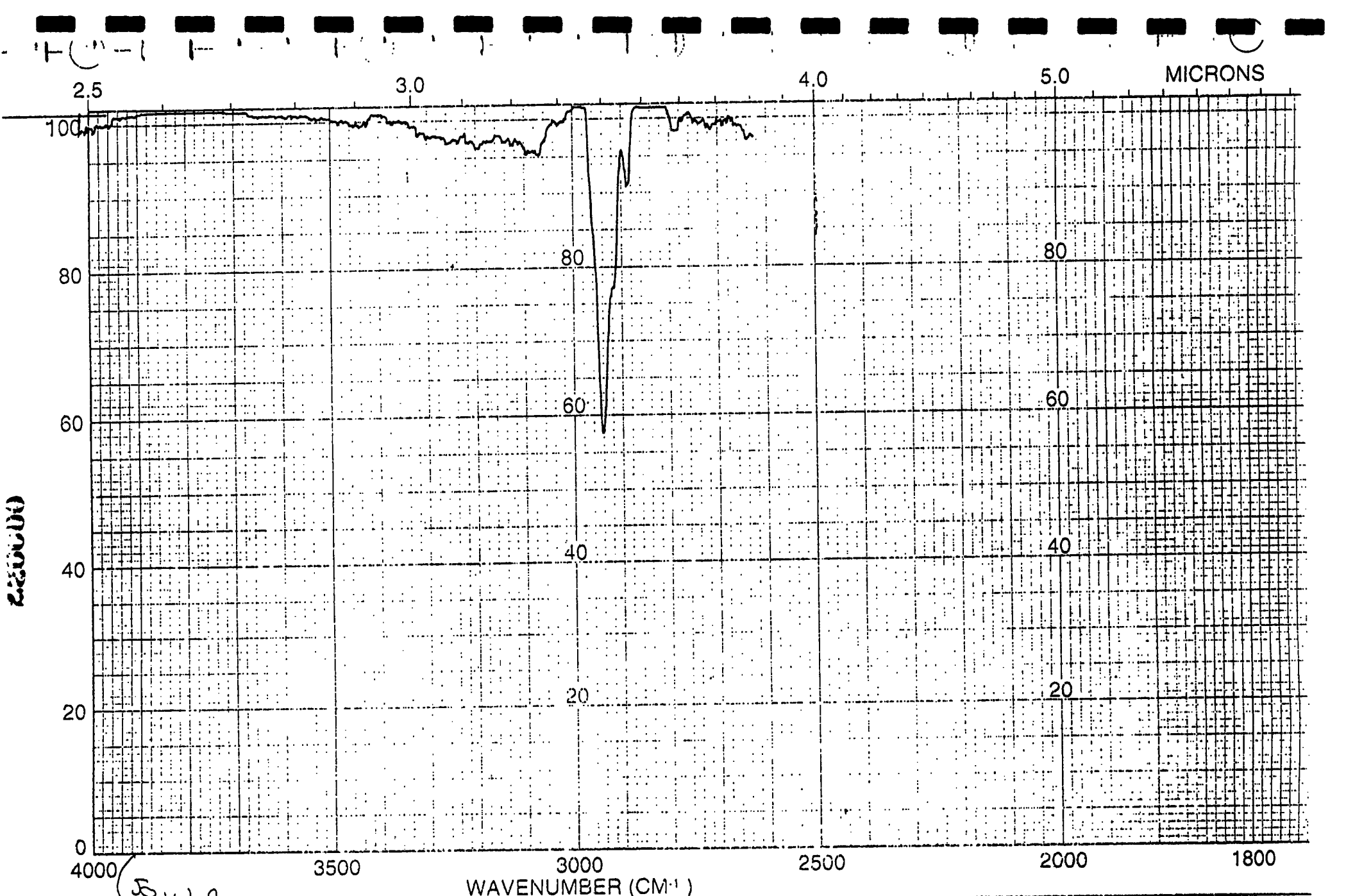
SAMPLE 9-5-96 DK- 145059 ORIGIN	SOLVENT CONCENTRATION CELL PATH REFERENCE	REMARKS

000025



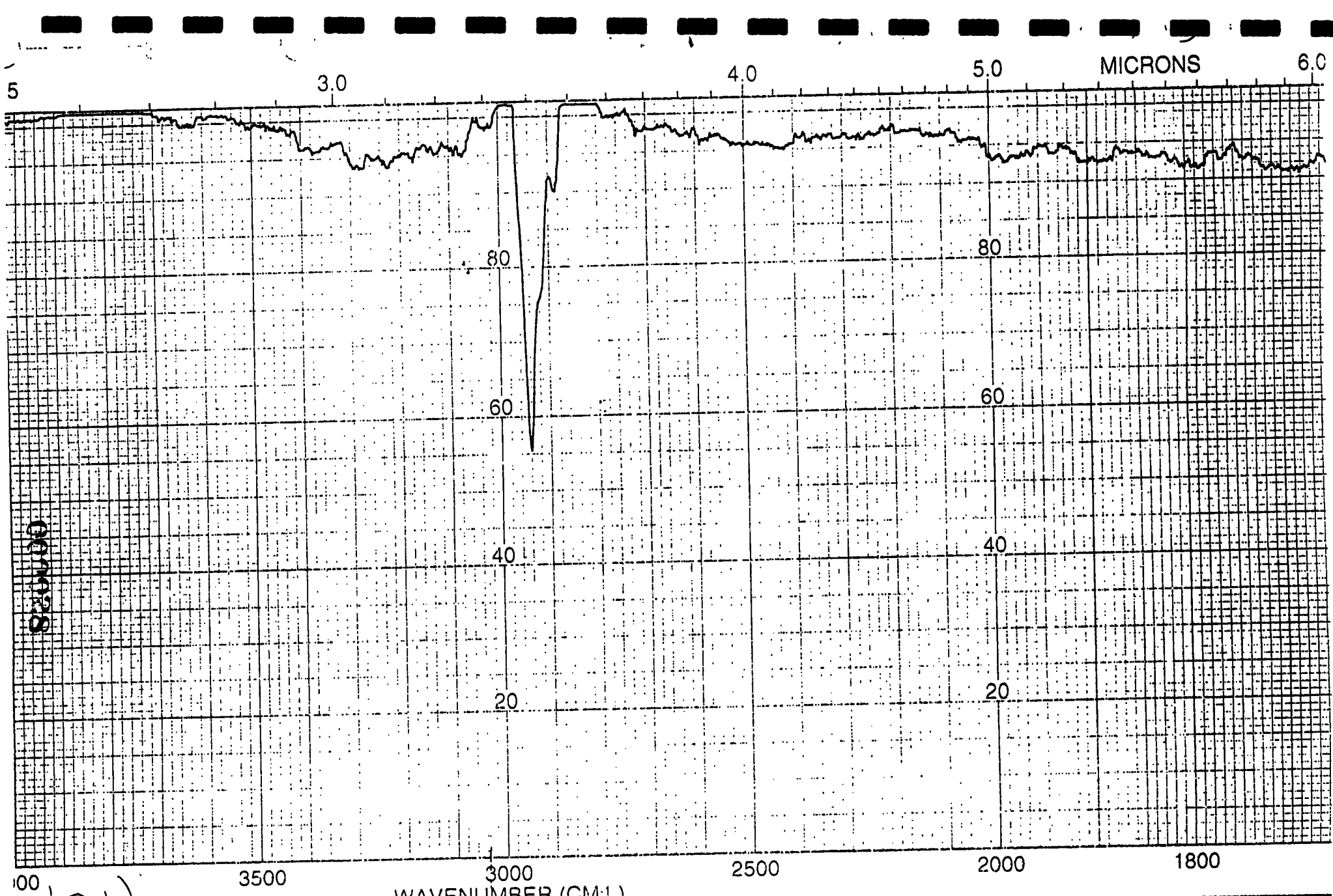
(H20)

SAMPLE blk/pK 9-5-96	SOLVENT	REMARKS
	CONCENTRATION	
	CELL PATH	
ORIGIN	REFERENCE	



(Soil) 9-5-96

SAMPLE blk/spk 165059 ORIGIN	SOLVENT CONCENTRATION CELL PATH REFERENCE	REMARKS



(Soil)

SAMPLE MS- 16059-1

9-5-96

ORIGIN

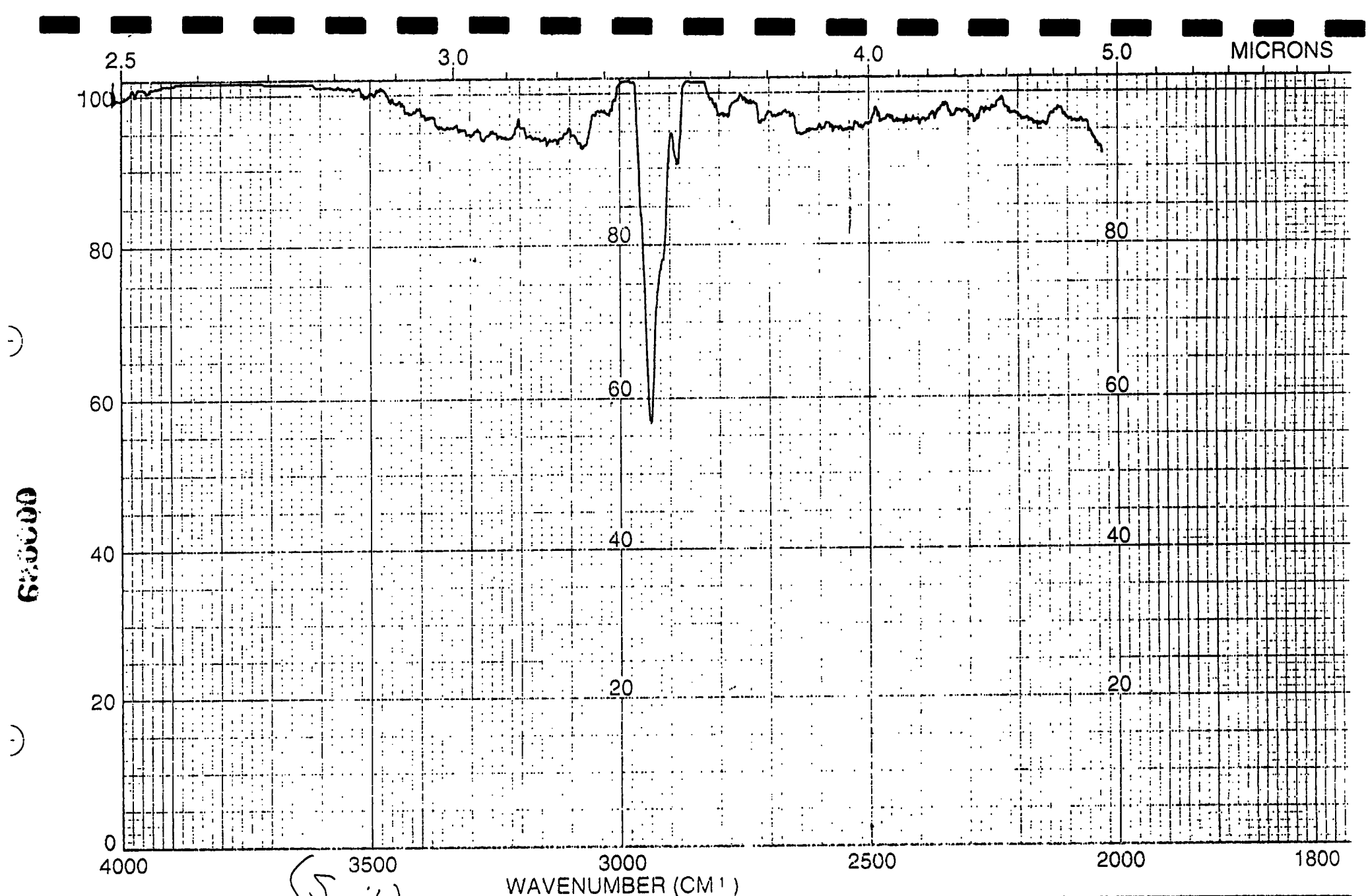
SOLVENT

CONCENTRATION

CELL PATH

REFERENCE

REMARKS



(Soil)

SAMPLE MSD-16505G-1	SOLVENT	REMARKS
	CONCENTRATION	
	CELL PATH	
ORIGIN 95-96	REFERENCE	

TPH 418.1

Batch#: 110194
Date Extracted: 9-5-96 TR.
Date Analyzed: 9-5-96 MB

Units: mg/kg dry
mg/L

LAB#	WT/VOL	ABS.	%SOL.	MG	DIL	RESULTS
Std @	4.7	37	100	4.8	4.8	4.7 102%
BLANK	20g	100	100	0.5u		25.0u
1105059-1	10	100	68.4	0.5u		36.55u
-2		100	79.7	0.5u		31.37u
-3		46	54.5	3.8		348.62
-4		100	81.2	0.5u		30.79u
-5	↓	100	79.9	0.5u		31.29u
BLK SPK	20g	58	100	2.6		2.6/4.7 55.3%
059-1 MS	10	55	68.4	2.9		2.9/4.7 61.7%
059-1 MSD	↓	57	68.4	2.7		2.7/4.7 57.4%
STD @						
BLANK	1000ml	100	100	0.4u		0.4u
1105059-6	500ml	100	↓	0.8u		0.8u
BLK SPK	1000ml	48	100	3.6	3.6	4.7 77%
MS						
MSD						

Recovery Limits Water: 70-126 Soil 46-124
Standard: 90-120

EnviroTest Laboratories Inc.
315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

APPENDIX E

Waste Manifest

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

2 6 3 7 7 0 2

Please type or print in block letters. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039. Expires 9-30-96

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: NJD000104781 — Manifest Document No.: 00002
2. Page 1 of 1 — Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
1 ~~Becton Drive~~ STANLEY ST E. RUTHERFORD NJ 07073
~~Franklin Lakes, NJ 07417-1880~~

4. Generator's Phone (201) 847-7175

A. State Manifest Document Number: NJA 2637702
B. State Generator's ID (Gen. Site Address):

5. Transporter 1 Company Name: Horwith Trucking, Inc.
6. US EPA ID Number: PAD146714875
C. State Trans. ID-NJDEPE: S 0 7 1 1 0
Decal No.: 75198

7. Transporter 2 Company Name:
8. US EPA ID Number:
D. Transporter's Phone (215) 751-2220
E. State Trans. ID-NJDEPE:
Decal No.:

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616

10. US EPA ID Number: OHD045243706
F. Transporter's Phone ( )
G. State Facility's ID:
H. Facility's Phone (419) 698-3500

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	001	DT	Est. 44026	P	D008
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a. c.
b. d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
EPA # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which I have determined and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize the waste generated and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: [illegible] — Signature: [illegible] — Month Day Year: 96

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: [illegible] — Signature: [illegible] — Month Day Year: [illegible]

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name: — Signature: — Month Day Year:

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: — Signature: — Month Day Year:

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete

SIGNATURE AND INFORMATION *MUST* BE LEGIBLE ON ALL COPIES

6—GENERATOR MAIL TO-TSD'S STATE

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

2 6 3 7 7 0 3

Please type or print in block letters. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039. Expires 9-30-96

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: NJD000304782 — Manifest Document No.: 00000
2. Page 1 of 1

Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address:
Becton Dickinson & Company
~~1 Becton Drive~~ ONE STANLEY ST EAST RUTHERFORD
~~Franklin Lakes, NJ 07417-1880~~ NJ 07073
4. Generator's Phone ( ) (201) 847-7175

A. State Manifest Document Number: NJA 2637703
B. State Generator's ID (Gen. Site Address):

5. Transporter 1 Company Name: Horwith Trucking, Inc.
6. US EPA ID Number: PAD145716878
C. State Trans. ID-NJDEPE: 307110
Decal No.: 75225

7. Transporter 2 Company Name:
8. US EPA ID Number:
D. Transporter's Phone (215) 261-2220
E. State Trans. ID-NJDEPE:
Decal No.:

9. Designated Facility Name and Site Address:
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number: OHD045243706
F. Transporter's Phone ( )
G. State Facility's ID:
H. Facility's Phone (419) 698-3500

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt./Vol.	I. Waste No.
a.	X	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	001	DT	Est. 44000	P	D008
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a. c.
b. d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
WHID # 32695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government [illegible]

[illegible] quantity generator [illegible] volume and [illegible] [illegible] to human health and the environment, OR [illegible] the best waste management [illegible]

Printed/Typed Name: | Signature:

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: Robert Kester | Signature: [illegible]

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name: | Signature:

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except [illegible]
Printed/Typed Name: | Signature: | Month Day Year

EPA Form 8700-[illegible] (Rev. 9/88) Previous editions are obsolete.

SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

2 6 3 7 0 4

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. N J D 0 0 0 3 0 4 7 8 2 | Manifest Document No. 00024 | 2. Page 1 of 1 | Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
1 Becton Drive / STANLEY ST EAST RUTHERFORD NJ 07073
~~Franklin Lakes, NJ 07417-1880~~
4. Generator's Phone (201) 847-7175

A. State Manifest Document Number NJA 2637704
B. State Generator's ID (Gen. Site Address)

5. Transporter 1 Company Name
Norwith Trucking, Inc.
6. US EPA ID Number P A D 1 4 6 1 1 4 5 7 2

C. State Trans. ID-NJDEPE 5 0 7 1 1 1 0
Decal No. 75201

7. Transporter 2 Company Name
8. US EPA ID Number

D. Transporter's Phone (215) 261-2250
E. State Trans. ID-NJDEPE
Decal No.

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number O H D 0 4 8 4 8 9 7 0 5

F. Transporter's Phone ( )
G. State Facility's ID
H. Facility's Phone (419) 698-3500

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	X	0 0 1	D F	0 0 0 2 2	P	D 0 0 8
b.						
c.						
d.						

J. Additional Descriptions for Materials Listed Above
K. Handling Codes for Wastes Listed Above

15. Special Handling Instructions and Additional Information
NSLD # 15695-001
ERG # 171
24 hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national governmen

Month Day Year

Print/Type Name: Garrett Sumner
Signature: Garrett Sumner
Month Day Year

17. Transporter Acknowledgement of Receipt of Materials
Print/Type Name
Signature
Month Day Year

18. Discrepancy Indication Space

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Print/Type Name
Signature
Month Day Year

SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

NJA 2637704

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: NJD000304782 | Manifest Document No.: 00015 | 2. Page 1 of 1 | Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
~~1 Becton Drive~~ 1 STANLEY ST EAST RUTHERFORD NJ 07073
~~Franklin Lakes, NJ 07417-1880~~

4. Generator's Phone ( ) (201) 847-7175

A. State Manifest Document Number: NJA 2637705
B. State Generator's ID (Gen. Site Address)

5. Transporter 1 Company Name: Horwith Trucking, Inc.
6. US EPA ID Number: PAD146716878
C. State Trans. ID-NJDEPE: 807110
Decal No.: 75292

7. Transporter 2 Company Name:
8. US EPA ID Number:
D. Transporter's Phone (215) 261-2220
E. State Trans. ID-NJDEPE:
Decal No.:

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number: OHD045143706
F. Transporter's Phone ( )
G. State Facility's ID
H. Facility's Phone (419) 698-3500

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	001	DT	Est. 4[illegible]	P	D008
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a. c.
b. d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government [illegible]

[illegible] that I have a [illegible] and [illegible] environment; OR [illegible] and [illegible] method that is available [illegible]

Printed/Typed Name | Signature | Month

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: JERRY L. ANDREWS | Signature | 08 [illegible]

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name | Signature | Month

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19
Printed/Typed Name | Signature | Month

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete. SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: NJD000304782 — Manifest Document No.: 00326
2. Page 1 of 1 — Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
~~1 Becton Drive~~ 1 STANLEY ST EAST RUTHERFORD NJ
~~Franklin Lakes, NJ 07417-1880~~ 07073
4. Generator's Phone (201) 847-7175

A. State Manifest Document Number: NJA 2637706
B. State Generator's ID (Gen. Site Address)

5. Transporter 1 Company Name: Horwith Trucking, Inc.
6. US EPA ID Number: PAD146714878
C. State Trans. ID-NJDEPE: 907110
Decal No.: 75151

7. Transporter 2 Company Name
8. US EPA ID Number
D. Transporter's Phone (215) 261-2220
E. State Trans. ID-NJDEPE
Decal No.
F. Transporter's Phone ( )

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number: OHD045248706
G. State Facility's ID
H. Facility's Phone (419) 698-3500

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	001	DT	Est. 44000	P	D008
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a. c.
b. d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are [illegible] and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government [illegible]

[illegible] generator, I certify that I have a pro[illegible] and toxicity of waste [illegible]

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name — Signature — Month Day Year: 09/31/96

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name — Signature — Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19
Printed/Typed Name — Signature — Month Day Year

NJA 2637706

EPA Form 1720-22, Revised 10/31/92 [illegible] — SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

2637707

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. N J D 0 0 0 3 0 4 7 8 2 — Manifest Document No. 40042
2. Page 1 of 1 — Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
1 Becton Drive / STANLEY ST EAST RUTHERFORD NJ. 07073
Franklin Lakes, NJ 07417-1880

4. Generator's Phone (201) 847-7173

A. State Manifest Document Number NJA 2637707
B. State Generator's ID (Gen. Site Address)
C. State Trans. ID-NJDEPE 807110
Decal No. 76260

5. Transporter 1 Company Name: Herwith Trucking, Inc.
6. US EPA ID Number: PAD146714878
D. Transporter's Phone (215) 261-2320
E. State Trans. ID-NJDEPE
Decal No.

7. Transporter 2 Company Name
8. US EPA ID Number
F. Transporter's Phone ( )

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number: OHD048248706
G. State Facility's ID
H. Facility's Phone (419) 698-3500

11. US DOT Description (Including Proper Shipping Name; Hazard Class or Division, ID Number and Packing Group)	HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	X	001	DF	4,400	P	DD018
b.						
c.						
d.						

J. Additional Descriptions for Materials Listed Above
a. c.
b. d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
WSID # 12595-001
ERG # 171
24 hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government

Printed/Typed Name — Signature — Month Day Year

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: [illegible] — Signature: Michael Moore — 08 19 96

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name — Signature — Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19
Printed/Typed Name — Signature — Month Day Year

EPA Form [illegible] (Rev. 9-88) Previous editions are obsolete.

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State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. NJ D 0 0 3 0 4 7 8 2 — Manifest Document No. 00008

2. Page 1 of 1 — Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
1 Becton Drive / STANLEY ST. EAST, Rutherford NJ 07075
Franklin Lakes, NJ 07417-1880

4. Generator's Phone (201) 847-7175

A. State Manifest Document Number NJA 2637708

B. State Generator's ID (Gen. Site Address)

5. Transporter 1 Company Name: Horwith Trucking, Inc.

6. US EPA ID Number: P A D 1 4 6 7 1 4 8 7 8

C. State Trans. ID-NJDEPE: S 0 7 1 1 0 — Decal No.: F 3 2 4 3

7. Transporter 2 Company Name

8. US EPA ID Number

D. Transporter's Phone (215) 261-2220

E. State Trans. ID-NJDEPE — Decal No.

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616

10. US EPA ID Number: O H D 0 4 5 2 4 8 7 0 5

F. Transporter's Phone ( )

G. State Facility's ID

H. Facility's Phone (419) 698-3500

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	0 0 1	0 2	Est. 17000	P	0 0 0 8
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a. c.
b. d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
KRG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government [illegible]

[illegible] quantity generator, I certify that I have a pr[illegible] in place to reduce the volume and toxicity [illegible] that I have selected the p[illegible] [illegible] quantity generator [illegible] and the environment; OR, [illegible] quantity generator [illegible] waste management method that is available [illegible] can afford.

Printed/Typed Name: [illegible] — Signature: Dominick Gasbarro Jr 08/21/96

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: Harry Johnson — Signature: [illegible]

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name — Signature — Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name — Signature — Month Day Year

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete

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In case of an emergency or spill immediately call the state the emergency occurred in and the NJ Dept. of Environmental Protection and Energy (DOE) [illegible]

2 6 3 7 7 0 9

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: NJD000304782 — Manifest Document No.: 00039
2. Page 1 of 1

Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
~~1 Becton Drive~~ 1 STANLEY ST. EAST RUTHERFORD NJ.
~~Franklin Lakes, NJ~~ 07417-1880 (201) 847-7175 07073

4. Generator's Phone ( )

A. State Manifest Document Number: NJA 2637709
B. State Generator's ID (Gen. Site Address)

5. Transporter 1 Company Name: Horwith Trucking, Inc.
6. US EPA ID Number: PAD146714878

C. State Trans. ID-NJDEPE: S 0 7 1 1 0
Decal No.: 75224

7. Transporter 2 Company Name
8. US EPA ID Number

D. Transporter's Phone (215) 261-2220
E. State Trans. ID-NJDEPE
Decal No.-
F. Transporter's Phone ( )
G. State Facility's ID
H. Facility's Phone (419) 698-3500

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616

10. US EPA ID Number: OHD045243706

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	0 8 1	D T	Est. 44,000	P	D 0 0 8
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a. c.
b. d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are [illegible] and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government [illegible]

[illegible] Dominick Gasbarro Jr. Month Day Year 08 2 1 96

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: [illegible] Signature: [illegible] Month Day Year

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name Signature Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19
Printed/Typed Name Signature Month Day Year

NJA 2637709

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State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. N J D 0 0 3 0 1 7 8 2 0 0 0 | Manifest Document No. | 2. Page 1 of 1 | Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
1 Becton Drive / STAUL / ST. EAST RUTHERFORD NJ.
Franklin Lakes, NJ 07417-1880

4. Generator's Phone (201) 847-7175 07073

A. State Manifest Document Number NJA 2637710

B. State Generator's ID (Gen. Site Address)

5. Transporter 1 Company Name
Horvith Trucking, Inc.

6. US EPA ID Number P A D 1 4 5 P 1 4 8 7 8

C. State Trans. ID-NJDEPE 0 0 1 1 1 0
Decal No. 75248

7. Transporter 2 Company Name

8. US EPA ID Number

D. Transporter's Phone (219) 261-3220

E. State Trans. ID-NJDEPE
Decal No.

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616

10. US EPA ID Number O H D 0 4 8 4 7 9 0 6 6

F. Transporter's Phone ( )

G. State Facility's ID

H. Facility's Phone (419) 698-3500

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	X	001	DT	49000	P	D008
b.						
c.						
d.						

GENERATOR

J. Additional Descriptions for Materials Listed Above

K. Handling Codes for Wastes Listed Above

a. c.

b. d. a. c.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
BRC # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national governmental regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name

Signature Dominick Stanbarzog 08 21 96

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name Joseph Horvath
Signature
Month Day

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name
Signature
Month Day

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name
Signature
Month Day

EPA Form 8700-22 (Rev. 9-88) Previous editions are obsolete. SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES.

In case of an emergency or environmental release call the state hotline immediately and follow the instructions on page 2 of this manifest.

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: N J D 0 0 0 3 0 4 7 8 2 — Manifest Document No.: 00006
2. Page 1 of 1 — Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
~~1 Becton Drive~~ One Stanley St. East Rutherford NJ 07073
~~Franklin Lakes, NJ 07417-1880~~
4. Generator's Phone ( ) (201) 847-7175

A. State Manifest Document Number: NJA 2637711
B. State Generator's ID (Gen. Site Address):

5. Transporter 1 Company Name: Horwith Trucking, Inc.
6. US EPA ID Number: P A D 1 4 6 7 1 4 8 7 8
C. State Trans. ID-NJDEPE: S 0 7 1 1 0
Decal No.: 75354

7. Transporter 2 Company Name:
8. US EPA ID Number:
D. Transporter's Phone (215) 261-2220
E. State Trans. ID-NJDEPE:
Decal No.:

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number: O H D 0 4 5 2 4 3 7 0 6
F. Transporter's Phone ( )
G. State Facility's ID:
H. Facility's Phone (419) 698-3500

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	0 0 1	D T	Est. 44000	P	D 0 0 8
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
c.
d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government

[illegible]

Dominick Gasbarrow Jr. — Month Day Year 08 22 96

Acknowledgement of Receipt of Materials

George Szaczka — George Szaczka — Month Day Year 08 22 96

Acknowledgement of Receipt of Materials

Printed/Typed Name — Signature — Month Day Year

Indication Space

Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Typed Name — Signature — Month Day Year

NJA 2637711

SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

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UNIFORM HAZARDOUS WASTE MANIFEST

Generator's US EPA ID No. NJ 0 0 0 0 3 0 4 7 8 7 | Manifest Document No. 00012

2. Page 1 of ... | Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address: Becton Dickinson [illegible] 1 Becton Drive Franklin Lakes, NJ 07073 (201) 847-7175

A. State Manifest Document Number: NJA 2637712

B. State Generator's ID (Gen. Site Address)

4. Transporter 1 Company Name: Horwith Trucking,

6. US EPA ID Number: PAD 1 4 4 7 1 4 4 7 8

C. State Trans. ID-NJDEPE: 8 0 7 1 1 0 | Decal No. 75307

7. Transporter 2 Company Name

8. US EPA ID Number

D. Transporter's Phone (215) 261-2220

E. State Trans. ID-NJDEPE | Decal No.

9. Designated Facility Name and Site: Envirosafe Services, 876 Otter Creek Road, Oregon, OH 43616

10. US EPA ID Number: 0 8 0 0 4 5 2 4 8 7 6 6

F. Transporter's Phone ( )

G. State Facility's ID

H. Facility's Phone (419) 698-3500

11. US DOT Description (Including Proper Hazard Class or Division, ID Number)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	RQ, Hazardous Solid, N.O.S., (D008), Class 9, NA [illegible]	0 0 1	D T	Est. 44000	P	D 0 0 8
b.							
c.							
d.							

J. Additional Descriptions for Materials: a. c. b. d.

K. Handling Codes for Wastes Listed Above: a. c. b. d.

15. Special Handling Instructions and Additional Information

WSID # 18695-001
ERG # 171
24 Hour Phone # (20[illegible]

16. GENERATOR'S CERTIFICATION: I hereby certify that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have made to reduce the volume and toxicity of waste generated to the [illegible] to be economically practicable and [illegible] of treatment, storage, or disposal [illegible] available to me [illegible] and future [illegible] quantity generator, I have made a good faith effort to minimize [illegible] and select the [illegible] can afford.

Printed/Typed Name: Donald [illegible] | Signature: [illegible] | Month Day Year: 0 8 2 2 9 6

17. Transporter 1 Acknowledgement of Receipt

Printed/Typed Name: George V | Signature: [illegible] | Month Day Year: 0 8 2 2 9 6

18. Transporter 2 Acknowledgement of Receipt

Printed/Typed Name | Signature | Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name | Signature | Month Day Year

GENERATOR / TRANSPORTER / FACILITY

In case of an emergency or spill immediately call the state the emergency occurred in and the N.J. Dept. of Environmental Protection and Energy. (609) 292-7172

EPA Form 8700-22 (Rev. 9/88) Previous editions

SIGNATURE AND INFORMATION *MUST* BE LEGIBLE ON ALL COPIES

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

2 6 3 7 7 1 3

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: N J D 0 0 0 3 0 4 7 8 2 — Manifest Document No.: 00012
2. Page 1 of 1
Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
~~1 Becton Drive~~ One Stanley Street East Rutherford NJ 07073
~~[illegible] 07417-1880~~
4. Generator's Phone ( ) (201) 847-7175

A. State Manifest Document Number: NJA 2637713
B. State Generator's ID (Gen. Site Address)

5. Transporter 1 Company Name: Horwith Trucking, Inc.
6. US EPA ID Number: F A D 1 4 6 7 1 4 8 7 8
C. State Trans. ID-NJDEPE: S 0 7 1 1
Decal No.: 75153

7. Transporter 2 Company Name
8. US EPA ID Number
D. Transporter's Phone (215) 261-2220
E. State Trans. ID-NJDEPE
Decal No.
F. Transporter's Phone ( )

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number: O H D 0 4 5 2 4 3 7 0 6
G. State Facility's ID
H. Facility's Phone (419) 698-3500

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	0 0 1	D T	Est. 4/1000	P	D 0 0 8
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a. c.
b. d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national governmental [illegible]

[illegible] certify that I have a program in place to reduce the volume and toxicity of waste generated to the [illegible] [illegible] OR [illegible]

Printed/Typed Name: Dominick Gabarro — Signature: Dominick Gabarro — Month: 08 22 9

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: Jeff Weltman — Signature: Jeff Weltman — Month: 08 22 9

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name — Signature — Month

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19
Printed/Typed Name — Signature — Month

GENERATOR — TRANSPORTER — FACILITY

In case of an emergency or spill immediately call the state the emergency occurred in and the N.J. Dept. of Environmental Protection and Energy. (609) 292-7172

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete.

SIGNATURE AND INFORMATION *MUST* BE LEGIBLE ON ALL COPIES

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

2 6 3 7 7 1 4

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: NJD000304782 — Manifest Document No.: 00014 — 2. Page 1 of 1 — Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
~~[illegible] Drive~~ One Stanley Street East Rutherford NJ 07093
~~[illegible]~~ (201) 847-7175

A. State Manifest Document Number: NJA 2637714
B. State Generator's ID (Gen. Site Address)

4. Generator's Phone ( ) (201) 847-7175

5. Transporter 1 Company Name: Horwith Trucking, Inc.
6. US EPA ID Number: PAD1[illegible]
C. State Trans. ID-NJDEPE: [illegible]
Decal No.: 75154

7. Transporter 2 Company Name
8. US EPA ID Number
D. Transporter's Phone ( ) 215 261-2220
E. State Trans. ID-NJDEPE
Decal No.

9. Designated Facility Name and Site Address
Enviromafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number: OHD0[illegible]
F. Transporter's Phone ( )
G. State Facility's ID
H. Facility's Phone ( ) 419 698-3500

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt./Vol.	I. Waste No.
a.	X	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	001	DT	Est. 49000	P	D008
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a. c.
b. d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national governmen[illegible]

[illegible] that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined [illegible] selected the [illegible] of treatment storage, or disposal currently available [illegible] environment OR [illegible] quantity generator, I have made a good faith [illegible] can afford.

Printed/Typed Name: Dennis Gaskin — Signature: Dennis Gaskin — Month Day Year: 08 22 96

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: Timothy D. Boyle — Signature: [illegible] — Month Day Year: 08 22 96

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name — Signature — Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name — Signature — Month Day Year

SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

In case of an emergency or spill immediately call the state the emergency occurred in and the N.J. Dept. of Environmental Protection and Energy. (609) 292-7172

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

2 6 3 7 7 1 5

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Form Approved. OMB No. 2050-0039. Expires 9-30-96

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: NJD000304782 | Manifest Document No.: 00015 | Page 1 of 1

Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
~~[illegible]~~ 1 St. East Rutherford, NJ 07073
~~[illegible]~~
4. Generator's Phone (201) 847-7175

A. State Manifest Document Number: NJA 2637715
B. State Generator's ID (Gen. Site Address)

5. Transporter 1 Company Name: Horwith Trucking, Inc.
6. US EPA ID Number: PAD146714878
C. State Trans. ID-NJDEPE: 307110
Decal No.: 73275

7. Transporter 2 Company Name
8. US EPA ID Number
D. Transporter's Phone (215) 261-2220
E. State Trans. ID-NJDEPE
Decal No.

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number: OHD045243706
F. Transporter's Phone ( )
G. State Facility's ID
H. Facility's Phone (419) 698-3500

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	001	DT	Rot. 4900D	P	D008
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a. c.
b. d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government [illegible]

Printed/Typed Name: Dominick Gasbarro | Signature: Dominick Gasbarro | Month Day Year: 08 22 96

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: GM Barnack | Signature: GM Barnack | Month Day Year: 08 22 96

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name | Signature | Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator Certification of receipt of hazardous materials covered by this manifest except as noted in item 19.
Printed/Typed Name | Signature | Month Day Year

In case of an emergency or spill immediately call the state the emergency [illegible] N.J. [illegible] of Environmental P[illegible] [illegible] 2-717

EPA Form 8700-22 Rev. 9/88) Previous editions are obsolete

SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

2 6 3 7 7 1 6

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: NJD000304782 — Manifest Document No.: 000016
2. Page 1 of 1 — Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
~~[illegible]~~ One Stanley St. East Rutherford, NJ 07073
~~[illegible]~~
4. Generator's Phone: (201) 847-7175

A. State Manifest Document Number: NJA 2637716
B. State Generator's ID (Gen. Site Address)
C. State Trans. ID-NJDEPE: 507110
Decal No.: 75850
D. Transporter's Phone: 215 261-2220
E. State Trans. ID-NJDEPE:
Decal No.:
F. Transporter's Phone:
G. State Facility's ID:
H. Facility's Phone: 419 698-3550

5. Transporter 1 Company Name: Horwith Trucking, Inc.
6. US EPA ID Number: PAD1A6P1A8P8

7. Transporter 2 Company Name:
8. US EPA ID Number:

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number: OHD0A5149706

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	001	DT	49000	P	D008
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a. c.
b. d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government [illegible]

[illegible] quantity generator, I [illegible] that I have a [illegible] in place [illegible] reduce [illegible] quantity [illegible] can afford.

Printed/Typed Name: Domenick Gasbarro — Signature: [illegible] — Month Day Year: 08 22 96

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: Jean J. Fox — Signature: [signature] — Month Day Year: 08 22 96

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name: — Signature: — Month Day Year:

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: — Signature: — Month Day Year:

GENERATOR — TRANSPORTER — FACILITY

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State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: NJD000304782 — Manifest Document No.: [illegible]
2. Page 1 of 1
Information in the shaded areas is not required by Federal law.

A. State Manifest Document Number: NJA 2637717
B. State Generator's ID (Gen. Site Address):
C. State Trans. ID-NJDEPE: 807110
Decal No.: 75225
D. Transporter's Phone (215) 261-2220
E. State Trans. ID-NJDEPE:
Decal No.:
F. Transporter's Phone ( )
G. State Facility's ID:
H. Facility's Phone (419) 698-3500

3. Generator's Name and Mailing Address
Becton Dickinson & Company
~~1 Becton Drive~~ One Stanley Street
~~[illegible]~~ Fort Rutherford, NJ 07073
4. Generator's Phone ( ) (201) 847-7175

5. Transporter 1 Company Name: Horwith Trucking, Inc.
6. US EPA ID Number: PAD146714678

7. Transporter 2 Company Name:
8. US EPA ID Number:

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number: OHD045243706

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	001	DT	Est. 44000	P	D008
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a. c.
b. d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government [illegible]

[illegible] Month Day Year

17. Transporter Acknowledgment of Receipt of Materials
Printed Name: ROBERT J. McCLAFFERTY Robert J. McClafferty Month Day Year 08 22 96

18. Transporter Acknowledgment of Receipt of Materials
Printed Name: Signature: Month Day Year

19. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed Name: Signature: Month Day Year

EPA [illegible] Previous editions are obsolete

SIGNATURE AND INFORMATION *MUST* BE LEGIBLE ON ALL COPIES

In case of an emergency or spill immediately call the state the emergency [illegible]

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. N J D 0 8 0 3 0 5 7 8 2 Manifest Document No. 000118
2. Page 1 of 1 — Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
One Steuart Street East Rutherford NJ
4. Generator's Phone (201) 847-7175 07073

A. State Manifest Document Number NJA 2687718
B. State Generator's ID (Gen. Site Address)

5. Transporter 1 Company Name — 6. US EPA ID Number
Horwith Trucking, Inc. P A D 1 4 8 7 1 8 8 8 8
C. State Trans.ID-NJDEPE 8 0 7 1 1 1 0 — Decal No. 1 3 5 9 9

7. Transporter 2 Company Name — 8. US EPA ID Number
D. Transporter's Phone (215) 261-2220
E. State Trans.ID-NJDEPE — Decal No.

9. Designated Facility Name and Site Address — 10. US EPA ID Number
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
F. Transporter's Phone ( )
G. State Facility's ID
H. Facility's Phone (419) 698-3500

	11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group) HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
GENERATOR	a.	X RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	0 0 1	P	49000	P	D 0 0 8
	b.						
	c.						
	d.						

J. Additional Descriptions for Materials Listed Above
a. c.
b. d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
NJID # 18693-001
NBC # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national governmental regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: Donald F. Gaudio — Signature — Month Day Year: 09 12 96

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name — Signature — Month Day Year

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name — Signature — Month Day Year

19. Discrepancy Indication Space

FACILITY

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name — Signature — Month Day Year

EPA Form 8700-22 Rev. 9-88 Previous editions are obsolete. SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

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UNIFORM HAZARDOUS WASTE MANIFEST	1. Generator's US EPA ID No. / Manifest Document No.	2. Page 1 of	Information in the shaded areas is not required by Federal law.
	N J D 0 0 3 0 4 7 8 2 0	1	

3. Generator's Name and Mailing Address
Becton Dickinson & Company
1 Becton Drive
Franklin Lakes, NJ 07417-1880

4. Generator's Phone (201) 847-7175

A. State Manifest Document Number: NJA 2837720
B. State Generator's ID (Gen Site Address):

5. Transporter 1 Company Name: Forwith Trucking, Inc.
6. US EPA ID Number: P A D 1 4 8 7 1 4 8 8 8
C. State Trans. ID-NJDEPE: 1 0 7 1 1 0
Decal No.: 1 3 5 7 7 8

7. Transporter 2 Company Name
8. US EPA ID Number
D. Transporter's Phone (1 3) 2 6 1 - 2 2 3 0
E. State Trans. ID-NJDEPE
Decal No.

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number: O H D 0 4 8 4 8 9 6 4 6
F. Transporter's Phone ( )
G. State Facility's ID
H. Facility's Phone (4 1 9) 6 9 8 - 3 5 0 0

	11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
GENERATOR a.	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	X	0 0 1	DT	0 0 1 0	P	D 0 0 8
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a. c.
b. d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

Special Handling Instructions and Additional Information
SEID # 18095-001
REG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national governmental regulations. If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name
Signature
Month Day Year

TRANSPORTER
17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name
Signature
Month Day Year

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name
Signature
Month Day Year

FACILITY
19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name
Signature
Month Day Year

EPA Form 8700-22 Rev. 3-89 (Please print or type. Form designed for use on elite (12-pitch) typewriter.) SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

In case of an emergency or spill immediately call the state emergency occurrence and the Department's hotline

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

2 6 3 7 7 2 1

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. NJD000304782 Manifest Document No. 00021
2. Page 1 of 1
Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
~~1 Becton Drive~~
~~Franklin Lakes, NJ 07417-1880~~
One Stanley Street
E. Rutherford NJ 07073
4. Generator's Phone (201) 847-7175

A. State Manifest Document Number NJA 2637721
B. State Generator's ID (Gen. Site Address)

5. Transporter 1 Company Name: Norwith Trucking, Inc.
6. US EPA ID Number: PAD146714878
C. State Trans. ID-NJDEPE: S07110
Decal No.: 75392

7. Transporter 2 Company Name
8. US EPA ID Number
D. Transporter's Phone (215) 261-2220
E. State Trans. ID-NJDEPE
Decal No.
F. Transporter's Phone ( )
G. State Facility's ID
H. Facility's Phone (419) 698-3500

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number: OHD045243706

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	001	DT	Est.	P	D008
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a. c.
b. d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government [illegible]

[illegible] quantity generator, I certify that I have a [illegible] reduce the volume and toxicity of waste generated to the degree [illegible] to be economically practicable and that I have selected the [illegible] of treatment storage [illegible] and future threat to human health and the environment. [illegible] quantity generator [illegible] the best waste management method that is [illegible]

Printed Typed Name: [illegible] Signature: [illegible] Month Day Year

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed Typed Name: JERRY L. ANDREWS Signature: [illegible] Month Day Year: 08 23 96

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed Typed Name Signature Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in item 19.
Printed Typed Name Signature Month Day Year

GENERATOR / TRANSPORTER / FACILITY

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete

SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. N J D 0 0 0 3 0 6 7 2 3 5 | Manifest Document No. 212 | 2. Page 1 of 1 | Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
1 Becton Drive
Franklin Lakes, NJ 07417-1880

4. Generator's Phone (201) 847-7175

5. Transporter 1 Company Name: Horvath Trucking, Inc.
6. US EPA ID Number: P A D 1 4 8 7 6 4 8 8

7. Transporter 2 Company Name
8. US EPA ID Number

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number: O H D 0 4 8 4 0 7 0 6

A. State Manifest Document Number: NJA 2617722
B. State Generator's ID: [illegible]
C. State Trans. ID-NJDEP: [illegible] Decal No. 75163
D. Transporter's Phone ( ) 261-2220
E. State Trans. ID-NJDEP: Decal No.
F. Transporter's Phone ( )
G. State Facility's ID
H. Facility's Phone (419) 698-3300

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	L Waste No.
a. RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	X	0 0 1	DM	00010	P	D 0 0 8
b.						
c.						
d.						

J. Additional Descriptions for Materials Listed Above
a. c.
b. d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
WSID # 18693-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: [illegible] Signature: [illegible] Month 8 Day 12 Year

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: [illegible] Signature: [illegible] Month Day Year

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name Signature Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name Signature Month Day Year

EPA Form 8700-22 (Rev. 9-88) Previous editions are obsolete

SIGNATURE AND INFORMATION *MUST* BE LEGIBLE ON ALL COPIES

In case of an emergency or spill immediately call the state the emergency occurred in and the N.J. Dept. of Environmental Protection and Energy. (609) 292-7172

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

2 6 3 7 7 2 3

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. NJD000304782 Manifest Document No. 00043
2. Page 1 of 1
Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
1 Becton Drive
Franklin Lakes, NJ 07417-1880
4. Generator's Phone (201) 847-7175

A. State Manifest Document Number NJA 2637723
B. State Generator's ID (Gen. Site Address)

5. Transporter 1 Company Name: Horwith Trucking, Inc.
6. US EPA ID Number: PAD146714878
C. State Trans. ID-NJDEPE: 807110
Decal No.: XA 61DD

7. Transporter 2 Company Name
8. US EPA ID Number
D. Transporter's Phone (215) 261-2220
E. State Trans. ID-NJDEPE
Decal No.

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number: OHD045243706
F. Transporter's Phone ( )
G. State Facility's ID
H. Facility's Phone (419) 698-3500

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	001	DT	Est. 1000	P	D008
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
c.
L.
d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government

Month Day Year

17. Transporter's Acknowledgement of Receipt of Materials
Name: [illegible]
Signature: [illegible]
Month Day Year

18. Transporter's Acknowledgement of Receipt of Materials
Printed/Typed Name
Signature
Month Day Year

19. Special Handling Location Space

20. Receipt Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name
Signature
Month Day Year

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete

SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. | Manifest Document No. | 2. Page 1 of 1 | Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
1 Becton Drive
Franklin Lakes, NJ 07417-1880

4. Generator's Phone (201) 847-7175

A. State Manifest Document Number: NJA 2637724

B. State Generator's ID (Gen Site Address)

5. Transporter 1 Company Name: Horwith Trucking, Inc.

6. US EPA ID Number: F A D 1 4 8 7 1 6 6 1 6

C. State Trans. ID-NJDEPE: 8 0 7 1 1 1 0
Decal No.: 7 5 2 9 1

7. Transporter 2 Company Name

8. US EPA ID Number

D. Transporter's Phone (215) 261-2120

E. State Trans. ID-NJDEPE

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616

10. US EPA ID Number: O H D 0 4 5 6 4 6 6 0 6

Decal No.

F. Transporter's Phone ( )

G. State Facility's ID

H. Facility's Phone (419) 698-3500

	11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	Waste No.
GENERATOR a.	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	X	0 0 1	D P	0 0 0 1 0	P	N 0 0 1
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above

a. | c.

b. | d.

K. Handling Codes for Wastes Listed Above

a. | c.

b. | d.

15. Special Handling Instructions and Additional Information

WSID # 18095-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national governmental regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: T J C | Signature: Donna Grabek/tjm | Month Day Year: 08 23 96

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name: Ronald Stanitz | Signature | Month Day Year

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name | Signature | Month Day Year

19. Discrepancy Indication Space

FACILITY

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19

Printed/Typed Name | Signature | Month Day Year

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete

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State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: NJD000304782 — Manifest Document No.: 925 — 2. Page 1 of 1 — Information in the shaded area is not required by Federal law.

3. Generator's Name and Mailing Address:
Becton Dickinson & Company
1 Becton Drive
Franklin Lakes, NJ 07417-1880

4. Generator's Phone: (201) 847-7175

A. State Manifest Document Number: NJA 2637725
B. State Generator's ID (Gen. Site Address):

5. Transporter 1 Company Name: Norwith Trucking, Inc.
6. US EPA ID Number: PAD146716878
C. State Trans. ID-NJDEPE: 8 0 7
Decal No.:

7. Transporter 2 Company Name:
8. US EPA ID Number:
D. Transporter's Phone: (215) 261-222
E. State Trans. ID-NJDEPE:
Decal No.:

9. Designated Facility Name and Site Address:
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number: OHD045248706
F. Transporter's Phone:
G. State Facility's ID:
H. Facility's Phone: (419) 698-2500

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	001	DT	Est.	P	D0
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a. c.
b. d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and classified, packed, marked and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national govern

[illegible]

Printed/Typed Name: [illegible] — Signature: Domenick Gaffaro/[illegible] — Month Day: 08 23

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: Robert Kester — Signature: [illegible] — Month Day: 08 23

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name: — Signature: — Month Day:

19. Discrepancy Indication Space

20. Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: — Signature: — Month Day:

In case of an emergency or spill immediately call the state the emergency occurred in and the N.J. Dept. of Environmental Protection and Energy. (609) 292-7172

EPA Form 8700-22 (Rev. 9-88) Previous editions are obsolete. SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

2 6 3 7 7 2 6

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. NJD000304782 — Manifest Document No. 0026
2. Page 1 of 1 — Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
1 Becton Drive
Franklin Lakes, NJ 07417-1880

4. Generator's Phone (201) 847-7175

A. State Manifest Document Number NJA 2637726
B. State Generator's ID (Gen. Site Address)

5. Transporter 1 Company Name: Horwith Trucking, Inc.
6. US EPA ID Number: PAD146718878
C. State Trans. ID-NJDEPE: 807110
Decal No.: 75384

7. Transporter 2 Company Name
8. US EPA ID Number
D. Transporter's Phone (215) 261-2220
E. State Trans. ID-NJDEPE
Decal No.

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number: OHD045243706
F. Transporter's Phone ( )
G. State Facility's ID
H. Facility's Phone (419) 698-3500

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	001	DT	49000	P	D008
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a. c.
b. d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government [illegible]

Printed/Typed Name: [illegible] — Dominick Gasbers /jm — Month Day Year: 08 23 96

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: JEFFREY WEILER — Month Day Year: 08 23 96

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name — Signature — Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name — Signature — Month Day Year

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State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

2637227

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. N J D 0 0 3 0 4 7 8 2 | Manifest Document No. 12027 | 2. Page 1 of 1 | Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
1 Becton Drive
Franklin Lakes, NJ 07417-1880

4. Generator's Phone (201) 847-7175

A. State Manifest Document Number NJA 2637227

B. State Generator's ID (Gen. Site Address)

C. State Trans. ID-NJDEPE 807110
Decal No. 75229

5. Transporter 1 Company Name: Horwith Trucking, Inc.
6. US EPA ID Number: P A D 1 4 6 7 1 4 8 7 8

D. Transporter's Phone (215) 261-2220

7. Transporter 2 Company Name
8. US EPA ID Number

E. State Trans. ID-NJDEPE
Decal No.

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number: O H D 0 4 5 8 4 8 7 0 6

F. Transporter's Phone ( )

G. State Facility's ID

H. Facility's Phone (419) 698-3500

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	X	0 0 1	DT	Est.	P	D 0 0 8
b.						
c.						
d.						

GENERATOR

J. Additional Descriptions for Materials Listed Above
a.
b.
c.
d.

K. Handling Codes for Wastes Listed Above
a.
c.
b.
d.

15. Special Handling Instructions and Additional Information
WASTE # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national governmental regulations.

Printed/Typed Name
Signature: Dominick Gasbarro/jm
Month Day Year: 08 23 96

17. Transportation Agreement of Receipt of Materials

TRANSPORTER

Printed/Typed Name: Peter Whitman III
Signature
Month Day Year

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name
Signature
Month Day

19. Discrepancy Indication Space

FACILITY

20. Facility Owner or Operator Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name
Signature
Month Day

EPA Form 8700-22 (Rev. 3-88). Previous editions are obsolete.

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State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

2 6 3 7 7 2 8

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: M J D 0 0 0 3 0 4 7 8 2 — Manifest Document No.: 0 0 0 2 8
2. Page 1 of 1
Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
1 Becton Drive
Franklin Lakes, NJ 07417-1880
4. Generator's Phone (201) 847-7175

A. State Manifest Document Number: NJA 2637728
B. State Generator's ID (Gen. Site Address)

5. Transporter 1 Company Name: Horwith Trucking, Inc.
6. US EPA ID Number: P A D 1 4 5 7 1 4 8 7 8
C. State Trans. ID-NJDEPE: 5 0 7 1 1 0
Decal No.: 76000
7. Transporter 2 Company Name
8. US EPA ID Number
D. Transporter's Phone (215) 261-2220
E. State Trans. ID-NJDEPE
Decal No.
9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number: O H D 0 4 5 2 4 8 7 9 6
F. Transporter's Phone ( )
G. State Facility's ID
H. Facility's Phone (419) 693-3500

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt./Vol	I. Waste No.
a.	X	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	0 0 1	1	2st.	P	D 0 0 8
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a. c.
b. d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name, [illegible] classified, packed, marked and [illegible] in all respects [illegible] for transport by highway according to applicable international and [illegible]

Dominick Gasbera /jm 082396

17. Transporter 1 Acknowledgment of Receipt of Materials
Michael C. Sherer — Michael C. Sherer 082396

18. Transporter 2 Acknowledgment of Receipt of Materials
Printed/Typed Name — Signature — Month Day

19. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19
Printed/Typed Name — Signature — Month Day

SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

NJA 2637728

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

2 6 3 7 7 2 9

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. NJD000304782 Manifest Document No. 00029
2. Page 1 of 1

Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
~~1 Becton Drive~~
~~Franklin Lakes, NJ 07417-1880~~
Doc Stony Sites
E. R. [illegible]
4. Generator's Phone ( ) (201) 847-7175

A. State Manifest Document Number NJA 2637729
B. State Generator's ID-(Gen. Site Address)

5. Transporter 1 Company Name: Norwich Trucking, Inc.
6. US EPA ID Number: PAD146714878
C. State Trans. ID-NJDEPE: S07110
Decal No.- 75179
7. Transporter 2 Company Name
8. US EPA ID Number
D. Transporter's Phone (215) 261-2220
E. State Trans. ID-NJDEPE
Decal No.-
9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number: OHD045243706
F. Transporter's Phone ( )
G. State Facility's ID
H. Facility's Phone (419) 698-3500

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	001	DT	Est.	P	D008
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a. c.
b. d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government [illegible]

[illegible] generator, I certify that I have a [illegible] I have selected the pr[illegible] [illegible] to human health and the environment, OR [illegible] [illegible] waste management method that is available [illegible]

Printed/Typed Name: [illegible] Signature: Dominick Gasbarro/Jm

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: Thomas Bender Signature: [illegible] Month Day Year

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name Signature Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19
Printed/Typed Name Signature Month Day Year

GENERATOR / TRANSPORTER / FACILITY

In case of an emergency or spill immediately call the state the emergency occurred in and the N.J. Dept. of Environmental Protection and Energy (609) [illegible]

EPA Form 8700-22 Rev. 9/88 Previous editions are obsolete

SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

2 6 3 7 7 3 0

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

Please type or print in block letters. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039. Expires 9-30-96

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: NJD000304782 — Manifest Document No.: 00030
2. Page 1 of 1 — Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address: ~~Becton Dickinson & Company~~ Becton Dickinson Company, One Stanley Street, E. Rutherford NJ 07073
~~1 Becton Drive~~
~~Franklin Lakes, NJ 07417-1880~~

4. Generator's Phone: (201) 847-7175

A. State Manifest Document Number: NJA 2637730
B. State Generator's ID (Gen/Site Address):

5. Transporter 1 Company Name: Horwith Trucking, Inc.
6. US EPA ID Number: PAD146714878
C. State Trans. ID-NJDEPE: 807110
Decal No.: 38412

7. Transporter 2 Company Name:
8. US EPA ID Number:
D. Transporter's Phone: (215) 261-2220
E. State Trans. ID-NJDEPE:
Decal No.:

9. Designated Facility Name and Site Address: Envirosafe Services of Ohio, 876 Otter Creek Road, Oregon, OH 43616
10. US EPA ID Number: OHD045243786
F. Transporter's Phone:
G. State Facility's ID:
H. Facility's Phone: (419) 698-3500

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	001	T	Est.	P	D008

J. Additional Descriptions for Materials Listed Above: a. c. d.

K. Handling Codes for Wastes Listed Above: a. c. b. d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government

Donald Gaberr/JM — Month Day Year: 08 2 1996

Tom Whitby — Month Day Year: 8 2 1996

17. Transporter's Acknowledgement of Receipt of Materials
Tom Typed Name — Signature — Month Day Year

18. Transporter's Indication Space

19. Facility Owner or Operator Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19
Typed Name — Signature — Month Day Year

NJA 2637730

SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

2637731

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. NJD003047820 Manifest Document No. 05351
2. Page 1 of 1
Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
1 Becton Drive
Franklin Lakes, NJ 07417-1880
4. Generator's Phone (201) 847-7175

A. State Manifest Document Number NJA 2637731
B. State Generator's ID (Gen. Site Address)

5. Transporter 1 Company Name
Herwick Trucking, Inc.
6. US EPA ID Number PAD164671688
C. State Trans. ID-NJDEPE 807110
Decal No. 32147

7. Transporter 2 Company Name
8. US EPA ID Number
D. Transporter's Phone (215) 261-2220
E. State Trans. ID-NJDEPE
Decal No.

9. Designated Facility Name and Site Address
Environafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number OHD064648796
F. Transporter's Phone ( )
G. State Facility's ID
H. Facility's Phone (419) 698-3500

	11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I Waste No.
GENERATOR a.	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	X	001	DF	440	P	D008
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a.
b.
c.
d.

K. Handling Codes for Wastes Listed Above
a.
b.
c.
d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked and labeled and are in all respects in proper condition for transport by highway according to applicable international and national governmental regulations.

Printed/Typed Name Dominick Gastaldo Signature /jm Month Day Year 08 23 96

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name Gene McClafferty Signature Gene McClafferty

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name Signature

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19
Printed/Typed Name Signature Month Day Year

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In case of an emergency or spill immediately call the state the emergency occurred in and the nearest police, fire department or environmental agency (ies).

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

2 6 3 7 7 3 8 2

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. | Manifest Document No. | 2. Page 1 of 1 | Information in the shaded areas is not required by Federal law.

N J D 0 0 3 0 4 7 8 2 0 | 0 0 3 8

3. Generator's Name and Mailing Address
Becton Dickinson & Company
1 Becton Drive
Franklin Lakes, NJ 07417-1880

4. Generator's Phone (201) 847-7175

A. State Manifest Document Number NJA 2637738
B. State Generator's ID (Gen. Site Address)

5. Transporter 1 Company Name | 6. US EPA ID Number
Horwith Trucking, Inc. | P A D 1 4 8 7 1 4 8 7

C. State Trans. ID-NJDEPE 0 0 7 1 1 1 0
Decal No. 7 9 8 5 7

7. Transporter 2 Company Name | 8. US EPA ID Number

D. Transporter's Phone (215) 261-2220
E. State Trans. ID-NJDEPE

9. Designated Facility Name and Site Address
Envirocafe Services of Ohio
676 Otter Creek Road
Oregon, OH 43616

10. US EPA ID Number
O H D 0 4 5 2 6 5 7 0 6

Decal No.
F. Transporter's Phone ( )
G. State Facility's ID
H. Facility's Phone (419) 698-3500

	11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt./Vol.	Waste No.
a.	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	X	0 0 1	D F	0 0 0 1	P	D 0 0 8
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above

K. Handling Codes for Wastes Listed Above

a. | c. | a. | c.
b. | d. | b. | d.

15. Special Handling Instructions and Additional Information

WSID # 18695--001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: D Mulick | Signature: Dennis Gaboccia | Month Day Year: 08 23 96

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name | Signature | Month Day Year

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name | Signature | Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19

Printed/Typed Name | Signature | Month Day Year

EPA Form 8700-22 (Rev. 3-88) Previous editions are obsolete. SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

2 6 3 7 7 3 3

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. NJD000304782 Manifest Document No. 000553
2. Page 1 of 1
Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
1 Becton Drive
Franklin Lakes, NJ 07417-1880
4. Generator's Phone (201) 847-7175

A. State Manifest Document Number NJA 2637733
B. State Generator's ID (Gen. Site Address) 32171

5. Transporter 1 Company Name: Horwith Trucking, Inc.
6. US EPA ID Number: PAD146714878
C. State Trans. ID-NJDEPE: 807110
Decal No.: 321881

7. Transporter 2 Company Name
8. US EPA ID Number
D. Transporter's Phone (215) 261-2220
E. State Trans. ID-NJDEPE
Decal No.
F. Transporter's Phone ( )
G. State Facility's ID
H. Facility's Phone (419) 698-3500

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number: ORD045263706

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	001	DT	Est. 7000	P	D008
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a. c.
b. d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
WSIS # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government [illegible] that I have a [illegible] reduce the volume and toxicity of waste generated to the degree [illegible] storage, or disposal [illegible] the environment OR [illegible] quantity generator, I have made a good faith effort to minimize [illegible] method that is available [illegible]

Printed/Typed Name: [illegible] Signature: Dominick Gasbarro Month Day Year: 06 25 96

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: [illegible] Signature: [illegible] Month Day Year: 06 25 96

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name Signature Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name Signature Month Day Year

EPA Form [illegible] Rev. [illegible] Previous editions are obsolete

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In case of an emergency or spill immediately call the state the emergency occurred in and the Nat. Dept. of Environmental Protection and Energy (609) [illegible]

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

2 6 3 7 7 3 4

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. N J D 0 0 0 3 0 4 7 8 2 | Manifest Document No. 06035 | 2. Page 1 of 1 | Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
1 Becton Drive
Franklin Lakes, NJ 07417-1880
4. Generator's Phone (201) 847-7175

A. State Manifest Document Number NJA 2637734
B. State Generator's ID (Generator Address)
C. State Trans. ID-NJDEPE 8 0 7 1 1 0
Decal No. 1772360

5. Transporter 1 Company Name: Horwith Trucking, Inc.
6. US EPA ID Number: P A D 1 4 6 7 1 6 8 7 8
D. Transporter's Phone (215) 261-2220
E. State Trans. ID-NJDEPE
Decal No.

7. Transporter 2 Company Name
8. US EPA ID Number
F. Transporter's Phone ( )
G. State Facility's ID

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number: O H D 0 4 5 7 4 7 0 0 6
H. Facility's Phone (419) 698-3500

	11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	X	001	T	4000	P	D008
b.							
c.							
d.							

GENERATOR

J. Additional Descriptions for Materials Listed Above
a. c.
b. d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
WSID # 16695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government

Printed/Typed Name: Domenick Gasbarro
Signature: Domenick Gasbarro /jm
Month Day Year: 08 26 96

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name
Signature
Month Day Year

TRANSPORTER

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name
Signature
Month Day Year

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19
Printed/Typed Name
Signature
Month Day Year

NJA 2637734

EPA Form [illegible] Rev. 9-93 Previous editions are obsolete

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State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

2 6 3 7 2 3 5

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. N J D 0 0 0 3 0 4 7 8 2 Manifest Document No. 000035
2. Page 1 of 1. Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
~~1 Becton Drive~~
~~Franklin Lakes, NJ 07417-1880~~
One Stanley Street
E Rutherford NJ 07073
4. Generator's Phone ( ) (201) 847-7179

A. State Manifest Document Number NJA 263735
B. State Generator's ID
C. State Trans. ID NJDEPE 807111
Decal No. 75799
D. Transporter's Phone (215) 261-2220
E. State Trans. ID NJDEPE
Decal No.
F. Transporter's Phone ( )
G. State Facility's ID
H. Facility's Phone (419) 698-2500

5. Transporter 1 Company Name: Horvath Trucking, Inc.
6. US EPA ID Number: P A D 1 4 6 7 1 4 8 7 6

7. Transporter 2 Company Name
8. US EPA ID Number

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number: O H D 0 4 5 2 4 3 7 0 6

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM	12. Containers No.	12. Containers Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	X	001	DT	44000	P	D008
b.						
c.						
d.						

J. Additional Descriptions for Materials Listed Above
a.
b.
c.
d.

K. Handling Codes for Wastes Listed Above
a.
b.
c.
d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and ar classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national governmer regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determine to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the presc to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generati and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: Domenick Gasbarro
Signature: Domenick Gasbarro/jrm
Month Day Ye: 08 26 9

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: Craig Doyle
Signature
Month Day Ye: 08 26 9

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name
Signature
Month Day Ye

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name
Signature
Month Day Ye

In case of an emergency or spill immediately call the state the emergency occurred in and the N.J. Dept. of Environmental Protection and Energy. (609) 292-7172

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete

SIGNATURE AND INFORMATION *MUST* BE LEGIBLE ON ALL COPIES

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

2 6 3 7 7 3 6

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. N J D 0 0 0 3 0 4 7 8 2 — Manifest Document No. 000036
2. Page 1 of 1 — Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
~~1 Becton Drive~~
~~Franklin Lakes, NJ 07417-1880~~
One Stanley Street
E. Rutherford NJ 07073
(201) 847-7175

4. Generator's Phone

A. State Manifest Document Number: NJA 2637736
B. State Generator's ID (Gen. Site Address)

5. Transporter 1 Company Name: Horwith Trucking, Inc.
6. US EPA ID Number: P A D 1 4 6 7 1 4 8 7 8
C. State Trans. ID-NJDEPE: 8 0 7 1 1 9 — Decal No.: 75307

7. Transporter 2 Company Name
8. US EPA ID Number
D. Transporter's Phone ( )
E. State Trans. ID-NJDEPE: 215 261-2220 — Decal No.:

9. Designated Facility Name and Site Address
Enviroscife Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number: O H D 0 4 5 1 6 3 7 0 6
F. Transporter's Phone ( )
G. State Facility's ID
H. Facility's Phone ( ) 419 698-3500

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	0 0 1	n r	44000	P	P 0 0 8
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a. c.
b. d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
WEID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are [illegible] respects in proper condition for transport by highway according to applicable international and national government [illegible]

Domenick Gasbarro — Domenick Gasbarro — 0 8 2 6 9 6

[illegible] — [illegible] — 0 8 2 6 9 6

Transporter Acknowledgement of Receipt of Materials
Signature — Month Day Year

Transporter Signature

Operator's Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Signature — Month Day Year

SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

2 6 3 7 7 3 7

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. N J D 0 0 3 0 4 7 8 1 0 0 0 3 7 — Manifest Document No.
2. Page 1 of 1
Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
1 Becton Drive
Franklin Lakes, NJ 07417-1880
4. Generator's Phone ( ) (201) 847-7175

A. State Manifest Document Number NJA 2637737
B. State Generator's ID-(Gen. Site Address)

5. Transporter 1 Company Name: Horwith Trucking, Inc.
6. US EPA ID Number: P A D 1 4 6 7 1 4 8 7 8
C. State Trans. ID-NJDEPE: S 0 7 1 1 0
Decal No.: 32201

7. Transporter 2 Company Name
8. US EPA ID Number
D. Transporter's Phone (215) 261-2220
E. State Trans ID-NJDEPE
Decal No.

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number: O H D 0 4 8 4 4 3 7 0 6
F. Transporter's Phone ( )
G. State Facility's ID
H. Facility's Phone (419) 698-3500

	11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	X	001	DT	4900	P	D008
b.							
c.							
d.							

GENERATOR

J. Additional Descriptions for Materials Listed Above
K. Handling Codes for Wastes Listed Above

a. c.
b. d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by [illegible]

Printed/Typed Name: Dominick Grasbarro
Signature: Dominick Grasbarro
Month Day Year: 08.26.96

17. Transporter 1 Acknowledgment of Receipt of Materials
Printed/Typed Name
Signature
Month Day Year

TRANSPORT

18. Transporter 2 Acknowledgment of Receipt of Materials
Printed/Typed Name
Signature
Month Day Year

19. Discrepancy Indication Space

FACILITY

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name
Signature
Month Day Year

NJA 2637737

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State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

2 6 3 7 7 3 8

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. NJ 0 0 0 3 0 4 7 8 2 — Manifest Document No. 000038

2. Page 1 of 1 — Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
1 Becton Drive
Franklin Lakes, NJ 07417-1880
One Stanley Street
E. Rutherford NJ 07073
(201) 847-7175

4. Generator's Phone

A. State Manifest Document Number NJA 2637738

B. State Generator's ID (Gen. Site Address)

5. Transporter 1 Company Name: Horwith Trucking, Inc.

6. US EPA ID Number: PAD146714878

C. State Trans. ID-NJDEPE: 807110

Decal No.: 75162

7. Transporter 2 Company Name

8. US EPA ID Number

D. Transporter's Phone (215) 261-3220

E. State Trans. ID-NJDEPE

Decal No.

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616

10. US EPA ID Number: OHD045245706

F. Transporter's Phone ( )

G. State Facility's ID

H. Facility's Phone (419) 698-3500

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	Waste No.
a.	X	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	001	DT	44000	P	D008
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above

a. c.

b. d.

K. Handling Codes for Wastes Listed Above

a. c.

b. d.

15. Special Handling Instructions and Additional Information

WSID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and [illegible]

[illegible] certify that I have a program in place to reduce the volume and toxicity of waste generated to the [illegible] storage or disposal [illegible] generator [illegible]

Domenick Gasbarro — Domenick Gasbarro /jm — 082696

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name: [illegible] — Signature: [illegible] — 082696

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name — Signature

19. Discrepancy Indication Space

20. Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name — Signature — Month Day

SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

2 6 3 7 7 3 9

Please type or print in block letters. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039. Expires 9-30-96

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. NJD000304782 Manifest Document No. 000039
2. Page 1 of 1
Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
1 Becton Drive
Franklin Lakes, NJ 07417-1880
One Stanley Street
E. Rutherford NJ 07073
4. Generator's Phone ( ) (201) 847-7175

A. State Manifest Document Number NJA 2637739
B. State Generator's ID (Gen. Site Address)

5. Transporter 1 Company Name: Horwith Trucking, Inc.
6. US EPA ID Number: PAD146714878
C. State Trans. ID-NJDEPE: 807110
Decal No.: 75008
D. Transporter's Phone (215) 261-2220

7. Transporter 2 Company Name
8. US EPA ID Number
E. State Trans. ID-NJDEPE
Decal No.
F. Transporter's Phone ( )

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
870 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number: OHD045243706
G. State Facility's ID
H. Facility's Phone (419) 698-3500

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	001	DT	44000	P	DC08
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a. c.
b. d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government [illegible]

[illegible] I can afford.

Printed/Typed Name: Domenick Gasbarro
Signature: Domenick Gasbarro / [illegible]
Month Day Year: 08 26 96

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: [illegible]
Signature: [illegible]
Month Day Year: 08 [illegible] 96

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name
Signature
Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19
Printed/Typed Name
Signature
Month Day Year

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete.

SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

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Please type or print in block letters. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039. Expires 9-30-96

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: NJD000304782 Manifest Document No.: 00040
2. Page 1 of 1
Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
1 Becton Drive
Franklin Lakes, NJ 07417-1880
4. Generator's Phone (201) 847-7175

A. State Manifest Document Number: NJA 2637740
B. State Generator's ID-(Gen. Site Address)

5. Transporter 1 Company Name: Horwith Trucking, Inc.
6. US EPA ID Number: PAD146714878
C. State Trans. ID-NJDEPE: 807110
Decal No.: 75300
D. Transporter's Phone (215) 261-2220
E. State Trans. ID-NJDEPE
Decal No.:
F. Transporter's Phone ( )
G. State Facility's ID
H. Facility's Phone (419) 698-3500

7. Transporter 2 Company Name
8. US EPA ID Number

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number: OHD045248706

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	001	DT	44000	P	D008
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a. c.
b. d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national [illegible]

Domenick Gasbarro — Domenick Gasbarro /jm — 08 26 96

17. Transporter 1 Acknowledgment of Receipt of Materials
Printed/Typed Name: [illegible]
Signature
Month

18. Transporter 2 Acknowledgment of Receipt of Materials
Printed/Typed Name
Signature
Month

19. Discrepancy Indication Space

20. Facility Owner or Operator Certification of receipt of hazardous materials covered by this manifest except as noted [illegible]
Printed/Typed Name
Signature
Month Day Year

NJA 2637740

EPA Form 8700-[illegible] Rev. [illegible] SIGNATURE AND INFORMATION [illegible] LEGIBLE ON ALL COPIES

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

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Please type or print in block letters. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039. Expires 9-30-96

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. / Manifest Document No.: N J P 0 0 0 3 0 4 7 8 2 / 0 0 0 0 1 4 3
2. Page 1 of 1
Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
1 Becton Drive
Franklin Lakes, NJ 07417-1880
4. Generator's Phone ( ) (201) 847-7175

A. State Manifest Document Number: NJA 2637743
B. State Generator's ID-(Gen. Site Address)

5. Transporter 1 Company Name: Horwith Trucking, Inc.
6. US EPA ID Number: P A D 1 4 6 7 1 4 6 7 6
C. State Trans. ID-NJDEPE: 0 0 1 1 0
Decal No.: 77755

7. Transporter 2 Company Name
8. US EPA ID Number
D. Transporter's Phone (215) 261-2220
E. State Trans. ID-NJDEPE
Decal No.

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number: O H D 0 4 5 2 4 3 7 0 6
F. Transporter's Phone ( )
G. State Facility's ID
H. Facility's Phone (419) 698-3500

	11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	X	0 0 1	D T	4 4 0 0 0	P	D 0 0 8
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
K. Handling Codes for Wastes Listed Above

a. c. a. c.
b. d. b. d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
EMC # 171
24 hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping [illegible] classified, packed, marked and labeled, and are in all respects in proper condition for transport by highway according to applicable international and [illegible]

[illegible] I have a written [illegible] to reduce the [illegible] and that I have selected the [illegible] method of [illegible] available to me which minimizes the present and future threat to human health and the environment; OR, if [illegible] and that I can afford. I have determined that the waste [illegible] and select the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment.

Printed/Typed Name: Domenick Gasbarro
Signature: Domenick Gasbarro
Month Day Year: 08 26 96

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: Wm Ney
Signature
Month Day Year: 08 26 96

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name
Signature
Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except [illegible]
Printed/Typed Name
Signature
Month Day Year

NJA 2637140

EPA Form 8700-22 (Rev. 9-88) Previous editions are obsolete. SIGNATURE AND INFORMATION [illegible]

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

2 4 3 7 7 4 4

Please type or print in block letters. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039. Expires 9-30-96

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. N J D 0 4 7 6 4 0 0 3 0 4 — Manifest Document No. 100044
2. Page 1 of 1 — Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
1 Becton Drive
Franklin Lakes, NJ 07417-1880
One Stanley Street
E. Rutherford NJ 07073
(201) 847-7175

A. State Manifest Document Number NJA 2637744
B. State Generator's ID-(Gen. Site Address) na

4. Generator's Phone ( )

5. Transporter 1 Company Name — 6. US EPA ID Number
Borwith Trucking, Inc. — P A D 1 6 8 7 1 6 8 7 8

C. State Trans. ID-NJDEPE 810711310
Decal No. 75113

7. Transporter 2 Company Name — 8. US EPA ID Number

D. Transporter's Phone (215) 261-2220
E. State Trans. ID-NJDEPE
Decal No.

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616

10. US EPA ID Number — O H D 0 6 5 6 4 6 3 7 9 9

F. Transporter's Phone ( )
G. State Facility's ID
H. Facility's Phone (419) 698-3500

	11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	Waste No.
a	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	X	001	DM	44000	P	D008
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above — K. Handling Codes for Wastes Listed Above

a. — c. — a. — c.
b. — d. — b. — d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government

Domenick Gasbarro — Domenick Gasbarro — Month Day Year 08 26 96

17. Transporter Acknowledgement of Receipt of Materials
Printed/Typed Name: HARRY DAVIS — Signature — Month Day Year 08 26 96

18. Discrepancy Indication Space

19. Operator Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name — Signature — Month Day Year

SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

NJA 2637744

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

2 6 3 7 7 4 5

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. NJD000304782 Manifest Document No. 100098
2. Page 1 of 1

Information in the shaded areas is not required by Federal law.

A. State Manifest Document Number NJA 2637745

B. State Generator's ID (Gen. Site Address)

3. Generator's Name and Mailing Address
Becton Dickinson & Company
1 Becton Drive
Franklin Lakes, NJ 07417-1880

4. Generator's Phone (201) 847-7175

5. Transporter 1 Company Name: Horwith Trucking, Inc.
6. US EPA ID Number: PAD146714878

C. State Trans. ID-NJDEPE: S07110
Decal No.: 75167

7. Transporter 2 Company Name
8. US EPA ID Number

D. Transporter's Phone (215) 261-2220
E. State Trans. ID-NJDEPE
Decal No.
F. Transporter's Phone ( )
G. State Facility's ID
H. Facility's Phone (419) 698-3500

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616

10. US EPA ID Number: OHD045243706

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	001	DT	44000	P	D008
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a.
b.
c.
d.

K. Handling Codes for Wastes Listed Above
a.
b.
c.
d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government [illegible]

[illegible] quantity generator, I [illegible] that I have [illegible] the volume and toxicity of waste generated to the degree [illegible] and future threat to human health [illegible] environment [illegible] generator, I have made a good [illegible] and select [illegible]

Printed/Typed Name: Domenick Gasbarro
Signature: Domenick Gasbarro /jm
Month Day Year: 08 26 9[illegible]

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: Peter [illegible]
Signature: [illegible]
Month Day Year

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name
Signature
Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name
Signature
Month Day Year

In case of an emergency or spill immediately call the state the emergency occurred in and the N.J. Dept. of Environmental Protection and Energy. (609) 292-7172

EPA Form 8700-22 (Rev. 9-88) Previous editions are obsolete

SIGNATURE AND INFORMATION *MUST* BE LEGIBLE ON ALL COPIES

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. N J D 0 4 3 4 1 0 0 0 1 6 | Manifest Document No. 0010FHO | 2. Page 1 of 1 | Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
~~1 Becton Drive~~ One Stanley Street
~~Franklin Lakes, NJ 07417-1880~~ E. Rutherford NJ 07073
4. Generator's Phone (201) 847-7175

A. State Manifest Document Number NJA 2637746
B. State Generator's ID (Gen. Site Address)
C. State Trans. ID-NJDEPE $ 0 2 1 1 1 0 | Decal No. 752338
D. Transporter's Phone (717) 261-2220
E. State Trans. ID-NJDEPE | Decal No.
F. Transporter's Phone ( )
G. State Facility's ID
H. Facility's Phone ( ) 419 698-3500

5. Transporter 1 Company Name: Horwith Trucking, Inc.
6. US EPA ID Number: P A D 1 4 6 7 1 6 8 7 8
7. Transporter 2 Company Name
8. US EPA ID Number
9. Designated Facility Name and Site Address
Envirocafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number: O H D 0 4 5 2 4 3 7 3 6

	11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	X	001	DT	49500	P	D008
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a. c.
b. d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government

Printed/Typed Name: Domenick Gasbarro
Signature: Domenick Gasbarro/jm
Month Day Year: 08 26 96

17. Transportation Acknowledgement of Receipt of Materials
Printed/Typed Name
Signature
Month Day Year

18. Discrepancy Indication Space

19. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest
Printed/Typed Name
Signature
Month Day Year

EPA Form 8700-22 Rev. 9-88 Previous editions are obsolete.

SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

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Please type or print in block letters. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039. Expires 9-30-96

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. NJD000304782 Manifest Document No. 00047
2. Page 1 of 1
Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Bectou Dickinson & Company
~~1 Becton Drive~~ One Stanley Street
~~Franklin Lakes, NJ 07417-1880~~ East Rutherford NJ 07073
4. Generator's Phone ( ) (201) 847-7175

A. State Manifest Document Number NJA 2637747
B. State Generator's ID (Gen. Site Address)
C. State Trans. ID-NJDEPE S07110
Decal No. 75225
D. Transporter's Phone (215) 261-2220
E. State Trans. ID-NJDEPE
Decal No.
F. Transporter's Phone ( )
G. State Facility's ID
H. Facility's Phone (419) 698-3500

5. Transporter 1 Company Name: Horwith Trucking, Inc.
6. US EPA ID Number: PAD146714878
7. Transporter 2 Company Name
8. US EPA ID Number
9. Designated Facility Name and Site Address
Enviroscafe Services of Ohio
276 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number: OHD045243706

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	001	DT	Est. 4000	P	D008
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a. c.
b. d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
ERN # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government [illegible]

[illegible] I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined [illegible] to me which minimizes the present [illegible] a good faith effort to minimize my waste generation [illegible]

Printed Typed Name: Demon K [illegible] Signature: [illegible] Month Day Year: 08 27 96

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed Typed Name: Robert Kesten Signature: [illegible] Month Day Year: 08 27 96

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed Typed Name Signature Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed Typed Name Signature Month Day Year

GENERATOR

TRANSPORTER

FACILITY

In case of an emergency or spill immediately call the state the emergency occurred in and the N.J. Dept. of Environmental Protection and Energy (609) [illegible]

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete

SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

Please type or print in block letters. (Form designed for use on elite (12-pitch) typewriter.) WHITE - MOD 3 Form Approved. OMB No. 2050-0039. Expires 9-30-96

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. N J D 0 0 1 6 4 7 8 2 0 0 0 | Manifest Document No. | 2. Page 1 of 1 | Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
1 Becton Drive
Franklin Lakes, NJ 07417-1880
(201) 847-7175

A. State Manifest Document Number: NJA 2687748
B. State Generator's ID (Gen. Site Address):
C. State Trans. ID-NJDEPE: 8 0 7 1 1 1 0
Decal No.: 75375

5. Transporter 1 Company Name: Horwith Trucking, Inc.
6. US EPA ID Number: P A D 1 4 6 7 1 4 8 7 8
D. Transporter's Phone: (215) 261-2220
E. State Trans. ID-NJDEPE:
Decal No.:

7. Transporter 2 Company Name
8. US EPA ID Number
F. Transporter's Phone ( )
G. State Facility's ID:

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number: O H D 0 4 5 2 4 3 7 9 6
H. Facility's Phone: (419) 698-3500

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	X	0 0 1	D F	Est. 0	P	D 0 0 8
b.						
c.						
d.						

J. Additional Descriptions for Materials Listed Above
a. c.
b. d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national governmental regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: Paul Connors
Signature: [signature]
Month Day Year: 5 12 96

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: Ed Barnes
Signature: [signature]
Month Day Year: 5 12 96

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name
Signature
Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name
Signature
Month Day Year

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete.

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: NJD000030478 — Manifest Document No.: 200041
2. Page 1 of 1

Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
~~1 Becton Drive~~ One Stanley
~~Franklin Lakes, NJ 07417-1880~~ East Rutherford, NJ 07073
4. Generator's Phone (201) 847-7175

A. State Manifest Document Number: NJA 2637749
B. State Generator's ID (Gen. Site Address)

5. Transporter 1 Company Name: Horwith Trucking, Inc.
6. US EPA ID Number: PAD146714876
C. State Trans. ID-NJDEPE: 807110
Decal No.: 75224

7. Transporter 2 Company Name
8. US EPA ID Number
D. Transporter's Phone (215) 241-2220
E. State Trans. ID-NJDEPE
Decal No.
F. Transporter's Phone ( )
G. State Facility's ID
H. Facility's Phone (419) 698-3500

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number: OHD045243706

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	001	DT	45 Est.	P	D008
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a. c.
b. d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government

[illegible]

Domenick Gasbarro — Month Day Year: 082796

17. Transporter Acknowledgement of Receipt of Materials
Peter Wittmann — Month Day Year: 082796

18. Transporter Acknowledgement of Receipt of Materials
Printed Typed Name — Signature — Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed Typed Name — Signature — Month Day Year

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In case of an emergency or spill immediately call the state the emergency occurred in and the N.J. Dept. of Environmental Protection and Energy. (800) 4[illegible]

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. N J 0 0 0 0 3 0 4 7 6 2 — Manifest Document No. 00050

2. Page 1 of 1 — Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
~~1 Becton Drive~~ One Street
~~Franklin Lakes, NJ 07417-1880~~ (201) 847-7175

A. State Manifest Document Number: NJA 2837750

B. State Generator's ID (Gen. Site Address)

4. Generator's Phone

5. Transporter 1 Company Name: Horwith Trucking, Inc.

6. US EPA ID Number: P A D 1 4 6 7 1 4 8 7 8

C. State Trans. ID-NJDEPE: 5 0 7 1 1 G — Decal No.: 76260

7. Transporter 2 Company Name

8. US EPA ID Number

D. Transporter's Phone (219) 261-2220

E. State Trans. ID-NJDEPE

Decal No.

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616

10. US EPA ID Number: O H D 0 4 5 2 4 3 7 0 6

F. Transporter's Phone ( )

G. State Facility's ID

H. Facility's Phone (419) 698-3500

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	0 0 1	D T	Est. 4 7 5 0 0	P	D 0 0 8
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a. c.
b. d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

[illegible] quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree [illegible] practicable and that I have selected the [illegible] treatment, storage, or disposal currently available to me [illegible] to human health and the environment; OR [illegible] quantity generator, I have made a good faith effort [illegible] management method that is available [illegible] can afford.

Printed/Typed Name: [illegible] — Signature: [illegible] — Month Day Year: 08 27 96

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: Michael Sherer — Signature: [illegible] — Month Day Year: 08 27 96

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name — Signature — Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name — Signature — Month Day Year

GENERATOR — TRANSPORTER — FACILITY

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete. SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES.

NJA 2837750

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. N J D 0 0 0 3 0 4 7 8 2 — Manifest Document No. 7
2. Page 1 of 1 — Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
1 Becton Drive
Franklin Lakes, NJ 07417-1880
4. Generator's Phone (201) 847-7175

A. State Manifest Document Number NJA 2637751
B. State Generator's ID

5. Transporter 1 Company Name
Horwith Trucking, Inc.
6. US EPA ID Number P A D 1 4 6 7 1 4 6 7 8
C. State Trans. ID NJDEPE 430 8 0 2 1 1 0
Decal No. 75179

7. Transporter 2 Company Name
8. US EPA ID Number
D. Transporter's Phone (215) 261-2220
E. State Trans. ID NJDEPE
Decal No.

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number O H D 0 4 5 2 4 3 7 0 6
F. Transporter's Phone ( )
G. State Facility's ID
H. Facility's Phone (419) 698-3500

	11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	X	0 0 1	D T	1 Est.	P	D 0 0 8
b.							
c.							
d.							

GENERATOR

J. Additional Descriptions for Materials Listed Above
K. Handling Codes for Wastes Listed Above

a.	c.	a.	c.
b.	d.	b.	d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
EEC # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government

I am a large quantity generator and that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name — Signature — Month Day Year 10 2 94

TRANSPORTER

17a. Transporter Acknowledgement of Receipt of Materials
Printed/Typed Name Thomas DeMito — Signature — Month Day Year 10 2 94

17b. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name — Signature — Month Day Year

18. Discrepancy Indication Space

FACILITY

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name — Signature — Month Day Year

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete.

SIGNATURE AND INFORMATION *MUST* BE LEGIBLE ON ALL COPIES

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

2 6 3 7 7 5 2

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: NJD000304781 — Manifest Document No.: 00052
2. Page 1 of 1
Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
~~1 Becton Drive~~ One Stanley Street East Rutherford NJ 07073
~~Franklin Lakes, NJ 07417-1880~~
4. Generator's Phone: (201) 847-7175

A. State Manifest Document Number: NJA 2637752
B. State Generator's ID (Gen. Site Address):

5. Transporter 1 Company Name: Horwith Trucking, Inc.
6. US EPA ID Number: PAD146714878
C. State Trans. ID-NJDEPE: S07110
Decal No.: 25189
D. Transporter's Phone: (215) 261-2220
E. State Trans. ID-NJDEPE:
Decal No.:
F. Transporter's Phone:
G. State Facility's ID:
H. Facility's Phone: (419) 698-3500

7. Transporter 2 Company Name:
8. US EPA ID Number:

9. Designated Facility Name and Site Address
Environafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number: OHD065243706

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	001	DT	4 Est. 4000	P	D008
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a.
b.
c.
d.

K. Handling Codes for Wastes Listed Above
a.
b.
c.
d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government [illegible]

[illegible]

Printed/Typed Name: [illegible] — Signature: [illegible] — Month Day Year: 0 27 96

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: TONI FARRILL — Signature: [illegible] — Month Day Year: 08 27 96

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name: — Signature: — Month Day Year:

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: — Signature: — Month Day Year:

GENERATOR — TRANSPORTER — FACILITY

EPA Form 8700-22 (Rev. 9-88) Previous editions are obsolete.

SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES.

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: NJD000304788 | Manifest Document No.: 000055 | 2. Page 1 of 1 | Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
~~1 Becton Drive~~ One Stanley Street
~~Franklin Lakes, NJ 07417-1880~~ 07097
4. Generator's Phone (201) 847-7175

A. State Manifest Document Number: NJA 2637753
B. State Generator's ID (Gen. Site Address)
C. State Trans. ID-NJDEPE: S 0 7 1 1 0
Decal No.: 76850
D. Transporter's Phone (215) 261-2220
E. State Trans. ID-NJDEPE
Decal No.
F. Transporter's Phone ( )
G. State Facility's ID
H. Facility's Phone (419) 698-3500

5. Transporter 1 Company Name: Horwith Trucking, Inc.
6. US EPA ID Number: PAD146714878

7. Transporter 2 Company Name
8. US EPA ID Number

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number: OHD045243706

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	001	DT	Est. 44000	P	D008
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a. c.
b. d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
WSIP # 18695-001
ENG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government [illegible]

[illegible] quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree [illegible] storage or disposal currently available to me [illegible] to human health and the environment. OR [illegible] quantity generator, I have made a good faith effort to minimize [illegible] waste management method that is available [illegible]

Printed/Typed Name: [illegible] | Signature: [illegible] | Month Day Year: [illegible]

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: John J. Fox | Signature: [illegible] | Month Day Year: [illegible]

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name | Signature | Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name | Signature | Month Day Year

GENERATOR | TRANSPORTER | FACILITY

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State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: N J D 0 0 0 1 0 4 1 8 3 — Manifest Document No.: 000154
2. Page 1 of 1 — Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
1 Becton Drive
Franklin Lakes, NJ 07417-1880
4. Generator's Phone: (201) 847-7175

A. State Manifest Document Number: NJA 2637754
B. State Generator's ID (Gen. Site Address):

5. Transporter 1 Company Name: Horwich Trucking, Inc.
6. US EPA ID Number: P A D 1 4 6 7 1 4 8 7 8
C. State Trans. ID-NJDEPE: S 0 7 1 1 0
Decal No.: 75192

7. Transporter 2 Company Name:
8. US EPA ID Number:
D. Transporter's Phone (215) 261-2220
E. State Trans. ID-NJDEPE:
Decal No.:

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number: O H D 0 4 5 2 4 3 7 0 6
F. Transporter's Phone ( )
G. State Facility's ID:
H. Facility's Phone (419) 698-3500

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	0 0 1	D T	Est. 49000	P	D 0 0 8
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
K. Handling Codes for Wastes Listed Above

15. Special Handling Instructions and Additional Information
WSID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government [illegible]

[illegible] quantity generator [illegible] have a program in place to reduce the volume and toxicity of waste generated to the [illegible] practicable and that have selected the [illegible] storage or disposal currently available to me which [illegible] to minimize health and the environment; OR, [illegible] quantity generator, [illegible] have a good faith effort to minimize [illegible] that is available [illegible] can afford.

Printed Typed Name: [illegible] — Signature: [illegible] — Month Day Year: 0 2 7 9 6

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed Typed Name: TOM WHITBY — Signature: Tom Whitby — Month Day Year: 8 2 7 9 6

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed Typed Name: — Signature: — Month Day Year:

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed Typed Name: — Signature: — Month Day Year:

EPA Form 8700-22 Rev. 9/86 Previous editions are obsolete.

SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. NJD000304782 Manifest Document No. 00055 2. Page 1 of 1

Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Secton Dickinson & Company
~~1 Sutton Drive~~ One Stanley Street
~~Franklin Lakes, NJ 07417-1880~~ Rutherford NJ 07073

4. Generator's Phone ( ) (201) 847-7175

A. State Manifest Document Number NJA 2637755

B. State Generator's ID (Gen. Site Address)

5. Transporter 1 Company Name: Horwith Trucking, Inc.
6. US EPA ID Number: PAD146714878

C. State Trans. ID-NJDEPE: 8-0-7-1-7-0
Decal No.- 78247

7. Transporter 2 Company Name
8. US EPA ID Number

D. Transporter's Phone (215) 261-2220

E. State Trans. ID-NJDEPE
Decal No.-

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616

10. US EPA ID Number: OHD045243706

F. Transporter's Phone ( )

G. State Facility's ID

H. Facility's Phone (419) 698-3500

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	001	DT	44,000	P	D008
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a. c.
b. d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government [illegible]

[illegible]

Printed/Typed Name: [illegible] Signature: Domenick Gasbarro Jr. Date: 08 27 96

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: Manny Aracho 281 Signature: Manny Aracho 281 Date: 8 27 96

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name Signature Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name Signature Month Day Year

GENERATOR / TRANSPORTER / FACILITY

NJA 2637755

EPA Form 8700-22 (Rev. 3-88) Previous editions are obsolete. SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

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State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. N J D 0 0 0 1 0 4 7 8 6 Manifest Document No. 0 0 0 5 6
2. Page 1 of 1
Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
~~1 Becton Drive~~ One Stanley Street
~~Franklin Lakes, NJ 07417-1880~~ E. Rutherford NJ 07073
4. Generator's Phone (201) 847-7175

A. State Manifest Document Number NJA 2637756
B. State Generator's ID (Gen. Site Address)
C. State Trans. ID-NJDEPE 5 0 7 1 1 0
Decal No. 77755

5. Transporter 1 Company Name
Horwith Trucking, Inc.
6. US EPA ID Number P A D 1 4 6 7 1 4 8 7 8

7. Transporter 2 Company Name
8. US EPA ID Number

D. Transporter's Phone (215) 261-2220
E. State Trans. ID-NJDEPE
Decal No.
F. Transporter's Phone ( )

9. Designated Facility Name and Site Address
Environafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number O H D 0 4 5 2 4 3 7 0 6

G. State Facility's ID
H. Facility's Phone (419) 698-3900

	11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	X	0 0 1	D T	1 Est 770 0 0	P	D 0 0 8
b.							
c.							
d.							

GENERATOR

J. Additional Descriptions for Materials Listed Above
a. c.
b. d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

[illegible] large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I determine to be economically practicable and I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: Dominick Gasbarro
Signature: Dominick Gasbarro
Month Day Year: 08 26 96

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: Vin Vey
Signature: [signature]
Month Day Year: 08 28 96

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name
Signature
Month Day Year

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name
Signature
Month Day Year

NJA 2637756

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete.

SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

2 6 3 7 7 5 7

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: NJD000304782 — Manifest Document No.: 105057
2. Page 1 of 1
Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
~~1 Becton Drive~~
~~Franklin Lakes, NJ 07417-1880~~
One Stanley Street
E. Rutherford NJ 07073
4. Generator's Phone ( ) (201) 847-7175

A. State Manifest Document Number: NJA 2637757
B. State Generator's ID (Gen. Site Address)

5. Transporter 1 Company Name: Horwith Trucking, Inc.
6. US EPA ID Number: PAD146714878
C. State Trans. ID-NJDEPE: SG7110
Decal No.: 75247

7. Transporter 2 Company Name
8. US EPA ID Number
D. Transporter's Phone (215) 261-2220
E. State Trans. ID-NJDEPE
Decal No.
F. Transporter's Phone ( )
G. State Facility's ID
H. Facility's Phone (419) 698-3500

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number: OHD045243706

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	001	BT	445.00	P	D008
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a. c.
b. d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government [illegible]

[illegible] quantity generator [illegible] have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined [illegible] of treatment, storage, or disposal currently available to me which minimizes the present [illegible] quantity generator, I have made a good faith effort to minimize my waste generation [illegible]

Printed/Typed Name: Domenick Gasbarro
Signature: Domenick Gasbarro [signature]
Month Day Year: 08 28 96

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: Ambrose J. Peter
Signature: [signature]
Month Day Year: 08 28 96

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name
Signature
Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name
Signature
Month Day Year

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete

SIGNATURE AND INFORMATION *MUST* BE LEGIBLE ON ALL COPIES

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. NJ000010478 Manifest Document No. 00058
2. Page 1 of 1
Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
~~1 Becton Drive~~
~~Franklin Lakes, NC 07417-1880~~
One Stanley Street
E. Rutherford NJ 07073
4. Generator's Phone (201) 847-7175

A. State Manifest Document Number NJA 2637758
B. State Generator's ID (Gen. Site Address)

5. Transporter 1 Company Name: Horwith Trucking, Inc.
6. US EPA ID Number: PAD146714878
C. State Trans. ID-NJDEPE: 807110
Decal No.: 75160

7. Transporter 2 Company Name
8. US EPA ID Number
D. Transporter's Phone (215) 261-2220
E. State Trans. ID-NJDEPE
Decal No.

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number: OHD045243706
F. Transporter's Phone ( )
G. State Facility's ID
H. Facility's Phone (419) 698-3500

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	001	DT	44000	P	D008
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a. c.
b. d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government

[illegible]

Printed/Typed Name: Domenick Gasbarro
Signature: Domenick Gasbarro /jm
Month Day Year: 08 28 96

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: Gordon Bird
Signature: Gordon Bird
Month Day Year: 08 28 96

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name
Signature
Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19
Printed/Typed Name
Signature
Month Day Year

GENERATOR / TRANSPORTER / FACILITY

NJA 2637758

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete

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State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. N J D 0 0 0 3 0 4 7 8 2 Manifest Document No. 0 0 0 0 1
2. Page 1 of 1 — Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
~~1 Becton Drive~~
~~Franklin Lakes, NJ 07417-1880~~
One Stanley Street
E. Rutherford NJ 07073
4. Generator's Phone ( ) (201) 847-7175

A. State Manifest Document Number NJA 2637759
B. State Generator's ID (Gen. Site Address)

5. Transporter 1 Company Name: Horwith Trucking, Inc.
6. US EPA ID Number: P A D 1 4 6 7 1 4 8 7 8
C. State Trans. ID-NJDEPE: S 0 7 1 1 0
Decal No.: 75102

7. Transporter 2 Company Name
8. US EPA ID Number
D. Transporter's Phone (215) 261-2220
E. State Trans. ID-NJDEPE
Decal No.
F. Transporter's Phone ( )

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number: O H D 0 4 5 2 4 3 7 0 6
G. State Facility's ID
H. Facility's Phone (419) 698-3500

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	0 0 1	D T	Est. 4 9 0 0 0	P	D 0 0 8
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a. c.
b. d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
WSID # 10695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government [illegible]

[illegible] generator, hereby, that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined [illegible] treatment, storage, or disposal [illegible] present [illegible] environment, OR [illegible] quantity generated, I have made a good faith effort to minimize [illegible] waste generation [illegible] method that is [illegible] can afford.

Printed/Typed Name: Domenick Gasbarco
Signature: Domenick Gasbarco /jm
Month Day Year: 0 8 2 8 9 6

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: Richard W Kinehold
Signature: [signature]
Month Day Year: 0 8 2 8 9 6

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name
Signature
Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name
Signature
Month Day Year

GENERATOR

TRANSPORTER

FACILITY

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In case of an emergency or spill immediately call the state the emergency occurred in and the N.J. Dept. of Environmental Protection and Energy (609) 2[illegible]72

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. NJ 0 0 0 0 3 0 4 2 4 2 — Manifest Document No. 0 0 0 6 0

2. Page 1 of 1 — Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
~~1 Becton Drive~~
~~Franklin Lakes, NJ 07417-1880~~
One Stanley Street
E. Rutherford NJ 07073
(201) 847-7175

A. State Manifest Document Number NJA 2637760

B. State Generator's ID (Gen. Site Address)

4. Generator's Phone

5. Transporter 1 Company Name: Horwith Trucking, Inc.
6. US EPA ID Number: P A D 1 4 6 7 1 4 8 7 8

C. State Trans. ID-NJDEPE: 8 0 7 1 1 0
Decal No.: 7 5 1 4 3

7. Transporter 2 Company Name
8. US EPA ID Number

D. Transporter's Phone (215) 261-2220

E. State Trans. ID-NJDEPE
Decal No.

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616

10. US EPA ID Number: O H D 0 4 5 2 4 3 7 0 6

F. Transporter's Phone ( )

G. State Facility's ID

H. Facility's Phone (419) 698-3500

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	0 0 1	D T	49000	P	D 0 0 8
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a. c.
b. d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government [illegible]

[illegible] generator I certify that I have a program in place [illegible] waste generated to the degree I have determined [illegible] to the which minimizes the present [illegible] environment OR, [illegible] a [illegible] effort to minimize my waste generation [illegible]

Domenick Gasbarro — Signature: Domenick Gasbarro/fm — Month Day Year: 0 8 2 8 9 6

17. Transporter's Acknowledgment of Receipt of Materials
Printed/Typed Name: Larry Owens — Signature: [signature] — Month Day Year: 0 8 2 8 9 6

18. Transporter's Acknowledgment of Receipt of Materials
Printed/Typed Name — Signature — Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19
Printed/Typed Name — Signature — Month Day Year

EPA Form 8[illegible] Previous editions are obsolete

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State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. NJD000304782 | Manifest Document No. 000061 | 2. Page 1 of 1 | Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
~~1 Scott Drive~~
~~Franklin Lakes, NJ 07417-1880~~
One Stanley Street
E. Rutherford NJ 07073
4. Generator's Phone ( ) (201) 847-7175

A. State Manifest Document Number NJA 2637761
B. State Generator's ID (Gen. Site Address)

5. Transporter 1 Company Name: Horwith Trucking, Inc.
6. US EPA ID Number: PAD146714878
C. State Trans. ID-NJDEPE: 807110
Decal No.: 75274

7. Transporter 2 Company Name
8. US EPA ID Number
D. Transporter's Phone (215) 261-2220
E. State Trans. ID-NJDEPE
Decal No.

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number: OHD045243706
F. Transporter's Phone ( )
G. State Facility's ID
H. Facility's Phone (419) 698-3500

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	001	DT	44000	P	D008
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a. c.
b. d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
ERG # 171
24 hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government [illegible]

[illegible] generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the [illegible] and that I have selected the practicable method of treatment, storage, or disposal currently available to me [illegible] the environment; OR, if I am a small quantity generator, [illegible] method that is available to me and that I can afford.

Printed Typed Name: Domenick Gasbarro | Signature: Domenick Gasbarro | Month: 08 28 96

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed Typed Name: Tom Ruch | Signature: Tom Ruch | Month: 08 28 96

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed Typed Name | Signature | Month

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19
Printed Typed Name | Signature | Month

EPA Form 8700-22 (Rev. 9/86) Previous editions are obsolete.

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State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. NJD000304[illegible] Manifest Document No. 00062
2. Page 1 of 1
Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
~~1 Becton Drive~~
~~Franklin Lakes, NJ 07417-1880~~
One Stanley Street
E. Rutherford NJ 07073
4. Generator's Phone (201) 847-7175

A. State Manifest Document Number NJA 2637762
B. State Generator's ID (Gen. Site Address)

5. Transporter 1 Company Name: Horwith Trucking, Inc.
6. US EPA ID Number: PAD146714879
C. State Trans. ID-NJDEPE: S07110
Decal No.: 75307

7. Transporter 2 Company Name
8. US EPA ID Number
D. Transporter's Phone (215) 261-2220
E. State Trans. ID-NJDEPE
Decal No.

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number: OHD045243706
F. Transporter's Phone ( )
G. State Facility's ID
H. Facility's Phone (419) 698-3500

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. X RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	001	DT	74000	P	D008
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above
a. c.
b. d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government [illegible]

[illegible]

Printed/Typed Name: Domenick Gasbarro
Signature: Domenick Gasbarro / [illegible]
Month Day Year: 08 28 96

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: George Vauro
Signature: [illegible]
Month Day Year: 08 28 96

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name
Signature
Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name
Signature
Month Day Year

SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

NJA 2637762

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. N J D 0 0 0 3 0 4 7 1 6 | Manifest Document No. 000003 | 2. Page 1 of 1 | Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
~~1 Becton Drive~~
~~Franklin Lakes, NJ 07417-1880~~
One Stanley Street
E. Rutherford NJ 07073

4. Generator's Phone (201) 847-7175

A. State Manifest Document Number NJA 2637763

B. State Generator's ID (Gen. Site Address)

5. Transporter 1 Company Name
Horvith Trucking, Inc.

6. US EPA ID Number P A D 1 4 6 7 1 4 8 7 8

C. State Trans. ID-NJDEPE S 0 7 1 1 0
Decal No. 75199

7. Transporter 2 Company Name

8. US EPA ID Number

D. Transporter's Phone (215) 261-2120

E. State Trans. ID-NJDEPE

Decal No.

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616

10. US EPA ID Number O H D 0 4 5 2 4 3 7 0 6

F. Transporter's Phone ( )

G. State Facility's ID

H. Facility's Phone (419) 698-3500

	11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
GENERATOR a.	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	X	001	DT	14000	P	D008
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above

a. c.

b. d.

K. Handling Codes for Wastes Listed Above

a. c.

b. d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: [illegible] | Signature: Domenick Gasbarro | Month Day Year: 08 28 96

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name: Craig Day | Signature | Month Day Year: 08 28 96

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name | Signature | Month Day Year

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name | Signature | Month Day Year

In case of an emergency or spill immediately call the state police emergency occurrence and control unit, Department of Environmental Protection and Energy, Trenton, NJ 609-292-7172

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete

SIGNATURE AND INFORMATION *MUST* BE LEGIBLE ON ALL COPIES

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: N J D 0 0 0 3 0 4 7 8 — Manifest Document No.: 000064
2. Page 1 of 1 — Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
~~1 Becton Drive~~
~~Franklin Lakes, NJ 07417-1880~~
One Stanley Street
E. Rutherford NJ 07073
(201) 847-7175

A. State Manifest Document Number: NJA 2637784
B. State Generator's ID (Gen. Site Address)
C. State Trans. ID-NJDEPE: 507110
Decal No.: 76279
D. Transporter's Phone ( ): 215 201-3220
E. State Trans. ID-NJDEPE:
Decal No.:
F. Transporter's Phone ( )
G. State Facility's ID
H. Facility's Phone ( ): 419 698-3500

4. Generator's Phone ( ) 07417-1880

5. Transporter 1 Company Name: Norwith Trucking, Inc.
6. US EPA ID Number: P A D 1 4 6 7 1 4 8 7 8

7. Transporter 2 Company Name:
8. US EPA ID Number:

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number: O H D 0 4 5 2 4 3 7 0 6

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	X	001	DT	4 Yds	P	D008
b.						
c.						

J. Additional Descriptions for Materials Listed Above
a. c.
b. d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

[illegible] I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined [illegible] and that I have selected the [illegible] storage or disposal currently available to me which minimizes [illegible] and the environment; OR [illegible] generator I have made a good faith effort to minimize [illegible] method that is available [illegible]

Printed/Typed Name: Domenick Gasbarro
Signature: Domenick Gasbarro /jm
Month Day Year: 08 28 96

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: [illegible]
Signature:
Month Day Year:

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name:
Signature:
Month Day Year:

19. Discrepancy Indication Space

20. Facility Owner or Operator Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name:
Signature:
Month Day Year:

SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. NJD000304782 Manifest Document No. 00065
2. Page 1 of 1
Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
~~1 Becton Drive~~
~~Franklin Lakes, NJ 07417-1880~~
One Stanley Street
E. Rutherford NJ 07073
4. Generator's Phone ( ) (201) 847-7175

A. State Manifest Document Number NJA 2637765
B. State Generator's ID (Gen. Site Address)

5. Transporter 1 Company Name: Norwith Trucking, Inc.
6. US EPA ID Number: PAD146714878
C. State Trans. ID-NJDEPE: S 0 7 1 1 0
Decal No.: 75254

7. Transporter 2 Company Name
8. US EPA ID Number
D. Transporter's Phone (215) 261-2220
E. State Trans. ID-NJDEPE
Decal No.
F. Transporter's Phone ( )
G. State Facility's ID
H. Facility's Phone (419) 698-3500

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number: OHD045243706

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	001	DT	4 Jar 000	P	D008
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a. c.
b. d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. **GENERATOR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program [illegible] volume and toxicity of waste [illegible] economically practicable and that I have selected the practice [illegible] future threat to human health and the environment; OR [illegible] the best waste management method that is available [illegible]

Printed/Typed Name: Domenick Gasbarro
Signature: Domenick Gasbarro
Month Day Year: 08 28 96

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: Harold Ziegner
Signature: [illegible]
Month Day Year: [illegible]

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name
Signature
Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in item 19.
Printed/Typed Name
Signature
Month Day Year

GENERATOR
TRANSPORTER
FACILITY

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete
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State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. NJD000304788 Manifest Document No. 00067
2. Page 1 of 1
Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
~~[illegible]~~
~~[illegible]~~
One Stanley Street
E. Rutherford NJ 07073
4. Generator's Phone ( ) (201) 847-7175

A. State Manifest Document Number NJA 2637767
B. State Generator's ID (Gen. Site Address)

5. Transporter 1 Company Name
Horwith Trucking, Inc.
6. US EPA ID Number PAD146714878
C. State Trans. ID-NJDEPE S07110
Decal No. 77762

7. Transporter 2 Company Name
8. US EPA ID Number
D. Transporter's Phone (215) 261-2220
E. State Trans. ID-NJDEPE
Decal No.
F. Transporter's Phone ( )

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number OHD045243706
G. State Facility's ID
H. Facility's Phone (419) 698-3500

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	001	DT	44600	P	D008
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. **GENERATOR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government [illegible]

[illegible] quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined [illegible] practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present [illegible] threat to human health and the environment OR [illegible] small quantity generator, I have made a good faith effort to minimize my waste generation [illegible] the best waste management method that is available to me and that I can afford.

Printed/Typed Name: Domenick Gasbarro
Signature: Domenick Gasbarro
Month Day Year: 08 28 96

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: ONFESOR GONZALEZ
Signature: [signature]
Month Day Year: 08 28 96

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name
Signature
Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name
Signature
Month Day Year

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete

SIGNATURE AND INFORMATION *MUST* BE LEGIBLE ON ALL COPIES

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. | Manifest Document No. | 2. Page 1 of 1 | Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
1 Becton Drive
Franklin Lakes, NJ 07417-1880
4. Generator's Phone (201) 847-7175

A. State Manifest Document Number NJA 2637768
B. State Generator's ID (Gen. Site Address)

5. Transporter 1 Company Name: Horvith Trucking, Inc.
6. US EPA ID Number: P A D 1 4 6 7 1 4 8 7 8
C. State Trans. ID-NJDEPE / Decal No.: 8 0 7 1 1 0 / 1 7 0 1 1 0

7. Transporter 2 Company Name
8. US EPA ID Number
D. Transporter's Phone ( ) 215 261-2220
E. State Trans. ID-NJDEPE / Decal No.

9. Designated Facility Name and Site Address
Envirocare Services of Ohio
876 Otter Creek Road
Oregon, Oh 43616
10. US EPA ID Number: O H D 0 4 5 2 4 3 7 0 6
F. Transporter's Phone ( )
G. State Facility's ID
H. Facility's Phone (419) 698-3300

	11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	X	0 0 1	DM	44000	P	D 0 0 8
b.							
c.							
d.							

GENERATOR

J. Additional Descriptions for Materials Listed Above
a.
c.
d.

K. Handling Codes for Wastes Listed Above
a.
c.
d.

15. Special Handling Instructions and Additional Information
WSID # 10695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national governmental

Printed/Typed Name: Domerick Gasbarro
Signature: Domenic Gasbarro
Month Day Year: 08 28 96

TRANSPORTER

Printed/Typed Name: William Rogers
Signature
Month Day Year: 08 28 96

FACILITY

20. Discrepancy Indication Space

21. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name
Signature
Month Day Year

NJA 2637768

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State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. NJD000304782 Manifest Document No. 000069
2. Page 1 of 1
Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
~~[illegible]~~
~~[illegible]~~
One Stanley Street
E. Rutherford NJ 07073
(201) 847-7175

4. Generator's Phone ( )

A. State Manifest Document Number NJA 2637769
B. State Generator's ID (Gen. Site Address)

5. Transporter 1 Company Name: Horwith Trucking, Inc.
6. US EPA ID Number: PAD146714878
C. State Trans. ID-NJDEPE: 807110
Decal No.: 75198

7. Transporter 2 Company Name
8. US EPA ID Number
D. Transporter's Phone (215) 261-2220
E. State Trans. ID-NJDEPE
Decal No.
F. Transporter's Phone ( )

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
376 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number: OHD043243706
G. State Facility's ID
H. Facility's Phone (419) 698-3500

11. US DOT Description (Including Proper Shipping Name; Hazard Class or Division, ID Number and Packing Group)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	001	DT	49000	P	D008
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a.
b.
c.
d.

K. Handling Codes for Wastes Listed Above
a.
b.
c.
d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government [illegible]

[illegible] quantity generator, I certify that I have a program in place [illegible] to be economically practicable and that I have selected the [illegible] to minimize the [illegible] to human health and the environment; OR [illegible] quantity generator [illegible] the best waste management method that is available [illegible]

Printed/Typed Name: Domenick Gasbarro
Signature: Domenick Gasbarro/JM
Month Day Year: 082896

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: Booker Riddick
Signature: [illegible]
Month Day Year: [illegible]

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name
Signature
Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19
Printed/Typed Name
Signature
Month Day Year

GENERATOR / TRANSPORTER / FACILITY

NJA 2637769

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State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: N J D 0 0 0 3 0 4 7 8 2 — Manifest Document No.: 0 0 0 7 0

2. Page 1 of 1 — Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
1 Becton Drive
~~Franklin Lakes, NJ~~ One Stanley Street E. Rutherford NJ 07073

4. Generator's Phone (201) 847-7175

A. State Manifest Document Number: NJA 2637770

B. State Generator's ID (Gen. Site Address)

5. Transporter 1 Company Name: Norwith Trucking, Inc.

6. US EPA ID Number: F A D 1 4 6 7 1 4 6 7 8

C. State Trans. ID-NJDEPE: S 0 3 1 1 0 — Decal No.: 7 5 1 8 9

7. Transporter 2 Company Name

8. US EPA ID Number

D. Transporter's Phone ( )

E. State Trans. ID-NJDEPE: 215 201-2220 — Decal No.

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616

10. US EPA ID Number: O H D 0 4 5 2 4 3 7 0 4

F. Transporter's Phone ( )

G. State Facility's ID

H. Facility's Phone ( ) 419 698-3500

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	Waste No.
a.	X	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	0 0 1	D T	4 4 5 0 0	P	D 0 0 8
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above

a. c.

b. d.

K. Handling Codes for Wastes Listed Above

a. c.

b. d.

15. Special Handling Instructions and Additional Information

WSID # 18695-001
FRG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government [illegible] quantity generator [illegible] to reduce the volume and toxicity of waste generated to the degree I have determined [illegible] which minimizes the present [illegible] to minimize my waste generation [illegible] can afford.

Printed/Typed Name: Domenick Gasbarro — Signature: Domenick Gasbarro / jm — Month Day Year: 0 8 2 9 9 6

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name: Toni Faddell — Signature: [signature] — Month Day Year: 0 8 2 9 9 6

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name — Signature — Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name — Signature — Month Day Year

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State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. NJD000304282 Manifest Document No. 00071
2. Page 1 of 1

Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
~~1 Becton Drive~~
~~Franklin Lakes, NJ 07417-1880~~
One Stanley Street
E. Rutherford NJ 07073
(201) 847-7179

4. Generator's Phone ( )

A. State Manifest Document Number NJA 2637771

B. State Generator's ID (Gen. Site Address)

5. Transporter 1 Company Name: Horwith Trucking, Inc.
6. US EPA ID Number: PAD146714578

C. State Trans. ID-NJDEPE: S07110
Decal No.: 75145

7. Transporter 2 Company Name
8. US EPA ID Number

D. Transporter's Phone (215) 261-2220

E. State Trans. ID-NJDEPE
Decal No.

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616

10. US EPA ID Number: OHD045243706

F. Transporter's Phone ( )

G. State Facility's ID

H. Facility's Phone (419) 698-3500

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	001	DT	Est. 44000	P	D008
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a.
b.
c.
d.

K. Handling Codes for Wastes Listed Above
a.
b.
c.
d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government [illegible]

[illegible] generator, I certify that I have a [illegible] to the degree [illegible] that I have selected [illegible] human health and the environment OR [illegible] waste management method that is available [illegible]

Printed/Typed Name: Domenick Gasbarro
Signature: Domenick Gasbarro
Month Day Year: 08 29 96

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name
Signature
Month Day Year

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name
Signature
Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name
Signature
Month Day Year

GENERATOR

TRANSPORTER

FACILITY

EPA Form [illegible] (Rev. 9/88) Previous editions are obsolete. SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. NJD000104788 Manifest Document No. 000072
2. Page 1 of 1
Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
~~[illegible]~~
~~[illegible]~~
One Stanley Street
E. Rutherford NJ 07073
4. Generator's Phone (201) 847-7175

A. State Manifest Document Number NJA 2637772
B. State Generator's ID (Gen. Site Address)

5. Transporter 1 Company Name
Horwith Trucking, Inc.
6. US EPA ID Number PAD146714878
C. State Trans. ID-NJDEPE S07110
Decal No. 75225

7. Transporter 2 Company Name
8. US EPA ID Number
D. Transporter's Phone (215) 261-2220
E. State Trans. ID-NJDEPE
Decal No.

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number OHD045243706
F. Transporter's Phone ( )
G. State Facility's ID
H. Facility's Phone (419) 698-3500

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	001	DT	44000	P	D008
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a. c.
b. d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
#SID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are [illegible] packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government [illegible]

[illegible] certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined [illegible] selected [illegible] treatment, storage, or disposal currently available to me which minimizes [illegible] and the environment OR [illegible] quantity generated, I have made a good faith effort to minimize my [illegible] management method that is available [illegible] and affordable.

Domenick Gasbarro | Signature Domenick Gasbarro | Month Day Year 08 29 96

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name Robert Kesten | Signature [signature] | Month Day Year 09 29 96

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name | Signature | Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name | Signature | Month Day Year

NJA 2637772

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State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. NJD000304782 Manifest Document No. 200073
2. Page 1 of 1
Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
1 Becton Drive
Franklin Lakes, NJ 07417-1880
One Stanley Street
E. Rutherford NJ 07073
4. Generator's Phone ( ) (201) 847-7175

A. State Manifest Document Number NJA 2637773
B. State Generator's ID (Gen. Site Address)

5. Transporter 1 Company Name
Horwith Trucking, Inc.
6. US EPA ID Number PAD146714878
C. State Trans. ID-NJDEPE 807110
Decal No. 75275

7. Transporter 2 Company Name
8. US EPA ID Number
D. Transporter's Phone (215) 261-2220
E. State Trans. ID-NJDEPE
Decal No.

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number OBD045243706
F. Transporter's Phone ( )
G. State Facility's ID
H. Facility's Phone (419) 698-3500

	11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	HM X EQ, Hazardous Waste Solid, N.O.S., (DOOS), Class 9, NA 3077, PG III	001	DT	445.00	P	DOOS
b.						
c.						
d.						

J. Additional Descriptions for Materials Listed Above
a. c.
b. d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

I am a large quantity generator, I certify that [illegible] the volume and toxicity [illegible] to be economically practicable and that I have [illegible] storage or disposal [illegible] and future threat to human health and the environment [illegible] generator, I have made a [illegible] and select the best waste management method that is [illegible]

Printed/Typed Name: Domenick Gasbarro
Signature: Domenick Gasbarro/jm
Month Day Year: 08 29 96

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: [illegible]
Signature: [illegible]
Month Day Year: [illegible]

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name
Signature
Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19
Printed/Typed Name
Signature
Month Day Year

GENERATOR / TRANSPORTER / FACILITY

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete

SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

2 6 3 7 7 7 4

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: NJD000304789 — Manifest Document No.: 00074
2. Page 1 of 1 — Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address: Becton Dickinson & Company, One Stanley Street, E. Rutherford NJ 07073
4. Generator's Phone: (201) 847-7175

A. State Manifest Document Number: NJA 2637774
B. State Generator's ID (Gen. Site Address):

5. Transporter 1 Company Name: Horwith Trucking, Inc.
6. US EPA ID Number: PAD146714878
C. State Trans. ID-NJDEPE: 807110 — Decal No.: 75224

7. Transporter 2 Company Name:
8. US EPA ID Number:
D. Transporter's Phone: 215 261-2220
E. State Trans. ID-NJDEPE: — Decal No.:

9. Designated Facility Name and Site Address: Envirosafe Services of Ohio, 876 Otter Creek Road, Oregon, OH 43616
10. US EPA ID Number: UND045243706
F. Transporter's Phone:
G. State Facility's ID:
H. Facility's Phone: 419 698-3500

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	001	DT	4400	P	D008
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above: a. b. c. d.

K. Handling Codes for Wastes Listed Above: a. b. c. d.

15. Special Handling Instructions and Additional Information:
WSID # 18695-001
ERC # 171
24 Hour Phone # (201) 847-7175

16. **GENERATOR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government [illegible]

[illegible] large quantity generator I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined [illegible] of treatment, storage, or disposal currently available to me which minimizes the present [illegible] quantity generator, I have made a good faith effort to minimize my waste generation [illegible] can afford.

Printed/Typed Name: Domenick Gasbarro — Signature: Domenick Gasbarro / [illegible] — Month Day Year: 08 29 96

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: Peter Wittmann — Signature: Peter Wittmann — Month Day Year: 08 29 96

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name: — Signature: — Month Day Year:

19. Discrepancy Indication Space:

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: — Signature: — Month Day Year:

NJA 2637774

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete

SIGNATURE AND INFORMATION *MUST* BE LEGIBLE ON ALL COPIES

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: NJD000304[illegible] Manifest Document No.: 00080
2. Page 1 of 1
Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
~~1 Becton Drive~~
~~[illegible]~~
One Stanley Street
E. Rutherford NJ 07073
4. Generator's Phone (201) 847-7175

A. State Manifest Document Number: NJA 2637780
B. State Generator's ID (Gen. Site Address)
C. State Trans. ID-NJDEPE: S07119
Decal No.: 75850
D. Transporter's Phone (215) 261-2220
E. State Trans. ID-NJDEPE
Decal No.
F. Transporter's Phone ( )
G. State Facility's ID
H. Facility's Phone (419) 696-3500

5. Transporter 1 Company Name: Horwith Trucking, Inc.
6. US EPA ID Number: PAD146714878
7. Transporter 2 Company Name
8. US EPA ID Number
9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number: OHD045243706

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	001	DT	44000	P	D008
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a. c.
b. d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government [illegible]

Printed/Typed Name: Domenick Gasbarro
Signature: Domenick Gasbarro
Month Day Year: 08 29 96

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: [illegible]
Signature: [illegible]
Month Day Year: [illegible]

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name
Signature
Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in item 19.
Printed/Typed Name
Signature
Month Day Year

EPA Form [illegible] Rev. 9 (3) Previous editions are obsolete.
SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

2637729

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. N J D 0 0 9 3 0 4 7 8 2 | Manifest Document No. 001071 | 2. Page 1 of 1 | Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
~~1 Becton Drive~~
~~Franklin Lakes, NJ 07417-1880~~
One Stanley Street
E. Rutherford, NJ 07073
4. Generator's Phone ( ) ~~(201) 847-6800~~ (201) 847-7175

A. State Manifest Document Number: NJA 2637729
B. State Generator's ID (Gen. Site Address):

5. Transporter 1 Company Name: Horwith Trucking, Inc.
6. US EPA ID Number: P A D 1 4 6 7 1 4 8 7 8
C. State Trans. ID-NJDEPE: 8 0 7 1 1 0
Decal No.: 75285

7. Transporter 2 Company Name
8. US EPA ID Number
D. Transporter's Phone (215) 261-2220
E. State Trans. ID-NJDEPE
Decal No.

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number: O H D 0 4 5 2 4 3 7 0 6
F. Transporter's Phone ( )
G. State Facility's ID
H. Facility's Phone (419) 698-3500

	11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM	12. Containers No.	12. Containers Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	RQ, Hazardous Waste Solid, N.O.S., (BOO8), Class 9, NA 3077, PG III	X	001	DT	4980 Est.	P	D010
b.							
c.							
d.							

GENERATOR

J. Additional Descriptions for Materials Listed Above
a. c.
b. d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
USID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: DoMenick Gasbarro
Signature: Domenick Gasbarro
Month Day Year: 08 29 96

17. Transporter 1 Acknowledgement of Receipt of Materials

TRANSPORTER

Printed/Typed Name: RoBERT J. McCLAFFERTY
Signature: Robert J. McClafferty
Month Day Year: 08 29 96

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name
Signature
Month Day Year

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in item 19.

Printed/Typed Name
Signature
Month Day Year

NJA 2637729

EPA Form 8700-22 (Rev. 9-88) Previous editions are obsolete

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State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: N J D 0 0 0 3 0 4 7 8 2 — Manifest Document No.: 0 0 0 7 8
2. Page 1 of 1 — Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address: Becton Dickinson & Company, ~~1 Becton Drive~~ One Stanley Street, E. Rutherford NJ 07073
4. ~~[illegible]~~ (201) 847-7175

A. State Manifest Document Number: NJA 2637778
B. State Generator's ID (Gen. Site Address)

5. Transporter 1 Company Name: Herwith Trucking, Inc.
6. US EPA ID Number: P A D 1 4 6 7 1 4 8 7 8
C. State Trans. ID-NJDEPE: 8 0 7 1 1 0
Decal No.: 75210

7. Transporter 2 Company Name:
8. US EPA ID Number:
D. Transporter's Phone (219) 261-2220
E. State Trans. ID-NJDEPE:
Decal No.:

9. Designated Facility Name and Site Address: Envirosafe Services of Ohio, 876 Otter Creek Road, Oregon, OH 43616
10. US EPA ID Number: O R D 0 4 5 2 4 3 7 0 6
F. Transporter's Phone ( )
G. State Facility's ID
H. Facility's Phone (419) 698-3500

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	0 0 1	D T	Est. [illegible]	P	D 0 0 8
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above: a. b. c. d.
K. Handling Codes for Wastes Listed Above: a. b. c. d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government [illegible]

Printed/Typed Name: Domenick Gasbarro — Signature: Domenick Gasbarro — Month Day Year: 08 29 96

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: Paul Kreiger — Signature: [illegible] — Month Day Year: [illegible]

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name: — Signature: — Month Day Year:

19. Discrepancy Indication Space

20. Facility Owner or Operator Certification of receipt of hazardous materials covered by this manifest except as noted in item 19
Printed/Typed Name: — Signature: — Month Day Year:

EPA Form 8700-22, Rev. 9-88. Previous editions are obsolete.

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State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: NJD000304782 — Manifest Document No.: 00077
2. Page 1 of 1
Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
~~1 Becton Drive~~
~~Franklin Lakes, NJ 07417-1880~~
One Stanley Street
E. Rutherford NJ 07073
(201) 847-7175

4. Generator's Phone ( )

A. State Manifest Document Number: NJA 2687777
B. State Generator's ID (Gen. Site Address): 8796

5. Transporter 1 Company Name: Dare Trucking, Inc. — US EPA ID Number: OHD0[illegible]65825
C. State Trans. ID-NJDEPE: S0[illegible]
Decal No.: 72[illegible]

7. Transporter 2 Company Name
8. US EPA ID Number
D. Transporter's Phone (216) [illegible]
E. State Trans. ID-NJDEPE: 533-9841
Decal No.:

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number: OHD045243706
F. Transporter's Phone ( )
G. State Facility's ID
H. Facility's Phone (419) 698-3500

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	001	DT	Est. 44000	P	D008
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a. c.
b. d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government [illegible]

[illegible] generator, I certify that I have a program [illegible] to reduce the volume and toxicity of waste generated to the degree I have determined [illegible] and that I have selected [illegible] of treatment, storage or disposal [illegible] which minimizes the [illegible] health and the environment. OR [illegible] small quantity generator, I have made a good [illegible] minimize my waste [illegible] best waste management method that is available [illegible] can afford.

Printed/Typed Name: Domenick Gasbarro — Signature: Domenick Gasbarro /jm — Month Day Year: 08 29 96

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: JONAS J. MILLER — Signature: Jonas J. Miller 917 — Month Day Year: 08 29 96

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name — Signature — Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name — Signature — Month Day Year

NJA 2637777

EPA Form 8700-22 (Rev. 3/88) Previous editions are obsolete.

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State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: NJD000304788 — Manifest Document No.: 000076

2. Page 1 of 1 — Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address: Becton Dickinson & Company, One Stanley Street, E. Rutherford NJ 07073

4. Generator's Phone: (201) 847-7175

A. State Manifest Document Number: NJA 2837776

B. State Generator's ID (Gen. Site Address): 8796

5. Transporter 1 Company Name: Dort Trucking, Inc.

6. US EPA ID Number: OHD009865825

C. State Trans. ID-NJDEPE: 8077

Decal No.: 71947

7. Transporter 2 Company Name:

8. US EPA ID Number:

D. Transporter's Phone (216) [illegible]

E. State Trans. ID-NJDEPE: 533-9841

Decal No.:

9. Designated Facility Name and Site Address: Envirosafe Services of Ohio, 876 Otter Creek Road, Oregon, OH 43616

10. US EPA ID Number: OHD045243706

F. Transporter's Phone ( )

G. State Facility's ID

H. Facility's Phone (419) 698-3500

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	001	DT	440.00	P	DC08
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above: a. c. b. d.

K. Handling Codes for Wastes Listed Above: a. c. b. d.

15. Special Handling Instructions and Additional Information

WSID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator I certify that I have a program in place [illegible] to the degree I have determined to be economically practicable and that I have selected the [illegible] which minimizes the [illegible] and future threat to human health and the environment; OR [illegible] quantity [illegible] minimize my [illegible] and select the best waste management method that is available [illegible] I can afford.

Printed/Typed Name: Domenick Gasbarro — Signature: Domenick Gasbarro/[illegible] — Month Day Year: 08 29 96

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name: Scott Fritch — Signature: [illegible] — Month Day Year: 08 29 96

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name: — Signature: — Month Day Year:

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19

Printed/Typed Name: — Signature: — Month Day Year:

GENERATOR — TRANSPORTER — FACILITY

In case of an emergency or spill immediately call the state the emergency occurred in and the Dept. of Environmental Protection and Energy

EPA Form 8700-22 (Rev. 9-88) Previous editions are obsolete.

SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: NJD000304781 Manifest Document No.: 00075
2. Page 1 of 1
Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address: Becton Dickinson & Company, One Stanley Street, E. Rutherford NJ 07073
4. Generator's Phone: (201) 847-7175

A. State Manifest Document Number: NJA 2637775
B. State Generator's ID (Gen. Site Address):
C. State Trans. ID-NJDEPE: 807110
Decal No.: 75154
D. Transporter's Phone: (215) 261-2220
E. State Trans. ID-NJDEPE:
Decal No.:
F. Transporter's Phone:
G. State Facility's ID:
H. Facility's Phone: (419) 698-3500

5. Transporter 1 Company Name: Horwith Trucking, Inc.
6. US EPA ID Number: PAD146714878
7. Transporter 2 Company Name:
8. US EPA ID Number:
9. Designated Facility Name and Site Address: Envirosafe Services of Ohio, 876 Otter Creek Road, Oregon, OH 43616
10. US EPA ID Number: OHD045243706

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	001	DT	4 Est. 00	P	D008
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a. c.
b. d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
WSID # 16695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government [illegible] generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined [illegible] and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present [illegible] to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation [illegible] method that is available to me and that I can afford.

Printed Typed Name: Domenick Gasbarro
Signature: Domenick Gasbarro
Month Day Year: 08 29 96

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed Typed Name: Timothy D. Boyle
Signature: Timothy D. Boyle
Month Day Year: 08 29 96

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed Typed Name:
Signature:
Month Day Year:

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed Typed Name:
Signature:
Month Day Year:

EPA Form 8700-22 (Rev. 9-88) Previous editions are obsolete.

SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

NJA 2637775

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: N J D C 0 0 3 0 4 7 8 3 — Manifest Document No.: 0 0 0 1 4
2. Page 1 of 1 — Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
~~1 Becton Drive~~
~~Franklin Lakes, NJ 07417-1880~~
Fort Rutland NJ 07073
4. Generator's Phone (201) 847-7175

A. State Manifest Document Number: NJA 2637784
B. State Generator's ID (Gen. Site Address)

5. Transporter 1 Company Name: Horwith Trucking, Inc.
6. US EPA ID Number: P A D 1 4 6 7 1 4 8 7 8
C. State Trans. ID-NJDEPE: 8 0 7 1 1 0
Decal No.: 7 5 2 4 7

7. Transporter 2 Company Name
8. US EPA ID Number
D. Transporter's Phone (215) 261-2220
E. State Trans. ID-NJDEPE
Decal No.

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number: O H D 0 4 5 2 4 3 7 0 6
F. Transporter's Phone
G. State Facility's ID
H. Facility's Phone (410) 698-3500

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	1. Waste No.
a.	X	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	0 0 1	D T	Est. 4 4 2 0 0	P	D 0 0 8
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a. c.
b. d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
WSIP # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that I have available to me and that I can afford.

Printed/Typed Name: [illegible] — Signature: [illegible] — Month Day Year: 08 30 96

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: Ambro, J [illegible] — Signature: [illegible] — Month Day Year: 08 30 96

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name — Signature — Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name — Signature — Month Day Year

NJA 2637784

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete

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2 6 3 7 7 8 3

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

Please type or print in block letters. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039. Expires 9-30-96

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. NJD000304781 Manifest Document No. 00083
2. Page 1 of 1
Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
~~[illegible]~~
~~[illegible]~~
One Stanley Street
E. Rutherford NJ 07073
4. Generator's Phone ( ) (201) 847-7175

A. State Manifest Document Number NJA 2637783
B. State Generator's ID (Gen. Site Address)

5. Transporter 1 Company Name
Horwith Trucking, Inc.
6. US EPA ID Number PAD146714878
C. State Trans. ID-NJDEPE 607110
Decal No. 75843

7. Transporter 2 Company Name
8. US EPA ID Number
D. Transporter's Phone (215) 261-2220
E. State Trans. ID-NJDEPE
Decal No.

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number OHD045243706
F. Transporter's Phone ( )
G. State Facility's ID
H. Facility's Phone (419) 698-3500

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	EQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	001	DT	440 00 Est.	P	D008
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a. c.
b. d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government [illegible]

[illegible] a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree [illegible] to be economically practicable and that I have selected the [illegible] storage or disposal [illegible] and future threat to human health and the environment; OR, [illegible] quantity generator, I have made a good faith [illegible] and select the best waste management method that is available [illegible] can afford.

Printed/Typed Name: DoMenick Gasbarro
Signature: Domenick Gasbarro
Month Day Year: 08 29 96

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name
Signature
Month Day Year

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name
Signature
Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19
Printed/Typed Name
Signature
Month Day Year

NJA 2637783

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete.

SIGNATURE AND INFORMATION *MUST* BE LEGIBLE ON ALL COPIES

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

Please type or print in block letters. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039. Expires 9-30-96

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. N J D 0 0 1 3 0 4 7 8 2 — Manifest Document No. 0 0 0 9 1 2 — 2. Page 1 of 1 — Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
~~1 Becton Drive~~
~~Franklin Lakes, NJ 07417-1880~~
One Stanley Street
E. Rutherford NJ 07073
4. Generator's Phone (201) 847-7175

A. State Manifest Document Number NJA 2837782
B. State Generator's ID (Generator Address)
C. State Trans. ID-NJDEPE ID 8 0 7 1 1 0
Decal No. 75300

5. Transporter 1 Company Name
Horvith Trucking, Inc.
6. US EPA ID Number P A D 1 4 6 7 1 4 8 7 8
D. Transporter's Phone (315) 761-2120
E. State Trans. ID-NJDEPE ID
Decal No.

7. Transporter 2 Company Name
8. US EPA ID Number
F. Transporter's Phone ( )
G. State Facility's ID

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number O H D 0 4 5 2 6 3 7 0 6
H. Facility's Phone (419) 698-3500

	11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
GENERATOR a.	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, RA 3077, PG III	X	0 0 1	DT	440	P	D 0 0 8
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a. c.
b. d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
NESD # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government

[illegible] I have reduced the volume and toxicity of waste generated to the degree I have determined to be economically practicable and I have selected the method of treatment, storage or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: DOMenick Gasbarro
Signature: Domenick Gasbarro
Month Day Year: 08 29 96

17. Transporter 1 Acknowledgment of Receipt of Materials
Printed/Typed Name: [illegible]
Signature: [illegible]
Month Day Year: [illegible]

18. Transporter 2 Acknowledgment of Receipt of Materials
Printed/Typed Name
Signature
Month Day Year

19. Special Transportation Information Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name
Signature
Month Day Year

EPA Form 8700-22 (Rev. 3-89) Previous editions are obsolete.

SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

DESIGNATED FACILITY TO RECEIVE WASTE LISTED ON THIS MANIFEST UNDER RCRA PERMIT

Do not use this manifest if the waste listed on this manifest is subject to the land disposal restrictions of 40 CFR Part 268 and you have not received a notice or certification from your waste supplier.

2 6 3 7 7 8 1

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. NJD000304782 Manifest Document No. 000081
2. Page 1 of 1
Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
~~1 Becton Drive~~
~~Franklin Lakes, NJ 07417-1389~~
One Stanley Street
E. Rutherford, NJ 07073
4. Generator's Phone (201) 847-7175

A. State Manifest Document Number NJA 2637781
B. State Generator's ID (Gen. Site Address)

5. Transporter 1 Company Name: Norwith Trucking, Inc.
6. US EPA ID Number: PAD146714878
C. State Trans. ID-NJDEPE: S07110
Decal No.: 76260

7. Transporter 2 Company Name
8. US EPA ID Number
D. Transporter's Phone (215) 261-2220
E. State Trans. ID-NJDEPE
Decal No.
F. Transporter's Phone ( )

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number: OHD045243706
G. State Facility's ID
H. Facility's Phone (419) 698-3500

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	001	DT	44000	P	D008
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a. c.
b. d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: Domenick Gasbarro
Signature: Domenick Gasbarro
Month Day Year: 08 29 96

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: Michael Sherer
Signature: [illegible]
Month Day Year: 08 29 96

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name
Signature
Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in item 19
Printed/Typed Name
Signature
Month Day Year

GENERATOR / TRANSPORTER / FACILITY

NJA 2637781

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State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

2 6 3 7 7 8 7

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. N J D 0 0 3 0 4 7 8 2 | Manifest Document No. 2637787 | 2. Page 1 of 1 | Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
1 Becton Drive
Franklin Lakes, NJ 07417-1880
4. Generator's Phone (201) 847-7175

A. State Manifest Document Number NJA 2637787
B. State Generator's ID (Generator Address)
C. State Trans. ID-NJDEPE 8 0 3 1 0
Decal No. 75316
D. Transporter's Phone (215) 261-2120
E. State Trans. ID-NJDEPE
Decal No.
F. Transporter's Phone ( )
G. State Facility's ID
H. Facility's Phone (419) 698-3500

5. Transporter 1 Company Name: Horwith Trucking, Inc.
6. US EPA ID Number: P A D 1 4 6 7 1 4 8 7 8
7. Transporter 2 Company Name
8. US EPA ID Number
9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number: O H D 0 4 5 2 4 8 7 0 6

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM	12. Containers No.	12. Containers Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	X	001	DF	11000	P	D 0 0 8
b.						
c.						
d.						

J. Additional Descriptions for Materials Listed Above
a.
b.
c.
d.

K. Handling Codes for Wastes Listed Above
a.
b.
c.
d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government

Printed/Typed Name | Signature | Month Day Year

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name | Signature | Month Day Year

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name | Signature | Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name | Signature | Month Day Year

EPA Form 8700-22 Rev. 3-86 Previous editions are obsolete.

SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

2 6 3 7 7 8 8

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: NJ0000304782 — Manifest Document No.: 00072
2. Page 1 of 1 — Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
~~1 Becton Drive~~ One Stone
~~Franklin Lakes, NJ 07417-1880~~

4. Generator's Phone: (201) 847-7175

A. State Manifest Document Number: NJA 2637788
B. State Generator's ID (Gen. Site Address)

5. Transporter 1 Company Name: Horwitz Trucking, Inc.
6. US EPA ID Number: PAD146718878
C. State Trans. ID-NJDEPE: 807110
Decal No.: 75215

7. Transporter 2 Company Name:
8. US EPA ID Number:
D. Transporter's Phone: 215 261-2220
E. State Trans. ID-NJDEPE:
Decal No.:

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number: OHD045245706
F. Transporter's Phone:
G. State Facility's ID:
H. Facility's Phone: 419 698-9500

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	001	DT	77000	P	D008
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a. c.
b. d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree [illegible] economically practicable and that I have selected the practicable method of treatment, storage or disposal currently available to [illegible] for future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize [illegible] waste management method that is available to me and that I can afford.

Printed/Typed Name: [illegible] — Signature: [illegible] — Month Day Year: 0030 96

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: Jeff [illegible] — Signature: — Month Day Year:

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name: — Signature: — Month Day Year:

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19
Printed/Typed Name: — Signature: — Month Day Year:

GENERATOR — TRANSPORTER — FACILITY

EPA Form 8700-22 (Rev. 9-88) Previous editions are obsolete.

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State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

2 6 3 7 7 8 6

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: N J D 0 0 0 3 0 4 7 8 2 — Manifest Document No.: 000486
2. Page 1 of 1 — Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
~~1 Becton Drive~~ One Stanley Street
~~Franklin Lakes, NJ 07417-1880~~ Fairfield NJ 07073
4. Generator's Phone (201) 847-7175

A. State Manifest Document Number: NJA 2637786
B. State Generator's ID (Generator Site Address)

5. Transporter 1 Company Name: Horwith Trucking, Inc.
6. US EPA ID Number: P A D 1 4 6 7 1 4 8 7 8
C. State Trans. ID-NJDEPE: 5 0 7 1 1 0
Decal No.: 75261

7. Transporter 2 Company Name
8. US EPA ID Number
D. Transporter's Phone (215) 261-2220
E. State Trans. ID-NJDEPE
Decal No.
F. Transporter's Phone ( )
G. State Facility's ID
H. Facility's Phone (419) 698-3500

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number: O N D 0 4 5 2 4 3 7 0 6

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	0 0 1	D T	11000 Est.	P	D 0 0 8
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a. c.
b. d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal [illegible] to me which [illegible] the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and [illegible] can afford.

Printed/Typed Name: [illegible] — Signature: [illegible] — Month Day Year: [illegible]

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: EARL KUNKEL — Signature: Earl Kunkel — Month Day Year: 0 3 0 96

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name — Signature — Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name — Signature — Month Day Year

GENERATOR — TRANSPORTER — FACILITY

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete

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State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

2637785

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. | Manifest Document No. | 2. Page 1 of 1 | Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
1 Becton Drive One Stanhope Street 07875
Franklin Lakes, NJ 07417-1880
4. Generator's Phone (201) 847-7175

A. State Manifest Document Number NJA 2637785
B. State Generator's ID (Gen. Site Address) 8796
5. Transporter 1 Company Name
Barrett Trucking, Inc.
6. US EPA ID Number
C. State Trans. ID-NJDEPE 1 5 0 7 3 3
Decal No. 19357
7. Transporter 2 Company Name
8. US EPA ID Number
D. Transporter's Phone (215) 261-2220
E. State Trans. ID-NJDEPE
Decal No.
9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number
F. Transporter's Phone ( )
G. State Facility's ID
H. Facility's Phone (419) 698-3500

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. NA, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	X	001	DT	1700	P	D008
b.						
c.						
d.						

GENERATOR

J. Additional Descriptions for Materials Listed Above
K. Handling Codes for Wastes Listed Above

a.	c.	a.	c.
b.	d.	b.	d.

15. Special Handling Instructions and Additional Information
WSID # 13695-001
ERG # 171
24 hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name [illegible] Signature Dominick Gadaleto Jr. Month 08 Day 30 Year 96

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name JAMES R DURHAM Signature [signature] Month 08 Day 31 Year 96

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name Signature Month Day Year

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name Signature Month Day Year

NJA 2637785

EPA Form 8700-22 (Rev. 9-88) Previous editions are obsolete.

SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

2437798

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. NJD003067182 | Manifest Document No. 100918 | 2. Page 1 of 1 | Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
~~1 Becton Drive~~ One Stanley Street
~~Franklin Lakes NJ 07417-1880~~ E. Rutherford NJ 07073
4. Generator's Phone (201) 847-7175

A. State Manifest Document Number NJA 2437798
B. State Generator's ID (Gen. Site Address)

5. Transporter 1 Company Name: Horvath Trucking, Inc.
6. US EPA ID Number: PAD066778888
C. State Trans. ID-NJDEPE: 807111110
Decal No.: 75312

7. Transporter 2 Company Name
8. US EPA ID Number
D. Transporter's Phone ( ) 215 261-2320
E. State Trans. ID-NJDEPE
Decal No.

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number: OHD004558788
F. Transporter's Phone ( )
G. State Facility's ID
H. Facility's Phone (419) 698-3500

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division. ID Number and Packing Group)	HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	X	001	DM	44000	P	D008
b.						
c.						
d.						

J. Additional Descriptions for Materials Listed Above
a.
b.
c.
d.

K. Handling Codes for Wastes Listed Above
a.
b.
c.
d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: Domenick Gasbarro | Signature: Domenick Gasbarro | Month Day Year: 09 03 96

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name | Signature | Month Day Year

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name | Signature | Month Day Year

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name | Signature | Month Day Year

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete. SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

GENERATOR

INSTRUCTIONS

OMB 2050-0039

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: NJD000304782 Manifest Document No.: 00097
2. Page 1 of 1
Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
~~1 Becton Drive~~
~~Franklin Lakes, NJ 07417-1880~~
One Stanley Street
E. Rutherford NJ 07073
4. Generator's Phone ( ) (201) 847-7175

A. State Manifest Document Number: NJA 2637787
B. State Generator's ID (Gen. Site Address):

5. Transporter 1 Company Name: Horwith Trucking, Inc.
6. US EPA ID Number: PAD146714676
C. State Trans. ID-NJDEPE: 892110
Decal No.: 13335

7. Transporter 2 Company Name:
8. US EPA ID Number:
D. Transporter's Phone (215) 261-2220
E. State Trans. ID-NJDEPE:
Decal No.:

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number: OHD045243706
F. Transporter's Phone ( )
G. State Facility's ID:
H. Facility's Phone (419) 698-3500

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	001	DT	44000	P	D008
b.							
c.							

J. Additional Descriptions for Materials Listed Above
a. c.
b. d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government [illegible]

[illegible] generator, I [illegible] that I have a proper [illegible] the volume and toxicity of waste generated to the degree I have determined [illegible] selected [illegible] storage or disposal currently available to me which minimizes the present [illegible] threat to human health and the environment; OR, [illegible] quantity generator, I have made a good faith effort to minimize my waste generation [illegible] management method that is available [illegible] afford.

Printed/Typed Name: Domenick Gasbarro
Signature: Domenick Gasbarro/jm
Month Day Year: 09 03 96

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: Richard A Siffies
Signature: Richard A Siffies
Month Day Year: 09 03 96

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name:
Signature:
Month Day Year:

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name:
Signature:
Month Day Year:

NJA 2637787

EPA Form 8700-12, Rev. 9/88 (Previous editions are obsolete)

SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: N J D 0 0 3 0 4 7 8 2 — Manifest Document No.: 0 0 0 9 6
2. Page 1 of 1
Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
~~1 Becton Drive~~
~~Franklin Lakes, NJ 07417-1880~~
One Stanley Street
E. Rutherford NJ 07073
(201) 847-7175

A. State Manifest Document Number: NJA 2637796
B. State Generator's ID (Gen. Site Address)

5. Transporter 1 Company Name: Norwith Trucking, Inc.
6. US EPA ID Number: P A D 1 4 5 7 1 4 8 7 8
C. State Trans. ID-NJDEPE: 8 0 7 1 1 0
Decal No.: 7 5 2 7 9

7. Transporter 2 Company Name
8. US EPA ID Number
D. Transporter's Phone (215) 261-2220
E. State Trans. ID-NJDEPE
Decal No.
F. Transporter's Phone ( )
G. State Facility's ID
H. Facility's Phone (619) 698-3500

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number: O H D 0 4 5 1 4 3 7 0 6

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	0 0 1	D F	4 4 0 0 0	P	D 0 0 8
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a.
b.
c.
d.

K. Handling Codes for Wastes Listed Above
a.
b.
c.
d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.
If I am a large quantity generator, I certify that I have a program in place to [illegible] generated to the degree I have determined [illegible] to me which [illegible] the future threat to human health and the environment OR [illegible] to minimize [illegible] and select the best waste management method that is available [illegible]

Printed/Typed Name: Domenick Gasbarro
Signature: Domenick Gasbarro
Month Day: 0 9 0 3 9 6

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: [illegible]
Signature
Month Day Year

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name
Signature
Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name
Signature
Month Day Year

GENERATOR / TRANSPORTER / FACILITY

NJA 2637796

EPA Form 8700-22 (Rev. 3-88) Previous Edition [illegible]
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State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

2 6 3 7 7 9 5

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: NJD000304782 — Manifest Document No.: 00075
2. Page 1 of 1
Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
~~1 Becton Drive~~
~~Franklin Lakes, NJ 07417-1880~~
One Stanley Street
E. Rutherford NJ 07073
4. Generator's Phone (201) 847-7175

A. State Manifest Document Number: NJA 2637795
B. State Generator's ID (Gen. Site Address)

5. Transporter 1 Company Name: Horwith Trucking, Inc.
6. US EPA ID Number: PAD146714878
C. State Trans. ID-NJDEPE: S07110
Decal No.: 75225

7. Transporter 2 Company Name
8. US EPA ID Number
D. Transporter's Phone (215) 261-2220
E. State Trans. ID-NJDEPE
Decal No.
F. Transporter's Phone ( )

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number: OHD045243706
G. State Facility's ID
H. Facility's Phone (419) 698-3300

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	001	DT	44000	P	D008
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a. c.
b. d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government [illegible]

[illegible] I certify that I have a program in [illegible] volume and toxicity of waste generated to the degree I have determined [illegible] which [illegible] to [illegible] health and the environment, OR, [illegible] I have made a good faith effort to minimize my waste generation [illegible] that is available [illegible]

Printed/Typed Name: Domenick Gasbarro
Signature: Domenick Gasbarro
Month Day Year: 09 03 96

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: Robert Kester
Signature: [illegible]
Month Day Year: 09 03 96

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name
Signature
Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name
Signature
Month Day Year

NJA 2637795

EPA Form 8700-22 Rev. 3-88 Previous editions are obsolete

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State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. NJD000304783 Manifest Document No. 000192

2. Page 1 of 1

Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
1 Becton Drive
Franklin Lakes, NJ 07417-1880

4. Generator's Phone (201) 847-7175

A. State Manifest Document Number NJA 2637794

B. State Generator's ID (Gen. Site Address)

5. Transporter 1 Company Name: Horwith Trucking, Inc.

6. US EPA ID Number: PAD146714878

C. State Trans. ID-NJDEPE: 507110
Decal No.: 7 3 3 2

7. Transporter 2 Company Name

8. US EPA ID Number

D. Transporter's Phone ( ) 219 261-2220

E. State Trans. ID-NJDEPE
Decal No.

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616

10. US EPA ID Number: OHD045243705

F. Transporter's Phone ( )

G. State Facility's ID

H. Facility's Phone ( ) 419 698-3500

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	001	DT	Est.	P	D008
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a.
b.
c.
d.

K. Handling Codes for Wastes Listed Above
a.
b.
c.
d.

15. Special Handling Instructions and Additional Information
WBID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government [illegible]

[illegible] large quantity generator, I certify that I have a program in place [illegible] to the degree [illegible] to be [illegible] practicable and that I have selected the [illegible] threat to human health and the environment OR [illegible] to minimize [illegible] waste management method that [illegible]

Printed/Typed Name | Signature | Month Day Year

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: Michael Silfie | Michael Silfie | Month Day Year: 08 30 96

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name | Signature | Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19
Printed/Typed Name | Signature | Month Day Year

GENERATOR

TRANSPORTER

FACILITY

NJA 2637794

EPA Form [illegible] Previous editions are obsolete

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State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. NJD000304782 Manifest Document No. 000 13
2. Page 1 of 1
Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
~~1 Becton Drive~~ One Stone St.
~~Franklin Lakes, NJ 07417-1880~~ E. Rutherford NJ 07073
4. Generator's Phone (201) 847-7175

A. State Manifest Document Number NJA 2637793
B. State Generator's ID (Gen. Site Address) 8796
C. State Trans. ID-NJDEPE 8 0 7 1 1 0
Decal No. 72050
D. Transporter's Phone (215) 261-2220
E. State Trans. ID-NJDEPE
Decal No.
F. Transporter's Phone ( )
G. State Facility's ID
H. Facility's Phone (419) 698-3500

5. Transporter 1 Company Name
~~Horsfall~~ Trucking, Inc.
6. US EPA ID Number OHD 0 0 4 5 8 2 5
7. Transporter 2 Company Name
8. US EPA ID Number

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number OHD045248706

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	001	DT	1/Ent. 00	P	D008
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a. c.
b. d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

[illegible] I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined [illegible] to be economically [illegible] and further [illegible] health and the environment OR [illegible] effort to minimize my waste generation [illegible]

Printed/Typed Name: [illegible] Signature: Domenick Gasbarro Jr. Month Day Year 083096

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: Gerald W. Yerkey Signature: Gerald W. Yerkey Month Day Year 083096

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name Signature Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19
Printed/Typed Name Signature Month Day Year

GENERATOR

FACILITY

EPA Form 8700-22 Rev. 9/88 Previous editions are obsolete. SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES.

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State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. NJD000304782 Manifest Document No. 000092

2. Page 1 of 1

Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
1 Becton Drive
Franklin Lakes, NJ 07417-1880 (201) 847-7175 (707)

A. State Manifest Document Number NJA 2637792

B. State Generator's ID (Gen. Site Address)

5. Transporter 1 Company Name: Horwith Trucking, Inc.

6. US EPA ID Number: PAD146714878

C. State Trans. ID-NJDEPE: 507110
Decal No.: 75277

7. Transporter 2 Company Name

8. US EPA ID Number

D. Transporter's Phone (215) 261-2220

E. State Trans. ID-NJDEPE
Decal No.

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616

10. US EPA ID Number: OHD045243706

F. Transporter's Phone ( )

G. State Facility's ID

H. Facility's Phone (419) 698-3500

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	001		[illegible]	P	D008
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a. c.
b. d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal [illegible] which [illegible] and future threat to human health and the environment; OR, [illegible] quantity generator, I have made a [illegible] to minimize [illegible] and select the best waste management method that is available [illegible] cal. attest.

Printed/Typed Name: [illegible] Signature: Dominick Gasbarrone Month Day Year: 083096

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: Tom Ruch Signature: [illegible] Month Day Year: 083096

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name Signature Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in item 19
Printed/Typed Name Signature Month Day Year

GENERATOR

TRANSPORTER

FACILITY

NJA 2637792

EPA Form 8700-22, Rev. 9 (88) Previous editions are obsolete. SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. NJD000304782 Manifest Document No. 00091
2. Page 1 of 1
Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
~~1 Becton Drive~~ One Stone Street
~~Franklin Lakes, NJ 07417-1880~~ Franklin NJ 07473
4. Generator's Phone (201) 847-7175

A. State Manifest Document Number NJA 2637791
B. State Generator's ID (Gen. Site Address)
C. State Trans. ID-NJDEPE 50-1110
Decal No. 73307
D. Transporter's Phone (215) 261-2220
E. State Trans. ID-NJDEPE
Decal No.
F. Transporter's Phone ( )
G. State Facility's ID
H. Facility's Phone (419) 698-3500

5. Transporter 1 Company Name
Horwith Trucking, Inc.
6. US EPA ID Number PAD146714878

7. Transporter 2 Company Name
8. US EPA ID Number

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number OHD045243706

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	15. Waste No.
a.	X	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	001	DT	44,000	P	D008
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a. c.
b. d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government [illegible]

[illegible] a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined [illegible] storage, or disposal currently available to me which minimizes the present [illegible] to human health [illegible] generator, I have made a good faith effort to minimize my waste generation [illegible] afford.

Printed/Typed Name [illegible] Signature Domenick Gasbarro Jr. Month Day Year 08 30 96

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name George Vaud Signature [illegible] Month Day Year 08 30 96

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name Signature Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name Signature Month Day Year

NJA 2637791

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete.

SIGNATURE AND INFORMATION *MUST* BE LEGIBLE ON ALL COPIES

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. N J 0 0 0 3 0 8 7 8 2 — Manifest Document No. 000010 — 2. Page 1 of 1 — Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
1 Becton Drive One Steele Street
Franklin Lakes, NJ 07417-1880 07073

4. Generator's Phone (201) 847-7175

A. State Manifest Document Number: NJA 2837780

B. State Generator's ID (Generator Address)

5. Transporter 1 Company Name: Horwith Trucking, Inc.

6. US EPA ID Number: P A D 1 4 6 1 4 8 7 6

C. State Trans. ID-NJDERE 8 0 7 1 1 0 — Decal No. 9 5 1 1 5

7. Transporter 2 Company Name

8. US EPA ID Number

D. Transporter's Phone (215) 261-2226

E. State Trans. ID-NJDERE

Decal No.

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616

10. US EPA ID Number: O H D 0 4 8 4 8 9 0 6

F. Transporter's Phone ( )

G. State Facility's ID

H. Facility's Phone (419) 698-3500

	11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	RQ, Hazardous Waste Solid, N.O.S., (D003), Class 9, NA 3077, PG III	X	0 0 1	DT	4Ref100	P	D 0 0 3
b.							
c.							
d.							

GENERATOR

J. Additional Descriptions for Materials Listed Above

a. c.

b. d.

K. Handling Codes for Wastes Listed Above

a. c.

b. d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
ERG # 171
24 hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: [illegible] Signature: [signature] Month 10 Day 30 Year 96

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name: [illegible] Signature: Month Day Year

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name Signature Month Day Year

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name Signature Month Day Year

NJA 2837780

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete

SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

2 6 3 7 7 8 9

Please type or print in block letters. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039. Expires 9-30-96

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. N J D 0 0 3 0 4 7 8 2 | Manifest Document No. 000169 | 2. Page 1 of 1 | Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
1 Becton Drive
Franklin Lakes, NJ 07417-1880
4. Generator's Phone ( ) (201) 847-7175

A. State Manifest Document Number NJA 2637789
B. State Generator's ID (Gen. Site Address)
C. State Trans. ID-NJDEPE 18-7111-0
Decal No. 175355
D. Transporter's Phone (215) 261-2220
E. State Trans. ID-NJDEPE
Decal No.
F. Transporter's Phone ( )
G. State Facility's ID
H. Facility's Phone (419) 698-3500

5. Transporter 1 Company Name: Horwith Trucking, Inc.
6. US EPA ID Number: P A D 1 4 6 7 1 6 8 7 6
7. Transporter 2 Company Name
8. US EPA ID Number
9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number: O H D 0 4 8 4 8 9 0 6

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM	12. Containers No.	12. Containers Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	X	001	DF	00110	P	D008
b.						
c.						
d.						

J. Additional Descriptions for Materials Listed Above
a. c.
b. d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
WSIB # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government

Printed/Typed Name: D. Mc
Signature: Dennis Conroy
Month Day Year: 04 30 96

17. Transportation Acknowledgement of Receipt of Materials
Printed/Typed Name: FRANK EECKHOUT
Signature
Month Day Year: 04 30 96

18. Discrepancy Indication Space

19. Hazardous Waste Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name
Signature
Month Day Year

EPA Form 8700-22 (Rev. 9-85) Previous editions are obsolete.

SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 421, Trenton, NJ 08625-0421

2 6 3 7 7 9 9

Please type or print in block letters. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039. Expires 9-30-96

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: NJD000304782 Manifest Document No.: 00079
2. Page 1 of 1
Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson & Company
~~[illegible] Drive~~
~~[illegible]~~
One Stanley Street
E. Rutherford NJ 07073
4. Generator's Phone ( ) (201) 847-7175

A. State Manifest Document Number: NJA 2637799
B. State Generator's ID (Gen. Site Address):

5. Transporter 1 Company Name: Horwith Trucking, Inc.
6. US EPA ID Number: PAD146714878
C. State Trans. ID-NJDEPE: 807110
Decal No.: 75850

7. Transporter 2 Company Name:
8. US EPA ID Number:
D. Transporter's Phone (215) 261-2220
E. State Trans. ID-NJDEPE:
Decal No.:

9. Designated Facility Name and Site Address
Envirosafe Services of Ohio
876 Otter Creek Road
Oregon, OH 43616
10. US EPA ID Number: OBD045260706
F. Transporter's Phone ( )
G. State Facility's ID:
H. Facility's Phone (419) 698-3500

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	RQ, Hazardous Waste Solid, N.O.S., (D008), Class 9, NA 3077, PG III	001	DT	4 Esc.	P	D008
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a. c.
b. d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
WSID # 18695-001
ERG # 171
24 Hour Phone # (201) 847-7175

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government [illegible]

[illegible] quantity generator, I certify that I have a [illegible] place to reduce the volume and toxicity of waste generated to the degree I have determined [illegible] method of treatment, storage, or disposal currently available to me which minimizes the present and [illegible] threat to human health and the environment, OR [illegible] a small quantity generator, I have made a good faith effort to minimize my waste generation [illegible] that I can afford.

Printed/Typed Name: Domenick Gasbarro
Signature: Domenick Gasbarro
Month Day Year: 09 03 96

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: [illegible]
Signature: [illegible]
Month Day Year: [illegible]

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name:
Signature:
Month Day Year:

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name:
Signature:
Month Day Year:

SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

State of New Jersey
Department of Environmental Protection
Division of Hazardous Waste Management
Manifest Section
CN 028, Trenton, NJ 08625

Please type or print in block letters. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039. Expires 9-30-94

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. N J D 0 0 0 3 0 4 7 8 2 Manifest Document No. 07007

2. Page 1 of 1

Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson and Company
1 Becton Drive, Franklin Lakes, New Jersey 07417-1880
SITE: 1 STANLEY STREET EAST RUTHERFORD NJ 07073

4. Generator's Phone (201) 848-6800

A. State Manifest Document Number NJA 1530697

B. State Generator's ID

5. Transporter 1 Company Name PAGE ETC

6. US EPA ID Number NY D 1 8 6 7 6 7 7 4 7

C. State Trans. ID NJDEPS 50010

7. Transporter 2 Company Name

8. US EPA ID Number

D. Transporter's Phone (800) 230 5037

E. State Trans. ID

9. Designated Facility Name and Site Address
American Landfill, Inc.
7916 Chapel Street, SE
Waynesburg, OH 44688

10. US EPA ID Number NONE

F. Transporter's Phone ( )

G. State Facility's ID 330 866 3265

H. Facility's Phone ( )

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number) HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. X	Environmentally Hazardous Substances, Solid, N.O.S., Class 9, PG III NA3077 (Lead)	001	DT	00018	Y	C306
b.						
c.						
d.						

J. Additional Descriptions for Materials Listed Above
a. S.T (Lead)
c.
b.
d.

K. Handling Codes for Wastes Listed Above
a. D 8 0
c.
b.
d.

15. Special Handling Instructions and Additional Information
Material is Non-RCRA Regulated. Material is only regulated in NJ as a Hazardous Waste - Waste #C306.
Emergency Contact: Dominick Gasbarro (201) 847-7175
Approval #18216

NJ DEPL # 78447

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national [illegible]

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have [illegible] the present and [illegible] human health and the [illegible] and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name [illegible] Signature [illegible] Month Day Year 09 04 96

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name Fred St John Signature [signature] Month Day Year 09 04 96

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name Signature Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name Signature Month Day Year

GENERATOR

TRANSPORTER

FACILITY

EPA Form 8700-22 (Rev. 9-88) Previous editions are obsolete.

SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

NJA 1530697

AMERICAN LANDFILL, INC. MAHONING LANDFILL, INC.

EAST LIVERPOOL LANDFILL, INC.

SUBSIDIARIES OF AMERICAN WASTE SERVICES, INC. NJA 1530697

ONE AMERICAN WAY • WARREN, OHIO • 44484-5555 • (216) 856-8800

** PLEASE NOTE AREA CODE CHANGE (330) 856-8800 EFFECTIVE MARCH 9,1996

NON-HAZARDOUS WASTE MANIFEST DOCUMENT NO. 347408

THIS SECTION TO BE COMPLETED BY GENERATOR:

COMPANY NAME	ADDRESS	WASTE I.D. NUMBER
BECTON DICKINSON & CO.	1 BECTON DRIVE	18216
	FRANKLIN LAKES, NJ 07417 (CITY / STATE / ZIP)	P.O. NUMBER

NAME OR DESCRIPTION OF WASTE(S) SHIPPED

METALS CONTAMINATED SOIL

COMMENTS

WASTE SITE LOCATION: STANLEY ST. EAST RUTHERFORD, NJ
P.O. # X-12824

	NAME	PHONE NO.	24 HR. EMERGENCY NO.
IN CASE OF AN EMERGENCY OR SPILL, CONTACT	BRIAN LOGUE	(330) 533-9841	(216) 467-2885
	DOMENICK GASBARRO	(201) 847-7175	(201) 847-7175

I Hereby certify that the above named waste(s) are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the DOT and the EPA.

GENERATOR'S SIGNATURE Domenick Gasbarro DATE 9/4/96

THIS SECTION TO BE COMPLETED BY THE HAULER/TRANSPORTER:

COMPANY NAME	ADDRESS	PHONE NO.
PAGE ETC.	Woodsport, NY	(800) 230-5037

VEHICLE I.D. NO.	STATE	BOX NUMBER-IN	BOX NUMBER-OUT	JOB NO.
T4A 695	NJ			

I Hereby certify that the above described waste(s) were accepted for transportation at the producer's site for delivery to the waste facility. Both as listed hereupon.

PRINT DRIVER'S NAME Fred St John

DRIVER'S SIGNATURE

DATE 9/4/96

THIS SECTION TO BE COMPLETED BY RECEIVER AT DISPOSAL FACILITY:

FACILITY NAME	ADDRESS	PHONE NO.
AMERICAN LANDFILL, INC.	7916 CHAPEL STREET S.E. WAYNESBURG, OH 44688	(330) 866-3265

COMMENTS

I Hereby certify that the above described wastes were delivered to this Facility, that the Facility is authorized and permitted to receive such wastes.

AUTHORIZED SIGNATURE

DATE

QUANTITY TO BE DETERMINED AT DISPOSAL FACILITY

GENERATOR - COPY 1

SEE LANDFILL RULES AND REGULATIONS ON BACK

GENERATOR: Copies 1 & 6 AWS INVOICING DEPT: Copies 2 & 3 DISPOSAL FACILITY: Copy 4 HAULER: Copy 5

State of New Jersey
Department of Environmental Protection
Division of Hazardous Waste Management
Manifest Section
CN 028, Trenton, NJ 08625

Please type or print in block letters. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039. Expires 9-30-94

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. N J D 0 0 0 3 0 4 7 8 2 Manifest Document No. 01062
2. Page 1 of 1
Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson and Company
1 Becton Drive, Franklin Lakes, New Jersey 07417-1880
201 848-6800
SITE : 1 STANLEY ST. C. RUTHERFORD, NJ 07073

A. State Manifest Document Number NJA 1530698

B. State Generator's ID.

4. Generator's Phone ( )

5. Transporter 1 Company Name PAGE ETC
6. US EPA ID Number NYD986696947
C. State Trans. ID NJMS00110
D. Transporter's Phone (800) 230 5037

7. Transporter 2 Company Name
8. US EPA ID Number
E. State Trans. ID

9. Designated Facility Name and Site Address
American Landfill, Inc.
7916 Chapel Street, SE
Waynesburg, OH 44688
10. US EPA ID Number NONE
F. Transporter's Phone ( )
G. State Facility's ID
H. Facility's Phone ( ) 330 866-4265

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol.	I. Waste No.
a. Environmentally Hazardous Substances, Solid, N.O.S., Class 9, PG III NA3077 (Lead)	X	001	DT	00018	Y	C106
b.						
c.						
d.						

J. Additional Descriptions for Materials Listed Above
a. S.T (Lead)
c.
e.

K. Handling Codes for Wastes Listed Above
a. D80
c.
e. d.

15. Special Handling Instructions and Additional Information
Material is Non-RCRA Regulated. Material is only regulated in NJ as a Hazardous Waste - Waste #C106.
Emergency Contact: Dominick Gasbarro (201) 847-7175
Approval #18216
NJ Status Ha 37L

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled/placarded and are in all respects in proper condition for transport by highway according to applicable international and national governmental regulations.
If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: Dominick Gasbarro
Signature: Dominick Gasbarro Jr.
Month Day Year: 09 04 96

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: Steven M Thompson
Signature:
Month Day Year: 09 04 96

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name
Signature
Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name
Signature
Month Day Year

NJA 1530698

EPA Form 8700-22 (Rev. 9-88) Previous editions are obsolete.

SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

AMERICAN LANDFILL, INC. **MAHONING LANDFILL, INC.**

EAST LIVERPOOL LANDFILL, INC. * NJA 1530698

SUBSIDIARIES OF AMERICAN WASTE SERVICES, INC.

** PLEASE NOTE AREA CODE CHANGE (330) 856-8800 EFFECTIVE MARCH 9, 1996

ONE AMERICAN WAY - WARREN, OHIO - 44484-5555 - (216) 856-8800

NON-HAZARDOUS WASTE MANIFEST

DOCUMENT NO. 347409

THIS SECTION TO BE COMPLETED BY GENERATOR:

COMPANY NAME	ADDRESS	WASTE I.D. NUMBER
BECTON DICKINSON & CO.	1 BECTON DRIVE	18216
	FRANKLIN LAKES, NJ 07417	P.O. NUMBER
	CITY STATE ZIP	

NAME OR DESCRIPTION OF WASTE(S) SHIPPED
METALS CONTAMINATED SOIL

COMMENTS
WASTE SITE LOCATION: STANLEY ST. EAST RUTHERFORD, NJ
P.O. # X-12824

	NAME	PHONE NO.	24 HR. EMERGENCY NO.
IN CASE OF AN EMERGENCY OR SPILL, CONTACT	BRIAN LOGUE	(330) 533-9841	(216) 467-2885
	DOMENICK GASBARRO	(201) 847-7175	(201) 847-7175

I Hereby certify that the above named waste(s) are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the DOT and the EPA.

GENERATOR'S SIGNATURE Domenick Gasbarro Jr. DATE 9/4/96

THIS SECTION TO BE COMPLETED BY THE HAULER/TRANSPORTER:

COMPANY NAME	ADDRESS	PHONE NO.
PAGE ETC	WOODSBORO, MD	(800) 230-5037

VEHICLE I.D. NO.	STATE	BOX NUMBER-IN	BOX NUMBER-OUT	JOB NO.
T200WR	OH			

I Hereby certify that the above described waste(s) were accepted for transportation at the producer's site for delivery to the waste facility. Both as listed hereupon.

PRINT DRIVER'S NAME Steven M Thompson DATE 9/4/96

DRIVER'S SIGNATURE

THIS SECTION TO BE COMPLETED BY RECEIVER AT DISPOSAL FACILITY:

FACILITY NAME	ADDRESS	PHONE NO.
AMERICAN LANDFILL, INC.	7916 CHAPEL STREET S.E. WAYNESBURG, OH 44688	(330) 866-3265

COMMENTS

I Hereby certify that the above described wastes were delivered to this Facility, that the Facility is authorized and permitted to receive such wastes.	AUTHORIZED SIGNATURE	DATE

QUANTITY TO BE DETERMINED AT DISPOSAL FACILITY

GENERATOR - COPY 1

SEE LANDFILL RULES AND REGULATIONS ON BACK

GENERATOR: Copies 1 & 6 AWS INVOICING DEPT: Copies 2 & 3 DISPOSAL FACILITY: Copy 4 HAULER: Copy 5

State of New Jersey
Department of Environmental Protection
Division of Hazardous Waste Management
Manifest Section
CN 028, Trenton, NJ 08625

Please type or print in block letters. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039. Expires 9-30-94

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. NJD000304782 Manifest Document No. 01003

2. Page 1 of 1

Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson and Company
1 Becton Drive, Franklin Lakes, New Jersey 07417-1880
SITE: 1 STANLEY ST. E. RUTHERFORD NJ 07073

4. Generator's Phone (201) 848-6800

A. State Manifest Document Number NJA 1530699

B. State Generator's ID

5. Transporter 1 Company Name JOHN PERUMMER, INC.

6. US EPA ID Number PAD008781072

C. State Trans. ID NJDEP 58610

7. Transporter 2 Company Name

8. US EPA ID Number

D. Transporter's Phone (800) 525-2785

E. State Trans. ID

9. Designated Facility Name and Site Address
American Landfill, Inc.
7916 Chapel Street, SE
Waynesburg, OH 44688

10. US EPA ID Number NONE

F. Transporter's Phone

G. State Facility's ID 330 866-3265

H. Facility's Phone ( )

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number) HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. X	Environmentally Hazardous Substances, Solid, N.O.S., Class 9, PG III NA3077 (Lead)	001	DT	00018	Y	C306
b.						
c.						
d.						

J. Additional Descriptions for Materials Listed Above
a. S.T (Lead)
b.

K. Handling Codes for Wastes Listed Above
a. D80
b.
c.
d.

15. Special Handling Instructions and Additional Information
Material is Non-RCRA Regulated. Material is only regulated in NJ as a Hazardous Waste - Waste #C306.
Emergency Contact: Dominick Gasbarro (201) 847-7175
Approval #18216

NJ Dec m # 70140

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked and labeled, and are in all respects in proper condition for transport by highway according to applicable international and [illegible]

If I am a large quantity generator, I certify [illegible] to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have [illegible] present, storage, or disposal currently available to me which minimizes the present and future threat to human health and [illegible] I have made a good faith [illegible] and select the best waste management method [illegible]

Printed Typed Name: Dominick Gasbarro
Signature: [signature]
Month Day Year: 09 04 96

17. Transporter 1 Acknowledgement of [illegible]
Printed Typed Name: A.R. Burke
Signature: A.R. Burke
Month Day Year: 09 04 96

18. Transporter 2 Acknowledgement of [illegible]
Printed Typed Name
Signature
Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification [illegible] by this manifest except as noted in Item 19.
Printed Typed Name
Signature
Month Day Year

NJA 1530699

EPA Form 8700-22 (Rev. 9-88) Previous editions [illegible]

SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

VHW-001 (REV. 9-86)

State of New Jersey
Department of Environmental Protection
Division of Hazardous Waste Management
Manifest Section
CN 028, Trenton, NJ 08625

Please type or print in block letters. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039. Expires 9-30-94

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. NJD000304782 Manifest Document No. 01008

2. Page 1 of 1

Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson and Company
1 Becton Drive, Franklin Lakes, New Jersey 07417-1880
SITE: 1 STANLEY ST. E. RUTHERFORD NJ 07073

4. Generator's Phone (201) 848-6800

A. State Manifest Document Number NJA 1530704

B. State Generator's ID

5. Transporter 1 Company Name PAGE E.T.C.

6. US EPA ID Number NY0986969147

C. State Trans. ID NJ0935 0010

7. Transporter 2 Company Name

8. US EPA ID Number

D. Transporter's Phone (800) 230-5077

E. State Trans. ID

9. Designated Facility Name and Site Address
American Landfill, Inc.
7916 Chapel Street, SE
Waynesburg, OH 44688

10. US EPA ID Number NONE

F. Transporter's Phone ( )

G. State Facility's ID 330 866-3265

H. Facility's Phone ( )

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	Environmentally Hazardous Substances, Solid, N.O.S., Class 9, PG III NA3077 (Lead)	001	DT	00018	Y	C306
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a. S,T (Lead)
b.
c.
d.

K. Handling Codes for Wastes Listed Above
a. D80
b.
c.
d.

15. Special Handling Instructions and Additional Information
Material is Non-RCRA Regulated. Material is only regulated in NJ as a Hazardous Waste - Waste #C306.
Emergency Contact: Dominick Gasbarro (201) 847-7175
Approval #18216

Dest # NJ75195

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment. If I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: Dominick Gasbarro
Signature: Dominick Gasbarro
Month Day Year: 07 [illegible] 96

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: [illegible]
Signature: [illegible]
Month Day Year: 07 [illegible] 96

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name
Signature
Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name
Signature
Month Day Year

GENERATOR

TRANSPORTER

FACILITY

NJA 1530704

EPA Form 8700-22 (Rev. 9-88) Previous editions are obsolete.

SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

AMERICAN LANDFILL, INC. **MAHONING LANDFILL, INC.**

EAST LIVERPOOL LANDFILL, INC. #NJA1530704

SUBSIDIARIES OF AMERICAN WASTE SERVICES, INC.

** PLEASE NOTE NEW ADDRESS ~~ONE AMERICAN WAY WARREN, OH 44484-5555~~ (216) 658-8600

NON-HAZARDOUS WASTE MANIFEST DOCUMENT NO. 347415

THIS SECTION TO BE COMPLETED BY GENERATOR:

COMPANY NAME	ADDRESS	WASTE I.D. NUMBER
BECTON DICKINSON & CO.	1 BECTON DRIVE FRANKLIN LAKES, NJ 07417 CITY STATE ZIP	18218 P.O. NUMBER

NAME OR DESCRIPTION OF WASTE(S) SHIPPED
METALS CONTAMINATED SOIL

COMMENTS
WASTE SITE LOCATION: STANLEY ST. EAST RUTHERFORD, NJ
P.O. # X-12824

	NAME	PHONE NO.	24 HR. EMERGENCY NO.
IN CASE OF AN EMERGENCY OR SPILL, CONTACT	BRIAN LOGUE	(330) 533-9841	(216) 467-2885
	DOMENICK GASBARRO	(201) 847-7175	(201) 847-7175

I Hereby certify that the above named waste(s) are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the DOT and the EPA.

GENERATOR'S SIGNATURE Domenick Gasbarro DATE 9/4/96

THIS SECTION TO BE COMPLETED BY THE HAULER/TRANSPORTER:

COMPANY NAME	ADDRESS	PHONE NO.
PAGE E.T.C.	Weedsport NY	(908) 230-5637

VEHICLE I.D. NO.	STATE	BOX NUMBER-IN	BOX NUMBER-OUT	JOB NO.
XA 77103	NJ			

I Hereby certify that the above described waste(s) were accepted for transportation at the producer's site for delivery to the waste facility. Both as listed hereupon.

PRINT DRIVER'S NAME Gary Dottray
DRIVER'S SIGNATURE Gary Dottray
DATE 9-4-96

THIS SECTION TO BE COMPLETED BY RECEIVER AT DISPOSAL FACILITY:

FACILITY NAME	ADDRESS	PHONE NO.
AMERICAN LANDFILL, INC.	7916 CHAPEL STREET S.E. WAYNESBURG, OH 44688	(330) 866-3265

COMMENTS

I Hereby certify that the above described wastes were delivered to this Facility, that the Facility is authorized and permitted to receive such wastes.	AUTHORIZED SIGNATURE	DATE

QUANTITY TO BE DETERMINED AT DISPOSAL FACILITY

GENERATOR - COPY 1

SEE LANDFILL RULES AND REGULATIONS ON BACK

GENERATOR: Copies 1 & 6 AWS INVOICING DEPT: Copies 2 & 3 DISPOSAL FACILITY: Copy 4 HAULER: Copy 5

VHW 001 (REV. 9-88)

State of New Jersey
Department of Environmental Protection
Division of Hazardous Waste Management
Manifest Section
CN 028, Trenton, NJ 08625

Please type or print in block letters. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039. Expires 9-30-94

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. NJD000304782 Manifest Document No. 01004

2. Page 1 of 1

Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson and Company
1 Becton Drive, Franklin Lakes, New Jersey 07417-1880
SITE: 1 STANLEY ST. E. RUTHERFORD, NJ 07073

4. Generator's Phone (201) 848-6800

A. State Manifest Document Number NJA 1530700

B. State Generator's ID

5. Transporter 1 Company Name JOHN PFROMMER INC.

6. US EPA ID Number PAD008781072

C. State Trans. ID NJDEB8610

7. Transporter 2 Company Name

8. US EPA ID Number

D. Transporter's Phone (800) 523-2785

E. State Trans. ID

9. Designated Facility Name and Site Address
American Landfill, Inc.
7916 Chapel Street, SE
Waynesburg, OH 44688

10. US EPA ID Number NONE

F. Transporter's Phone ( )

G. State Facility's ID 330 866-3265

H. Facility's Phone ( )

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	Environmentally Hazardous Substances, Solid, N.O.S., Class 9, PG III NA3077 (Lead)	001	DT	00018	Y	C306
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a. S,T (Lead)
b.
c.
d.

K. Handling Codes for Wastes Listed Above
a. D80
b.
c.
d.

15. Special Handling Instructions and Additional Information
Material is Non-RCRA Regulated. Material is only regulated in NJ as a Hazardous Waste Waste #C306.
Emergency Contact: Dominick Gasbarro (201) 847-7175
Approval #18216

NJ DECAL # 70153

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal current available to me which minimizes the present and future threat to human health and the environment [illegible] I have made a good [illegible] to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name [illegible] Signature Dominick [illegible] Month Day Year [illegible]

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name William Crust Signature William Crust Month Day Year 09 05 96

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name Signature Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name Signature Month Day Year

GENERATOR / TRANSPORTER / FACILITY

NJA 1530700

EPA Form 8700-22 (Rev. 9-88) Previous editions are obsolete.

SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

AMERICAN LANDFILL, INC. **MAHONING LANDFILL, INC.**

EAST LIVERPOOL LANDFILL, INC. NJA 1530700

SUBSIDIARIES OF AMERICAN WASTE SERVICES, INC.

** PLEASE NOTE NEW ADDRESS ~~ONE AMERICAN WAY, WARREN, OH 44484-5555~~ (216) 858-8806

NON-HAZARDOUS WASTE MANIFEST DOCUMENT NO. 347411

THIS SECTION TO BE COMPLETED BY GENERATOR:

COMPANY NAME	ADDRESS	WASTE I.D. NUMBER
BECTON DICKINSON & CO.	1 BECTON DRIVE	18218
	FRANKLIN LAKES, NJ 07417	P.O. NUMBER
	CITY STATE ZIP	

NAME OR DESCRIPTION OF WASTE(S) SHIPPED
METALS CONTAMINATED SOIL

COMMENTS
WASTE SITE LOCATION: STANLEY ST. EAST RUTHERFORD, NJ
P.O. # X-12824

	NAME	PHONE NO.	24 HR. EMERGENCY NO.
IN CASE OF AN EMERGENCY OR SPILL, CONTACT	BRIAN LOGUE	(330) 533-9841	(216) 467-2885
	DOMENICK GASBARRO	(201) 847-7175	(201) 847-7175

I Hereby certify that the above named waste(s) are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the DOT and the EPA.

GENERATOR'S SIGNATURE Domenick Gasbarro JR DATE 9/5/96

THIS SECTION TO BE COMPLETED BY THE HAULER/TRANSPORTER:

COMPANY NAME	ADDRESS	PHONE NO.
J&M Plummer Inc.	Douglassville, PA	(800) 523-2705

VEHICLE I.D. NO.	STATE	BOX NUMBER-IN	BOX NUMBER-OUT	JOB NO.
TL40907	PA			

I Hereby certify that the above described waste(s) were accepted for transportation at the producer's site for delivery to the waste facility. Both as listed hereupon.

PRINT DRIVER'S NAME William Crust
DRIVER'S SIGNATURE William Crust
DATE 09 05 96

THIS SECTION TO BE COMPLETED BY RECEIVER AT DISPOSAL FACILITY:

FACILITY NAME	ADDRESS	PHONE NO.
AMERICAN LANDFILL, INC.	7916 CHAPEL STREET S.E. WAYNESBURG, OH 44688	(330) 866-3265

COMMENTS

I Hereby certify that the above described wastes were delivered to this Facility, that the Facility is authorized and permitted to receive such wastes.	AUTHORIZED SIGNATURE	DATE

QUANTITY TO BE DETERMINED AT DISPOSAL FACILITY

GENERATOR - COPY 1

SEE LANDFILL RULES AND REGULATIONS ON BACK

GENERATOR: Copies 1 & 6 AWS INVOICING DEPT: Copies 2 & 3 DISPOSAL FACILITY: Copy 4 HAULER: Copy 5

State of New Jersey
Department of Environmental Protection
Division of Hazardous Waste Management
Manifest Section
CN 028, Trenton, NJ 08625

Please type or print in block letters. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039. Expires 9-30-94

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. N J D 0 0 6 3 0 4 7 8 2 Manifest Document No. 07009

2. Page 1 of 1 — Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson and Company
1 Becton Drive, Franklin Lakes, New Jersey 07417-1880
201 848-6800
SITE: 1 Stanley St. E. Rutherford, NJ 07073

A. State Manifest Document Number: NJA 1530705

B. State Generator's ID

4. Generator's Phone ( )

5. Transporter 1 Company Name: Ryder Truck Co. — 6. US EPA ID Number: PA0052788497

C. State Trans. ID: NJDEP 5801 25

7. Transporter 2 Company Name — 8. US EPA ID Number

D. Transporter's Phone ( ): 859-7404

E. State Trans. ID

9. Designated Facility Name and Site Address
American Landfill, Inc.
7916 Chapel Street, SE
Waynesburg, OH 44688

10. US EPA ID Number: NONE

F. Transporter's Phone ( )

G. State Facility's ID 330 866-3365

H. Facility's Phone ( )

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number) HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X Environmentally Hazardous Substances, Solid, N.O.S., Class 9, PG III NA3077 (Lead)	001	DT	00018	Y	C306
b.						
c.						
d.						

J. Additional Descriptions for Materials Listed Above
a. S.T (Lead)
b.
c.
d.

K. Handling Codes for Wastes Listed Above
a. D80
b.
c.
d.

15. Special Handling Instructions and Additional Information
Material is Non-RCRA Regulated. Material is only regulated in NJ as a Hazardous Waste. Waste #C306.
Emergency Contact: Dominick Gasbarro (201) 847-7175
Approval #18216
NJ Decal # 7127 5

15. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name	Signature	Month Day Year

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month Day Year

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month Day Year

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in item 19.

Printed/Typed Name	Signature	Month Day Year

NJA 1530705

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete.

SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

AMERICAN LANDFILL, INC. **MAHONING LANDFILL, INC.**

EAST LIVERPOOL LANDFILL, INC. #NJA1530705

SUBSIDIARIES OF AMERICAN WASTE SERVICES, INC.

ONE AMERICAN WAY • WARREN, OHIO • 44484-5555 • (216) 856-8800

** PLEASE NOTE AREA CODE CHANGE (330) 856-8800 EFFECTIVE MARCH 9,1996

NON-HAZARDOUS WASTE MANIFEST

DOCUMENT NO. 347416

THIS SECTION TO BE COMPLETED BY GENERATOR:

COMPANY NAME	ADDRESS	WASTE I.D. NUMBER
BECTON DICKINSON & CO.	1 BECTON DRIVE	18216
	FRANKLIN LAKES, NJ 07417 (CITY / STATE / ZIP)	P.O. NUMBER

NAME OR DESCRIPTION OF WASTE(S) SHIPPED: METALS CONTAMINATED SOIL

COMMENTS: WASTE SITE LOCATION: STANLEY ST. EAST RUTHERFORD, NJ
P.O. # X-12824

IN CASE OF AN EMERGENCY OR SPILL, CONTACT	NAME	PHONE NO.	24 HR. EMERGENCY NO.
	BRIAN LOGUE	(330) 533-9841	(216) 467-2885
	DOMENICK GASBARRO	(201) 847-7175	(201) 847-7175

I Hereby certify that the above named waste(s) are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the DOT and the EPA.

GENERATOR'S SIGNATURE: Domenick Gasbarro Jr. DATE: 9/5/96

THIS SECTION TO BE COMPLETED BY THE HAULER/TRANSPORTER:

COMPANY NAME	ADDRESS	PHONE NO.
Kephart Trucking Co.	Bigler Pa.	(814) 857-7704

VEHICLE I.D. NO.	STATE	BOX NUMBER-IN	BOX NUMBER-OUT	JOB NO.
TP5170	PA			

I Hereby certify that the above described waste(s) were accepted for transportation at the producer's site for delivery to the waste facility. Both as listed hereupon.

PRINT DRIVER'S NAME: Donald Gower

DRIVER'S SIGNATURE: Donald Gower DATE: 9-5-96

THIS SECTION TO BE COMPLETED BY RECEIVER AT DISPOSAL FACILITY:

FACILITY NAME	ADDRESS	PHONE NO.
AMERICAN LANDFILL, INC.	7916 CHAPEL STREET S.E. WAYNESBURG, OH 44688	(330) 866-3265

COMMENTS

I Hereby certify that the above described wastes were delivered to this Facility, that the Facility is authorized and permitted to receive such wastes.	AUTHORIZED SIGNATURE	DATE

QUANTITY TO BE DETERMINED AT DISPOSAL FACILITY

GENERATOR - COPY 1

SEE LANDFILL RULES AND REGULATIONS ON BACK

GENERATOR: Copies 1 & 6 AWS INVOICING DEPT: Copies 2 & 3 DISPOSAL FACILITY: Copy 4 HAULER: Copy 5

State of New Jersey
Department of Environmental Protection
Division of Hazardous Waste Management
Manifest Section
CN 028, Trenton, NJ 08625

Please type or print in block letters. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039. Expires 9-30-94

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. N J D 0 0 3 0 4 7 8 2 — Manifest Document No. 07970

2. Page 1 of 1 — Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Boston Dickinson and Company
1 Boston Drive, Franklin Lakes, New Jersey 07417-1880
SITE: 1 SPENCER ST. E. RUTHERFORD NJ 07073
4. Generator's Phone (201) 848-6800

A. State Manifest Document Number: NJA 1530706

B. State Generator's ID

5. Transporter 1 Company Name: Howard Trucks Inc.
6. US EPA ID Number: PAD 1 6 7 1 9 7 8
C. State Trans. ID: NJDEP SHIELD
D. Transporter's Phone ( ) 215 223-2020

7. Transporter 2 Company Name
8. US EPA ID Number
E. State Trans. ID

9. Designated Facility Name and Site Address
American Landfill, Inc.
7916 Chapel Street, SE
Waynesburg, OH 44688
10. US EPA ID Number: NONE
F. Transporter's Phone ( )
G. State Facility's ID
H. Facility's Phone (330) 866-3265

GENERATOR

	11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number) HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X Environmentally Hazardous Substances, Solid, N.O.S., Class 9, PG III NA3077 (Lead)	001	DT	00018	Y	C306
b.						
c.						
d.						

J. Additional Descriptions for Materials Listed Above
a. S,T (Lead)
c.
b.
d.

K. Handling Codes for Wastes Listed Above
a. D 8 0
c.
b.
d.

15. Special Handling Instructions and Additional Information
Material is Non-RCRA Regulated. Material is only regulated in NJ as a Hazardous Waste - Waste #C306.
Emergency Contact: Dominick Ciabarra (201) 847-7175
Approval #18216
NJ Dec. 75209

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name	Signature	Month Day Year
		09 05 96

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month Day Year
Charles Stanton		09 05 96

16. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month Day Year

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name	Signature	Month Day Year

NJA 1530706

EPA Form 8700-22 (Rev. 9/89) Previous editions are obsolete.

SIGNATURE AND INFORMATION *MUST* BE LEGIBLE ON ALL COPIES

7 — GENERATOR MAIL TO - GENERATOR STATE

AMERICAN LANDFILL, INC. **MAHONING LANDFILL, INC.**

EAST LIVERPOOL LANDFILL, INC. #NJA1530706

SUBSIDIARIES OF AMERICAN WASTE SERVICES, INC.

** PLEASE NOTE NEW ADDRESS ONE AMERICAN WAY WARREN, OHIO 44484-5555 (216) 658-8800

NON-HAZARDOUS WASTE MANIFEST DOCUMENT NO. 347417

THIS SECTION TO BE COMPLETED BY GENERATOR:

COMPANY NAME	ADDRESS	WASTE I.D. NUMBER
BECTON DICKINSON & CO.	1 BECTON DRIVE FRANKLIN LAKES, NJ 07417 CITY STATE ZIP	18216 P.O. NUMBER

NAME OR DESCRIPTION OF WASTE(S) SHIPPED
METALS CONTAMINATED SOIL

COMMENTS
WASTE SITE LOCATION: STANLEY ST., EAST RUTHERFORD, NJ
P.O. # X-12824

	NAME	PHONE NO.	24 HR. EMERGENCY NO.
IN CASE OF AN EMERGENCY OR SPILL, CONTACT	BRIAN LOGUE	(330) 533-9841	(216) 467-2885
	DOMENICK GASBARRO	(201) 847-7175	(201) 847-7175

I Hereby certify that the above named waste(s) are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the DOT and the EPA.

GENERATOR'S SIGNATURE Domenick Gasbarro Jr DATE 9/5/96

THIS SECTION TO BE COMPLETED BY THE HAULER/TRANSPORTER:

COMPANY NAME	ADDRESS	PHONE NO.
Horwith Trucks Inc.	Northampton, PA	(610)261-2220

VEHICLE I.D. NO.	STATE	BOX NUMBER-IN	BOX NUMBER-OUT	JOB NO.
XA-07719	PA			

I Hereby certify that the above described waste(s) were accepted for transportation at the producer's site for delivery to the waste facility. Both as listed hereupon.

PRINT DRIVER'S NAME Charles Steckel
DRIVER'S SIGNATURE Charles Steckel DATE 9/5/96

THIS SECTION TO BE COMPLETED BY RECEIVER AT DISPOSAL FACILITY:

FACILITY NAME	ADDRESS	PHONE NO.
AMERICAN LANDFILL, INC.	7916 CHAPEL STREET S.E. WAYNESBURG, OH 44688	(330) 866-3265

COMMENTS

I Hereby certify that the above described wastes were delivered to this Facility, that the Facility is authorized and permitted to receive such wastes.

AUTHORIZED SIGNATURE

DATE

QUANTITY TO BE DETERMINED AT DISPOSAL FACILITY

GENERATOR - COPY 1

SEE LANDFILL RULES AND REGULATIONS ON BACK

GENERATOR: Copies 1 & 6 AWS INVOICING DEPT: Copies 2 & 3 DISPOSAL FACILITY: Copy 4 HAULER: Copy 5

VHW-001 Rev. 9/86)

State of New Jersey
Department of Environmental Protection
Division of Hazardous Waste Management
Manifest Section
CN 028, Trenton, NJ 08625

Please type or print in block letters. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039. Expires 9-30-94

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. NJD000304782 Manifest Document No. 07011

2. Page 1 of 1

Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson and Company
1 Becton Drive, Franklin Lakes, New Jersey 07417-1880
SITE: 1 STANLEY ST. E. RUTHERFORD NJ 07073

4. Generator's Phone (201) 848-6800

A. State Manifest Document Number NJA 1530707

B. State Generator's ID

5. Transporter 1 Company Name [illegible] Inc.

6. US EPA ID Number [illegible]

C. State Trans. ID NJA 07110

7. Transporter 2 Company Name

8. US EPA ID Number

D. Transporter's Phone ([illegible]) [illegible]

E. State Trans. ID

9. Designated Facility Name and Site Address
American Landfill, Inc.
7916 Chapel Street, SE
Waynesburg, OH 44688

10. US EPA ID Number NONE

F. Transporter's Phone ( )

G. State Facility's ID 330 866-3265

H. Facility's Phone ( )

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	Environmentally Hazardous Substances, Solid, N.O.S., Class 9, PG III NA3077 (Lead)	001	DT	00018	Y	C306
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a. S,T (Lead)
b.
c.
d.

K. Handling Codes for Wastes Listed Above
a. D80
b.
c.
d.

15. Special Handling Instructions and Additional Information
Material is Non-RCRA Regulated. Material is only regulated in NJ as a Hazardous Waste Waste #C306.
Emergency Contact: Dominick Gasbarro (201) 847-7175
Approval #18216
NJ 1075253

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected [illegible] to me which minimizes the present and future threat [illegible] minimize my waste generation and select the best waste management method that is available [illegible] that I can afford.

Printed/Typed Name [illegible] Signature [illegible] Month Day Year [illegible]

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name Kenneth Kemmerer Signature Kenneth Kemmerer Month Day Year 09 03 96

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name Signature Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name Signature Month Day Year

GENERATOR

TRANSPORTER

FACILITY

NJA 1530707

EPA Form 8700-22 (Rev. 9/86) Previous editions are obsolete.

SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

AMERICAN LANDFILL, INC. **MAHONING LANDFILL, INC.**

EAST LIVERPOOL LANDFILL, INC. #NJA530707

SUBSIDIARIES OF AMERICAN WASTE SERVICES, INC.

ONE AMERICAN WAY • WARREN, OHIO • 44484-5555 • (216) 856-8800

** PLEASE NOTE AREA CODE CHANGE (330) 856-8800 EFFECTIVE MARCH 9,1996

NON-HAZARDOUS WASTE MANIFEST

DOCUMENT NO. 347418

THIS SECTION TO BE COMPLETED BY GENERATOR:

COMPANY NAME	ADDRESS	WASTE I.D. NUMBER
BECTON DICKINSON & CO.	1 BECTON DRIVE FRANKLIN LAKES, NJ 07417 CITY STATE ZIP	18216 P.O. NUMBER

NAME OR DESCRIPTION OF WASTE(S) SHIPPED: METALS CONTAMINATED SOIL

COMMENTS: WASTE SITE LOCATION: STANLEY ST. EAST RUTHERFORD, NJ
P.O. # X-12824

	NAME	PHONE NO.	24 HR. EMERGENCY NO.
IN CASE OF AN EMERGENCY OR SPILL, CONTACT	BRIAN LOGUE DOMENICK GASBARRO	(330) 533-9841 (201) 847-7175	(216) 467-2885 (201) 847-7175

I Hereby certify that the above named waste(s) are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the DOT and the EPA.

GENERATOR'S SIGNATURE: Domenick Gasbarro Jr. DATE: 9/5/96

THIS SECTION TO BE COMPLETED BY THE HAULER/TRANSPORTER:

COMPANY NAME	ADDRESS	PHONE NO.
Horwith Trucks Inc.	Northampton, Pa	(610) 261-2220

VEHICLE I.D. NO.	STATE	BOX NUMBER-IN	BOX NUMBER-OUT	JOB NO.
TW66796	NJ			

I Hereby certify that the above described waste(s) were accepted for transportation at the producer's site for delivery to the waste facility. Both as listed hereupon.

PRINT DRIVER'S NAME: Kenneth Kemmerer.
DRIVER'S SIGNATURE: Kenneth Kemmerer DATE: 09/5/96

THIS SECTION TO BE COMPLETED BY RECEIVER AT DISPOSAL FACILITY:

FACILITY NAME	ADDRESS	PHONE NO.
AMERICAN LANDFILL, INC.	7916 CHAPEL STREET S.E. WAYNESBURG, OH 44688	(330) 866-3265

COMMENTS

I Hereby certify that the above described wastes were delivered to this Facility, that the Facility is authorized and permitted to receive such wastes.	AUTHORIZED SIGNATURE	DATE

QUANTITY TO BE DETERMINED AT DISPOSAL FACILITY

GENERATOR - COPY 1

SEE LANDFILL RULES AND REGULATIONS ON BACK

GENERATOR: Copies 1 & 6 AWS INVOICING DEPT: Copies 2 & 3 DISPOSAL FACILITY: Copy 4 HAULER: Copy 5

VHW-001 (REV. 9/88)

State of New Jersey
Department of Environmental Protection
Division of Hazardous Waste Management
Manifest Section
CN 028, Trenton, NJ 08625

Please type or print in block letters. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039. Expires 9-30-94

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. NJD000304782 Manifest Document No. 01012

2. Page 1 of 1

Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson and Company
1 Becton Drive, Franklin Lakes, New Jersey 07417-1880
SITE: 1 STANLEY ST. E. RUTHERFORD, NJ 07073

4. Generator's Phone (201) 848-6800

A. State Manifest Document Number NJA 1530708

B. State Generator's ID

5. Transporter 1 Company Name [illegible]

6. US EPA ID Number PAD052[illegible]

C. State Trans. ID [illegible]

7. Transporter 2 Company Name

8. US EPA ID Number

D. Transporter's Phone ([illegible]) [illegible]

E. State Trans. ID

9. Designated Facility Name and Site Address
American Landfill, Inc.
7916 Chapel Street, SE
Waynesburg, OH 44688

10. US EPA ID Number NONE

F. Transporter's Phone ( )

G. State Facility's ID

H. Facility's Phone (330) 866-3265

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	Environmentally Hazardous Substances, Solid, N.O.S., Class 9, PG III NA3077 (Lead)	001	DT	00018	Y	C306
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a. S,T (Lead)
b.
c.
d.

K. Handling Codes for Wastes Listed Above
a. D80
b.
c.
d.

15. Special Handling Instructions and Additional Information
Material is Non-RCRA Regulated. Material is only regulated in NJ as a Hazardous Waste - Waste #C306.
Emergency Contact: Dominick Gasbarro (201) 847-7175
Approval #18216
NJ Lic #75281

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government [illegible]

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable [illegible] minimizes the present and [illegible] waste generation and select the best waste management method that is available to me and that I can afford [illegible]

Printed Typed Name [illegible] Signature [illegible] Month Day Year 09 05 96

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed Typed Name Signature Month Day Year

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed Typed Name Signature Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed Typed Name Signature Month Day Year

GENERATOR

TRANSPORTER

FACILITY

NJA 1530708

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete.

SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

AMERICAN LANDFILL, INC. **MAHONING LANDFILL, INC.**

EAST LIVERPOOL LANDFILL, INC. #NJA153078

SUBSIDIARIES OF AMERICAN WASTE SERVICES, INC.

** PLEASE NOTE NEW ADDRESS ~~ONE AMERICAN WAY, WARREN, OHIO 44484-5555 (216) 858-8206~~

NON-HAZARDOUS WASTE MANIFEST DOCUMENT NO. 347419

THIS SECTION TO BE COMPLETED BY GENERATOR:

COMPANY NAME	ADDRESS	WASTE I.D. NUMBER
BECTON DICKINSON & CO.	1 BECTON DRIVE FRANKLIN LAKES, NJ 07417 CITY STATE ZIP	18216 P.O. NUMBER

NAME OR DESCRIPTION OF WASTE(S) SHIPPED
METALS CONTAMINATED SOIL

COMMENTS
WASTE SITE LOCATION: STANLEY ST. EAST RUTHERFORD, NJ
P.O. # X-12824

	NAME	PHONE NO.	24 HR. EMERGENCY NO.
IN CASE OF AN EMERGENCY OR SPILL, CONTACT	BRIAN LOGUE	(330) 533-9841	(216) 467-2885
	DOMENICK GASBARRO	(201) 847-7175	(201) 847-7175

I Hereby certify that the above named waste(s) are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the DOT and the EPA.

GENERATOR'S SIGNATURE Domenick Gasbarro Jr. DATE 9/5/97

THIS SECTION TO BE COMPLETED BY THE HAULER/TRANSPORTER:

COMPANY NAME	ADDRESS	PHONE NO.
Kephart Trucking Co.	Bigler, PA	(814) 857-7704

VEHICLE I.D. NO.	STATE	BOX NUMBER-IN	BOX NUMBER-OUT	JOB NO.
TP25798	PA			

I Hereby certify that the above described waste(s) were accepted for transportation at the producer's site for delivery to the waste facility. Both as listed hereupon.

PRINT DRIVER'S NAME Homer Smith DATE 9-5-96

DRIVER'S SIGNATURE H. Smith

THIS SECTION TO BE COMPLETED BY RECEIVER AT DISPOSAL FACILITY:

FACILITY NAME	ADDRESS	PHONE NO.
AMERICAN LANDFILL, INC.	7916 CHAPEL STREET S.E. WAYNESBURG, OH 44688	(330) 866-3265

COMMENTS

I Hereby certify that the above described wastes were delivered to this Facility, that the Facility is authorized and permitted to receive such wastes.	AUTHORIZED SIGNATURE	DATE

QUANTITY TO BE DETERMINED AT DISPOSAL FACILITY

GENERATOR - COPY 1

SEE LANDFILL RULES AND REGULATIONS ON BACK

GENERATOR: Copies 1 & 6 AWS INVOICING DEPT: Copies 2 & 3 DISPOSAL FACILITY: Copy 4 HAULER: Copy 5

VHW-001 (REV 9/86)

State of New Jersey
Department of Environmental Protection
Division of Hazardous Waste Management
Manifest Section
CN 028, Trenton, NJ 08625

Please type or print in block letters. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039. Expires 9-30-94

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. N J D 0 0 0 3 0 4 7 8 2 — Manifest Document No. 0 7 0 1 3

2. Page 1 of 1 — Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson and Company
1 Becton Drive, Franklin Lakes, New Jersey 07417-1880
SITE: 1 STANLEY ST. E. RUTHERFORD NJ 07073

4. Generator's Phone (201) 848-6800

A. State Manifest Document Number: NJA 1530709

B. State Generator's ID: NJGP ST 125

5. Transporter 1 Company Name: [illegible] Co.

6. US EPA ID Number: PAD 0 5 2 [illegible]

C. State Trans. ID

7. Transporter 2 Company Name

8. US EPA ID Number

D. Transporter's Phone ( ) 857-7[illegible]

E. State Trans. ID

9. Designated Facility Name and Site Address
American Landfill, Inc.
7916 Chapel Street, SE
Waynesburg, OH 44688

10. US EPA ID Number: NONE

F. Transporter's Phone ( )

G. State Facility's ID: 330 866-3265

H. Facility's Phone ( )

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	Environmentally Hazardous Substances, Solid, N.O.S., Class 9, PG III NA3077 (Lead)	001	DT	00018	Y	C306
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a. S.T (Lead)
b.
c.
d.

K. Handling Codes for Wastes Listed Above
a. D 8 0
b.
c.
d.

15. Special Handling Instructions and Additional Information
Material is Non RCRA Regulated. Material is only regulated in NJ as a Hazardous Waste Waste #C306.
Emergency Contact: Dominick Gasbarro (201) 847-7175
Approval #18216
NJ Dept #73271

16. **GENERATOR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.
If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal [illegible] the present and future [illegible] the best waste management method that is available [illegible] generator and select

Printed/Typed Name | Signature | Month Day Year

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name | Signature | Month Day Year

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name | Signature | Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name | Signature | Month Day Year

GENERATOR / TRANSPORTER / FACILITY

NJA 1530709

EPA Form [illegible] (Rev. 2-85) Previous editions are obsolete. SIGNATURE AND INFORMATION IN WHITE LEGIBLE ON ALL COPIES

AMERICAN LANDFILL, INC. **MAHONING LANDFILL, INC.**

EAST LIVERPOOL LANDFILL, INC. #NJA1530709

SUBSIDIARIES OF AMERICAN WASTE SERVICES, INC.

ONE AMERICAN WAY • WARREN, OHIO • 44484-5555 • (216) 856-8800

** PLEASE NOTE AREA CODE CHANGE (330) 856-8800 EFFECTIVE MARCH 9,1996

NON-HAZARDOUS WASTE MANIFEST

DOCUMENT NO. 347420

THIS SECTION TO BE COMPLETED BY GENERATOR:

COMPANY NAME	ADDRESS	WASTE I.D. NUMBER
BECTON DICKINSON & CO.	1 BECTON DRIVE	18216
	FRANKLIN LAKES, NJ 07417 (CITY / STATE / ZIP)	P.O. NUMBER

NAME OR DESCRIPTION OF WASTE(S) SHIPPED

METALS CONTAMINATED SOIL

COMMENTS

WASTE SITE LOCATION: STANLEY ST. EAST RUTHERFORD, NJ
P.O. # X-12824

IN CASE OF AN EMERGENCY OR SPILL, CONTACT	NAME	PHONE NO.	24 HR. EMERGENCY NO.
	BRIAN LOGUE	(330) 533-9841	(216) 467-2885
	DOMENICK GASBARRO	(201) 847-7175	(201) 847-7175

I Hereby certify that the above named waste(s) are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the DOT and the EPA.

GENERATOR'S SIGNATURE: Domenick Gasbarro Jr.

DATE: 9/5/96

THIS SECTION TO BE COMPLETED BY THE HAULER/TRANSPORTER:

COMPANY NAME	ADDRESS	PHONE NO.
Kephart Trucking Co.	Butler PA	814/857-7704

VEHICLE I.D. NO.	STATE	BOX NUMBER-IN	BOX NUMBER-OUT	JOB NO.
TT5720	PA			

I Hereby certify that the above described waste(s) were accepted for transportation at the producer's site for delivery to the waste facility. Both as listed hereupon.

PRINT DRIVER'S NAME: E E Clark

DRIVER'S SIGNATURE: E E Clark

DATE: 9-5-96

THIS SECTION TO BE COMPLETED BY RECEIVER AT DISPOSAL FACILITY:

FACILITY NAME	ADDRESS	PHONE NO.
AMERICAN LANDFILL, INC.	7916 CHAPEL STREET S.E. WAYNESBURG, OH 44688	(330) 866-3265

COMMENTS

I Hereby certify that the above described wastes were delivered to this Facility, that the Facility is authorized and permitted to receive such wastes.	AUTHORIZED SIGNATURE	DATE

QUANTITY TO BE DETERMINED AT DISPOSAL FACILITY

GENERATOR - COPY 1

SEE LANDFILL RULES AND REGULATIONS ON BACK

GENERATOR: Copies 1 & 6 AWS INVOICING DEPT: Copies 2 & 3 DISPOSAL FACILITY: Copy 4 HAULER: Copy 5

HWM-001 (REV. 9.88)

State of New Jersey
Department of Environmental Protection
Division of Hazardous Waste Management
Manifest Section
CN 028, Trenton, NJ 08625

Please type or print in block letters. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039. Expires 9-30-94

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. NJD000630782 Manifest Document No. 07014

2. Page 1 of 1

Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson and Company
1 Becton Drive, Franklin Lakes, New Jersey 07417-1880
4. Generator's Phone (201) 848-6800

SITE: 1 STANLEY ST. E. RUTHERFORD NJ 07073

A. State Manifest Document Number NJA 1530710

B. State Generator's ID

5. Transporter 1 Company Name Laidlaw Co. 6. US EPA ID Number PAD052124197

C. State Trans. ID NJ-13-5615

7. Transporter 2 Company Name 8. US EPA ID Number

D. Transporter's Phone ( ) 537-7460

E. State Trans. ID

9. Designated Facility Name and Site Address
American Landfill, Inc.
7916 Chapel Street, SE
Waynesburg, OH 44688
10. US EPA ID Number NONE

F. Transporter's Phone ( )

G. State Facility's ID 330 866-3365

H. Facility's Phone ( )

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number) HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. X Environmentally Hazardous Substances, Solid, N.O.S., Class 9, PG III NA3077 (Lead)	001	DT	00018	Y	C306
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above
a. S,T (Lead)
b.
c.
d.

K. Handling Codes for Wastes Listed Above
a. D80
b.
c.
d.

15. Special Handling Instructions and Additional Information
Material is Non-RCRA Regulated. Material is only regulated in NJ as a Hazardous Waste Waste #C306.
Emergency Contact: Dominick Gasbarro (201) 847-7175
Approval #18216
NJ Port # 73280

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national governmental regulations.
If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name Dominick Gasbarro Signature Month 07 Day 05 Year 96

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name Signature Month 07 Day 05 Year 96

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name Signature Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name Signature Month Day Year

NJA 1530710

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete.

SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

AMERICAN LANDFILL, INC. **MAHONING LANDFILL, INC.**

EAST LIVERPOOL LANDFILL, INC. #NJA1530710

SUBSIDIARIES OF AMERICAN WASTE SERVICES, INC.

** PLEASE NOTE: NEW AMERICAN WAY WARREN, OHIO 44484-5555 (216) 856-8800 EFFECTIVE MARCH 8 1996

NON-HAZARDOUS WASTE MANIFEST DOCUMENT NO. 347421

THIS SECTION TO BE COMPLETED BY GENERATOR:

COMPANY NAME	ADDRESS	WASTE I.D. NUMBER
BECTON DICKINSON & CO.	1 BECTON DRIVE FRANKLIN LAKES, NJ 07417 CITY STATE ZIP	P.O. NUMBER

NAME OR DESCRIPTION OF WASTE(S) SHIPPED
METALS CONTAMINATED SOIL

COMMENTS
WASTE SITE LOCATION: STANLEY ST. EAST RUTHERFORD, NJ
P.O. # X-12824

	NAME	PHONE NO.	24 HR. EMERGENCY NO.
IN CASE OF AN EMERGENCY OR SPILL, CONTACT	BRIAN LOGUE	(330) 533-9841	(216) 467-2885
	DOMENICK GASBARRO	(201) 847-7175	(201) 847-7175

I Hereby certify that the above named waste(s) are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the DOT and the EPA.

GENERATOR'S SIGNATURE Domenick Gasbarro DATE 9/5/96

THIS SECTION TO BE COMPLETED BY THE HAULER/TRANSPORTER:

COMPANY NAME	ADDRESS	PHONE NO.
Kephart Trucking Co.	Bixler, PA	(814) 857-7704

VEHICLE I.D. NO.	STATE	BOX NUMBER-IN	BOX NUMBER-OUT	JOB NO.
TN8770	PA			

I Hereby certify that the above described waste(s) were accepted for transportation at the producer's site for delivery to the waste facility. Both as listed hereupon.

X PRINT DRIVER'S NAME JEFF ROUSSEY X DATE 9-5-96

X DRIVER'S SIGNATURE JJ Roussey

THIS SECTION TO BE COMPLETED BY RECEIVER AT DISPOSAL FACILITY:

FACILITY NAME	ADDRESS	PHONE NO.
AMERICAN LANDFILL, INC.	7916 CHAPEL STREET S.E. WAYNESBURG, OH 44688	(330) 866-3265

COMMENTS

I Hereby certify that the above described wastes were delivered to this Facility, that the Facility is authorized and permitted to receive such wastes.	AUTHORIZED SIGNATURE	DATE

QUANTITY TO BE DETERMINED AT DISPOSAL FACILITY

GENERATOR - COPY 1

SEE LANDFILL RULES AND REGULATIONS ON BACK

GENERATOR: Copies 1 & 6 AWS INVOICING DEPT: Copies 2 & 3 DISPOSAL FACILITY: Copy 4 HAULER: Copy 5

WHW 001 (REV. 9/86)

State of New Jersey
Department of Environmental Protection
Division of Hazardous Waste Management
Manifest Section
CN 028, Trenton, NJ 08625

Please type or print in block letters. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039. Expires 9-30-94

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. NJD000304782 Manifest Document No. 01015

2. Page 1 of 1

Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson and Company
1 Becton Drive, Franklin Lakes, New Jersey 07417-1880
SITE: 1 STANLEY ST. E. RUTHERFORD NJ 07073

4. Generator's Phone (201) 848-6800

A. State Manifest Document Number: NJA 1530711

B. State Generator's ID

5. Transporter 1 Company Name: Kephart Trucking Co.

6. US EPA ID Number: PAD052188497

C. State Trans. ID: NJBFF 550125

7. Transporter 2 Company Name

8. US EPA ID Number

D. Transporter's Phone (84) 837-6794

E. State Trans. ID

9. Designated Facility Name and Site Address
American Landfill, Inc.
7916 Chapel Street, SE
Waynesburg, OH 44688

10. US EPA ID Number: NONE

F. Transporter's Phone ( )

G. State Facility's ID: 330 866-3265

H. Facility's Phone ( )

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	Environmentally Hazardous Substances, Solid, N.O.S., Class 9, PG III NA3077 (Lead)	001	DT	00018	Y	C306
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a. S,T (Lead)
b.
c.
d.

K. Handling Codes for Wastes Listed Above
a. D80
b.
c.
d.

15. Special Handling Instructions and Additional Information
Material is Non-RCRA Regulated. Material is only regulated in NJ as a Hazardous Waste. Waste #C306.
Emergency Contact: Dominick Gasbarro (201) 847-7175
Approval #18216
NJ Decal #73267

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the [illegible], I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: [illegible] Signature: [illegible] Month Day Year

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: [illegible] Signature: [illegible] Month Day Year

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name Signature Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name Signature Month Day Year

GENERATOR / TRANSPORTER / FACILITY

NJA 1530711

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete.

SIGNATURE AND INFORMATION *MUST* BE LEGIBLE ON ALL COPIES

AMERICAN LANDFILL, INC. **MAHONING LANDFILL, INC.**

EAST LIVERPOOL LANDFILL, INC. #NJA 153071

SUBSIDIARIES OF AMERICAN WASTE SERVICES, INC.

ONE AMERICAN WAY • WARREN, OHIO • 44484-5555 • (216) 856-8800

** PLEASE NOTE AREA CODE CHANGE (330) 856-8800 EFFECTIVE MARCH 9,1996

NON-HAZARDOUS WASTE MANIFEST

DOCUMENT NO. 347422

THIS SECTION TO BE COMPLETED BY GENERATOR:

COMPANY NAME	ADDRESS	WASTE I.D. NUMBER
BECTON DICKINSON & CO.	1 BECTON DRIVE	18216
	FRANKLIN LAKES, NJ 07417 (CITY / STATE / ZIP)	P.O. NUMBER

NAME OR DESCRIPTION OF WASTE(S) SHIPPED

METALS CONTAMINATED SOIL

COMMENTS

WASTE SITE LOCATION: STANLEY ST. EAST RUTHERFORD, NJ
P.O. # X-12824

	NAME	PHONE NO.	24 HR. EMERGENCY NO.
IN CASE OF AN EMERGENCY OR SPILL, CONTACT	BRIAN LOGUE	(330) 533-9841	(216) 467-2885
	DOMENICK GASBARRO	(201) 847-7175	(201) 847-7175

I Hereby certify that the above named waste(s) are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the DOT and the EPA.

GENERATOR'S SIGNATURE: Domenick Gasbarro

DATE: 9/5/96

THIS SECTION TO BE COMPLETED BY THE HAULER/TRANSPORTER:

COMPANY NAME	ADDRESS	PHONE NO.
Kephart Trucking Co.	Biglerville, PA	(814) 857-7704

VEHICLE I.D. NO.	STATE	BOX NUMBER-IN	BOX NUMBER-OUT	JOB NO.
T5/4176	PA			

I Hereby certify that the above described waste(s) were accepted for transportation at the producer's site for delivery to the waste facility. Both as listed hereupon.

PRINT DRIVER'S NAME: ERNIE DIXON

DRIVER'S SIGNATURE: Ernie Dixon

DATE: 9-5-96

THIS SECTION TO BE COMPLETED BY RECEIVER AT DISPOSAL FACILITY:

FACILITY NAME	ADDRESS	PHONE NO.
AMERICAN LANDFILL, INC.	7916 CHAPEL STREET S.E. WAYNESBURG, OH 44688	(330) 866-3265

COMMENTS

I Hereby certify that the above described wastes were delivered to this Facility, that the Facility is authorized and permitted to receive such wastes.	AUTHORIZED SIGNATURE	DATE

QUANTITY TO BE DETERMINED AT DISPOSAL FACILITY

GENERATOR - COPY 1

SEE LANDFILL RULES AND REGULATIONS ON BACK

GENERATOR: Copies 1 & 6 AWS INVOICING DEPT: Copies 2 & 3 DISPOSAL FACILITY: Copy 4 HAULER: Copy 5

State of New Jersey
Department of Environmental Protection
Division of Hazardous Waste Management
Manifest Section
CN 028, Trenton, NJ 08625

Please type or print in block letters. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039. Expires 9-30-94

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. N J D 0 0 6 3 0 4 7 8 2 — Manifest Document No. 01016

2. Page 1 of 1 — Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson and Company
1 Becton Drive, Franklin Lakes, New Jersey 07417-1880
SHIP: 1 STANLEY ST. E. RUTHERFORD, NJ 07073

A. State Manifest Document Number: NJA 1530712

4. Generator's Phone (201) 848 6800

B. State Generator's ID

5. Transporter 1 Company Name: [illegible]

6. US EPA ID Number: [illegible]

C. State Trans. ID: [illegible]

7. Transporter 2 Company Name

8. US EPA ID Number

D. Transporter's Phone (609) 523-2780

E. State Trans. ID

9. Designated Facility Name and Site Address
American Landfill, Inc.
7916 Chapel Street, SE
Waynesburg, OH 44688

10. US EPA ID Number: NONE

F. Transporter's Phone ( )

G. State Facility's ID

H. Facility's Phone (330) 866-3265

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number) HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. X Environmentally Hazardous Substances, Solid, N.O.S., Class 9, PG III NA3077 (Lead)	001	DT	00018	Y	C306
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above
a. ST (Lead)

K. Handling Codes for Wastes Listed Above
a. D80

15. Special Handling Instructions and Additional Information
Material is Non RCRA Regulated. Material is only regulated in NJ as a Hazardous Waste - Waste #C306.
Emergency Contact: Dominick Gasbarro (201) 847-7175
Approval #18216

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked and labeled and are in all respects in proper condition for transport by highway according to applicable international and national governmental regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: [illegible] — Signature: [signature] — Month Day Year: 09 03 96

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name: RANDALL D SNYDER — Signature: [signature] — Month Day Year: 09 03 96

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name — Signature — Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name — Signature — Month Day Year

In case of an emergency or spill immediately call the emergency coordinator listed on the manifest and the 24-hour number (800) 962-7962

DISTRICT COPY

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete.

SIGNATURES AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

AMERICAN LANDFILL, INC. **MAHONING LANDFILL, INC.**

EAST LIVERPOOL LANDFILL, INC. #NJA153712

SUBSIDIARIES OF AMERICAN WASTE SERVICES, INC.

** PLEASE NOTE: ONE AMERICAN WAY, WARREN, OHIO 44484-5555 (216) 658-8600

NON-HAZARDOUS WASTE MANIFEST DOCUMENT NO. 347423

THIS SECTION TO BE COMPLETED BY GENERATOR:

COMPANY NAME	ADDRESS	WASTE I.D. NUMBER
BECTON DICKINSON & CO.	1 BECTON DRIVE FRANKLIN LAKES, NJ 07417 CITY STATE ZIP	18216 P.O. NUMBER

NAME OR DESCRIPTION OF WASTE(S) SHIPPED
METALS CONTAMINATED SOIL

COMMENTS
WASTE SITE LOCATION: STANLEY ST. EAST RUTHERFORD, NJ
P.O. # X-12824

	NAME	PHONE NO.	24 HR. EMERGENCY NO.
IN CASE OF AN EMERGENCY OR SPILL, CONTACT	BRIAN LOGUE	(330) 533-9841	(216) 467-2885
	DOMENICK GASBARRO	(201) 847-7175	(201) 847-7175

I Hereby certify that the above named waste(s) are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the DOT and the EPA.

GENERATOR'S SIGNATURE Dominick Gasbarro Jr. DATE 9/5/96

THIS SECTION TO BE COMPLETED BY THE HAULER/TRANSPORTER:

COMPANY NAME	ADDRESS	PHONE NO.
John Pfrommer Inc	Douglassville, PA	(800) 523-2785

VEHICLE I.D. NO.	STATE	BOX NUMBER-IN	BOX NUMBER-OUT	JOB NO.
XD 26020	PA			

I Hereby certify that the above described waste(s) were accepted for transportation at the producer's site for delivery to the waste facility. Both as listed hereupon.

PRINT DRIVER'S NAME ROS RANDAL O SNYDER DATE 09-05-96

DRIVER'S SIGNATURE Randall O Snyder

THIS SECTION TO BE COMPLETED BY RECEIVER AT DISPOSAL FACILITY:

FACILITY NAME	ADDRESS	PHONE NO.
AMERICAN LANDFILL, INC.	7916 CHAPEL STREET S.E. WAYNESBURG, OH 44688	(330) 866-3265

COMMENTS

I Hereby certify that the above described wastes were delivered to this Facility, that the Facility is authorized and permitted to receive such wastes.	AUTHORIZED SIGNATURE	DATE

QUANTITY TO BE DETERMINED AT DISPOSAL FACILITY

GENERATOR - COPY 1

SEE LANDFILL RULES AND REGULATIONS ON BACK

GENERATOR: Copies 1 & 6 AWS INVOICING DEPT: Copies 2 & 3 DISPOSAL FACILITY: Copy 4 HAULER: Copy 5

HW-001 (REV. 9/86)

State of New Jersey
Department of Environmental Protection
Division of Hazardous Waste Management
Manifest Section
CN 028, Trenton, NJ 08625

Please type or print in block letters. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039. Expires 9-30-94

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. N J D 0 0 6 3 0 4 7 8 2 — Manifest Document No. 01017

2. Page 1 of 1

Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson and Company
1 Becton Drive, Franklin Lakes, New Jersey 07417-1880
SITE: 1 STANLEY ST. E. RUTHERFORD, NJ 07073

4. Generator's Phone (201) 848-6800

A. State Manifest Document Number: **NJA 1530713**

B. State Generator's ID

5. Transporter 1 Company Name: Horwith Trucking Inc.
6. US EPA ID Number: PAD 1 4 6 7 1 9 5 7 8

C. State Trans. ID: NJDEP S 07110

7. Transporter 2 Company Name
8. US EPA ID Number

D. Transporter's Phone (610) 261-2220

E. State Trans. ID

9. Designated Facility Name and Site Address
American Landfill, Inc.
7916 Chapel Street, SE
Waynesburg, OH 44688

10. US EPA ID Number: NONE

F. Transporter's Phone ( )

G. State Facility's ID 330 866-3265

H. Facility's Phone ( )

	11. US DOT Description (including Proper Shipping Name, Hazard Class, and ID Number)	HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	Environmentally Hazardous Substances, Solid, N.O.S., Class 9, PG III NA3077 (Lead)	X	001	DT	00018	Y	C306
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a. S,T (Lead)
c.
b.
d.

K. Handling Codes for Wastes Listed Above
a. D80
c.
b.
d.

15. Special Handling Instructions and Additional Information
Material is Non RCRA Regulated. Material is only regulated in NJ as a Hazardous Waste - Waste #C306.
Emergency Contact: Dominick Gasbarro (201) 847-7175
Approval #18216
NJ D 1 0 7 3 3 5

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: [illegible] Signature: [illegible] Month Day Year

17. Transporter 1 Acknowledgment of Receipt of Materials
Printed/Typed Name: Richard A Silfies Signature: Richard A Silfies Month Day Year

18. Transporter 2 Acknowledgment of Receipt of Materials
Printed/Typed Name: Signature: Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in item 19.
Printed/Typed Name: Signature: Month Day Year

GENERATOR / TRANSPORTER / FACILITY

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete.

SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

NJA 1530713

AMERICAN LANDFILL, INC. **MAHONING LANDFILL, INC.**

EAST LIVERPOOL LANDFILL, INC. NJA 153073

SUBSIDIARIES OF AMERICAN WASTE SERVICES, INC.

ONE AMERICAN WAY • WARREN, OHIO • 44484-5555 • (216) 856-8800

** PLEASE NOTE AREA CODE CHANGE (330) 856-8800 EFFECTIVE MARCH 9,1996

NON-HAZARDOUS WASTE MANIFEST

DOCUMENT NO. 347424

THIS SECTION TO BE COMPLETED BY GENERATOR:

COMPANY NAME	ADDRESS	WASTE I.D. NUMBER
BECTON DICKINSON & CO.	1 BECTON DRIVE FRANKLIN LAKES, NJ 07417 CITY STATE ZIP	18216 P.O. NUMBER

NAME OR DESCRIPTION OF WASTE(S) SHIPPED

METALS CONTAMINATED SOIL

COMMENTS

WASTE SITE LOCATION: STANLEY ST. EAST RUTHERFORD, NJ
P.O. # X-12824

	NAME	PHONE NO.	24 HR. EMERGENCY NO.
IN CASE OF AN EMERGENCY OR SPILL, CONTACT	BRIAN LOGUE DOMENICK GASBARRO	(330) 533-9841 (201) 847-7175	(216) 467-2885 (201) 847-7175

I Hereby certify that the above named waste(s) are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the DOT and the EPA.

GENERATOR'S SIGNATURE: Domenick Gasbarro Jr.

DATE: 9/5/96

THIS SECTION TO BE COMPLETED BY THE HAULER/TRANSPORTER:

COMPANY NAME	ADDRESS	PHONE NO.
Horwith Trucks Inc.	Northampton, PA	(610) 261-2220

VEHICLE I.D. NO.	STATE	BOX NUMBER-IN	BOX NUMBER-OUT	JOB NO.
XB 47595	PA			

I Hereby certify that the above described waste(s) were accepted for transportation at the producer's site for delivery to the waste facility. Both as listed hereupon.

PRINT DRIVER'S NAME: Richard A Silfies

DRIVER'S SIGNATURE: Richard A Silfies

DATE: 09-05-96

THIS SECTION TO BE COMPLETED BY RECEIVER AT DISPOSAL FACILITY:

FACILITY NAME	ADDRESS	PHONE NO.
AMERICAN LANDFILL, INC.	7916 CHAPEL STREET S.E. WAYNESBURG, OH 44688	(330) 866-3265

COMMENTS

I Hereby certify that the above described wastes were delivered to this Facility, that the Facility is authorized and permitted to receive such wastes.	AUTHORIZED SIGNATURE	DATE

QUANTITY TO BE DETERMINED AT DISPOSAL FACILITY

GENERATOR - COPY 1

SEE LANDFILL RULES AND REGULATIONS ON BACK

GENERATOR: Copies 1 & 6 AWS INVOICING DEPT: Copies 2 & 3 DISPOSAL FACILITY: Copy 4 HAULER: Copy 5

State of New Jersey
Department of Environmental Protection
Division of Hazardous Waste Management
Manifest Section
CN 028, Trenton, NJ 08625

Please type or print in block letters. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039. Expires 9-30-94

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. NJD000304782 Manifest Document No. 01018

2. Page 1 of 1

Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson and Company
1 Becton Drive, Franklin Lakes, New Jersey 07417-1880
SITE: 1 STANLEY ST. E. RUTHERFORD NJ 07073

4. Generator's Phone (201) 848 6800

A. State Manifest Document Number NJA 1530714

B. State Generator's ID

5. Transporter 1 Company Name [illegible]

6. US EPA ID Number [illegible]

C. State Trans. ID NJDEP 507110

7. Transporter 2 Company Name

8. US EPA ID Number

D. Transporter's Phone (610) 261-2220

E. State Trans. ID

9. Designated Facility Name and Site Address
American Landfill, Inc.
7916 Chapel Street, SE
Waynesburg, OH 44688

10. US EPA ID Number NONE

F. Transporter's Phone ( )

G. State Facility's ID

H. Facility's Phone (330) 866-3265

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number) HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. X	Environmentally Hazardous Substances, Solid, N.O.S., Class 9, PG III NA3077 (Lead)	001	DT	00018	Y	C306
b.						
c.						
d.						

J. Additional Descriptions for Materials Listed Above
a. S,T (Lead)
b.
c.
d.

K. Handling Codes for Wastes Listed Above
a. D80
b.
c.
d.

15. Special Handling Instructions and Additional Information
Material is Non RCRA Regulated. Material is only regulated in NJ as a Hazardous Waste Waste #C306.
Emergency Contact: Dominick Gasbarro (201) 847-7175
Approval #18216
NJ Decal 75312

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be [illegible] I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and [illegible] minimize my waste generation and select the best [illegible] method that is available to me and that I can afford.

Printed/Typed Name [illegible] Signature [illegible] Month Day Year 09 05 96

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name Signature Month Day Year 09 05 96

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name Signature Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name Signature Month Day Year

NJA 1530714

EPA Form [illegible] Previous editions are obsolete.

SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

AMERICAN LANDFILL, INC. **MAHONING LANDFILL, INC.**

EAST LIVERPOOL LANDFILL, INC. # NJA 153074

SUBSIDIARIES OF AMERICAN WASTE SERVICES, INC.

** PLEASE NOTE: ONE AMERICAN WAY WARREN, OHIO 44484-5555 (216) 856-8800 EFFECTIVE MARCH 8 1996

NON-HAZARDOUS WASTE MANIFEST DOCUMENT NO. 347425

THIS SECTION TO BE COMPLETED BY GENERATOR:

COMPANY NAME	ADDRESS	WASTE I.D. NUMBER
BECTON DICKINSON & CO.	1 BECTON DRIVE FRANKLIN LAKES, NJ 07417 CITY STATE ZIP	10210 P.O. NUMBER

NAME OR DESCRIPTION OF WASTE(S) SHIPPED
METALS CONTAMINATED SOIL

COMMENTS
WASTE SITE LOCATION: STANLEY ST. EAST RUTHERFORD, NJ
P.O. # X-12824

	NAME	PHONE NO.	24 HR. EMERGENCY NO.
IN CASE OF AN EMERGENCY OR SPILL, CONTACT	BRIAN LOGUE	(330) 533-9841	(216) 467-2885
	DOMENICK GASBARRO	(201) 847-7175	(201) 847-7175

I Hereby certify that the above named waste(s) are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the DOT and the EPA.

GENERATOR'S SIGNATURE Domenick Gasbarro DATE 9/5/96

THIS SECTION TO BE COMPLETED BY THE HAULER/TRANSPORTER:

COMPANY NAME	ADDRESS	PHONE NO.
Horwith Trucks Inc.	Northampton, PA	(610) 261-2220

VEHICLE I.D. NO.	STATE	BOX NUMBER-IN	BOX NUMBER-OUT	JOB NO.
XA5027	PA			

I Hereby certify that the above described waste(s) were accepted for transportation at the producer's site for delivery to the waste facility. Both as listed hereupon.

PRINT DRIVER'S NAME John Kaboly
DRIVER'S SIGNATURE John Kaboly
DATE 9-5-96

THIS SECTION TO BE COMPLETED BY RECEIVER AT DISPOSAL FACILITY:

FACILITY NAME	ADDRESS	PHONE NO.
AMERICAN LANDFILL, INC.	7916 CHAPEL STREET S.E. WAYNESBURG, OH 44688	(330) 866-3265

COMMENTS

I Hereby certify that the above described wastes were delivered to this Facility, that the Facility is authorized and permitted to receive such wastes.

AUTHORIZED SIGNATURE

DATE

QUANTITY TO BE DETERMINED AT DISPOSAL FACILITY

GENERATOR - COPY 1

SEE LANDFILL RULES AND REGULATIONS ON BACK

GENERATOR: Copies 1 & 6 AWS INVOICING DEPT: Copies 2 & 3 DISPOSAL FACILITY: Copy 4 HAULER: Copy 5

State of New Jersey
Department of Environmental Protection
Division of Hazardous Waste Management
Manifest Section
CN 028, Trenton, NJ 08625

Please type or print in block letters. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039. Expires 9-30-94

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. NTD003047812 Manifest Document No. 01020
2. Page 1 of 1
Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson and Company
1 Becton Drive, Franklin Lakes, New Jersey 07417 1880
SAT 1 STANLEY ST. E. RUTHERFORD NJ 07073
4. Generator's Phone (201 848-6800)

A. State Manifest Document Number NJA 1530716
B. State Generator's ID
C. State Trans. ID
D. Transporter's Phone
E. State Trans. ID
F. Transporter's Phone ( )
G. State Facility's ID
H. Facility's Phone (330 866-3265)

5. Transporter 1 Company Name
6. US EPA ID Number
7. Transporter 2 Company Name
8. US EPA ID Number
9. Designated Facility Name and Site Address
American Landfill, Inc.
7916 Chapel Street, SE
Waynesburg, OH 44688
10. US EPA ID Number NONE

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	HM	12. Containers No.	12. Containers Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. Environmentally Hazardous Substances, Solid, N.O.S., Class 9, PG III NA3077 (Lead)	X	001	DT	00018	Y	C306
b.						
c.						
d.						

J. Additional Descriptions for Materials Listed Above
a. S,T (Lead)
c.
b.
d.

K. Handling Codes for Wastes Listed Above
a. D80
c.
b.
d.

15. Special Handling Instructions and Additional Information
Material is Non-RCRA Regulated. Material is only regulated in NJ as a Hazardous Waste - Waste #C306.
Emergency Contact: Dominick Gasbarro (201) 847-7175
Approval #18216

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national governmental regulations.
If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.
Printed/Typed Name | Signature | Month Day Year

17. Transporter Acknowledgement of Receipt of Materials
Printed/Typed Name | Signature | Month Day Year

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name | Signature | Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name | Signature | Month Day Year

NJA 1530716

EPA Form 8700-22 (Rev. 9-88) Previous editions are obsolete.

SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

In case of an emergency or spill immediately call the appropriate agency listed in the emergency response section and Local Fire Department

AMERICAN LANDFILL, INC. **MAHONING LANDFILL, INC.**

EAST LIVERPOOL LANDFILL, INC. # NJA/530716

SUBSIDIARIES OF AMERICAN WASTE SERVICES, INC.

ONE AMERICAN WAY • WARREN, OHIO • 44484-5555 • (216) 856-8800

** PLEASE NOTE AREA CODE CHANGE (330) 856-8800 EFFECTIVE MARCH 9,1996

NON-HAZARDOUS WASTE MANIFEST DOCUMENT NO. 347426

THIS SECTION TO BE COMPLETED BY GENERATOR:

COMPANY NAME	ADDRESS	WASTE I.D. NUMBER
BECTON DICKINSON & CO.	1 BECTON DRIVE	18216
	FRANKLIN LAKES, NJ 07417 (CITY / STATE / ZIP)	P.O. NUMBER

NAME OR DESCRIPTION OF WASTE(S) SHIPPED: METALS CONTAMINATED SOIL

COMMENTS: WASTE SITE LOCATION: STANLEY ST. EAST RUTHERFORD, NJ
P.O. # X-12824

	NAME	PHONE NO.	24 HR. EMERGENCY NO.
IN CASE OF AN EMERGENCY OR SPILL, CONTACT	BRIAN LOGUE	(330) 533-9841	(216) 467-2885
	DOMENICK GASBARRO	(201) 847-7175	(201) 847-7175

I Hereby certify that the above named waste(s) are property classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the DOT and the EPA.

GENERATOR'S SIGNATURE: Domenick Gasbarro Jr. DATE: 9/5/96

THIS SECTION TO BE COMPLETED BY THE HAULER/TRANSPORTER:

COMPANY NAME	ADDRESS	PHONE NO.
Horwith Trucks Inc.	Northampton, PA	(610) 261-2220

VEHICLE I.D. NO.	STATE	BOX NUMBER-IN	BOX NUMBER-OUT	JOB NO.
TM 84346	PA			

I Hereby certify that the above described waste(s) were accepted for transportation at the producer's site for delivery to the waste facility. Both as listed hereupon.

PRINT DRIVER'S NAME: Ken Breidinger
DRIVER'S SIGNATURE: Ken Breidinger
DATE: 9/5/96

THIS SECTION TO BE COMPLETED BY RECEIVER AT DISPOSAL FACILITY:

FACILITY NAME	ADDRESS	PHONE NO.
AMERICAN LANDFILL, INC.	7916 CHAPEL STREET S.E. WAYNESBURG, OH 44688	(330) 866-3265

COMMENTS

I Hereby certify that the above described wastes were delivered to this Facility, that the Facility is authorized and permitted to receive such wastes.	AUTHORIZED SIGNATURE	DATE

QUANTITY TO BE DETERMINED AT DISPOSAL FACILITY

GENERATOR - COPY 1

SEE LANDFILL RULES AND REGULATIONS ON BACK

GENERATOR: Copies 1 & 6 AWS INVOICING DEPT: Copies 2 & 3 DISPOSAL FACILITY: Copy 4 HAULER: Copy 5

State of New Jersey
Department of Environmental Protection
Division of Hazardous Waste Management
Manifest Section
CN 028, Trenton, NJ 08625

Please type or print in block letters. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039. Expires 9-30-94

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. N J D 0 0 6 3 0 4 7 8 2 — Manifest Document No. 01017

2. Page 1 of 1 — Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson and Company
1 Becton Drive, Franklin Lakes, New Jersey 07417-1880
SITE: 1 SIMLER ST. E. RUTHERFORD, NJ 07073
4. Generator's Phone (201 848-6800)

A. State Manifest Document Number: NJA 1530715

B. State Generator's ID

5. Transporter 1 Company Name: [illegible] Inc. — US EPA ID Number: PAD [illegible]

C. State Trans. ID: NJAG 50716

7. Transporter 2 Company Name — 8. US EPA ID Number

D. Transporter's Phone ([illegible])

E. State Trans. ID

9. Designated Facility Name and Site Address
American Landfill, Inc.
7916 Chapel Street, SE
Waynesburg, OH 44688
10. US EPA ID Number: NONE

F. Transporter's Phone ( )

G. State Facility's ID

H. Facility's Phone (330 866-3265)

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number) HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. X Environmentally Hazardous Substances, Solid, N.O.S., Class 9, PG III NA3077 (Lead)	001	DT	00018	Y	C306
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above
a. ST (Lead)
c.
e.
g.

K. Handling Codes for Wastes Listed Above
a. D80
c.
b.
d.

15. Special Handling Instructions and Additional Information
Material is Non RCRA Regulated. Material is only regulated in NJ as a Hazardous Waste - Waste #C306.
Emergency Contact: Dominick Gasbarro (201) 847-7175
Approval #18016
NJ Reg # 7<9411

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national [illegible]

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name — Signature — Month Day Year

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name: [illegible] — Signature: Barry Ward — Month Day Year: 6/10/96

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name — Signature — Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name — Signature — Month Day Year

EPA Form 8700-22 (Rev. 9-88) Previous editions are obsolete.

SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

AMERICAN LANDFILL, INC. **MAHONING LANDFILL, INC.**

EAST LIVERPOOL LANDFILL, INC. # NJA153075

SUBSIDIARIES OF AMERICAN WASTE SERVICES, INC.

** PLEASE NOTE NAME CHANGE TO ONE AMERICAN WAY, WARREN, OH 44484-6555 (216) 856-8800

NON-HAZARDOUS WASTE MANIFEST DOCUMENT NO. 347427

THIS SECTION TO BE COMPLETED BY GENERATOR:

COMPANY NAME	ADDRESS	WASTE I.D. NUMBER
BECTON DICKINSON & CO.	1 BECTON DRIVE FRANKLIN LAKES, NJ 07417 CITY STATE ZIP	18216 P.O. NUMBER

NAME OR DESCRIPTION OF WASTE(S) SHIPPED
METALS CONTAMINATED SOIL

COMMENTS
WASTE SITE LOCATION: STANLEY ST. EAST RUTHERFORD, NJ
P.O. # X-12824

	NAME	PHONE NO.	24 HR. EMERGENCY NO.
IN CASE OF AN EMERGENCY OR SPILL, CONTACT	BRIAN LOGUE	(330) 533-9841	(216) 467-2885
	DOMENICK GASBARRO	(201) 847-7175	(201) 847-7175

I Hereby certify that the above named waste(s) are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the DOT and the EPA.

GENERATOR'S SIGNATURE Domenick Gasbarro Jr. DATE 9/5/96

THIS SECTION TO BE COMPLETED BY THE HAULER/TRANSPORTER:

COMPANY NAME	ADDRESS	PHONE NO.
Horwith Trucks Inc.	Northampton, PA	(610) 261-2220

VEHICLE I.D. NO.	STATE	BOX NUMBER-IN	BOX NUMBER-OUT	JOB NO.
XC08291	PA			

I Hereby certify that the above described waste(s) were accepted for transportation at the producer's site for delivery to the waste facility. Both as listed hereupon.

PRINT DRIVER'S NAME Barry Werley DATE 09/05/96

DRIVER'S SIGNATURE Barry Werley

THIS SECTION TO BE COMPLETED BY RECEIVER AT DISPOSAL FACILITY:

FACILITY NAME	ADDRESS	PHONE NO.
AMERICAN LANDFILL, INC.	7916 CHAPEL STREET S.E. WAYNESBURG, OH 44688	(330) 866-3265

COMMENTS

I Hereby certify that the above described wastes were delivered to this Facility, that the Facility is authorized and permitted to receive such wastes.	AUTHORIZED SIGNATURE	DATE

QUANTITY TO BE DETERMINED AT DISPOSAL FACILITY

GENERATOR - COPY 1

SEE LANDFILL RULES AND REGULATIONS ON BACK

GENERATOR: Copies 1 & 6 AWS INVOICING DEPT: Copies 2 & 3 DISPOSAL FACILITY: Copy 4 HAULER: Copy 5

State of New Jersey
Department of Environmental Protection
Division of Hazardous Waste Management
Manifest Section
CN 028, Trenton, NJ 08625

Please type or print in block letters. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039. Expires 9-30-94

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: NJD000304782 — Manifest Document No.: 07022

2. Page 1 of 1

Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson and Company
1 Becton Drive, Franklin Lakes, New Jersey 07417-1880
SITE: 1 STANLEY ST. E. RUTHERFORD NJ 07073

4. Generator's Phone (201) 848-6800

A. State Manifest Document Number: NJA 1530718

B. State Generator's ID

5. Transporter 1 Company Name: Horwith Truck Inc.

6. US EPA ID Number: PAD146714878

C. State Trans. ID: S07110

7. Transporter 2 Company Name

8. US EPA ID Number

D. Transporter's Phone (610) 261-2220

E. State Trans. ID

9. Designated Facility Name and Site Address
American Landfill, Inc.
7916 Chapel Street, SE
Waynesburg, OH 44688

10. US EPA ID Number: NONE

F. Transporter's Phone ( )

G. State Facility's ID

H. Facility's Phone (330) 866-3365

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	Environmentally Hazardous Substances, Solid, N.O.S., Class 9, PG III NA3077 (Lead)	001	DT	00018	Y	C306
b.							
c.							

J. Additional Descriptions for Materials Listed Above
a. S,T (Lead)
c.
d.

K. Handling Codes for Wastes Listed Above
a. D80
c.
b.
d.

15. Special Handling Instructions and Additional Information
Material is Non-RCRA Regulated. Material is only regulated in NJ as a Hazardous Waste - Waste #C306.
Emergency Contact: Dominick Gasbarro (201) 847-7175
Approval #18216

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.
If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be [illegible] and that I have selected the [illegible] storage, or disposal currently available to me which minimizes the present and [illegible] waste management method that is available to me and that I can afford. [illegible]

Printed/Typed Name: Dominick Gasbarro — Signature: [illegible] — Month Day Year: 09 06 96

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: EARL [illegible] — Signature: [illegible] — Month Day Year: 9 9 06 96

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name — Signature — Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name — Signature — Month Day Year

NJA 1530718

EPA Form [illegible] (Rev. 9-88). Previous editions are obsolete.

SIGNATURE AND INFORMATION *MUST* BE LEGIBLE ON ALL COPIES

6. GENERATOR MAIL TO: TOPIC STATE

AMERICAN LANDFILL, INC. **MAHONING LANDFILL, INC.**

EAST LIVERPOOL LANDFILL, INC.

SUBSIDIARIES OF AMERICAN WASTE SERVICES, INC. NJA1530718

ONE AMERICAN WAY • WARREN, OHIO • 44484-5555 • (216) 856-8800

** PLEASE NOTE AREA CODE CHANGE (330) 856-8800 EFFECTIVE MARCH 9,1996

NON-HAZARDOUS WASTE MANIFEST DOCUMENT NO. 347428

THIS SECTION TO BE COMPLETED BY GENERATOR:

COMPANY NAME	ADDRESS	WASTE I.D. NUMBER
BECTON DICKINSON & CO.	1 BECTON DRIVE	18216
	FRANKLIN LAKES, NJ 07417	P.O. NUMBER
	CITY STATE ZIP	

NAME OR DESCRIPTION OF WASTE(S) SHIPPED
METALS CONTAMINATED SOIL

COMMENTS
WASTE SITE LOCATION: STANLEY ST. EAST RUTHERFORD, NJ
P.O. # X-12824

	NAME	PHONE NO.	24 HR. EMERGENCY NO.
IN CASE OF AN EMERGENCY OR SPILL, CONTACT	BRIAN LOGUE	(330) 533-9841	(216) 467-2885
	DOMENICK GASBARRO	(201) 847-7175	(201) 847-7175

I Hereby certify that the above named waste(s) are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the DOT and the EPA.

GENERATOR'S SIGNATURE Domenick Gasbarro Jr/pm

DATE 9/6/96

THIS SECTION TO BE COMPLETED BY THE HAULER/TRANSPORTER:

COMPANY NAME	ADDRESS	PHONE NO.
Horwith Truck Inc.	Northampton PA	(610)261-2220

VEHICLE I.D. NO.	STATE	BOX NUMBER-IN	BOX NUMBER-OUT	JOB NO.
XB19429	PA	159		

I Hereby certify that the above described waste(s) were accepted for transportation at the producer's site for delivery to the waste facility. Both as listed hereupon.

PRINT DRIVER'S NAME EARL KUNTZEL

DRIVER'S SIGNATURE Earl Kuntzel

DATE 9/6/96

THIS SECTION TO BE COMPLETED BY RECEIVER AT DISPOSAL FACILITY:

FACILITY NAME	ADDRESS	PHONE NO.
AMERICAN LANDFILL, INC.	7916 CHAPEL STREET S.E. WAYNESBURG, OH 44688	(330) 866-3265

COMMENTS

I Hereby certify that the above described wastes were delivered to this Facility, that the Facility is authorized and permitted to receive such wastes.	AUTHORIZED SIGNATURE	DATE

QUANTITY TO BE DETERMINED AT DISPOSAL FACILITY

GENERATOR - COPY 1

SEE LANDFILL RULES AND REGULATIONS ON BACK

GENERATOR: Copies 1 & 6 AWS INVOICING DEPT: Copies 2 & 3 DISPOSAL FACILITY: Copy 4 HAULER: Copy 5

State of New Jersey
Department of Environmental Protection
Division of Hazardous Waste Management
Manifest Section
CN 028, Trenton, NJ 08625

Please type or print in block letters. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039. Expires 9-30-94

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. NJD000304782 Manifest Document No. 01008

2. Page 1 of 1

Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson and Company
1 Becton Drive, Franklin Lakes, New Jersey 07417-1880
Sm: 1 Stanley St. E. Rutherford NJ 07073

4. Generator's Phone (201) 848-6800

A. State Manifest Document Number NJA 1530719

B. State Generator's ID

5. Transporter 1 Company Name Horwith Trucks Inc.

6. US EPA ID Number PAD146714878

C. State Trans. ID S07110

7. Transporter 2 Company Name

8. US EPA ID Number

D. Transporter's Phone (610) 261-2220

E. State Trans. ID

9. Designated Facility Name and Site Address
American Landfill, Inc.
2916 Chapel Street, SE
Waynesburg, OH 44688

10. US EPA ID Number NONE

F. Transporter's Phone ( )

G. State Facility's ID

H. Facility's Phone (330) 866-3265

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number) HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. X	Environmentally Hazardous Substances, Solid, N.O.S., Class 9, PG III NA3077 (Lead)	001	DT	00018	Y	C306
b.						
c.						
d.						

J. Additional Descriptions for Materials Listed Above
a. S.T (Lead)
c.
b.
d.

K. Handling Codes for Wastes Listed Above
a. D80
c.
b.
d.

15. Special Handling Instructions and Additional Information
Material is Non RCRA Regulated. Material is only regulated in NJ as a Hazardous Waste Waste #C306.
Emergency Contact: Dominick Gasbarro (301) 847-7175
Approval #18216

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway [illegible] to applicable international and national government regulations.
[illegible] quantity generator, I certify that I have a program [illegible] the volume and toxicity of waste generated to the degree I have determined to be [illegible] storage or disposal currently available [illegible] the best waste management method that is available to me and [illegible] afford.

Printed/Typed Name [illegible] Signature [illegible] Month Day Year 04 26 96

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name Richard A. Silfies Signature Richard A. Silfies Month Day Year 04 26 96

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name Signature Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name Signature Month Day Year

EPA Form [illegible] (Rev. 9/93) Previous editions are obsolete

SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

AMERICAN LANDFILL, INC. **MAHONING LANDFILL, INC.**

EAST LIVERPOOL LANDFILL, INC.

SUBSIDIARIES OF AMERICAN WASTE SERVICES, INC. NJA1530719

** PLEASE NOTE: ONE AMERICAN WAY, WARREN, OHIO 44484-5555 (216) 856-8800

NON-HAZARDOUS WASTE MANIFEST DOCUMENT NO. 347429

THIS SECTION TO BE COMPLETED BY GENERATOR:

COMPANY NAME	ADDRESS	WASTE I.D. NUMBER
BECTON DICKINSON & CO.	1 BECTON DRIVE FRANKLIN LAKES, NJ 07417 CITY STATE ZIP	18218 P.O. NUMBER

NAME OR DESCRIPTION OF WASTE(S) SHIPPED
METALS CONTAMINATED SOIL

COMMENTS
WASTE SITE LOCATION: STANLEY ST. EAST RUTHERFORD, NJ
P.O. # X-12824

	NAME	PHONE NO.	24 HR. EMERGENCY NO.
IN CASE OF AN EMERGENCY OR SPILL, CONTACT	BRIAN LOGUE	(330) 533-9841	(216) 467-2885
	DOMENICK GASBARRO	(201) 847-7175	(201) 847-7175

I Hereby certify that the above named waste(s) are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the DOT and the EPA.

GENERATOR'S SIGNATURE Dominick Gasbarro/jm DATE 9/6/96

THIS SECTION TO BE COMPLETED BY THE HAULER/TRANSPORTER:

COMPANY NAME	ADDRESS	PHONE NO.
Horwith Trucks Inc.	Northampton PA	(610)261-2220

VEHICLE I.D. NO.	STATE	BOX NUMBER-IN	BOX NUMBER-OUT	JOB NO.
X826508	Pa			

I Hereby certify that the above described waste(s) were accepted for transportation at the producer's site for delivery to the waste facility. Both as listed hereupon.

PRINT DRIVER'S NAME Richard A Sulfis
DRIVER'S SIGNATURE Richard A Sulfis
DATE 9/6/96

THIS SECTION TO BE COMPLETED BY RECEIVER AT DISPOSAL FACILITY:

FACILITY NAME	ADDRESS	PHONE NO.
AMERICAN LANDFILL, INC.	7916 CHAPEL STREET S.E. WAYNESBURG, OH 44688	(330) 866-3265

COMMENTS

I Hereby certify that the above described wastes were delivered to this Facility, that the Facility is authorized and permitted to receive such wastes.

AUTHORIZED SIGNATURE DATE

QUANTITY TO BE DETERMINED AT DISPOSAL FACILITY

GENERATOR - COPY 1

SEE LANDFILL RULES AND REGULATIONS ON BACK

GENERATOR: Copies 1 & 6 AWS INVOICING DEPT: Copies 2 & 3 DISPOSAL FACILITY: Copy 4 HAULER: Copy 5

State of New Jersey
Department of Environmental Protection
Division of Hazardous Waste Management
Manifest Section
CN 028, Trenton, NJ 08625

Please type or print in block letters. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039. Expires 9-30-94

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. NJD000304782 Manifest Document No. 07025

2. Page 1 of 1

Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Becton Dickinson and Company
1 Beckton Drive, Franklin Lakes, New Jersey 07417-1880
SITE: 1 STANLEY ST. E. RUTHERFORD, NJ 07073

4. Generator's Phone (201) 848 6800

A. State Manifest Document Number NJA 1530619

B. State Generator's ID

5. Transporter 1 Company Name Kephart Trucking Co.

6. US EPA ID Number PAD052188497

C. State Trans. ID S50125

7. Transporter 2 Company Name

8. US EPA ID Number

D. Transporter's Phone (814) 857-7704

E. State Trans. ID

9. Designated Facility Name and Site Address
American Landfill, Inc.
7916 Chapel Street, SE
Waynesburg, OH 44688

10. US EPA ID Number NONE

F. Transporter's Phone ( )

G. State Facility's ID 330 866-3265

H. Facility's Phone ( )

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number) HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. X	Environmentally Hazardous Substances, Solid, N.O.S., Class 9, PG III NA3077 (Lead)	001	DT	00018	Y	C306
b.						
c.						
d.						

J. Additional Descriptions for Materials Listed Above
a. S.T (Lead)
c.
b.
d.

K. Handling Codes for Wastes Listed Above
a. D80
c.
b.
d.

Special Handling Instructions and Additional Information
Material is Non-RCRA Regulated. Material is only regulated in NJ as a Hazardous Waste - Waste #C306.
Emergency Contact: Dominick Gasbarro (201) 847-7175
Approval #18216

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national governmental regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be [illegible] storage, or disposal currently available to me which minimizes the present and [illegible] I have made a good faith effort to minimize my waste generation and select [illegible] management method [illegible]

73274

Printed Typed Name Dominick Gasbarro Signature [illegible] Month Day Year 04 [illegible]

[illegible] Acknowledgement of [illegible]

Printed Typed Name [illegible] Signature [illegible] Month Day Year 04 [illegible]

17. Transporter 2 Acknowledgement of Receipt of Materials

Printed Typed Name Signature Month Day Year

18. Discrepancy Indication Space

19. Facility Owner or Operator: Certification of receipt of hazardous materials [illegible] by this manifest except as noted in Item 19.

Printed Typed Name Signature Month Day Year

[illegible] Previous editions are obsolete

SIGNATURE AND INFORMATION *MUST* BE LEGIBLE ON ALL COPIES

NJA 1530619

AMERICAN LANDFILL, INC. **MAHONING LANDFILL, INC.**

EAST LIVERPOOL LANDFILL, INC.

SUBSIDIARIES OF AMERICAN WASTE SERVICES, INC. NJA1530619

** PLEASE NOTE NEW BLUE ORANGE ADDRESS: ONE AMERICAN WAY, WARREN, OH 44484-5555 (216) 850-8806

NON-HAZARDOUS WASTE MANIFEST DOCUMENT NO. 347431

THIS SECTION TO BE COMPLETED BY GENERATOR:

COMPANY NAME	ADDRESS	WASTE I.D. NUMBER
BECTON DICKINSON & CO.	1 BECTON DRIVE FRANKLIN LAKES, NJ 07417 CITY STATE ZIP	18216 P.O. NUMBER

NAME OR DESCRIPTION OF WASTE(S) SHIPPED
METALS CONTAMINATED SOIL

COMMENTS WASTE SITE LOCATION: STANLEY ST. EAST RUTHERFORD, NJ
P.O. # X-12824

	NAME	PHONE NO.	24 HR. EMERGENCY NO.
IN CASE OF AN EMERGENCY OR SPILL, CONTACT	BRIAN LOGUE DOMENICK GASBARRO	(330) 533-9841 (201) 847-7175	(216) 467-2885 (201) 847-7175

I Hereby certify that the above named waste(s) are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the DOT and the EPA.	GENERATOR'S SIGNATURE Dominic Gasbarro	DATE 9/6/96

THIS SECTION TO BE COMPLETED BY THE HAULER/TRANSPORTER:

COMPANY NAME	ADDRESS	PHONE NO.
Kephart Trucking Co.	Bigler, PA	(814)857-7704

VEHICLE I.D. NO.	STATE	BOX NUMBER-IN	BOX NUMBER-OUT	JOB NO.
TZ47572	PA	670	670	

I Hereby certify that the above described waste(s) were accepted for transportation at the producer's site for delivery to the waste facility. Both as listed hereupon.	PRINT DRIVER'S NAME SAM KODI DRIVER'S SIGNATURE Sam Kodi	DATE 9/6/96

THIS SECTION TO BE COMPLETED BY RECEIVER AT DISPOSAL FACILITY:

FACILITY NAME	ADDRESS	PHONE NO.
AMERICAN LANDFILL, INC.	7916 CHAPEL STREET S.E. WAYNESBURG, OH 44688	(330) 866-3265

COMMENTS

I Hereby certify that the above described wastes were delivered to this Facility, that the Facility is authorized and permitted to receive such wastes.	AUTHORIZED SIGNATURE	DATE

QUANTITY TO BE DETERMINED AT DISPOSAL FAC...

GENERATOR - COPY 1

SEE LANDFILL RULES AND REGULATIONS ON B...

GENERATOR: Copies 1 & 6 AWS INVOICING DEPT: Copies 2 & 3 DISPOSAL FACILITY: Copy 4 HAULER: Copy 5

State of New Jersey
Department of Environmental Protection
Division of Hazardous Waste Management
Manifest Section
CN 028, Trenton, NJ 08625

Form Approved. OMB No. 2050-0039. Expires 9-30-94

Please type or print in block letters. (Form designed for use on elite (12-pitch) typewriter.)

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. NJD000304782 Manifest Document No. 07026

2. Page 1 of 1

Information in the shaded areas is not required by Federal law.

A. State Manifest Document Number: NJA 1530620

3. Generator's Name and Mailing Address
Becton Dickinson and Company
1 Beckton Drive, Franklin Lakes, New Jersey 07417-1880
SITE: 1 Stanley St. E. Rutherford, NJ 07073

4. Generator's Phone (201) 848-6800

B. State Generator's ID

5. Transporter 1 Company Name: Kephart Trucking Inc.

6. US EPA ID Number: PAD052188497

C. State Trans. ID: 850125

7. Transporter 2 Company Name

8. US EPA ID Number

D. Transporter's Phone (814) 857-7704

E. State Trans. ID

9. Designated Facility Name and Site Address
American Landfill, Inc.
7916 Chapel Street, SE
Waynesburg, OH 44688

10. US EPA ID Number: NONE

F. Transporter's Phone ( )

G. State Facility's ID

H. Facility's Phone (330) 866-3265

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	Environmentally Hazardous Substances, Solid, N.O.S., Class 9, PG III NA3077 (Lead)	001	DT	00018	Y	C306
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
a. S.T (Lead)
b.
c.
d.

K. Handling Codes for Wastes Listed Above
a. D80
b.
c.
d.

15. Special Handling Instructions and Additional Information
Material is Non-RCRA Regulated. Material is only regulated in NJ as a Hazardous Waste - Waste #C306.
Emergency Contact: Dominick Gasbarro (201) 847-7175
Approval #18216

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.
If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; I have made a good faith effort to minimize my waste generation and select the best waste management [illegible]

Printed/Typed Name: Dominick Gasbarro
Signature: [illegible]
Month Day Year: 07 06 96

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: [illegible]
Signature: [illegible]
Month Day Year: [illegible]

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name
Signature
Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name
Signature
Month Day Year

EPA Form 8700-22 (Rev. 9-88) Previous editions are obsolete.

SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

6 — GENERATOR MAIL TO - TSD'S STATE

LANDFILL, INC. **MAHONING LANDFILL, INC.**

EAST LIVERPOOL LANDFILL, INC.

SUBSIDIARIES OF AMERICAN WASTE SERVICES, INC. NJA1530620

ONE AMERICAN WAY • WARREN, OHIO • 44484-5555 • (216) 856-8800

SE NOTE AREA CODE CHANGE (330) 856-8800 EFFECTIVE MARCH 9,1996

NON-HAZARDOUS WASTE MANIFEST

DOCUMENT NO. 347432

BE COMPLETED BY GENERATOR:

	ADDRESS	WASTE I.D. NUMBER
ICKINSON & CO.	1 BECTON DRIVE	18216
	FRANKLIN LAKES, NJ 07417	P.O. NUMBER
	CITY STATE ZIP	

ION OF WASTE(S) SHIPPED

CONTAMINATED SOIL

LOCATION: STANLEY ST. EAST RUTHERFORD, NJ
P.O. # X-12824

NAME	PHONE NO.	24 HR. EMERGENCY NO.
BRIAN LOGUE	(330) 533-9841	(216) 467-2885
DOMENICK GASBARRO	(201) 847-7175	(201) 847-7175

above named waste(s) are properly ckaged, marked, and labeled and are transportation according to the of the DOT and the EPA.	GENERATOR'S SIGNATURE Domenick Gasbarro /fpm	DATE 9/6/96

BE COMPLETED BY THE HAULER/TRANSPORTER:

ADDRESS			PHONE NO.
Trucking Co. Bigler PA			(814) 857-7704
STATE PA	BOX NUMBER-IN	BOX NUMBER-OUT	JOB NO.

e above described d for transportation at r delivery to the waste l hereupon.	PRINT DRIVER'S NAME Tim Wian	DATE 9/6/96
	DRIVER'S SIGNATURE	

BE COMPLETED BY RECEIVER AT DISPOSAL FACILITY:

ADDRESS	PHONE NO.
NDFILL, INC. 7916 CHAPEL STREET S.E. WAYNESBURG, OH 44688	(330) 866-3265

above described wastes acility, that the Facility itted to receive such wastes.	AUTHORIZED SIGNATURE	DATE

QUANTITY TO BE DETERMINED AT DISPOSAL FACILITY

GENERATOR - COPY 1

SEE LANDFILL RULES AND REGULATIONS ON BACK

AWS INVOICING DEPT: Copies 2 & 3 DISPOSAL FACILITY: Copy 4 HAULER: Copy 5

BD responses to EPA Request for Information

Nos. 14

GROUND WATER REMEDIAL ACTION WORKPLAN ADDENDUM

ISRA Case No. 87577
Becton Dickinson
East Rutherford, NJ

July 1999

Prepared for:

Becton Dickinson and Company
1 Becton Drive
Franklin Lakes, New Jersey

Prepared by:

ENVIRONMENTAL RESOURCES MANAGEMENT
175 Froehlich Farm Blvd.
Woodbury, NY 11797

GROUND WATER REMEDIAL ACTION WORKPLAN ADDENDUM

ISRA Case No. 87577
Becton Dickinson
East Rutherford, NJ

July 1999

Prepared for:

Becton Dickinson and Company
1 Becton Drive
Franklin Lakes, New Jersey

Prepared by:

ENVIRONMENTAL RESOURCES MANAGEMENT
175 Froehlich Farm Blvd.
Woodbury, NY 11797

18615708.468a

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Becton, Dickinson and Company (BD) began terminating operations at its East Rutherford, New Jersey facility in the mid-1980's. BD had used this location since the early 1900's for a variety of manufacturing operations and administrative functions. In order to comply with NJDEP's ECRA (now ISRA) requirements, BD performed comprehensive soil and ground water investigations at the site. This lead to the development of a risk based remedial strategy to address heavy metals and petroleum hydrocarbons detected in on-site soils and chlorinated volatile organic compounds (VOCs) identified in the ground water underlying the site.

BD initiated activities to implement the remedial strategy in the late 1980's. Since that time, soils throughout the site have been remediated through excavation and off-site disposal. In 1990, BD installed and placed into operation a ground water recovery and treatment system to address the VOCs. This system has been successful in significantly reducing the areal extent and concentration of several of the VOC plumes at the site. The concentration of VOCs at these locations is now approaching the site's remedial objectives. However, the presence of two, dense, non-aqueous phase liquid (DNAPL) source areas in one of the plumes has impeded progress towards achieving the remedial objective at that location.

BD has decided to modify its strategy for meeting the remedial ground water objectives. The new strategy incorporates an in-situ, reactive treatment wall to effectively isolate and treat the DNAPL source area, while applying a monitored natural attenuation (MNA) approach at the other plumes.

This RAWP Addendum addresses the natural attenuation component of the strategy (a separate addendum will be prepared for the in-situ treatment wall). It describes the use of MNA at the BD site and

demonstrates that its use, as proposed, is consistent with NJDEP's requirements (N.J.A.C. 7:26 E-6.3(d)). Most importantly, this Addendum concludes that MNA can be applied to the site and taken together with the treatment wall, provides an environmentally sound approach that will successfully conclude active remedial activities at the site. (i.e., the pump and treat system).

The RAWP Addendum describes existing conditions at the site and discusses the process through which the proposed remedial strategy was developed. A receptor analysis is then presented to identify sensitive downstream receptors, compounds of concern and applicable standards. The Addendum then demonstrates that the geochemistry of the site is favorable to MNA and details a modeling effort that concludes that the compounds of concern are reduced to acceptable levels by the time the ground water reaches the sensitive receptors. Finally, a natural attenuation monitoring program is formulated together with a schedule to transition to this new remedial strategy.

1.0 *INTRODUCTION*

The Becton Dickinson and Company (BD) facility in East Rutherford, Bergen County, New Jersey was used for the production of various medical apparatus such as syringes and thermometers, beginning early this century and ending in 1988. Past manufacturing activities are considered to be the source of environmental impacts to the ground water beneath the site and several discreet areas of impacted soil around the site. As described in Section 1.2, BD conducted environmental investigations and performed remedial activities to address these environmental conditions.

BD is submitting this Ground Water Remedial Action Work Plan (RAWP) Addendum to modify the existing ground water recovery and treatment remedial strategy. The proposed new ground water remedial strategy is to apply monitored natural attenuation (MNA) to three of the four ground water plumes (designated at Plumes 1, 3 and 5) that are impacted with dissolved chlorinated organics. This report demonstrates how MNA meets the current New Jersey Department of Environmental Protection (NJDEP) requirements for natural remediation of impacted ground water, as set forth in N.J.A.C 7:26 E - 6.3(d).

The remaining plume (Plume 2) is also impacted by dissolved chlorinated organic compounds and in addition contains two areas of dense, non-aqueous phase liquid (DNAPL). In the short term, Plume 2 will continue to be addressed by ground water recovery and treatment. Subsequently, a zero-valent iron treatment wall will be installed to provide in-situ treatment for the ground water within Plume 2. BD will be submitting a second RAWP Addendum in the near future with the design of the in-situ treatment wall.

1.1 *PROJECT LOCATION*

The site is located on the western fringe of the Hackensack Meadowlands as shown in Figure 1-1. Figure 1-2 shows a plan view of the site during the fullest extent of BD operations. The site incompassed approximately 30 acres and is divided by public streets. Portions of the site are surrounded by chain link or iron fencing.

Local land use within 1,000 feet of the site property boundary is urban with mixed residential and industrial/commercial development. The site is bordered on the east by New Jersey State Highway Route 17. The north eastern portion of the site and east of Route 17 are tidal meadowlands. Developed areas along the east side of Route 17 include commercial and industrial establishments. The south and west sides of the site are bordered by residential and commercial establishments. A public high school lies to the north of the site boundaries.

1.2 *PROJECT CHRONOLOGY AND PREVIOUS ISRA/ECRA SUBMISSIONS*

In June 1987, BD submitted the initial ECRA notice to the New Jersey Department of Environmental Protection (NJDEP). The site was divided into six separate parcels, each with their own tax lot and block number and their own separate ECRA case. The boundaries of the six parcels are shown on Figure 1-2.

Environmental investigations of Parcel Nos. 1, 2 and 3 were conducted on an expedited schedule from October 1987 through December 1987. BD subsequently prepared and submitted Remedial Action Work Plans (RAWP) for the three parcels in July 1988. The RAWP for Parcels 1 and 2 included the overall ground water remediation strategy that was

subsequently applied to the entire site (as appropriate). The RAWPs were approved by the NJDEP in October 1988 and the soil cleanup in Parcel Nos. 1 and 2 was completed in November 1989. The department issued no further action letters for the soil remediation in Parcel Nos. 1 and 2 ECRA Cases in May 1991 and for the Parcel No. 3 ECRA/ISRA Case in July 1993.

Environmental investigations were conducted in Parcel Nos. 4, 5 and 6 from February to May 1988. The RAWPs for these Parcels were submitted to the department in March 1989 and were approved in September 1989. Remediation of soil in Parcel Nos. 4 and 5 (exclusive of soils underlying the on-site buildings) was completed in December 1991 and soil remediation of Parcel No. 6 was completed in September 1992. The Soil Remediation Reports for Parcel Nos. 4, 5 and 6 were submitted to the department in June 1992 and December 1992, respectively. The department issued an ISRA no further action letter for the Parcel No. 6 Case in September 1993. In February 1994, the Department issued an ISRA no further action letter for the Parcel No. 4 Case and for the Parcel No. 5 soil remediation.

The soil investigations in Parcel Nos. 4 and 5 were limited to outdoor areas because initial redevelopment plans called for the existing buildings to remain in place. However, subsequent redevelopment plans required the demolition of all site buildings on Parcel Nos. 4 and 5 (except for the ground water treatment plant). The assessment and remediation of sub-slab soil beneath these buildings began in April 1994 and was completed in September 1996. The NJDEP issued an ISRA no further action letter for the Sub-Slab Soil Remediation in February 1998.

The portion of the site south of Stanley Street (Parcels 1 and 2) was sold in 1989 and is presently completely redeveloped, containing a large building

owned and occupied by the Federal Reserve Bank of New York. Parcel 3, the smallest of the six, was sold in 1993 and is currently occupied by a small hardware store. The demolition of all other buildings north of Stanley Street was completed in 1996 and BD is in negotiations to sell this portion of the site (Parcels 4, 5, and 6). It is anticipated that the new land use of these parcels will consist of large retail sales operations. The ground water recovery and treatment system continues to operate at the site as of this writing.

Table 1-1 provides a summary listing of the project documents that have been submitted to the department and additional information on environmental conditions is provided in Section 2.0.

Figure 1-1

Figure 1-2

TABLE 1-1
SUMMARY OF PROJECT DOCUMENTS
Previously Submitted to NJDEP

Report Title	Report Summary	Submission Date
ECRA - Sampling and Analysis Plan, Volume I Parcel Nos. 1, 2, 3, 4, 5, and 6	Presents site information for the initial ECRA notice and the Sampling and Analysis Plan common to each of the 6 parcels	June 1987
ECRA - Sampling and Analysis Plan, Volume II Parcel Nos. 1, 2, 3, 4, 5, and 6	Presents parcel specific information for the Sampling and Analysis Plan including results of the Phase 1a Preliminary Environmental Investigation. Includes the GIS and SES ECRA forms for each parcel and supporting information.	June 1987
ECRA - Supplementary Information, Volume III Parcel Nos. 5 and 6	Presents the results of the Phase 1b and 1c Preliminary Environmental Investigations conducted in Parcel Nos. 5 and 6 and amends the June 1987 Sampling and Analysis Plans.	December 1987
ECRA - Environmental Assessment Program Parcels 1, 2, and 3	Presents results of the comprehensive environmental program conducted in Parcel Nos. 1, 2, and along with the results of the Phase 1b and 1c preliminary environmental investigations.	February 1988
Soil and Ground Water Remedial Action Plan Parcels #1 and 2	Presents results of environmental investigations and procedures to remediate soil and ground water contamination in Parcels 1 and 2.	July 1988
Soil and Ground Water Remedial Action Plan(s) Parcel No. 3	Presents additional results of environmental investigations and procedures to remediate soil and ground water contamination in Parcel No. 3.	July 1988
ECRA Environmental Assessment Program Parcel Nos. 4, 5 and 6	Presents results of the comprehensive environmental program conducted in Parcel Nos. 4, 5 and 6.	August 1988

TABLE 1-1
SUMMARY OF PROJECT DOCUMENTS
Previously Submitted to NJDEP
(continued)

Report Title	Report Summary	Submission Date
Soil and Ground Water Remedial Action Plan(s) Parcel No. 4	Presents procedures to remediate soil and ground water contamination in Parcel No. 4.	March 1989
Soil and Ground Water Remedial Action Plan(s) Parcel No. 5	Presents additional results of environmental investigations and procedures to remediate soil and ground water contamination in Parcel No. 5.	March 1989
Soil and Ground Water Remedial Action Plan(s) Parcel No. 6	Presents additional results of environmental investigations and procedures to remediate soil and ground water contamination in Parcel No. 6.	March 1989
Verification Report for ECRA Site Remediation Parcel Nos. 1 and 2	Documents the implementation of the Soil Remedial Action in Parcel Nos. 1 and 2.	November 1989
Verification Report for ECRA Soil Remediation Parcel Nos. 4 and 5	Documents the implementation of the Soil Remedial Action in Parcel Nos. 4 and 5.	June 1992
Verification Report for ECRA Soil Remediation Parcel No. 6	Documents the implementation of the Soil Remedial Action in Parcel No. 6.	December 1992
ISRA Site Investigation Report, Sub-Building Soil Investigation, Parcel No. 5	Presents the results of the investigation of sub-building soil in Parcel No. 5	October 1994
ISRA Site Investigation Report Addendum Sub-Building Soil Investigation Parcel No. 5	Presents the results of the investigation of sub-building soils in Parcel No. 5.	March 1995
Verification Report for ISRA Soil Remediation Parcel No. 5 Sub-building Soil, ISRA Case No. 87577	Documents the implementation of the Soil Remedial Action for Sub-Building Soils in Parcel No. 5	December 1996
Ground Water Remediation Project History	Documents past project remediation, presents the proposed modification to the ground water remedial strategy and provides specific responses to departmental inquiries.	December 1998

1.3 *REMEDIAL OBJECTIVES*

ERM performed an environmental and health based risk assessment in order to develop the original remedial objectives for the site. These objectives were developed to mitigate unacceptable risks to human health or the environment. The risk assessment utilized all of the environmental data that was collected during the site investigation phases of the project. The remedial objectives were stipulated in a series of RAWPs that were submitted to and approved by the NJDEP. These NJDEP-approved plans established the basis for all subsequent remedial activities at the site.

Most significant to the current proposal to modify the ground water remedial strategy are the objectives that the department approved for the remediation of ground water at the site. The approved objectives directed BD to:

- Maintain hydraulic control of the site in order to prevent off-site migration of VOCs in the shallow water table aquifer;
- Include within its capture zone ground water in the shallow aquifer that contained total VOCs greater than 100 ppb and/or total petroleum hydrocarbons greater than 10 ppm; and
- Address free products at locations were LNAPL was identified.

ERM did not deem it necessary nor did the NJDEP to require BD to address any of the following:

- Off-site ground water contamination (none was identified during the site investigation); and
- Trace concentrations of VOCs that had been detected in the confined aquifer.

The proposed remedial strategy, MNA, will maintain the overall goal of being protective of human health and the environment, both on and off-site. The MNA strategy was developed through:

- the identification of environmental receptors and the applicable standards required for protection of these receptors;
- the analysis of the geochemical environment to determine the mechanisms of biological degradation at the site; and
- ground water contaminant fate and transport modeling to determine the magnitude of the impacts at the identified receptors.

Through this evaluation it has been demonstrated that the application of MNA at the site will not result in unacceptable risks to human health and the environment.

1.4 *OVERVIEW OF REPORT*

The remainder of the report is organized into the following sections:

- *Section 2.0* – Environmental Conditions This section summarizes the soil and ground water quality data collected as part of the project and presents a summary of the site geology.
- *Section 3.0* – Selection of Remedial Technology. This section describes the procedures for selecting the MNA remedial strategy for the site.
- *Section 4.0* – Receptor Evaluation. In this section the downgradient receptors and applicable water quality criteria are identified.
- *Section 5.0* – Summary of Proposed Remedial Action. This section presents the technical and scientific data that demonstrates that the proposed remedial action, MNA, meets the NJDEP requirements for natural ground water remediation as set forth in N.J.A.C. 7:26E-6.3(d). This section also presents the data necessary to establish Classification Exception Areas (CEA's) for the impacted ground water beneath the site.
- *Section 6.0* – Remedial Sampling and Monitoring Plan. This section provides a discussion of the sentinel well system and the monitoring plan used to evaluate and document the natural attenuation process

- *Section 7.0* - Site Restoration Plan. The proposed schedule for the ground water recovery and treatment system decommissioning plan and site redevelopment plans are presented in this section.

- *Section 8.0* - Schedule of Remedial Activities. This section outlines the proposed schedule for implementing, monitoring and reporting on the proposed remedial action.

- *Section 9.0* - Revised Cost Estimate for Site Remediation. This section presents the revised cost estimate for the ground water remediation.

In order to facilitate easier reading of this report, data tables and figures are placed at the end of each section.

2.0 *ENVIRONMENTAL CONDITIONS*

During the initial project activities BD completed extensive soil and ground water sampling investigations in order to assess the environmental impacts of past manufacturing activities on the site. The results of these investigations were used to complete the various environmental assessment and remedial work plan reports which were submitted and approved by the Department. This following section presents a summary of the results of soil and groundwater site investigations and a discussion of the site geology.

2.1 *SOIL QUALITY*

BD's investigation of the soils at the site included the collection of over 1,000 soil samples. Samples were analyzed for: heavy metals, volatile organic compounds (VOC's), semi-volatile organic compounds (SVOC's), total petroleum hydrocarbons (TPH's), polychlorinated bi-phenyls (PCB's), and pesticides. The findings of these soil investigations indicated that on-site soil were impacted by heavy metals, PCB's and TPH's in discreet areas. The results of these investigations, are summarized as follows:

Parcel 1

- Four Areas of Concern for soil were identified in Parcel 1.
- The results of the analysis for heavy metals contained maximum concentrations for lead, mercury and zinc, at 691 ppm, 3.0 ppm, and 533 ppm respectively.
- SVOC concentrations in soil samples from these areas ranged 14.5 ppm to 28.6 ppm. The primary constituents of the total SVOC concentrations were polynuclear aromatic hydrocarbons (PAH's).

- Several soil samples had TPH concentrations ranging from 130 ppm to 8,500 ppm.

- No VOC, PCB or Pesticide impacted soils were encountered.

Parcel 2

- Over 30 Areas of Concern for soil were identified in Parcel 2.

- The results of soil samples analyzed for heavy metals demonstrated maximum concentrations for cadmium, chromium, copper, lead, mercury, nickel, silver and zinc, of 6.7 ppm, 700 ppm, 928 ppm, 13,789 ppm, 7.2 ppm, 209 ppm, 373 ppm and 12,967 ppm respectively.

- SVOC concentrations in soil samples from these areas ranged from 10 ppm to 46.3 ppm. The primary constituents of the total SVOC concentrations were polynuclear aromatic hydrocarbons (PAH's).

- Several soil samples had TPH concentrations ranging from 110 ppm to 48,780 ppm.

- Several soil samples were collected that had total VOC concentrations ranging from 2 ppm to 5 ppm. It should be noted that only one sample had a concentration of 5 ppm and the total VOC fraction was due to the presence of total xylenes. This soil sample was collected near an off-site auto repair shop discharge line.

- PCB concentrations in soil collected near transformer pads ranged from 1.4 ppm to 29,000 ppm. The primary PCB fraction was arochlor - 1260.

- No Pesticide impacted soils were encountered.

Parcel 3

- Only two areas were found to have impacted soil, these two areas had maximum concentrations of lead and TPH of 819 ppm and 3,450 ppm respectively.

- No VOC, SVOC, PCB or Pesticides were encountered.

Parcels 4, 5 and 6

- Five open areas and eleven areas of environmental concern were investigated in these parcels. The soil sampling program included over 350 samples and indicated areawide impacts with heavy metals. In addition soils containing TPH and SVOC's were encountered.

- Approximately eleven percent of the samples analyzed for heavy metals displayed concentrations of cadmium and chromium ranging from 3.3 ppm to 16.4 ppm, and 109 ppm to 887 ppm, respectively; forty percent displayed concentrations of lead ranging from 266 ppm to 2,239 ppm; twenty-one percent displayed concentrations of copper and zinc ranging from 234 ppm to 837 ppm and 362 ppm to 1,196 ppm, respectively; and fifty-one percent of the samples displayed concentrations of mercury ranging from 1.1 ppm to 22.4 ppm.

- Twenty-eight percent of the samples analyzed for SVOC's displayed concentrations of total SVOC's ranging from 5.2 ppm to 197.9 ppm.

- Twenty-five percent of the samples analyzed for TPH indicated levels of TPH that ranged from 100 ppm to 17,800 ppm.

- No VOC, PCB or Pesticides were encountered.

Parcel 5 Sub-Building Slab

Once the buildings on Parcel 5 were demolished a soil investigation was completed to establish any environmental impacts to soil beneath the buildings. The results of this investigation yielded the following:

- Nine areas of environmental concern were sampled and analyzed. This data indicated the presence of heavy metals including: copper, lead, mercury, and nickel. The respective maximum concentrations for these metals were 775 ppm, 4,390 ppm, 194 ppm, and 9,280 ppm.

- No VOC's, SVOC's, PCB's or pesticides were encountered.

As discussed in Section 1.2, all previous remedial actions for soil throughout the site have been completed and letters for no further action for soil remediation have been received from the department.

2.2 *SITE HYDROGEOLOGY*

The geologic materials underlying the BD site from top to bottom consist of:

- A layer of fill materials overlying the natural unconsolidated sediments at the surface;
- Holocene marsh and fluvial deposits;
- Pleistocene glacial deposits; and
- Bedrock (Passaic Formation of the Brunswick Group).

These units are described below. A representative geologic cross section is presented as Figure 2-1.

Anthropogenic Deposits

The uppermost layer of materials found underlying the site consists of fill (four to seven feet thick). The fill layer is a mixture of fine and coarse-grained sediments containing a spectrum of man-made objects. These objects include glass fragments from presumably off-specification thermometers and syringes, metal turnings, coal and ash, bricks, and wood fragments. The water table is sometimes found within this unit, therefore the fill exists both in the saturated and unsaturated zones. (Depth to water at the site generally ranges between approximately three and eight feet.) Due to the heterogeneous nature of these materials, it is assumed that its permeability will exhibit a large range of values.

Holocene Deposits

The deposition of these materials is related to the Hackensack Meadowlands, therefore they consist primarily of marsh deposits interbedded with lenticular fluvial and/or tide channel deposits.

Lithologically, this unit is comprised of fine to medium sand and silt. The hydraulic conductivity of this unit is low, averaging about 2.0 feet per day and ranging between 0.2 to 5.0 feet per day. These K values were determined from on-site slug tests and a pumping test of a pilot recovery trench.

A contiguous clay unit occurs within the silt and sand deposits along the southeastern boundary of the site (i.e., along Route 17). The clay attains a maximum thickness of 10 feet at the southern corner of Parcel 5 and generally thins towards the northeast through Parcel 6. Between one and three feet of peat mantles this clay, or is occasionally interbedded within it. The origin of this unit is from marsh deposition. The thickness of the Holocene deposits at the site ranges from 10 to 25 feet.

Shallow ground water flow within the upper saturated zone is in a generally south-southeasterly direction as shown in the water table contour map presented in Figure 2-2. This figure depicts the pre-pumping configuration of the water table.

Pleistocene Glacial Deposits

A southeastward thickening wedge of glacially derived sediments overlies bedrock at the site. The materials within this wedge can be divided from top to bottom into the following hydrogeologic zones:

- Glaciolacustrine Clay (aquitard)
- Outwash Sand and Gravel (confined aquifer)
- Till (aquitard)

The glaciolacustrine clay ranges in color from gray to reddish brown, and is interlayered with laminations of silt and fine sand. Dropstones are occasionally observed. The unit is wedge-shaped, with its zero edge occurring in the center of the site, and steeply thickening toward the

southeast. At the property boundary along Route 17, the unit is approximately 60 feet thick. Vertical hydraulic conductivity of this unit was measured at less than 0.003 feet per day in undisturbed Shelby tube samples.

A well-confined glaciofluvial deposit occurs beneath the glaciolacustrine clay. It consists of coarse to fine sand interbedded with silt and gravel horizons. Its hydraulic conductivity is fairly constant at approximately 50 to 55 feet per day based on several on-site slug tests. The areal extent of the glaciolacustrine clay and the potentiometric surface associated with the confined aquifer is shown in Figure 2-3.

The till directly overlies bedrock throughout most of the site. The geologic description of this unit is based on a small number of samples but can generally be described as dense and highly compacted, reddish brown unsorted sand, silt and gravel. Its hydraulic conductivity is believed to be very low.

Bedrock

Bedrock is sedimentary, chiefly siltstone and shale of the Triassic Passaic Formation. The bedrock beneath the site dips steeply to the southeast (towards Route 17). Depths range from 33 feet below grade in Parcel 4 to greater than 100 feet along Route 17. The logs for those borings at the site that extend to bedrock indicate that it consists primarily of siltstone. The Passaic Formation is a fairly prolific aquifer and it is widely used for water supply in New Jersey and specifically for industrial purposes within a five-mile radius of the site.

2.3 *GROUND WATER QUALITY*

Approximately 100 ground water monitoring wells have been installed and sampled for the purpose of characterizing ground water at the BD site. These wells were sampled for a comprehensive suite of analytes including:

- heavy metals;
- VOCs;
- SVOCs;
- PCBs;
- TPH; and
- pesticides.

The significant findings of this work may be summarized as follows:

- No SVOC, PCBs or pesticide impacts were found;
- VOC concentrations were found in four areas of the site; and
- the 3 VOC Compounds in these areas are trichlorethene (TCE), 1,2-dichloroethene (DCE) and vinyl chloride (VC)

Tabular representation of the VOC sampling results is presented in Appendices 1 and 2. Appendix A contains all data collected as part of the on-going semi-annual monitoring program, which samples a representative selection of 27 monitoring wells at the site, plus 11 ground water recovery trenches and wells. Appendix B contains the data from all other monitoring wells sampled during the project. The following is an analysis of these data, focusing on horizontal plume delineation in the shallow aquifer, water quality in the deep confined aquifer, current VOC concentrations in the shallow aquifer, identification of DNAPL source areas, VOC concentration trends within each plume, LNAPL and metals concentrations.

Shallow VOC Plume Delineation (1987-1988)

Based on the data presented in Appendices 1 and 2, four separate dissolved plumes of volatile organic compounds (VOCs) have been identified in shallow site ground water. This includes the "S" horizon wells that are screened at the water table, and the "M" horizon wells that are screened below the water table but above the glaciolacustrine confining unit. These plumes are characterized by elevated levels of TCE and its decay products DCE and VC. The areal extent of the VOC plumes was defined during the initial site characterization investigations conducted during 1987 and 1988. Figure 2-4 presents a total VOC isocontour map using a composite database of all sampling results from this time period. For those wells with multiple sampling events, the highest detected concentration was utilized. Figure 2-4 may therefore be considered a conservative interpretation of the available VOC data from this time period.

Vertical VOC Plume Delineation (1987-1988)

The shallow plumes at the site have been found, in most locations, to extend down to the top of the glaciolacustrine clay unit. Across most of the site, the clay is found 10 to 15 feet below grade (see Figure 2-1). In the southeastern part of the site near Route 17, the shallow aquifer is thicker (up to 30 feet), therefore in addition to wells screened at the water table, deeper wells (denoted by the suffix "m") were also installed to evaluate water quality in the lower portion of the shallow aquifer.

Water quality in the MW-30s/MW-30m cluster shows that the plume extends (albeit at significantly reduced concentration) down to the top of the glaciolacustrine clay. At other locations, the deeper well exhibits higher VOC concentrations (e.g., the MW-42s/MW-42m cluster). At the

MW-508s/MW-508m cluster, the plume concentration is fairly consistent throughout the thickness of the shallow aquifer.

It should be noted that the ground water recovery system was designed to collect ground water from the full thickness of the shallow aquifer, therefore VOCs at the bottom of the shallow aquifer are being addressed by the present pump and treatment system.

Ground water quality beneath the glaciolacustrine clay has also been evaluated. A total of six wells at the site are screened within the deep confined aquifer (see Figure 2-4 for well locations). Five of the six were sampled during the site characterization investigation in 1987 and 1988; the results are listed below:

Well	Total VOCs
MW-8d	ND
MW-14d	196 µg/l
MW-15d	164 µg/l
MW-16d	41 µg/l
MW-18d	not sampled
MW-508d	71 µg/l

The breakdown of compounds detected in these samples is generally consistent with the shallow plumes at the site (i.e., TCE, DCE and VC). Specific sample analytical results are provided in Appendix B. Ground water remediation was specifically not required by NJDEP for the following reasons:

- concentrations in the confined aquifer were relatively low;
- the thick sequence of overlying clay acts as a barrier between the confined aquifer and the shallow VOC plumes;
- the vertical ground water flow gradient is upward between the deep confined aquifer and the shallow unconfined aquifer; and

- no receptors were identified where water in the confined aquifer was being used.

Current Configuration of Shallow VOC Plume

Subsequent to the site characterization investigations in 1987 and 1988, semi-annual ground water sampling of selected wells has been conducted for the purpose of monitoring site remediation progress. These wells were selected to fulfill several purposes:

- monitor ground water quality entering the site from upgradient;
- monitor ground water quality within each plume at the site; and
- monitor ground water quality leaving the site along the downgradient property boundary.

This sampling plan was not designed to provide continuous redefinition of the plume configurations and the data from the program are inadequate for this purpose. However, the data does allow a qualitative plume delineation to be performed. This has been done for the most recent sampling round (May 1999) which is provided as Figure 2-5. A number of changes in the nature of the site plumes are noted as listed below:

- The VOC plume south of Stanley Street (Plume 1) has significantly decreased in concentration based on the available data. The latest sampling round (May 1999) shows total VOCs in this plume to be below 100 µg/l. Further discussion of this trend is given in the following section. Based on this change in plume character, it is also inferred that a coincident reduction in the plume area has occurred. It should be noted that the Federal Reserve Bank building overlies most of the former area of Plume 1.
- The VOC plume north of Stanley Street on the west side of the site (Plume 2) has changed much less significantly than the other plumes. Some concentration reductions have been observed, however these reductions are considered insignificant and high levels still persist. The shape of the plume is somewhat changed - partially caused by migration from natural ground water flow, but mainly due to the

pumpage of recovery trench 11 that has enhanced plume movement in the downgradient direction.

- The VOC plume located near the corner of Stanley Street and Route 17 (Plume 3) has been greatly reduced in the east to west direction from its original size. Little, if any VOC concentration reduction has occurred in the most contaminated part of the plume (well MW-508sr). Data has recently been obtained from new wells MW-523s and MW-523m which help delineate the downgradient end of Plume 3.

- The northern most VOC plume adjacent to the wetland area (Plume 5) is characterized by data collected in monitoring well MW-601m, which was later replaced by recovery well RW-3. Over time, the VOC concentration in Plume 5 has been reduced significantly. The latest data shows total VOCs in this plume to be below 100 µg/l. There is no data to evaluate whether the size of this small plume has changed.

DNAPL Source Areas

The ground water sampling data at the East Rutherford site suggests the presence of separate phase VOCs (i.e., dense, non-aqueous phase liquid, or DNAPL). A commonly applied rule-of-thumb states that DNAPL is likely present where dissolved ground water concentrations exceed 1% of the pure compound solubility. Since TCE was the original product that was used and subsequently released at the site, the benchmark level is 1% of TCE solubility or 11,000 µg/l.

Based on ground water sampling results of the site monitoring wells, two areas have been identified where it is highly likely that residual DNAPL is present (dissolved TCE concentrations are between 1% and 29% of TCE solubility in these areas). These two areas are referred to as the Building E Area and the Building UW Area. No other locations at the site have shown persistent concentrations at such levels. Two wells (MW-42m and MW-36) both had one data point above the benchmark level, however these seem to be anomalous data points. For both wells, all other sampling results were significantly below the benchmark, therefore residual DNAPL is not suspected at these locations.

In an effort to delineate the areal extent of the two suspected source areas, an investigation was performed using a Geoprobe drilling apparatus to collect ground water samples throughout these two areas. The ground water samples were analyzed immediately in the field with a portable gas chromatograph to facilitate immediate planning of subsequent sampling locations.

The result of this work is presented in Figures 2-6 and 2-7. A contour line has been placed on these figures to define the areal extent of ground water containing TCE concentrations above 1% of TCE solubility. This is interpreted as the probable extent of the DNAPL source area at these two locations.

VOC Concentration Trend Evaluation

Contaminant concentration trends were given a detailed treatment in ERM's report dated December 1998. A summary of this work is presented in this section. The analysis consisted of a qualitative evaluation using time versus concentration graphs and a quantitative evaluation using the Mann Kendall test. The Mann Whitney U-test was found to be a poor tool to evaluate the BD site data. All monitoring wells and recovery points with regular sampling data in Plumes 1, 3 and 5 were analyzed. Plume 2 was not analyzed because: (a) no changes are expected in these data due to the on-going source in the form of residual DNAPL and (b) natural attenuation is not being proposed for this plume. A summary of the findings is presented below:

- All of the times versus concentration graphs (except Trench 7 in Plume 3) qualitatively indicate downward total VOC concentration trends.
- In Plume 1, the Mann Kendall test results show a statistically significant downward trend in excess of the 95% confidence level in wells MW-42mr and MW-6. A downward trend is also apparent in the

Trench 1 data, but did not reach the 90% confidence level using monitoring data through May 1998.

- Subsequent to the December 1998 report, the trend analysis was reperformed for Trench 1, adding the November 1998 and May 1999 data points. The revised time versus concentration plot is provided as Figure 2-8. The results of the Mann Kendall re-analysis is given in Table 2-1. The Mann Kendall results indicate a statistically significant downward trend in excess of the 90% confidence level. It may therefore be concluded that all monitoring points within Plume 1 exhibit statistically valid downward trends for total VOCs.

- In Plume 3, the Mann Kendall results indicate that neither MW-508sr nor Trench 7 exhibits a statistically significant trend.

- The Mann Kendall test for the Plume 5 monitoring point (well MW-601m/RW-3) exhibits a statistically significant downward trend in excess of the 95% confidence level.

LNAPL and Metals Contamination

Free phase petroleum product (LNAPL) has been identified in two locations at the site, both within Parcel 5 north of Stanley Street. One LNAPL body is located at wells MW-2 and MW-501; the second is found in wells MW-519s and RW-2 (see Figure 2-4 for well locations). Both LNAPL bodies are small in areal extent and thickness and are not associated with Plumes 1, 3 and 5. The status of these LNAPL plumes and the progress of their on-going remediation were discussed in ERM's report dated December 1998 and are not addressed further in this document.

Ground water samples were also analyzed for metals during the site characterization investigation. These results were previously summarized in detail in ERM's report dated December 1998. In that report, elevated nickel concentrations were identified in well MW-15s. BD is in the process of performing additional characterization in this area and will report the results of this work in a subsequent, separate report.

3.0 *SELECTION OF REMEDIAL TECHNOLOGY*

BD evaluated several technology enhancements to improve their ability to handle the DNAPL areas in Plume 2. These included dewatering/soil vapor extraction, in-situ chemical oxidation and a zero-valent iron, in-situ treatment wall. The use of the treatment wall coupled with MNA to address impacted ground water in Plumes 1, 3 and 5 appears most suitable for implementation at the site for two principal reasons:

1. A geochemical evaluation of reductive dechlorination was conducted (see Section 5.2) which indicated that natural attenuation processes are taking place at the site; and

2. As discussed further at the end of this section, the conditions at this site are well suited for the use of an in-situ, zero-valent, iron filing treatment wall. An expert in the area of DNAPL phenomena has indicated that the application of an in-situ treatment wall to contain, control and treat the impacted ground water from the two DNAPL source areas within Plume 2 is an effective use of this technology.

The remainder of this section summarizes ERM's evaluation of methods of addressing DNAPL in Plume 2.

Dewatering/Soil Vapor Extraction Pilot Test

The purpose of this pilot test was to determine whether it was feasible to dewater down to the top of the glaciolacustrine confining unit and exposing the impacted soils to remediation using soil vapor extraction (SVE). The pilot test was conducted in the Building UW area. Figure 3-1 depicts the location of the dewatering, monitoring and SVE wells.

Ground water was pumped from three wells (DW-1, 2, and 3) in an approximately 1500 square feet area for dewatering purposes. Recovery Trench No. 6 was also pumping in this area. The depth to water in these three wells was lowered from, approximately 7.3 feet below grade on

average, to approximately 12.5 feet below grade (below the top of the glaciolacustrine confining unit). Average ground water flow from these wells was about 0.25 gpm each. After pumping for approximately one month it was found that water level in the shallow aquifer was reduced an average of two to three feet, as observed in the temporary monitoring wells, TMP-1, 2, and 3. The dewatering efforts did not effect full dewatering of the area; approximately two to three feet of saturated material remained above the glaciolacustrine clay unit.

As shown in Figure 3-1, MW-520 was used as a soil vapor extraction well. The SVE radius of influence was found to be 25 feet at 64 inches of water applied vacuum, as observed from vacuum measurements recorded in TMP-1, 2, and 3. However, SVE contaminant removal in the partially dewatered test area was disappointing. The concentration of total volatile organic compounds in the extracted soil vapor ranged between 7.3 and 11.2 ppmv. These poor results were largely attributed to insufficient dewatering in the test area.

This technology was not considered acceptable due to the fact that the tight soils formations at this site limit the effectiveness of dewatering and also greatly reduce the amount of soil pore spaces available to the influence of air flow.

In-Situ Chemical Oxidation Pilot Test

A second pilot test was conducted in the Building UW area utilizing a proprietary in-situ chemical oxidation technology. The basis of this technology is Fenton's Reaction where hydrogen peroxide reacts with ferrous iron in an acidified aqueous medium to produce hydroxyl radicals. The hydroxyl radicals then react with the contaminant to form carbon dioxide and water.

The test was conducted by CleanOx Environmental Services (the patent holder) and observed by ERM personnel. Initially acetic acid and ferrous sulfate were injected into TMP-1 and DW-3, as shown in Figure 3-1, in the test area. After this step was completed, hydrogen peroxide was injected into these wells which produced immediate visible evidence of reaction. Vigorous foaming was observed at each wellhead that diminished in intensity as the injection proceeded.

The effectiveness of this technology was evaluated by collecting ground water samples both before and after the test. The samples were collected from the two injection wells, TMP-1 and DW-3, as well as from the other wells in close proximity to the injection point (MW-520, TMP-2, TMP-3, DW-1, DW-2, and Trench-6). No significant reductions in dissolved ground water concentrations were observed in any well within the test area.

The inability of this technology to reduce dissolved ground water concentrations is most likely due to: (1) extreme heterogeneity and tight soil formation at the site limit the contact of the hydroxyl radicals with the constituents of concern; and (2) competition for hydroxyl radicals by naturally occurring organic carbon.

Treatment Wall and Monitored Natural Attenuation

This evaluation was undertaken to determine whether an in-situ treatment wall was suitable to be linked with a natural attenuation remediation strategy to provide a technically feasible and cost-effective method of addressing the remaining ground water impacts beneath the BD site. The application of the treatment wall to contain, control and treat the DNAPL source areas within Plume No. 2 would be coupled with the use of a natural attenuation remediation strategy to address dissolved Plume Nos. 1, 3 and 5 as shown in Figure 3-2.

As part of this evaluation, a thorough review of the existing literature was completed as well as an interview process which included a survey of federal and state officials familiar with this technology, and owners of sites using zero-valent iron fillings to remediate similar ground water conditions. Once this preliminary evaluation was completed, a concept design of the treatment wall system was developed and modeled. Through this evaluation BD determined that:

- an in-situ reactive treatment wall using granular, zero-valent iron is capable of degrading the chlorinated volatile organic compounds found in Plume 2;
- The relative thinness (~ 12 feet) of the shallow aquifer, the presence of the underlying clay layer and the current lack of structures at the site will facilitate the design and construction of such a system;
- The actual removal efficiency of the wall depends upon the width of the iron wall. This width can be determined by: 1) performing column tests on the ground water to determine decay rates; 2) applying a model to utilize the decay rates to calculate removal efficiency versus time; and 3) using a site specific ground water hydrogeological model to determine the ground water velocity through the treatment wall;
- The construction process typically involves the use of sealable-joint steel sheet pilings for the impermeable portions of the wall;
- The treatment cells are typically constructed in place using standard box trenching and sheet piles;
- This process has been accepted as a viable remediation technology by the NJDEP and currently, an aboveground reactor is used as an IRM to treat chlorinated VOCs in ground water in Wayne, New Jersey, and
- A similarly impacted ground water aquifer at a former manufacturing facility in Fairfield, NJ, is being remediated under NJDEP ISRA guidance and an in-situ iron filing wall was recently installed at the site.

These findings indicate that the treatment wall technology would be a technically feasible remediation technology at the East Rutherford site. Once this preliminary evaluation was completed, the proposed

configuration for an in-situ treatment wall in a funnel and gate configuration, as shown in Figure 3-2, was developed using ground water modeling.

Dr. Stanley Feenstra, of Applied Groundwater Research, Inc. reviewed the final conceptual design, and results of the site characterization. Dr. Feenstra is a well-known leader in the development and implementation of the treatment wall technology at similarly impacted sites. Dr. Feenstra is also considered an expert in the area of DNAPL phenomena and its occurrence in the environment. Dr. Feenstra concluded that the BD site was an excellent candidate for the application of the treatment wall technology to address Plume 2 and natural attenuation for Plumes 1, 3 and 5.

A separate RAWP Addendum will be submitted to the NJDEP to cover the design and installation of this treatment wall. The remainder of this report focuses on the MNA portion of the remedial strategy.

4.0 *RECEPTOR EVALUATION*

The purpose of the Receptor Evaluation is to identify potential receptors for compounds of concern in groundwater from Plumes 1, 3, and 5 at the site. In addition, applicable standards or criteria for each compound of concern in groundwater based on the identified receptors is provided. This information will be used to evaluate the effectiveness of MNA. In the following sections, the receptors are identified (Section 4.1), the compounds of concern are identified (Section 4.2), and applicable criteria for each of the compounds of concern are selected (Section 4.3).

4.1 *IDENTIFICATION OF RECEPTORS*

Exposure to the compounds of concern in groundwater can occur primarily through use of well water and following discharge of groundwater to surface water. Therefore, the following sources were reviewed to identify receptors downgradient of the site:

- Aerial photographs;
- Wetlands maps (U.S. Fish and Wildlife National Wetlands Inventory (NWI) Maps, New Jersey Freshwater Wetlands Maps);
- Contacts with the local public water supply company for information on current and future water supply sources; and
- A well search.

Based on this information, potential receptors via use of public water supply, private wells, and discharge of groundwater to surface water are identified below.

4.1.1 *Public Water Supply*

Water supply in East Rutherford is maintained by United Water New Jersey, an investor-owned utility company. According to personnel at United Water New Jersey, there are no water supply wells located in East Rutherford and ground water is not used for public supply in this area. There is one source of surface water utilized for public supply in the area, a lake in northern Bergen County (Matteo, 1998), which is not impacted by the site. In addition, there are no future plans to install any wells in the subject property area in East Rutherford. [Water supply lines are installed as development in the area is approved (Federico, 1998)]. Therefore, there are no current or expected future receptors for the compounds of concern in groundwater from Plumes 1, 3, and 5 via public water supply.

4.1.2 *Private Wells*

A manual well search was conducted by NJDEP at the request of ERM to identify all wells within one-half mile of the site. In addition, a well search for the adjacent Allied Signal (former UOP) site was conducted by the Bergen County Department of Health Services at the request of ERM. Since many of the wells identified in this search were listed for facilities which are no longer in existence, a list of sealed (abandoned) wells for East Rutherford was also obtained from NJDEP Water Supply Element. Based on a review of these records, excluding monitoring wells, a total of 19 wells were identified within one-half mile of the site (3 irrigation wells, 11 industrial wells, 1 manufacturing/food processing well, 3 domestic wells, and 1 well of unknown use). Of these, 14 wells are located upgradient or sidegradient of the site. The location of the remaining five wells which are potentially downgradient of the site are shown in Figure 4-1 and relevant information from the well records is summarized in Table 4-1.

None of the five wells identified above is expected to be impacted by the compounds of concern in groundwater from Plumes 1, 3, and 5 based on their locations and depths. None of the wells is directly downgradient of the plumes. The wells range in depth from 223 ft to 400 ft, and are all bedrock wells. As discussed in Section 2.3, the shallow aquifer is the aquifer of concern at the site. It may also be noted that three of these wells were installed over 30 years ago. Since documentation of sealing or abandonment of wells is frequently not provided to NJDEP, these wells may no longer exist.

In order to evaluate the potential for private wells to be installed in this area in the future, the Bergen County Department of Health Services and the Borough Clerk of East Rutherford were contacted. Information on local and/or county ordinances restricting the installation of potable wells in East Rutherford was requested; however, no definitive information could be obtained. It may be noted, however, that the Risk Assessment for the adjacent UOP Superfund site concluded that future use of the shallow aquifer on that site did not represent a potential exposure pathway due to the high salinity and low permeability of the aquifer, and the easy access to municipal water supply (ENSR, 1989).

Therefore, based on the above information, there are no current or expected future receptors for the compounds of concern in groundwater from Plumes 1, 3, and 5 via private wells.

4.1.3 *Discharge of Groundwater to Surface Water*

Groundwater from the site discharges to nearby surface water and wetlands. A review of aerial photographs of the site and the surrounding area and the wetland maps listed above indicates that there are several wetlands and surface water bodies located downgradient of the site between the site and Berry's Creek. Berry's Creek is located

approximately 1.5 miles east of the site (see Figure 4-1). Aquatic life in these wetlands and surface water bodies are potential receptors for the compounds of concern in groundwater at the site. In addition, ingestion of fish by humans from these waterways could also represent a potential exposure route. Due to the highly industrialized nature of this area, significant direct contact with surface water by children or other trespassers is not expected.

Based on the wetlands maps of the area and observations of the site, the nearest downgradient receptor (i.e., the nearest wetland) for Plumes 1 and 3 is an estuarine wetland, shown on the NWI map, which is immediately adjacent to and east of Route 17 (see Figure 4-1). This wetland is classified as E2EM (estuarine, intertidal, emergent) on the NWI map. For Plume 5, which is located within a mapped wetland on Parcel 6, the nearest receptor is the Parcel 6 wetland itself. Both of these wetlands are surrounded by chain link fencing and access is restricted.

The table below summarizes the nearest receptor for each plume.

Plume	*Nearest Receptor*
1	Wetland adjacent to SE shoulder of Rt. 17
3	Wetland adjacent to SE shoulder of Rt. 17
5	BD Parcel 6 Wetland

There are no vapor concerns from Plumes 1, 3 and 5 since there are no buildings or receptors in the area between the plumes and the wetlands to which they discharge in this area. Plumes 1 and 3 are separated from the downgradient wetland by NJ Route 17, a major highway. Plume 3 and the wetland are located immediately adjacent to the highway, and Plume 1 is located approximately 150 ft. from Rt. 17. As discussed above, Plume 5 is

located within the nearest receptor wetland, which is located on a fenced, undeveloped section of Parcel 6 of the BD site.

4.2 *IDENTIFICATION OF THE COMPOUNDS OF CONCERN*

Historically there have been three compounds of concern in groundwater at the site (trichloroethene, 1,2-dichloroethene, and vinyl chloride). (For further discussion of the current delineation of plumes, see Section 5.1). These three compounds have been detected most frequently in significant concentrations in ground water over time. In order to confirm that these are the only three chemicals of concern for the proposed MNA remedial technology, monitoring data for all other volatile organics over the last two years for representative wells within each of the plumes was compiled. These data, which includes sampling events from May 1997, November 1997, May 1998 and November 1998, is summarized in Table 4-2. As shown in Table 4-2, other than the three known compounds of concern, only three volatile organics have been detected in these wells, and the maximum detected concentration is 2.6J ug/l ('J' indicates estimated value below method detection limit). New Jersey Ground Water Quality Criteria have been established for only one of the compounds listed in this table (1,1-dichloroethane), and the maximum detected concentration (0.7J ug/l) is well below the applicable standard (70 ug/l). Therefore, the proposed MNA remedial technology addresses remediation of trichlorethene, 1,2-dichloroethene, and vinyl chloride.

4.3 *IDENTIFICATION OF APPLICABLE CRITERIA*

The requirements for MNA include demonstrating that groundwater contaminant concentrations will decrease to "applicable Groundwater Quality Standards, NJAC 7:9-6 or applicable State Surface Water Quality criteria, NJAC 7:9B, or Federal Surface Water Quality Criteria 40 CFR Part 131, which ever is more stringent" (NJAC 7:26E-6.3(d)1). In addition, the

proposal must demonstrate that "groundwater contaminated above the applicable standard will not reach the nearest downgradient receptor" (NJAC 7:26E-6.3(d)5).

As noted in the previous section, the nearest receptor for each of the three plumes is a wetland. Therefore, the standards applicable to these receptors are the New Jersey Surface Water Quality Criteria (SWQC) or the federal Water Quality Criteria (WQC) , whichever is more stringent.

The New Jersey SWQC include separate values for freshwaters (Class FW), saline estuarine water (Class SE), and saline coastal water (Class SC). In accordance with NJAC 7:9B1.15(b)5, the wetlands to which the three plumes discharge are classified as SE2 waters. The wetlands discharge to unnamed waterways which discharge to Berry's Creek. (The Parcel 6 wetland [Plume 5] discharges to unnamed waterways on the east side of Route 17 via a culvert under the highway). In the site vicinity, Berry's Creek is classified as SE2. Therefore, since unnamed or unlisted saline waterways that enter SE2 waters are classified as SE2 (unless otherwise specified in the regulations), these wetlands are classified as SE2. As further support for this classification, a salinity and tidal survey of the Parcel 6 wetland was conducted in November 1998. The study concluded that the wetland has a tidal fluctuation of several feet (based on synoptic water level measurements) and had a salinity of 6.5 parts per thousand (ppt). In accordance with NJAC 7:9B-1.4, saline waters are defined as waters having greater than 3.5 ppt salinity. The New Jersey SWQC for SE2 waters for the compounds of concern are presented in Table 4-3.

The Federal WQC include separate values for protection of freshwater aquatic life, saltwater aquatic life, ingestion of fish by humans, and ingestion of fish and potable water by humans. No saltwater or freshwater aquatic criteria have been established for the three compounds of concern. Since water from these wetlands is not used for potable water,

the applicable criteria are the values for ingestion of fish alone.

Based on this information, the most stringent applicable state or federal surface water quality criteria, and thus the applicable criteria for the MNA remedial technology at this site, are provided below.

Compound	Applicable Criteria for Monitored Natural Attenuation (ug/l)
trichloroethene	81
1,2-dichloroethene	140,000
vinyl chloride	525

For purposes of the Groundwater Classification Exception Area (CEA) (Section 5.4), the applicable criteria for the compounds of concern are the New Jersey Groundwater Quality Standards (GWQS). The New Jersey GWQS for Class II waters (groundwater for potable water supply) are listed below and the impacts to the identified downgradient receptors is discussed in Section 5.3. It may be noted that groundwater at the adjacent UOP Superfund site, located downgradient on the east side of Rte. 17 has been categorized as Class III (groundwater for uses other than potable water supply) (ENSR, 1992).

Compounds	New Jersey Groundwater Quality Standards for Class II Waters (ug/l)
trichloroethene	1
1,2-dichloroethene	10(1)
vinyl chloride	5(2)

(1) The groundwater quality standard for cis-1,2-dichloroethene

(2) The groundwater quality standard is 0.08 ug/l, but the PQL and thus the enforceable level is 5 ug/l.

The applicable criteria for MNA for the nearest downgradient receptor, as developed in the preceding sections, are above current levels encountered in Plumes 1, 3 and 5. The evaluation of the NJDEP requirements that natural attenuation processes are occurring at the site and that the applicable criteria for MNA for the nearest downgradient receptor will be met in the future is presented in the following section.

5.0 SUMMARY OF PROPOSED REMEDIAL ACTION

The purpose of this section is to describe the MNA strategy proposed for the BD site and to demonstrate that the proposed MNA remedy for Plumes 1, 3, and 5 meets the requirements for natural ground water remediation in N.J.A.C. 7:26E-6.3(d). The site conformance with these requirements is summarized below:

- "Ground water contaminant concentrations will decrease to applicable ... standards ...". The applicable standards were previously identified in Section 4.3. Documentation that concentrations will decrease to these levels is provided in Section 5.3, while an evaluation of the viability of MNA at the site is provided in Section 5.2.

- "Free or residual product ... is treated or removed, if practicable, or contained if treatment or removal are not practicable." The identification of DNAPL at the site is covered in Section 2.3 The DNAPL areas are not proposed for MNA but rather will be addressed by the treatment wall. Therefore this requirement has been met.

- "All soil contamination in the unsaturated zone has been ... remediated". As previously discussed, all required soil remediation has been completed and "no further action" letters have been issued by NJDEP.

- "Ground water contamination has been delineated to the standard applicable to the nearest downgradient receptor ... " . This requirement is discussed in detail in Section 5.1.

- "Ground water contaminated above the applicable standard will not reach the nearest downgradient receptor ... ". Documentation of this requirement is provided in Section 5.3.

- "The fate of the plume has been documented pursuant to NJAC 7:26E-6.2(a) 17". This requirement pertains to the establishment of a Classification Exception Area (CEA). This is addressed below in Section 5.4.

- "Contaminant levels in ground water do not present a vapor risk to any receptors." As discussed in Section 4.1.3, vapors are not expected to present a risk to any receptors.

- "Predicted impacts to potential receptors are consistent with the current and potential ground water uses based on a 25-year planning

horizon". As discussed in Section 4.1.2, there are no current or expected future receptors for chemicals in ground water from Plumes 1, 3, and 5 via public or private supply wells.

- "All necessary access agreements needed to monitor the ground water quality ... have been obtained." The details of the proposed monitoring program are presented in Section 6.0. All ground water monitoring will be conducted on property owned by BD, Federal Reserve Bank (FRB) of New York, or the State of New Jersey (Route 17 right-of-way). The status of access to these properties are summarized below:

  - BD currently controls access to their own property. Should the property be sold, an access agreement will be integral to the contract of sale.
  - An access agreement for ground water sampling already exists with the FRB.
  - Permission to install and sample wells has already been received from New Jersey DOT.

- " ... a Classification Exception Area needs to be established ... ". See Section 6.0.

The remainder of this section presents the additional analyses referred to above that are required for the approval of a MNA remedy.

5.1 *DELINEATION OF GROUND WATER CONTAMINATION*

The delineation of ground water contamination was reevaluated on a compound-specific basis using the most recent ground water sampling data (May 1999). As required by the Technical Requirements, ground water contamination must be delineated to the applicable remediation standard. As discussed in Section 4.0, these standards are defined by the allowable levels for protection of the wetland receptors. Figures 5-1 and 5-2 show the delineation of TCE and VC relative to their respective criteria. No figure is presented for DCE because no concentrations have ever been detected at the site that approach the applicable criteria.

Figure 5-1 shows that the only area where TCE exceeds the applicable

criteria of 81 µg/l is in Plume 2. Since this area is not proposed for MNA, no further discussion of this finding is necessary. In Figure 5-2, one area is shown where VC exceeds the applicable criteria of 525 µg/l. Plume 3 contains VC above the criteria and it is delineated by surrounding data points that are well below the criteria.

It is noted that the most recent round of sampling data generally contains the lowest levels ever detected in Plumes 1, 3 and 5. In fact, this data set indicates no exceedences of the applicable criteria. However, it is also recognized that historical levels typically fluctuate between sampling events and future sampling is needed to evaluate the situation over a longer period of time. At a minimum, the data indicates that Plumes 1 and 5 continue to attenuate, which is consistent with the findings of the natural attenuation evaluation in the following section.

5.2 *GEOCHEMICAL EVALUATION OF NATURAL ATTENUATION*

Preliminary ground water sampling has been performed at the site to evaluate the anaerobic biodecay of TCE at the BD site, an essential component of the MNA strategy. This sampling was conducted in March 1999 and included selected points in the plume areas proposed for natural attenuation, plus an upgradient well (MW-1). The following monitoring wells and recovery trenches were sampled: MW-1, MW-42mr, MW-508sr, MW-523s, MW-523m, Trench 1 and Trench 7. Each point was analyzed in the field using a flow-through cell for pH, temperature, dissolved oxygen, conductivity, and oxidation/reduction potential (ORP). Laboratory analysis was performed for iron, manganese, nitrate, total organic carbon, alkalinity, chloride, sulfate, carbon dioxide, methane, ethane, ethene and VOCs. The results of these analyses are presented in Table 5-1. The purpose of monitoring these parameters is to evaluate if the geochemical environment is suitable for reductive dechlorination and whether or not it is, in fact, occurring. The acceptable ranges for each analyte are taken

from EPA's "Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Ground Water" (Wiedemeyer, et. al., 1998).

The overall interpretation of these data strongly suggests that the conditions at the BD site are highly favorable for reductive dechlorination. Further, the complete reduction pathway of the parent TCE to the terminal product (methane) is conclusively demonstrated by the chemical evidence. A discussion of each parameter is presented below.

- pH - This parameter must be within the range that will support bacterial life (5 to 9). All wells have acceptable pH, generally between 6 and 7.

- Temperature - The ground water temperatures found at the site (10-14°C) will support bacterial life and are therefore acceptable.

- Dissolved Oxygen (DO) - Reductive dechlorination is an anaerobic process, therefore low DO concentrations (i.e., <0.5 mg/l) are most favorable. Anaerobic bacteria may tolerate DO as high as 5 mg/l. The DO range found within the plume areas is 0.19 to 2.68 with an average of 1.15 and a mean of 1.03. Only one of these six samples has a DO concentration above 1.46 mg/l (recovery trench TR-1). These results are considered to be acceptable for reductive dechlorination.

- Specific Conductance - This parameter is a general indicator of the geochemical environment and is useful in verifying that different wells are screened in the same aquifer. It is not significant relative to reductive dechlorination and there is no defined acceptable range. The results at the site generally show an increase in conductivity in the downgradient direction (toward Route 17 and the Hackensack Meadowlands). This is consistent with the fact that the surface water in the Meadowlands is brackish and may also be partly related to road salting on Route 17).

- Oxidation-Reduction Potential (ORP) - This parameter is used as a general indicator of the state of the geochemical system (i.e., whether oxidation processes (aerobic environment), or reduction processes (anaerobic environment) will prevail). An ORP of <50 mV is considered indicative of acceptable conditions, while an ORP of <-100 mV is considered optimal. ORP levels recorded within the plume areas are considerably above these benchmarks. The average and mean of the data set are both 109.5 mV. While certainly less than perfect, these ORP results are not considered to be fatal relative to

reductive dechlorination. Interpretation of ORP measurements is a complicated matter. All potentials present in the geochemical environment are not necessarily registered by the ORP probe, only those that react at the probe surface. Many important aqueous redox reactions will not occur at the probe surface, including most reactions involving carbon-based compounds (Snoeyink and Jenkins, 1980, page 422). It therefore should be recognized that ORP is a parameter with significant limitations and is only useful in a qualitative sense. Taken in the context of the entire suite of natural attenuation parameters, the ORP results at the BD site appear to be anomalous.

- Iron - This parameter is monitored because soluble oxidized iron (Fe^{3+}) may act as a competing electron acceptor over the chlorinated alkenes. This condition is unfavorable for reductive dechlorination. The presence of the reduced form of iron (Fe^{2+}) indicates a reducing condition and the absence of Fe^{3+}. This condition is favorable for reductive dechlorination. A speciation analysis was not performed (the results in Table 5-1 are for total iron), however for the pH range present at the site (generally 6 to 7), the total solubility of the Fe^{3+} species is extremely low, while total solubility of the Fe^{2+} species is quite high. It may therefore be concluded that any total iron present will be overwhelming of the Fe^{2+} variety. Iron concentrations at the site range were highly variable, ranging from 0.13 to 90.3 mg/l. Since most of this iron must be Fe^{2+}, this indicates reducing conditions and is interpreted as a favorable result relative to reductive dechlorination.

- Manganese - Manganese data is used in the same manner as the iron parameter. The oxidized form (Mn^{4+}) could act as a competing electron acceptor and its presence could be unfavorable for reductive dechlorination. The presence of the reduced form (Mn^{2+}) indicates a reducing condition and the absence of the oxidized forms. This condition is favorable for reductive dechlorination. As with iron, no speciation analysis was performed, however at the pH of the BD ground water the total solubility of the oxidized manganese species is extremely low, while total solubility of the reduced Mn^{2+} form is quite high. It is also concluded that total manganese will be present in the reduced (Mn^{2+}) form. Total manganese concentrations at the site ranged from 0.54 to 1.37 mg/l. Since most of this manganese must be Mn^{2+}, this suggests reducing conditions and is interpreted as a favorable result relative to reductive dechlorination.

- Nitrate-Nitrogen - Nitrate is a potential competitor as the preferential electron acceptor. Its presence at levels exceeding 1.0 mg/l is considered unfavorable for reductive dechlorination. The only detection of nitrate was found in the upgradient well (MW-1) at 4.46 mg/l. All samples from within the plume areas were ND (<0.1) mg/l. These results indicate favorable conditions for reductive dechlorination.

- Total Organic Carbon (TOC) - The presence of soluble organic carbon is required as a food source and electron donor. The samples from within the plume areas were found to contain TOC in the range of 3.0 to 46.7 mg/l. The average is 14.5 mg/l and the median is 10.1 mg/l. Under ideal conditions for reductive dechlorination, TOC should be above 20 mg/l. The TOC concentrations at the BD site are considered to be marginally acceptable.

- Chloride - This parameter is produced as the chlorinated alkenes undergo reductive dechlorination; chloride levels above twice background are generally considered indicative of this process. However, the plumes proposed for natural attenuation are within filled areas on the fringe of the Hackensack Meadowlands tidal marsh. Surface water in this area is brackish as previously described in Section 4.0. This significantly complicates the interpretation of the chloride data. An additional complication is the use of road salt on Route 17 for de-icing during winter. Due to these factors, chloride is not considered to be a useful parameter for evaluating natural attenuation at this site.

- Sulfate - Sulfate is a potential competitor as an electron acceptor. Its presence at levels exceeding 20.0 mg/l is considered unfavorable for reductive dechlorination. Sulfate concentrations at the site are considerably above this level. The median of the data set is 53.5 mg/l and the average is 121.7 mg/l. While this result is clearly outside of the desirable range, it may not represent a serious impediment to reductive dechlorination. The reduction of TCE, DCE and vinyl chloride are thermodynamically more favorable to the bacteria than the reduction of sulfate (SO_4^{2-}) to bisulfide (HS^-). In other words, the organism derives more benefit (energy) by reducing the chlorinated alkenes than by reducing the sulfate. The bacteria may therefore preferentially reduce chlorinated alkenes even though sulfate is abundant.

- Carbon Dioxide (CO_2) - As the terminal product of aerobic biodecay, elevated levels of CO_2 are favorable for reductive dechlorination because this is suggestive of anaerobic conditions. This is not considered an important indicator parameter because dissolved oxygen provides the same information in a much more direct manner. Nevertheless, levels in excess of twice background are considered favorable for reductive dechlorination. Since background is 160 mg/l, the benchmark level is 320 mg/l. The median of the data set is 310 mg/l and the average is 313 mg/l. These results are therefore considered acceptable.

- Total Alkalinity - The addition of CO_2 derived from aerobic biodecay to the geochemical environment increases the buffering capacity of the system by shifting the carbonate equilibria. Since [CO_2] is considered

to be equivalent to [H_2CO_3], increasing [CO_2] increases [H_2CO_3], and the carbonate equlibria adjusts by producing more HCO_3^- and CO_3^{2-}. This increases the buffering capacity of the system and the alkalinity parameter increases in magnitude. As stated above under the discussion of CO_2, this is not considered an important indicator analysis because dissolved oxygen provides the same information in a much more direct manner. Nevertheless, levels in excess of twice background are considered favorable for reductive dechlorination. Since background is 164 mg/l, the benchmark level is 328 mg/l. The median of the data set is 301 mg/l and the average is 314 mg/l. These results are therefore considered acceptable.

- cis-1,2-Dichloroethene (DCE) - This compound is the daughter product of the first sequential dechlorination of the parent TCE. Its presence is therefore considered direct evidence of reductive dechlorination. Five of the six samples collected in the plume areas contain DCE (the sixth sample (MW-523s) did not contain any chlorinated compounds). In these five samples, the concentration of DCE exceeds that of TCE. This is very strong evidence that reductive dechlorination is occurring at the site.

- Vinyl Chloride (VC) - This compound is the daughter product of the second sequential dechlorination of the parent TCE. Its presence is also considered direct evidence of reductive dechlorination. Five of the six samples collected in the plume areas contained VC. This is further evidence that reductive dechlorination is occurring at the site.

- Ethene - This compound is the daughter product of the third and final sequential dechlorination of the parent TCE. Its presence is also considered direct evidence of reductive dechlorination. Three of the six samples collected in the plume areas contained ethene. This demonstrates that the entire dechlorination pathway for TCE exists at the site.

- Ethane - Ethene will further reduce to ethane under favorable conditions. Ethane is present in four of the six samples collected in the plume area.

- Methane - Ethene and/or ethane can be further reduced to methane under the proper conditions. Methane is the terminal product of TCE reductive decay. However, methane may also be derived from anaerobic breakdown of naturally occurring organic material. It is present in all six samples collected in the plume areas.

5.3 *EVALUATION OF IMPACTS AT NEAREST RECEPTOR*

As discussed in Section 4.0, the nearest receptor downgradient of Plumes 1 and 3 is the wetland adjacent to the southeast shoulder of Route 17. A modeling exercise was performed to evaluate the impacts to this receptor after the pump and treat system is turned off and the plumes are allowed to attenuate naturally. This was accomplished through the use of a ground water flow and solute transport model. The ground water flow component was performed using the U. S. Geological Survey's MODFLOW code (McDonald & Harbaugh, 1988); the solute transport was performed using RT3D by Clement, 1997.

The impacts on the nearest receptor to Plume 5 were not evaluated through the use of the model. A separate discussion at the end of this section is provided regarding Plume 5.

The model analysis demonstrates that the compounds of concern in Plumes 1 and 3 decay to a level below applicable standards by the time they reach the sensitive, down stream receptors. For Plume 5, ground water quality already meets the applicable standard. The modeling results are therefore a favorable indicator pointing to the successful application of MNA to the BD site.

5.3.1 Groundwater Flow Model

As stated above, MODFLOW was used to simulate ground water flow conditions at the BD East Rutherford site. The objective of this portion of the modeling exercise was to generate a flow field that is comparable to the conditions present at the site. Primarily, this entailed matching the ground water flow velocity indicated by the site data and Darcy's Law.

A two-dimensional finite difference grid was developed to cover a rectangular region surrounding the area of Plumes 1 and 3. A variable spaced grid consisting of 84 columns and 77 rows was used to model the

site. The grid was refined around two points representing the centers of Plumes 1 and 3 with a minimum cell size of 7.5 feet and a maximum cell size of 100 feet obtained using a 1.1 cell size multiplier.

The model utilizes constant head boundaries at the northwest (upgradient) and southeast (downgradient) boundaries. The elevation and location of the upgradient constant head boundary was derived from the static water table contour map of April 1988 prior to the start-up of the remediation system. The elevation of the downgradient constant head boundary was defined by Berry's Creek. No-flow boundaries are utilized on the east and west model boundaries defined by ground water flow lines.

The model utilizes a single layer to represent the impacted zone of the shallow aquifer. This five-foot thick layer is defined by the water table at the top and the clay/meadow mat unit that exists across the majority of the site at the bottom. The elevation of the clay/meadow mat was determined from boring logs developed during the installation of monitoring wells on both the site and the neighboring UOP site.

Drains were used to represent the extensive wetland areas within the model. The drains cover a large portion of the model southeast of Route 17 to Berry's Creek.

A homogeneous hydraulic conductivity value of 2.0 foot/day was used throughout the model grid based on slug test data performed by ERM and data obtained from reports generated for the UOP site.

5.3.2 *Solute Transport Model*

The solute transport portion of the model utilized the RT3D code by Clement, 1997. RT3D is designed to be used in conjunction with MODFLOW; heads and cell-to-cell flux terms are computed by MODFLOW during the flow simulation phase and are written to a specially formatted file. This file is then read by RT3D and utilized as the flow field for the transport phase of the simulation.

Similar to MODFLOW, RT3D is divided into a series of components called "packages". Each package performs a specific task. Some packages are required for a simulation and some are optional. The packages used in this model are the basic transport package, the advection package, the dispersion package, the sink & source mixing package and the chemical reaction package. Each of these packages is described below.

Basic Transport Package - The basic transport package handles basic tasks that are required by the entire transport model. Among these tasks are definition of the problem, specification of the boundary and initial conditions, determination of the time step size, preparation of mass balance information, and output options for the simulation results.

Advection Package - This package solves the concentration change due to advection with one of the three mixed Eulerian-Langrangian schemes included in the package: MOC, MMOC, or HMOC. The modified method of characteristics (MMOC) was used to solve the advection portion of the advection dispersion equation in the Becton Dickinson model.

Dispersion Package - The dispersion package determines the concentration change due to dispersion with the explicit finite difference method. Both longitudinal and transverse dispersivities were

incorporated into the model.

Sink & Source Mixing Package - This package determines the concentration change due to fluid sink/source mixing with the explicit finite difference method. Sink/source terms may include wells, drains, rivers, recharge, and evapotranspiration. For this model drains were used to simulate the effects of the meadowland area to the southeast of the site.

Chemical Reaction Package - This package calculates the concentration change due to chemical reactions. These chemical reactions include linear or nonlinear sorption isotherms and first-order irreversible rate reactions (radioactive decay or biodegradation). Both sorption and biodegradation were used in this model. For the BD model, the RT3D Sequential Decay Reaction Module was used to simulate the sequential degradation reaction of TCE, DCE and VC.

5.3.2.1 *System Conceptualization*

The solute transport system conceptualization consisted of determining how to best represent the source and which attenuation mechanisms were applicable to the movement of solute at this site. In order to focus the solute portion of the model, a smaller model area was utilized. The smaller grid focused on the source areas, Plume 1 and Plume 3, and their common receptor. The smaller grid helped to minimize numerical computations, model run times and numerical oscillation. The grid spacing remained the same as in the flow model.

5.3.2.2 *Transport Parameters*

Biodegradation rates for TCE, DCE and VC were determined using the method of Buscheck and Alcantar (1995) which assumes a steady state plume condition. Ideally, a steady state condition should be verified by

using sampling data to show that the plume has ceased migration. In this case, the data predating the pump and treat remediation are limited to a brief period between late 1987 and early 1988. This time period is insufficient for this purpose. However, steady state conditions generally prevail in instances of older spills where the source has not been removed (Wiedemeyer, et. al., 1998). This scenario matches the known facts concerning the plumes at the BD site; therefore an assumption of steady state conditions may be made for the pre-pump and treat period.

The Buscheck-Alcantar method involves plotting the natural log of the contaminant concentration versus distance from the source. Data collected prior to initiating pump and treat remediation were generally used because these were assumed to be best representative of steady state conditions. A best-fit line was drawn through the data (see Figures 5-3, 5-4 and 5-5) and a linear regression analysis was conducted to determine the degree of data correlation. All data sets used in the decay rate calculations had R^2 values greater than 0.90. The slope of the best-fit line (m) provides one of the required parameters to an equation that solves for the compound-specific first-order decay constant (λ).

It should be noted that the only data available to create the required plots for vinyl chloride were from after the onset of the pump and treat remediation. To evaluate the acceptability of using these data, a comparison was made using TCE data before and after the pump and treat was started. It was found that the slope of the best-fit line from data sets before and after the pump and treat was essentially identical. The use of vinyl chloride data from after the start of the pump and treat remediation was therefore judged to be acceptable. For both TCE and DCE the data set incorporated concentrations for wells MW-15s, MW-24 and MW-39 from October 1987. For vinyl chloride, the plotted data set included wells MW-42mr and MW-6, plus recovery trench TR-1 from April 1992.

The other parameters required for the Buscheck-Alcantar analysis include the retarded contaminant flow velocity in the horizontal direction (V_{cx}) and the longitundinal dispersivity (D_x). The D_x parameter was estimated to 14.3 feet using the method of Xu and Eckstein (1995) which is based on plume length. The Buscheck-Alcantar equation is given as follows:

$$\lambda = V_{cx}/4D_x * \left((1 + 2D_x * (m))^2 - 1\right)$$

The V_{cx} parameter was determined with the standard approach that utilizes the organic carbon fraction (F_{oc}), the soil bulk density (ρ), the water/F_{oc} partition coefficient (K_{oc}) and the ground water flow velocity (V_w). The V_w parameter was determined using the aquifer hydraulic conductivity (K) , gradient (i) and porosity (n). The K and i parameters were known from the site characterization investigation (see Section 1.0). Porosity was estimated at 0.35. V_w is then calculated using Darcy's Law, where:

$$V_w = Ki/n$$

The F_{oc} and ρ parameters were determined through the collection of soil samples at the site. The K_{oc} parameter was taken from Weidemeyer, et. al., (1998). The following equations were then used to determine V_{cx}:

Distribution Coefficient (K_d) = $F_{oc} * K_{oc}$;
(USEPA, 1989, page 43);

Retardation Coefficient (R_f) = $1 + ((\rho/n) \times K_d)$;
(Freeze and Cherry, 1979, page 404); and

$V_{cx} = V_w/R_f$;
(Freeze and Cherry, 1979, page 404).

A summary of the Buscheck-Alcantar calculation is given in Table 5-2. The resulting first order decay coefficients for the three contaminants of concern are given as follows:

Contaminant	λ (day^{-1})	λ (year^{-1})	Half Life (H_L - years)
TCE	-1.65×10^{-4}	-0.06	11.55
DCE	-2.38×10^{-4}	-0.09	7.70
VC	-3.89×10^{-4}	-0.14	4.95

The values for TCE and vinyl chloride are both in the low end of the reported range found in the literature (Wiedemeyer, 1998). No range was reported for DCE.

All of the basic transport parameters required by the model such as porosity, D_x, ρ, λ, and R_f were consistent with the values given in the preceding discussion. Transverse dispersivity (D_y) was estimated as 0.3 D_x or 4.3 feet.

5.3.2.3 *Source Term*

The source area for the solute transport was based on concentrations reported from the May 1998 sampling round, plus the March 1999 sampling results for the MW-523 cluster. All ground water sampling data in Plumes 1 and 3 over the past year was reviewed and this data set was determined to be a conservative representation of current conditions. These concentrations were entered into the solute transport model as the starting condition. It was assumed that the source for Plumes 1 and 3 was finite and limited to the dissolved mass found in those plumes which was entered to the model as the starting condition. In other words, DNAPL is assumed to be absent and there is no source of on-going dissolution.

5.3.2.4 *Predictive Modeling*

A predictive model run was completed which simulated the source concentrations described above moving forward in time. Time was discretized into one 100-year stress period broken up into 103 time steps with a minimum length of 60 days and a maximum of 365 days. The primary objective of this run was to determine the magnitude of the impacts to the downgradient wetlands if Plumes 1 and 3 were released from the existing hydraulic control (as they would be under a natural attenuation scenario). Figure 5-6 shows the location of the receptor monitoring points and the location of the wetland.

The results of this run as shown on Figures 5-7 and 5-8 indicate the ground water concentrations entering the wetland receptor over time. These figures indicate that low-level concentrations of 1,2 dichloroethene and vinyl chloride will reach the wetland receptor downgradient of Plumes 1 and 3. However, these concentrations do not exceed the allowable limits defined in Section 4.0 for discharge to Class SE2 surface waters. The maximum predicted concentration of DCE and vinyl chloride at the receptor observation point for Plume 1 is 76.47 µg/l and 27.16 µg/l respectively. The maximum predicted concentration of DCE and vinyl chloride at the sensitive receptor observation point for Plume 3 is 317.23 µg/l and 239.77 µg/l respectively.

The duration of the predictive model run was selected to allow an evaluation of the time necessary for the existing contaminant levels to decrease to the New Jersey Ground Water Quality Standards (GWQS) for Class II ground water. This was performed in order to evaluate the time duration of the CEA. For both Plume 1 and Plume 3, the locations that are last to reach the GWQS are where the plumes enter the wetland receptor. Therefore, the graphs presented in Figures 5-7 and 5-8 can also be used for this purpose. This results of this evaluation are given as follows:

Plume	Parameter	GWQS	Time Needed to Reach GWQS
1	TCE	1 µg/l	Current levels at or below GWQS
1	DCE	10 µg/l	31 years
1	VC	5 µg/l	25 years
3	TCE	1 µg/l	Current levels at or below GWQS
3	DCE	10 µg/l	31 years
3	VC	5 µg/l	24 years

5.3.3 *Evaluation of Impacts Related to Plume 5*

The impacts related to Plume 5 were not evaluated using the model because this plume is wholly located within a mapped wetland in the northeastern portion of the BD property. A simple comparison between the ground water sampling data and the applicable criteria for impacts to the wetland is sufficient to evaluate whether an unacceptable exposure to this ecological receptor exists. The criteria previously presented in Section 4.0 are restated below:

Chemical	Applicable Criteria
trichloroethene	81
1,2-dichloroethene	140,000
vinyl chloride	525

A graph of TCE, DCE and VC concentrations versus time at the Plume 5 monitoring point is provided in Figure 5-9. This graph indicates the following:

- The wetland criteria have not been exceeded since May 1994;
- Nine consecutive sampling events have been below these criteria; and
- A qualitative review of these data suggests a continuing downward trend.

Based on these observations, it is concluded that there are no unacceptable impacts by Plume 5 on the wetland receptor.

It is also recognized that the remaining VOC concentrations in Plume 5 are above the ground water quality standards (GWQS) for DCE and VC. The model can be used to evaluate the time necessary for these concentrations to reach the GWQS. This was done using starting concentrations defined by the May 1998 sampling round and the results are presented in Figure 5-10. The time required to reach the GWQS is provided in the table below.

Plume	Parameter	GWQS	Time Needed to Reach GWQS
5	TCE	1 µg/l	Current levels at or below GWQS
5	DCE	10 µg/l	9 years
5	VC	5 µg/l	6 years

5.4 *ESTABLISHMENT OF CLASSIFICATION EXCEPTION AREAS*

Ground water in the shallow aquifer beneath the site has been impacted by the three compounds of concern and recent levels of TCE, DCE and VC in Plumes 1, 3 and 5 are all above the Ground Water Quality Standards (GWQS) limits as presented in Section 4.3. Therefore the implementation of MNA at this site requires the creation of Classification Exception Areas (CEA's) for each plume, as set forth in N.J.A.C. 7: 9-6. The three fundamental elements of each CEA, (CEA constituents, boundaries and longevity) are presented below.

CEA Constituents

As discussed in Section 4.2, a review of recent ground water sampling data from Plumes 1, 3 and 5 indicated that only TCE, DCE and VC have exceeded the GWQS in the upper aquifer beneath the site. The GWQS for TCE, DCE and VC are 1 ug/L, 10 ug/L and 5 ug/L respectively. No other VOCs exceed the GWQS. Therefore the ground water constituents to be incorporated in the CEAs for Plumes 1, 3 and 5 are TCE, DCE and VC.

CEA Boundaries

For Plume 1, the CEA boundaries will be the former Parcel No. 2 property boundaries and the downgradient wetlands receptor identified in Section 4.1, that is located on the east side of Route 17. These boundaries are shown in Figure 5-11. The property boundaries were selected since the GWQS for the CEA constituents identified above are occasionally exceeded across the parcel. The GWQS at the nearest down gradient receptor and within the CEA boundaries will be met under the proposed MNA remedial strategy as discussed in Section 5.3.2.4.

The upgradient and side gradient CEA boundaries for Plume 3 will incorporate the property boundaries of Parcel No. 5 and the down gradient boundary for this CEA will be the wetlands receptor identified in Section 4.1, that is located on the east side of Route 17. These boundaries are shown in Figure 5-11.

Plume 5 is located in the existing wetlands on Parcel No. 6. The boundaries for this CEA will be the property boundaries for Parcel No. 6 as shown in Figure 5-11.

CEA Longevity

The longevity of each CEA is the time required for the CEA constituents to reach the GWQS levels established for the Class II upper aquifer. The longevity of the CEA for each Plume was calculated using the ground water flow and solute transport model as developed in Section 5.3 and is further discussed below.

The model predicts that the time required for the Plume 1 CEA constituents, (DCE and VC), to decrease below the GWQS is 31 years and 25 years respectively. The current TCE level in Plume 1 is below the

GWQS. It is anticpated that TCE levels in Plume 1 may occasionally rise above the GWQS, however the expected time for this phenomena to cease is less than the predicted time periods for DCE and VCE. Therefore the longevity for the CEA for Plume 1 is predicted to be 31 years.

The model also predicts that the time required for the Plume 3 CEA constituents, (DCE and VC) to decrease below the GWQS is 31 years and 25 years respectively. The current TCE level in Plume 3 is below the GWQS. It is anticipated that TCE levels in Plume 3 may occasionally rise above the GWQS, however the expected time for this phenomena to cease is less than the predicted time periods for DCE and VCE. Therefore the longevity for the CEA for Plume 3 is predicted to be 31 years.

Plume No. 5 is located in the nearest receptor, the wetland in Parcel No. 6. As presented in Section 5.3, the CEA constituents levels currently meet the established receptor standards. The TCE level in Plume No. 5 is below the GWQS of 1 ug/L and the GWQS levels for DCE and VC will be met in 9 years and 6 years respectively. It is anticipated that TCE levels in Plume 5 may occasionally rise above the GWQS, however the expected time for this phenomena to cease is less than the predicted time for this phenomena to cease is less than the predicted time periods for DCE and VCE. Therefore, the longevity for the CEA for Plume 5 is predicted to be 9 years.

As discussed in Section 4.0, there is no further use of potable ground water planned within the CEA boundaries identified above. It should also be noted that the ground water downgradient of the BD site at the UOP Superfund site has ground water classified as Class III which is not for potable use. Based on these findings, BD will notify the appropriate external agencies (i.e., local and county departments, municipal governing bodies, and municipal planning boards) of the established CEA's for this site as required in N.J.A.C. 7:26 E6.2(a) 17v.

6.0 REMEDIAL SAMPLING AND MONITORING PLAN

Based on the evaluations presented in the preceding sections, MNA appears to be a viable remediation alternative for Plumes 1, 3, and 5, and meets the requirements set forth in N.J.A.C. 7:26E. The purpose of this section is to present the proposed monitoring program that will evaluate the progress of natural attenuation. The program will consist of quarterly sampling that will include the following elements as per N.J.A.C. 7:26E:

- at least one well in each plume proposed for natural attenuation within the most concentrated area of the plume;
- at least one sentinel well downgradient of each plume proposed for natural attenuation. The technical requirements state that this well should be located more than three years travel time from the nearest receptor and less than five years travel time from the downgradient extent of the plume;

The technical requirements also state that at least two other wells are required within each plume. However, given the very small size of the plumes proposed for natural attenuation at the BD site, this is not practical and has not been included as part of the proposed program.

A monitoring program was previously provided in ERM's report of December 1998 that was designed to meet the requirements discussed above. No new information has been developed that suggests this plan does not meet these requirements, therefore no changes to this plan are proposed. This plan is therefore restated below. The proposed plume monitoring and sentinel wells are given in the following table.

PLUME	NEAREST RECEPTOR	PLUME MONITOR WELL	SENTINEL MONITOR WELL
1	Wetland adjacent to SE shoulder of Rt. 17	MW-42mr, MW-6	MW-17
3	Wetland adjacent to SE shoulder of Rt. 17	MW-508sr	MW-523s MW-523m
5	BD Parcel 6 Wetland	RW-3	not applicable - plume is in receptor

The plume monitoring wells are all located within the most concentrated portion of their respective plumes and therefore satisfy the plume monitoring criteria. The rationale for the sentinel wells are summarized as follows:

- *Plume 1:* MW-17 is located less than five years travel time from the plume and greater than three years travel time from the nearest receptor. This satisfies the sentinel well criteria.

- *Plume 3:* Due to the proximity of the wetland, a useful sentinel well cannot be located at the required distance from the receptor, therefore this part of the criteria cannot be met. The sentinel wells will therefore consist of the new MW-523 well cluster recently installed on the southeast shoulder of Route 17. This cluster is located downgradient of well MW-508sr and within five years travel time from the plume.

- *Plume 5:* No sentinel well will be installed for this plume. As previously stated, the plume is located within the BD Parcel 6 wetland, therefore it may be concluded that the plume has already reached the nearest receptor.

Table 6-1 provides a list of the wells proposed for inclusion in the quarterly monitoring program. This program will include the wells discussed above, plus a number of additional wells to monitor Plume 2, the upgradient property boundary and the downgradient property boundary.

The proposed laboratory analytical parameters include VOCs (including methane, ethane and ethene), nitrate (NO_3), iron, sulfate (SO_4), alkalinity, and chloride. Proposed field analyses include pH, temperature, conductivity, dissolved oxygen (DO), and oxidation/reduction potential (ORP).

7.0 *SITE RESTORATION PLAN*

The use of MNA for the impacted ground water in Plumes 1, 3 and 5, and installing of an in-situ treatment wall for the DNAPL impacted areas of Plume 2, is a two-step process which will ultimately end with the elimination of the current ground water recovery and treatment strategy. Once MNA is approved for ground water Plumes 1, 3 and 5, active collection of ground water via recovery trenches and wells within these plumes will cease. These recovery wells and trenches will be "mothballed" but not immediately abandoned. Once the in-situ treatment wall is installed to contain, control and treat Plume 2, active ground water recovery in Plume 2 will also cease and use of the treatment plant terminated. Section 7.1 presents a more detailed description of the "mothballing" procedures and the proposed overall ground water remedial action plan work schedule is presented in Section 8.0.

In addition, BD is currently in contract negotiations with a developer to place a commercial shopping store/center on the site. BD will be retaining all environmental liabilities for on-going remedial activities at the site and an access agreement with the new tenants of the site will be forwarded to the NJDEP Case Manager upon receipt. A discussion of the current status of site redevelopment is provided in Section 7.2.

7.1 *GROUND WATER RECOVERY AND TREATMENT SYSTEM DECOMMISSIONING*

Trenches used to recover impacted ground water from Plumes 1, 3 and 5 will be shutoff shortly after approval of the proposed MNA remedial strategy. At that time power to these trenches will be turned off, the recovery well pump and riser pipe will be removed from the stilling wells at the end of each trench and cleaned and stored in the existing treatment plant building. The trenches and underground piping connected to the

trenches to the treatment building will be jet cleaned. Residual solids from this trench and pipe cleaning process will be transferred to the existing sludge holding tanks and dewatered prior to appropriate off-site disposal at an approved disposal facility.

Ground water recovery and treatment will continue, at a reduced flow rate, from Plume 2 until the in-situ treatment wall is installed. As presented in Section 8, the treatment wall is scheduled to be installed during the Spring of 2000. Once installed, the trenches and recovery well utilized to contain and control Plume 2 will be mothballed as discussed above. In addition, the treatment plant will then enter into a shutdown status. All recovered ground water in the equalization tanks will be treated and the tanks and internal plant piping will be cleaned. All residuals generated during this cleaning process will be transferred to the existing sludge holding tanks and dewatered prior to appropriate off-site disposal at an approved disposal facility.

After two-years of successful monitoring of the MNA strategy for Plumes 1,3 and 5, and successful verification of the performance of the in-situ treatment wall, the ground water recovery and treatment system will be decommissioned. Decommissioning will consist of abandonment of all recovery and wells and recovery trenches and the demolition of the treatment building.

7.2 *SITE REDEVELOPMENT*

BD is currently in contract with a developer to re-develop the site for commercial use. The use of the property is subject to the Town of East Rutherford planning board approval. BD has worked closely with the site developer to ensure that redevelopment is consistent with the overall remedial strategy. Therefore, the majority of site will be covered with asphalt for parking and buildings for commercial use as in the original

ECRA notification to the NJDEP. BD will obtain and forward a copy of the access agreement with the new owners and have unrestricted access to the site as part of their on-going environmental stewardship responsibilities.

8.0 *SCHEDULE OF REMEDIAL ACTIVITIES*

Table 8-1 presents the implementation schedule for the proposed MNA remedial strategy for Plumes 1,3 and 5 and proposed in-situ treatment wall installation for Plume 2. As discussed in Section 6.0, quarterly sampling will be conducted to monitor the natural attenuation process. The quarterly sampling frequency will be revisited in the future and adjustments to this sampling frequency may be made as set forth in 7:26 E-6.3(d).

TABLE 8-1: REMEDIAL ACTION SCHEDULE

Action Items	*Dates*
Submittal of Ground Water Remedial Action Work Plan Addendum (this document)	7/31/99
Development of Treatment Wall Design and RAWP Addendum Submittal	9/30/99
Receive NJDEP Approval of MNA for Plumes 1, 3 and 5. Shutoff of Recovery Trenches in Plumes 1, 3 and 5, and Commencement of MNA Quarterly Sampling.	1/31/2000
Receive NJDEP Approval for the installation of the treatment wall.	3/30/2000
Installation of Treatment Wall and shutoff of Recovery Trenches in Plume 2.	4/30/2000

9.0 *REVISED COST ESTIMATE FOR GROUND WATER REMEDIATION*

The original capital cost estimate for ground water remediation at this site, as presented in the previously submitted ground water remedial action plans for the site (July 1988 and March 1989), was $1,875,000. The itemized cost estimation for the proposed MNA and in-situ treatment wall is presented in Table 9-1 and the total estimated cost is $1,050,000. The implementation of the proposed MNA and in-situ treatment wall remedial strategy will bring the total capital expenditure for ground water remediation to $2,925,000.

Table 9-1 Cost Estimate for Revised Ground Water Remedial Action

Cost Item	*Estimated Cost*
Develop MNA and Concept Design of Treatment Wall	$ 300,000
Final Design and Installation of Treatment Wall	$ 750,000
Total Estimated Cost	$1,050,000

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13 November, 2002

Mr. Murdo Morrison
Case Manager
NJ Dept. of Environmental Conservation Div. of Responsible Party Site Remediation
Bureau of Environmental Evaluation
and Cleanup Responsibility Assessment
401 East State Street
Trenton, NJ 08625

Re: Submission of Ground Water Remedial Action Work Plan Addendum
Becton Dickinson & Company (BD)
East Rutherford, Bergen County, NJ
ISRA Case No. 87577

Dear Mr. Morrison:

On behalf of Becton Dickinson & Company (BD), Environmental Resources Management (ERM) is pleased to present the department with the accompanying report, "Ground Water Remedial Action Work Plan Addendum" (RAWP Addendum) for your review.

The purpose of this report is to meet department requirements set forth in N.J.A.C. 7:26 E for site remediation via natural remediation. This RAWP Addendum to the existing approved RAWP outlines the use of a MNA plan and documents the technical soundness of the adoption of this remedial strategy for the site. The RAWP Addendum was developed following departmental guidance for the submittal of RAWPs and includes necessary documentation for the creation of Classification Exception Areas (CEAs) for impacted groundwater on and off -site, as set forth in N.J.A.C. 7:9-6 et seq.

Please distribute the three- (3) copies of this report to the following department personnel: John Graham, Rob Lux and Joel Fradel. Should you have questions, comments or require any clarification, please contact the undersigned at (516) 921-4300 or via facsimile at (516) 921-5637. In addition we will be contacting you in the near future as a follow-up to this correspondence.

Very truly yours,

Michael B. Teetsel, C.P.G.
Senior Associate

Jim Rocco
Project Manager

cc: Paul T. Malinowski, BD
Matthew Bigley, BD

ERM-Northeast

BD responses to EPA Request for Information

Nos. 14

ECRA BUILDING DECONTAMINATION PLAN
PARCEL 3
BECTON, DICKINSON AND COMPANY
EAST RUTHERFORD, NEW JERSEY

AUGUST 1988

PREPARED FOR:

BECTON, DICKINSON AND COMPANY
ONE BECTON DRIVE
FRANKLIN LAKES, NEW JERSEY

PREPARED BY:

ERM-NORTHEAST
88 SUNNYSIDE BOULEVARD
PLAINVIEW, NEW YORK 11803

ERM-Northeast

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1.0 INTRODUCTION

1.1 Background

Becton, Dickinson and Company (B-D) owns and operates a medical apparatus manufacturing and assembly plant in the Borough of East Rutherford, Bergen County, New Jersey. Due to the planned cessation of operations in 1990, B-D initiated the ECRA review process by submitting the required documentation to the NJDEP on June 25, 1987. The initial ECRA submissions divided the plant site into six separate parcels. Each parcel has been assigned individual ECRA case numbers.

In support of the site re-development plan, the ownership of Parcel No. 3 will be transferred with all current structures vacated. This submittal provides the decontamination and abatement work plans for two buildings and building features within the Parcel. The work plans are designed to meet ECRA requirements as well as federal, state and local rules and regulations. This Building Decontamination Plan is being submitted in conjunction with an Environmental Remedial Action Plan for Parcel No.3 to complete the ECRA Cleanup Plan requirements.

1.2 Overview

The remainder of this report is organized into the following sections:

2.0 GENERAL INFORMATION - covers building histories, current activities and features.

3.0 IDENTIFICATION OF AREAS REQUIRING DECONTAMINATION- identifies areas within Parcel No. 3 requiring decontamination.

4.0 OPERATING PLAN, SPECIFIC WORK PLANS AND HASP FOR DECONTAMINATION OF BUILDINGS - covers the general aspects of building decontamination activities, the strategy for handling wastes generated and the requirements for ensuring the maintenance of health and safety. A series of Work Plans are presented that deal with activities not covered by the general aspects of building decontamination activities. Theses procedures include specific decontamination procedures, verification of decontamination effectiveness, removal and disposal of waste materials generated during abatement and specific health and safety requirements unique to the item being decontaminated.

5.0 DECONTAMINATION SCHEDULE - provides the schedule of decontamination activities for buildings in Parcel No. 3.

6.0 COST ESTIMATE - is the estimated expenditures to perform the activities outlined in the ECRA Decontamination Plan.

2.0 GENERAL INFORMATION

B-D's medical apparatus manufacturing plant covers approximately 36 acres. The location of the plant site is shown on the General Vicinity Map presented as Figure 2-1. Parcel No. 3 is located at the western end of the plant site and covers an area of approximately one half acre. A site plan for Parcel No. 3, presented as Figure 2-2 shows the locations of the two support buildings.

The following section summarizes the current and historical use of the buildings and structures within Parcel No. 3. Volume I and Volume II of the initial ECRA submission provide additional information on building history and utilization.

2.1 Building Histories, Current Activities - Parcel No.3

B-D acquired Parcel No. 3 in the early 1950's. The parcel contains two buildings. These buildings are designated as Building Z (Charvous Building) and Building Y (Miller's Garage). There are no aboveground or underground product/fuel/waste storage tanks in Parcel No. 3. Past and current activities related to the manufacturing of B-D products are described below.

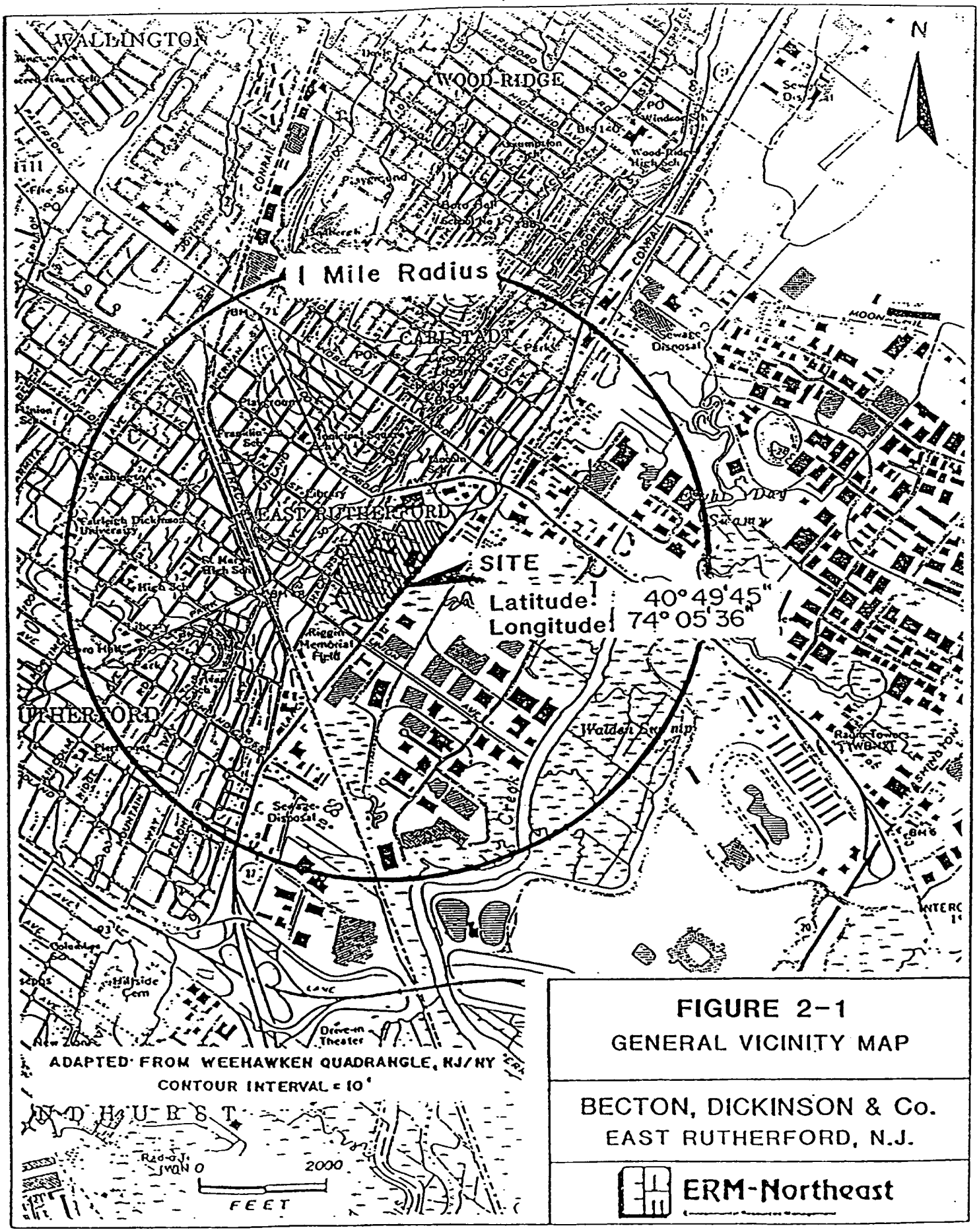


FIGURE 2-1
GENERAL VICINITY MAP

BECTON, DICKINSON & Co.
EAST RUTHERFORD, N.J.

ERM-Northeast

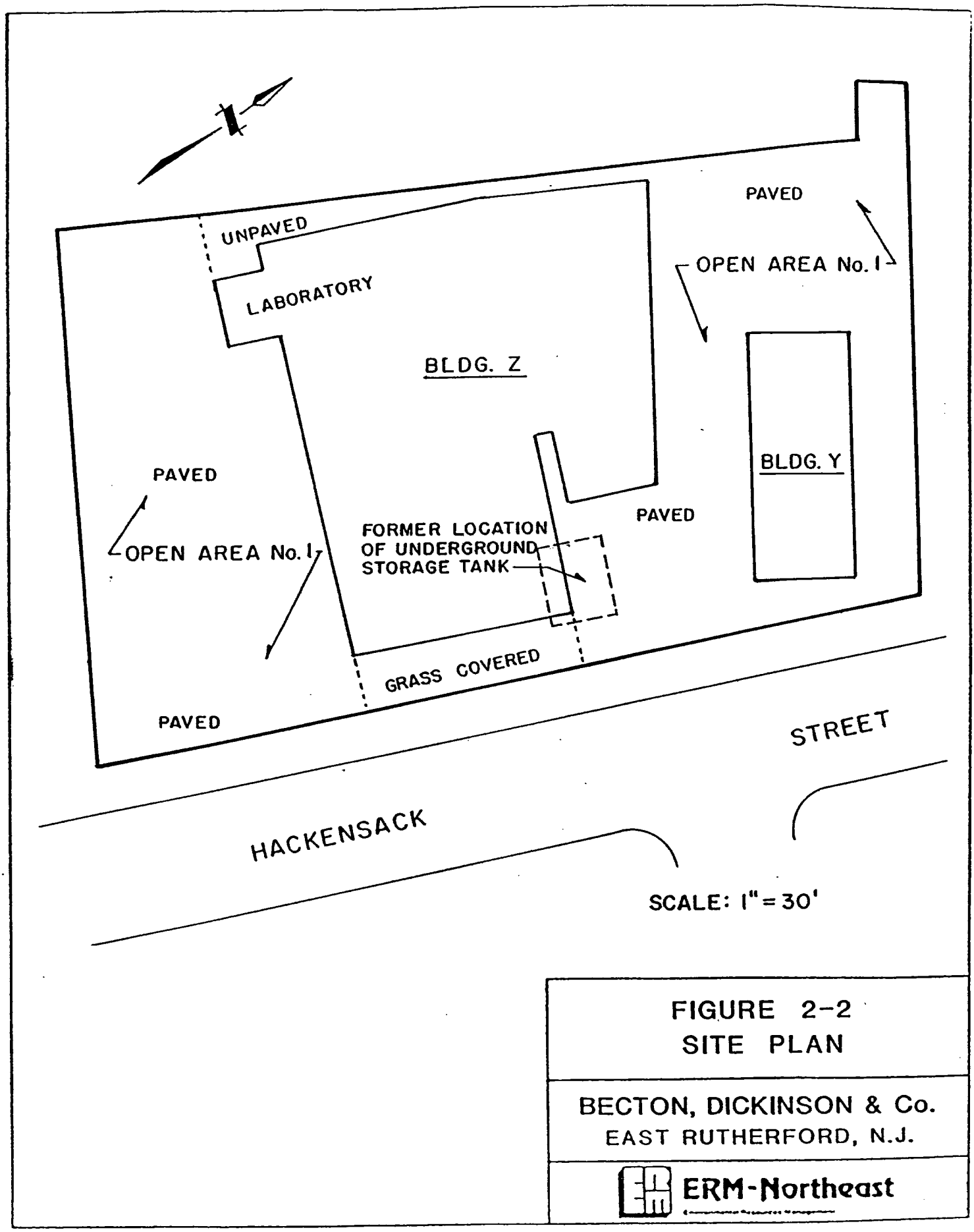


FIGURE 2-2
SITE PLAN

BECTON, DICKINSON & Co.
EAST RUTHERFORD, N.J.

ERM-Northeast

2.1.1 Building Z (Charvous Building)

According to the areal photographs presented in the Volume I report, this building was built prior to 1940. The building was used for the assembly of drafting equipment (all dry assembly) in the mid 1940's up until the time B-D acquired the building (estimated-early 1950's).

B-D used the building primarily for office space and the storage of office equipment and supplies. To a lesser extent, B-D used the building for an experimental machine shop (lamp machines - glass forming). Syringes were also assembled here. In addition, B-D also operated a small laboratory in the southwest corner of the building. Laboratory wastes were discharged to the public sewerage system.

2.1.2 Building Y (Miller's Garage)

The date of the construction of this building is unknown. From about 1944 to about 1954, this building housed an automobile body repair shop called Miller's Garage. Use of the building prior to 1944 is not known.

B-D acquired the property in the mid 1950's. The building was cleaned and improved, and used to store office supplies and new equipment. No manufacturing occurred in this building.

The building does not have sanitary facilities and, therefore, is not connected to the public sewerage system.

3.0 IDENTIFICATION OF AREAS REQUIRING DECONTAMINATION

This section of the plan is based on site inspections, operational history and current usage of the buildings and structures. Table 3-1 lists each building area, indicates whether decontamination is required and lists the areas and facilities requiring decontamination in accordance under with the appropriate work plan (see Section 4.0).

3.1 Identification of Clean Areas

Significant areas of Building Z such as office space, dry stock storage, hallways, restrooms, etc. are areas that do not require decontamination, except possibly for asbestos remediation. These areas are listed in Table 3-1. Building Y requires no decontamination work.

3.2 Building Areas and Requiring Decontamination

Areas requiring decontamination activities have been identified from the review of operational histories, current usage and recent inspections. These areas include laboratories, compressor, boiler, HVAC systems, floor drains, floor/walls, and asbestos insulated steam pipe or equipment. Table 3-1 lists each of the areas and indicates the applicable work plan.

TABLE 3-1
SUMMARY OF REQUIRED DECONTAMINATION PLAN ACTIVITIES

Parcel No.	Building Designation	Potentially Hazardous Raw Materials and Wastes	Equipment	Building Features	Asbestos	Areas Not Requiring Decontamination
3	Z Office Area			- HVAC duct system - Stm PV&F	- ACM drop ceiling on Stm PV&F	- Walls - Carpeted Floor
	Z (Small Laboratory)	- Reagents in cabinets		- Lab sink - Lab hood - Natural gas system	- ACM on Stm PV&F above drop ceiling - ACM wire gauze pads for lab	- Walls - Floor - Drop Ceiling (Styrofoam)
	Z (Restrooms)			- HVAC duct system - Stm PV&F	- ACM on Stm PV&F	- Walls - Floor - Drop Ceiling (Styrofoam)
	Z (Lab)	- Gas cylinders - Reagents in cabinets - Bags of plastic pellets	- Plasma Reactor - Vacuum Oven - Flammable Cabinet	- Lab sinks - Lab hood	- No visible ACM	- Walls - Floor - Ceiling
	Z (Basement)	- Bags of chemicals - Open can of oil	- Fired Heater - Compressor	- Stm PV&F - Boiler Flue - Floor stained and oily residue near compressor	- ACM on PV&F throughout area	- Walls - Ceiling (concrete)
	Y (Building)				- No visible ACM	- Walls - Floor - Ceiling (Wood)

4.0 OPERATING PLAN, SPECIFIC WORK PLANS AND HEALTH AND SAFETY PLAN FOR DECONTAMINATION OF BUILDINGS

The General Operating Plan, Specific Work Plans, and Health and Safety Plan (HASP) present procedures and methodologies required to perform the required remediation. These plans address the sequence of buildings to be decontaminated, sequence of work plan implementation, decontamination and operating procedures, health and safety procedures, location criteria for waste containers and waste transportation and disposal requirements.

4.1 Sequence of Buildings To Be Decontaminated

Decontamination activities will proceed once current activities are ceased and the buildings are vacated.

4.2 Sequence of Work Plans

The decontamination procedures and the Work Plans will generally be implemented in the following sequence:

1. Inventory and remove all commodities, hazardous materials, finished and unfinished products, raw

materials, miscellaneous materials, solid wastes, etc. (see Work Plan for Commodities and Hazardous Materials - Section 4.5.1);

2. Inventory and remove miscellaneous equipment (see Work Plan for Miscellaneous Equipment - Section 4.5.2);

3. Decontaminate building features such as floors, walls, and piping (see Work Plan for Building Features- Section 4.5.3);

4. Remove all asbestos containing materials (see Work Plan for Asbestos Abatement - Section 4.5.4).

4.3 General Procedures

4.3.1 Inventory Reduction

Becton, Dickinson and Company will attempt to minimize its commodity, equipment, product and waste inventory prior to the implementation of this plan. Inventory minimization will be accomplished through depletion from use, sale, transfer to other B-D facilities and disposal. Waste

disposal will be performed in accordance with the applicable NJDEP regulations.

4.3.2 Material Identification

A. Any samples required to determine the nature of a product/substance/waste will be collected and maintained using NJDEP-ECRA protocols, equipment, techniques, labeling and preservation. After sample acquisition is complete, a chain-of-custody document will be prepared with the required analysis specified. This information will be logged and a copy prepared to be included with the samples to be shipped to a certified laboratory for analysis.

B. A site sample location plan drawing will be prepared in support of the chain-of-custody document.

C. Parameters of analysis will be based upon several factors including the material used in an area, disposal requirements and previous sampling.

D. Laboratory reports of analytical data will be reviewed to evaluate the hazardous characteristics of a

substance. This information will also be used for waste disposal, determining the level of personnel protection necessary and the required safety equipment.

4.3.3 Waste Handling and Storage

A. Hazardous liquids will be stored in 17E DOT approved 55-gallon drums prior to transportation and disposal. Compatible liquids may be mixed as good practice permits or laboratory analysis proves to be safe. All containers bearing hazardous waste will be labeled with proper EPA/DOT hazardous waste shipping labels.

B. When necessary, compatible sludges and solids may be bulked in watertight roll-off containers and kept covered while awaiting transportation and disposal.

C. Drummed liquids and solid materials shall be segregated into groups according to laboratory analysis, chemical compatibility and good practice.

D. A roll-off container will be spotted on asphaltic or concrete surfaces close to the building exits. Preferably, only one exit will be used per building.

The spotting of the roll-off containers will consider traffic patterns, ease of delivery and removal by carters. Asbestos containing waste will not be mixed with any other waste and will be disposed of exclusively in a separate roll-off container.

4.3.4 General Decontamination Procedures

A. Cleaning methods to be used include sweeping, pumping, vacuuming, steam-cleaning, high pressure washing, chipping, wire brushing, scraping, scooping, shoveling and glove bagging.

B. Individuals performing the decontamination work will be thoroughly familiar with methods of removing and disposing of hazardous waste materials. All regulatory requirements for federal, state and local rules and regulations pertaining to hazardous waste handling will be complied with. During execution of the work, care will be taken to provide proper protection to all individuals entering and exiting the secured work area.

C. In order to implement the decontamination plan, proper equipment will be selected. Consideration will be

given to water and power requirements as well as the selection of any cleaning additives to be used for decontamination.

D. When necessary, a containment area will be established to control wash and rinse waters generated from decontamination procedures. These wash and rinse waters will be collected and stored prior to off-site disposal.

E. All mechanical equipment, hand tools, storage containers, decontamination rooms, protective clothing or any other equipment used during the execution of the work shall be properly decontaminated. No equipment or materials will be taken off the work site prior to decontamination.

F. All washwater and sorbents used to clean and decontaminate equipment and other surfaces will be contained and then disposed of in accordance with appropriate regulatory requirements.

G. Bulk samples of solids or grab samples of liquids may be acquired for the purpose of verifying

decontamination procedures. Positive findings indicate further decontamination procedures are required.

H. Inspection and approval procedures will be instituted. Initial inspection of equipment in decontamination areas will involve tagging items requiring decontamination. Each tagged item will receive a checklist to be kept in a clear plastic envelope detailing procedures needed to successfully decontaminate the equipment. The check list will indicate final acceptance.

I. Precautions will be taken to assure that asbestos containing materials will not come in contact with steam/water or be physically disturbed.

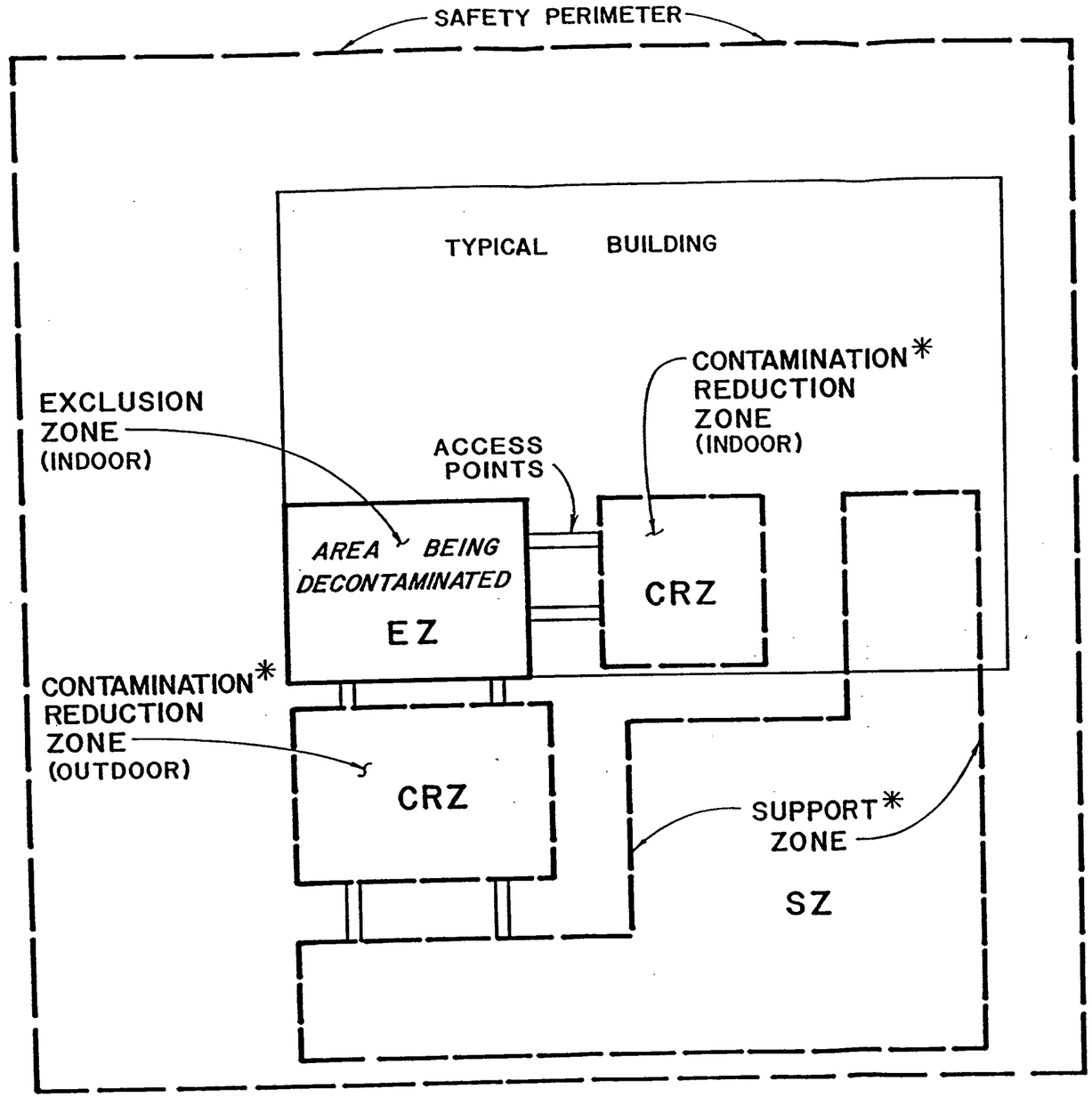
4.3.5 Security and Access Control

A. Site security and access control to the areas to be decontaminated will be established via a safe perimeter established utilizing boundary tape, staked flags and/or barriers. The perimeter will reduce the accidental spread of hazardous substances from a contaminated area into a clean area.

Interior work zones will be established on-site where different types of decontamination operations will occur. The work zones will include an exclusion zone, a contamination reduction zone and a support zone. The flow of personnel through the zones will be controlled. The establishment of these work zones will help ensure that: personnel are properly protected against the hazards present where they are working, work activities and contamination are confined to the appropriate areas, and personnel can be located and evacuated in an emergency. Figure 4-1 provides an exemplary decontamination layout indicating the location of various work zones and critical boundaries.

The use of these three zones is described below:

- Exclusion Zone - The contaminated area where the primary decontamination activities take place and requiring highest level of personnel protection will be established. The outer boundary of this zone is the Hotline that is clearly marked by lines, placards, hazard tape and enclosed by physical barriers such as fences or ropes. Access control points will be established at the



NOTE:

*- BOTH THE CONTAMINATION REDUCTION ZONE AND THE SUPPORT ZONE WILL BE INDOORS OR OUTDOORS AS REQUIRED.

TITLE

GENERAL DECONTAMINATION LAYOUT

PREPARED FOR

BECTON DICKINSON & CO.

ERM-Northeast
Environmental Resources Management

SCALE

DATE

FIGURE 4-1

periphery of the Exclusion Zone to regulate the flow of personnel and equipment into and out of the zone.

- Contamination Reduction Zone (CRZ) - The transition area between the contaminated area (Exclusion Zone) and clean areas will be established. Personnel decontamination and the decontamination of the exterior surface of waste containers and equipment will be accomplished within this zone. If necessary, two lines of decontamination stations will be set up within the CRZ: one for personnel and one for wastes and equipment. Access into and out of the CRZ from the Exclusion Zone is through Access Control Points: one each for personnel and equipment entrance, one each for personnel and equipment exit, if feasible.

- Support Zone - The support zone will contain the decontamination equipment, emergency response and first aid equipment, spill containment equipment, the sample handling and preparation area, worker facilities and the location of administrative and

other support functions. The Contamination Control Line separates the CRZ and the Support Zone.

The requirements and necessity for these zones will be established as required by specific decontamination activities.

B. Log books will be established and maintained for individuals entering and leaving the exclusion zone.

4.3.6 Containment and Contingency for Spills

A. In the event of spills, emergency methods for containment, control and disposal of the spilled material will be provided.

B. Any leakage, spillage, contamination of non-contaminated (clean) areas of a building, equipment or any other part of the site caused by the decontamination work shall be cleaned up and decontaminated. All contaminated materials shall be removed and disposed of in accordance with NJDEP regulations.

4.4 General HASP (Health and Safety Plan)

A. Level D protection will be used, at a minimum, by all personnel implementing decontamination procedures. Higher levels of protection, (levels A through C), may be prescribed according to the requirements of the specific work plans. Appendix B presents a description of each level of personnel protection and Appendix A presents a list of the components of each personnel protection.

B. Notifications by letter shall be made to all applicable federal, state, local agencies before any work is initiated.

C. A Hazard Evaluation Summary (HES) will be prepared for each of the individual HASPs covering the substance involved, concentrations (if known) and primary hazards such as reactivity, toxicity, ignitability, corrosivity, etc.

D. Personnel decontamination procedures will follow standard decontamination procedures common to specific types of work (e.g., asbestos work). Methods will include change of clothing procedures, personal hygiene, storage of boots/safety helmets, clothing, etc.).

E. Communication procedures and equipment shall be established and work crews will be trained in their use before work begins.

F. An environmental monitoring plan and equipment used for monitoring will be established and described. A monitoring log will be maintained.

G. Emergency procedures in the event of accidents, spill, fire/explosion, equipment failure of personal protective gear or other equipment will be established and described. Personnel will be trained to be familiar with these procedures.

H. Personal protective equipment will be selected prior to commencement of the work based upon the hazards of the substances to be removed.

4.5 Decontamination and Abatement Work Plans

This section presents the specific decontamination and abatement work plans that will be used to complete building decontamination. The General Procedures and General HASP

presented in Sections 4.3 and 4.4 respectively are part of each of the specific Work Plans.

4.5.1 Work Plan for Commodities and Hazardous Materials

Development of Inventory of Commodities and Hazardous Materials

Upon cessation of activities in each building an inventory of commodities and hazardous materials will be performed. The purpose of the inventory will be to locate and identify hazardous materials and unknowns. Hazardous materials include: paints, lacquers, thinners, unknown materials, unknown drums or containers of chemical products, compressed gas cylinders, laboratory reagents, metal turnings or filings, oil, and aerosols.

Commodity and Hazardous Material Handling

Inventory completion will be followed by preparation of a summary keyed to each building. The summary will identify commodities that can be transferred to other B-D facilities; other hazardous materials will then be segregated into reuseable and waste groupings. Reusable hazardous materials

can either be transferred to other B-D facilities, or sold for beneficial reuse.

Waste hazardous materials may either be salvaged for beneficial reclamation or disposed of by an authorized off-site TSD facility. These materials will be segregated into compatible groups and handled accordingly. A staging area will be selected for storage prior to off-site disposal.

Removal/Disposal of Commodities and Hazardous Materials

Special procedures are not required for handling commodities.

Hazardous materials handling, storage, transportation and disposal will follow the generic procedures described in Section 4.0. Unknown materials will be characterized using the procedures described in Section 4.3.3.

Health and Safety Plan

A. The anticipated level of protection required to complete the decontamination work is level D. This

includes the use of chemical resistant gloves, and face shields.

B. The generic elements of the HASP in Section 4.4 apply.

4.5.2 Work Plan for Miscellaneous Equipment

Development of the Inventory Checklist

Once operations cease in a building, an inventory of miscellaneous equipment will be performed. Information, in the form of a checklist, will include the following for each piece of equipment: utility hookups disconnected, fluids, chemical hazards, disassembly, decontamination completion, and ready for transport checkoff. This information will be placed in a plastic envelope and remain with the equipment until it leaves the facility. The Inventory Checklist will be reviewed by B-D to determine whether the equipment will be transferred, sold, salvaged for beneficial reclamation or scrapped. If the equipment is to be scrapped, disposal procedures will be in accordance with NJDEP's regulations and requirements.

Equipment Decommissioning and Decontamination Procedures

Miscellaneous equipment will be decommissioned and decontaminated according to the following procedures:

A. Disconnect all utilities.

B. Drain all fluids as per manufacturer's recommendations.

C. Steam clean, wash down, vacuum or wipe off, until decontamination is complete. An inspection will be required to ensure decontamination procedures have removed all visible residues.

D. Disassemble equipment and disconnect any tiedowns.

E. "Make ready" for shipment by crating, palleting, wrapping, or loading.

Removal/Disposal of Equipment

Once the equipment has been decommissioned and decontaminated, no further special measures are needed. B-D

will arrange for the transfer, sale a disposal of the equipment as appropriate.

HASP

A. The anticipated minimum level of protection required for equipment decontamination will be level D.

B. The generic elements of the HASP in Section 4.4 apply.

4.5.3 Work Plan for Building Features: HVAC Systems, Floors and Walls

Decontamination Procedures and Sequence

HVAC systems will be decontaminated first. Floors and walls will be decontaminated upon completion of HVAC systems.

HVAC Systems

A. HVAC systems will be evaluated in segments. The system segments will be established based upon the past

operation of the areas serviced. Where past operations indicate a potential for hazardous material build up in the HVAC system an internal inspection of the system will be conducted. If waste material build-up is noted, a representative sample will be collected and analyzed to determine the hazard classification. If the material is determined to be hazardous, the HVAC system will be decontaminated.

B. HVAC systems requiring decontamination will be cleaned by vacuuming, shoveling, scraping, brushing or similar technique, down to the duct material. The residual waste will be placed into plastic bags or containers. The bags will be placed or emptied into 55 gallon 17H drums.

Floors and Walls

A. Floors will be made "broom clean". Any visible residues will be scrapped off to the original concrete surface. Walls will be treated in the same manner and be "broom or wiped clean".

B. When required, areas of excessive oil/staining or other hazardous substance accumulation, will require steam cleaning or high pressure wash treatment as the final step in decontaminating building features. Liquid produced will be kept to a minimum. Any liquid produced by these methods will be collected in 55 gallon 17E drums or a tanker truck.

Decontamination Performance Standard and Verification

A. A visual inspection of each structure being decontaminated will be used to verify the completion of decontamination procedures.

B. Building features will be decontaminated to the extent possible using practices commonly employed to remove materials from the type of feature, e.g., pumping, pouring, vacuuming, shoveling, scraping, sweeping, power washing and steam cleaning.

Removal/Disposal of Waste Materials

Waste materials will be removed and disposed of following the generic procedures in Section 4.3.4.

HASP

A. The anticipated minimum level of protection required for building feature decontamination will be level D.

C. The generic elements of the HASP in Section 4.4 apply.

4.5.4 Work Plan for Asbestos Abatement

Decontamination Procedures and Sequence

A. The East Rutherford facility has been surveyed for asbestos hazards. The survey is contained in Appendix D. Additional surveying work will be performed to complete the existing survey. Together, the two surveys form the asbestos decontamination survey. The survey will include:

- o the identification of all possible sources of ACM;
- o review of building records;
- o a thorough inspection and sampling of materials in both buildings;
- o documentation of the survey including quantities and location;

- o confirmation through a certified laboratory of the type(s) of asbestos present.

B. The asbestos decontamination survey will be the basis for the abatement work to be performed on each building.

C. All other work plans (i.e., miscellaneous equipment, building features, etc.) shall be completed in a building or portion of a building before asbestos abatement work is initiated.

D. A Construction Permit will be obtained by completing an application in writing with the administrative authority having jurisdiction. The application will include:

- o the required fee;
- o name, address and license number of the asbestos contractor;
- o name, address of the Asbestos Safety Control Monitor;

- o asbestos hazard assessment approved by the Asbestos Safety Control Monitor;

- o plans and specifications (3 sets) indicating scope of work, provisions to contain ACM during all phases of abatement work and copies of site and floor plans;

- o documentation that buildings will be vacated during abatement except as approved by NJDOH or NJCA.

- o name and address of NJDEP registered waste hauler and of the NJDEP registered landfill where the asbestos waste will be deposited;

- o asbestos abatement project schedules;

- o a written release of the plans and specifications of the Asbestos Safety Control Monitor.

E. Pre-commencement inspections shall be conducted. Written notification will be provided to the Asbestos Safety Control Monitor by the owner or owner's agent at

least 48 hours in advance of the desired inspection date. This shall be done for each individual building or work site.

F. The initial work will be the placement of engineering controls such as, but as not limited to isolation, enclosure and exhaust ventilation to meet exposure limits. Barriers and air locks will be erected. They will be double layered and constructed of 6 mil polyethylene sheeting using overlapped duct taped folded seams, with sealing tape at the seams and boundaries. The second layer will have seams staggered with respect to the first layer. Three (3) compartments with air locks (Decontamination Chambers) will be constructed for access to the work area. Air locks will be constructed such that ACM can be passed through the locks. Each air lock will be separated by 3 layers of 6 mil polyethylene sheeting and be weighted to fall back into place when people pass through. The air lock doors must be 4 feet wide and the distance between flaps must be at least 4 feet. The barriers will be equipped with local exhaust ventilation and dust collection systems using HEPA negative air pressure equipment of sufficient capacity for the

volume of the work containment area. The equipment will comply with ANSI Z9.2-1971 which is incorporated by reference herein. An Asbestos Decontamination Layout sketch is included as Figure 4-2.

G. Barrier and decontamination chamber integrity will be checked using "smoke tubes". Any leaks will be sealed immediately with duct tape.

H. Caution signs will be posted in accordance with OSHA 29CFR 1926.58(K) and NJAC Subchapter 8 at required locations during the asbestos abatement project. These citations are incorporated by reference herein.

I. The following documents will be on file at the job site:

- o EPA, OSHA, NJDEP applicable regulations
- o Respiratory Protection Program
- o ACM waste hauling and landfill permits
- o Construction specifications
- o Medical surveillance employee records
- o Insurance for Asbestos work

ASBESTOS DECONTAMINATION LAYOUT

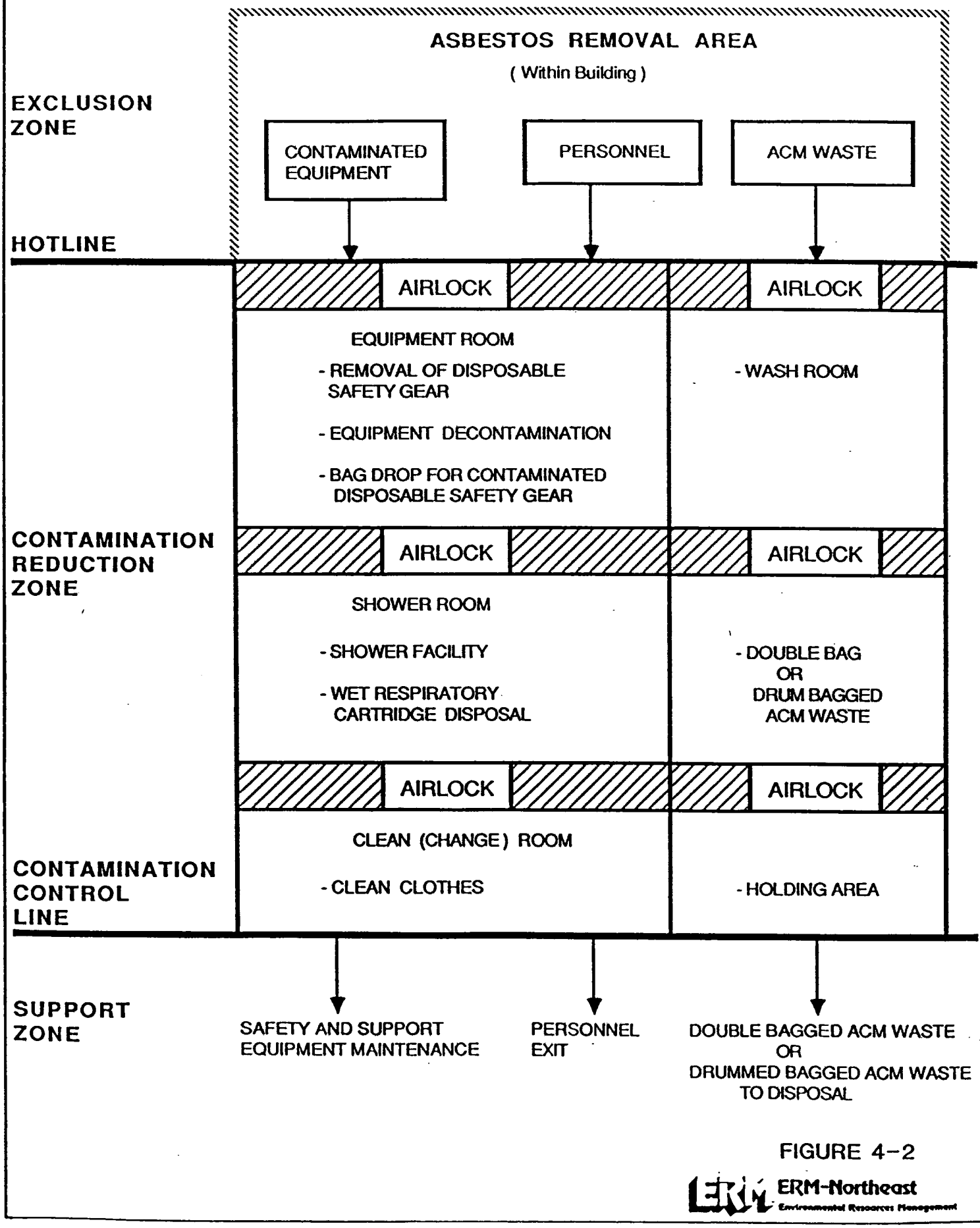


FIGURE 4-2

ERM-Northeast
Environmental Resources Management

J. Contractor shall, at the minimum, meet all EPA, NIOSH, DOT and state requirements with all workers being certified waste handlers satisfying the requirements of OSHA 29CFR 1910.1001(j)(5) and NJAC 5:23 Subchapter 8. These citations are incorporated by reference herein. Copies of training certificates will be kept on hand at the job site.

K. Communication procedures consist of 2-way radio communications and hand signals. Work Crews will be trained to follow these procedures before initiation of the work. Emergency procedures will be employed to address situations involving accidents, spills, fire/explosion, equipment failure of personal protective gear or other equipment. Work crews will be trained in these precautions before initiation of the work.

L. Notification of all applicable federal agencies will be made in writing ten days before any work is initiated and copies will be kept on file. The New Jersey Department of Community Affairs will be notified in writing within three business days of the issuance of the construction permit for asbestos abatement.

M. A daily log of all individuals entering and leaving the secured work area will be maintained.

N. Security of the work will be maintained by limiting access to the entrance of the decontamination chamber and the air locks with plastic barriers.

O. HEPA negative air exhausts will be located away from air intake devices supplying working environments. If necessary, air intake vents may be temporarily capped or sealed.

P. An Asbestos Safety Control Monitor and Asbestos Safety Technician will conduct air monitoring including pre-abatement,personal, post-abatement and final (aggressive air testing) clearance monitoring.

Q. The friable ACM waste, scrap, debris, bags, containers, equipment, and asbestos-contaminated clothing which could produce airborne concentrations of asbestos fibers in excess of 2 fibers (longer than 5 micrometers) per cubic centimeter of air, shall be collected and disposed of in sealed and labeled impermeable bags (OSHA1910.1001 approved asbestos

caution bags). Caution labels shall be affixed to all materials, mixtures, scrap, waste, debris, and other products containing asbestos fibers. However, no label is required where asbestos fibers have been modified by a bonding agent, coating, binder, or other material so that during any reasonably foreseeable use, handling, storage, disposal, processing, or transportation, no airborne concentrations of asbestos fibers in excess of the exposure limit will be released as described above. The labels shall be printed of sufficient size and contrast as to be readily visible and legible. The label shall state:

CAUTION

Contains Asbestos Fibers

Avoid Creating Dust

Breathing Asbestos Dust May Cause Serious

Bodily Harm

R. Work methods to accomplish ACM removal will include glove bagging", wet methods, scraping, brushing or HEPA vacuuming.

S. The wet method will consist of treating the ACM with a solution of water and a wetting agent to reduce fiber release. Some types of amosite-containing materials will not absorb either water or water combined with the wetting agent suggested by EPA (50% polyoxyethylene ester and 50% polyoxyethylene ether). Other wetting agents should be tested on the material for absorption. If the material will not absorb the wetting agent, dry removal methods using Type C respiratory protection will be used. EPA must approve all dry removal operations. If required, NESHAPS will be consulted.

T. Containment bags known as "glove bags" may be used where containment barriers are difficult to build. The removal procedure will comply with NJAC Subchapter 8. These bags must comply with OSHA standards. The bags will be positioned around the pipe insulation to be removed and sealed to the pipe with tape. Armholes and an inside pouch for tools will allow the worker to remove insulation without exposure to asbestos fibers. Respirators will be required when using this procedure.

U. ACM will be separated from pipe, values, fittings, ducts, structural members, boilers, water tanks, floor

and ceiling tiles, shingles, transite, walls, etc. for separate disposal. The bagged ACM will be placed in the designated roll-off container. All hand-operated and power-operated tools which may produce or release asbestos fibers in excess of exposure limits will be provided with local exhaust ventilation systems with HEPA filters. Examples of such tools are saws, drills, etc.

V. The pipe, values, fittings, ducts, boilers, water tanks, etc. will be encapsulated and placed in the roll-off container for ACM. These items may be cut into sections with torches and then encapsulated with a bridging encapsulant to prevent fiber release. Care will be taken not puncture bagged ACM waste.

W. Structural members requiring decontamination shall be encapsulated using an approved bridging encapsulant to prevent fiber release.

X. Environmental monitoring will be performed by an asbestos safety technician following NIOSH Method 7400. The technician will acquire three (3) samples per day The total sample volume shall be sufficient to achieve

a detection limit of 0.01 fibers per cubic centimeter. The sample shall be drawn through a prescribed filter with flow rates between 0.5 and 16 liters per minute during the time the abatement work is being performed. Pumps shall be calibrated before and after sampling and a record maintained. The monitoring samples will be taken daily near the entrance to the decontamination chamber and random locations near the barriers. Preference shall be given to rooms adjacent to critical barriers.

Y. In order to ensure proper decontamination, a rigorous post abatement cleanup program will be conducted. This will include wet-mopping or HEPA vacuuming all horizontal and vertical surfaces in the work area. (Wet mopheads and cloths should be discarded in sealed plastic bags and treated as asbestos contaminated waste.) Cleaning of surfaces outside the work area is highly recommended. Two cleanings, the second after 24 hours when suspended fibers have settled, will provide better assurance of fiber reduction.

Z. All equipment such as HEPA negative air machines, PVC piping used to construct any containment and/or

decontamination structure, ladders, scaffolding, etc., will be properly decontaminated. HEPA negative air machine filters, respirator filters, and contaminated disposable clothing will be bagged and treated in the same manner as ACM insulation.

AA. Progress inspections shall be performed in conformance with NJAC Subchapter 8.

BB. Clean up inspections shall be performed in conformance with NJAC 5:23-Subchapter 8.

Verification of Decontamination Effectiveness

A. Final (post abatement) clearance air monitoring will be performed to verify the effectiveness of the asbestos abatement procedures as required by NJAC 5:23-Subchapter 8. Satisfactory completion of the decontamination procedures will be approved when all sample values are below the reliable quantification limit of 0.02 fibers per cubic centimeter.

B. Quality assurance will be maintained by requiring the laboratory performing the air sampling and analysis to use NIOSH Method 7400 using PCM (phase contrast microscopy). This method is incorporated by reference herein. The laboratory will be certified and supply details of its quality control program. Documentation will be required of the laboratory demonstrating the lowest level of fibers routinely reported.

Removal/Disposal of Waste Materials

A. The roll-off container will be secured by lock and chain when bagged ACM waste is not being placed in the container.

B. A notification of intent to dispose of asbestos shall be sent to NJDEP at least 10 days prior to actual disposal as described in NJAC Subchapter 8.

C. A New Jersey landfill that accepts asbestos and registered by NJDEP to accept Waste ID No. 27 will be used.

D. All other procedures will be in accordance with the generic procedures in Section 4.3.3.

HASP

A. Prior to the initiation of abatement activities, a written respiratory protection program will be prepared which satisfies the requirements of 29CFR 1910.134 and 29CFR 1910.1001. These citations are incorporated by reference herein.

B. Prior to initiation of abatement activities, the personnel required to perform abatement work will have participated in a medical surveillance program that satisfies the requirements of 29CFR 1910.1001 and includes:

- Medical and work history;
- Complete physical examination with emphasis on respiratory system, cardiovascular and digestive tract;
- Chest X-rays;

- o Pulmonary function test covering forced vital capacity FVC and forced expiratory volume at one second (FEV 1.0);

- o Results of medical exam signed off by a licensed physician.

C. Compliance with the aforementioned exposure limits will be achieved by using proper respiratory protection equipment, suits, gloves, foot cover, etc. The equipment to be provided will be approved by MSHA/NIOSH. Respiratory equipment may vary for the hazards encountered. Equipment selection will include air purifying respirators, powered air purifying respirators and type "C" supplied air respirators, continuous flow or pressure demand class. Respirators are to be inspected and decontaminated daily as per 29CFR 1910.134. This citation is incorporated by reference herein. Selection of respiratory gear will be based on laboratory results of the site assessment (survey) and preabatement and abatement air sampling. Respiratory gear will be used to reduce the concentration of airborne asbestos fibers in the

respirator below the exposure limit of 5 fibers, longer than 5 micrometers,per cubic centimeter.

D. All personnel entering the abatement area or performing abatement work will be fit-tested by a CIH (Certified Industrial Hygienist) as outlined in Appendix C of 29CFR 1910.1001. This citation is incorporated by reference herein. While the engineering controls are being installed, work practices will require protective clothing and respiratory protection.

E. The CIH will ensure that a daily Personal Air Monitoring program is carried out. Sample analysis will be by NIOSH Method 7400. Samples shall be collected from within the area on membrane filters of 0.8 micrometer porosity mounted in an open-face filter holder. Samples shall be taken for the determination of the 8-hour time-weighted average airborne concentrations and of the ceiling concentration of asbestos fibers.

F. Emergency information (with phone numbers) will be posted in the clean room for:

- o Asbestos Safety Control Monitor Firm
- o Nearest hospital
- o Emergency squad/ambulance service
- o Fire department
- o Police department
- o Health Officer
- o Project Manager/Engineer
- o Direction to nearest hospital to be posted
- o Display emergency evacuation routes.
- o Display phone numbers of New Jersey Department of Labor, New Jersey Department of Health and New Jersey Department of Community Affairs

G. Personal protective clothing will be used to achieve the required level of protection. Clothing will consist of coveralls, headcovering, gloves and foot coverings for any person exposed to airborne concentrations of asbestos which exceed the 8-hour time weighted average of 2 fibers, longer than 5 micrometers per cubic centimeters of air. The initial selection of the protective clothing will be based on laboratory results obtained during the site assessment (survey) and pre-abatement air sampling.

H. Change room will be provided for workers who are exposed to airborne concentrations of asbestos fibers in excess of the exposure limits in item G. Change room asbestos fiber concentrations exceeding 0.02 fibers per cubic centimeter shall require corrective action.

I. Clothes lockers shall be provided. Two separate lockers or containers for each worker will be available such that contamination of the worker's street clothes by the person's work clothes will be prevented.

J. Decontamination procedures for protective clothing, respiratory filters, HEPA negative air equipment filters, rubber gloves, rubber boots, duct tape used to seal hands and feet, etc., will consist of placement of the waste in asbestos disposal bags. The bags will be passed out through the air locks and placed in roll-off containers.

K. Personal decontamination, once protective gear is removed, consists of showering in the middle chamber of the decontamination structure. The shower will be filtered using a HEPA filter equipped pump. Street

clothing will be stored in the clean room chamber of the decontamination structure.

4.6 Transportation and Disposal of Waste

A. Acceptance at a licensed waste disposal facility will be obtained prior to any waste being shipped off-site.

B. Drums and roll-off containers, etc., will be labeled to aid in tracking and manifesting.

C. When required, laboratory analysis shall be furnished to the facility receiving the waste for final disposal. Samples will also be furnished, if required.

D. Manifests shall be prepared prior to off-site disposal of each hazardous waste shipment. Any non-hazardous waste will receive a "Straight Bill of Lading".

E. Only DOT approved containers shall be used for shipping. All containers bearing hazardous waste will be labeled with proper EPA/DOT Hazardous Waste Shipping labels to match the manifests. Drummed liquids and solid materials shall be

segregated into groups according to laboratory analysis, chemical compatibility and good practice.

F. Scheduled pickups will be supervised during all phases of the pickup/loading operation.

G. Proper placards will be displayed on carting vehicles.

H. Copies of manifests signed by the transporter and TSD facility representatives will be retained by B-D.