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AlliedSignal Inc.

Morristown, New Jersey

ENSR

**Remedial Action Report
Area 2 - Block 104, Lot 2
UOP Uplands Site Remediation
East Rutherford, New Jersey**

ENSR Consulting and Engineering

November 1997

Document Number 0186-050

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EXECUTIVE SUMMARY

Location

The Universal Oil Products (UOP) Inc. site is located near the intersection of Route 17 and Paterson Plank Road in the Borough of East Rutherford, Bergen County, New Jersey, as shown on Figure 1-1. The property is surrounded by tidal marshes, highways, and commercial and light industrial property. Immediately to the north is Matheson Gas, an automotive storage lot, a metal plating business and a Fairfield Inn Motel. Berry's Creek and tidal marshes are located to the east. Ackerman's Creek and commercial properties are located to the south. New Jersey Route 17 parallels the western property boundary. West of Route 17 are a Becton Dickenson building, catering, restaurant and other commercial properties. The closest residential area is approximately one-quarter mile to the west of Route 17.

Background

The UOP property is approximately seventy-five acres of which approximately fifty percent is developed land built up with miscellaneous earthen fill, municipal type waste and rubble (elevations range from 4 to 9 feet above mean sea level). The developed area is commonly referred to as Uplands. The remaining half of the property is covered by a tidal salt marsh and man-made Ackerman's Creek. An active Conrail/N.J. Transit right-of-way runs North-South and separates the Uplands into two unequal areas. The area east of the railroad tracks consists of 45 acres, and the area west of the tracks consists of 30 acres.

From 1932 through 1979, an aroma and fragrance laboratory business, in addition to other industrial chemical companies, operated within the Uplands property. The Uplands area was initially developed in 1932 by Trubeck Laboratories (Trubeck) which built and operated the aroma chemicals laboratory. Trubeck began operating a solvent recovery facility in 1955. In 1956, Trubeck constructed a wastewater treatment plant, and in 1959 began utilizing two wastewater holding lagoons. UOP, a division of the Signal Companies, acquired the property and facilities in 1960. The wastewater treatment plant and wastewater lagoons ceased being used in 1971. All remaining operations at the facility were terminated in 1979. In 1980, all structures, except concrete slabs and a pedestrian bridge over the N.J. Transit tracks, were demolished. The contents of the two wastewater lagoons were removed and transported offsite for disposal in 1990.

In 1986, Allied Corporation merged with the Signal Companies forming AlliedSignal. AlliedSignal acquired the UOP property as part of the merger and thereby acquired the inactive UOP

property. Soil and shallow groundwater contamination at specific Upland areas are associated with past industrial activities.

Regulatory Background

The New Jersey Department of Environmental Protection (NJDEP), Bureau of Federal Case Management has been the lead oversight agency at the UOP site since 1982. In addition, both the USEPA Region II and the Hackensack Meadowlands Development Commission have provided an integral role in the regulatory oversight of all remedial activities. The site restoration activities described herein for Area 2 were performed in accordance with work plans and permits approved by the NJDEP.

The UOP site was added to the National Priorities List (NPL) on September 8, 1983 (Hazard Ranking Score of 54.65, Group 3). An Administrative Consent Order (ACO) was issued by NJDEP (NJDEP-1983) to perform a Remedial Investigation (RI), the purpose of which was to chemically characterize and delineate areas of soil and groundwater impacts that may require remedial action. UOP entered into a second ACO in May 1986 in which UOP agreed to continue site investigations, conduct a feasibility study (FS) of remedial action alternatives for the various areas at the site. In 1986, following the merger, AlliedSignal became responsible for completing the characterization activities initiated in 1983. In accordance with the ACO, remedial investigations and studies continued at the site until 1990. As components of the RI, a human health and ecological risk assessment were performed whose purpose was to establish specific numerical clean-up criteria for defining the limits of required remediation.

Remedial Investigation

The RI and a Supplementary Investigation were completed by ENSR in 1993. Soil in four discrete Upland areas, as well as process, sanitary, and storm sewer sediments, and shallow groundwater were identified as requiring remediation. The four Upland areas were designated as Areas 1, 1A, 2 and 5. Areas 3 and 4 were the remediated wastewater lagoons and the existing tidal stream channels, respectively. The sewers were designated as Network 1 through 5. The RI identified the following classes of contaminants in the soil and sewer sediment:

- Polychlorinated Biphenyls (PCBs)
- Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)
- Volatile Organic Compounds (VOCs)
- Inorganics, primarily lead (Pb)

The RI determined that the shallow groundwater had been impacted by VOCs, primarily

The RI determined that the shallow groundwater had been impacted by VOCs, primarily aromatics. The NJDEP determined in 1995 that the shallow groundwater is a non-potable, Class III-B aquifer, hydraulically connected to a saline surface water body.

Feasibility Study

Based on the chemical and physical characterization data collected and evaluated during the RI, remedial alternatives were developed for the Upland Areas as part of a Feasibility Study (FS) prepared by ENSR, dated June 1992. As required by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), nine evaluation criteria were considered during the FS as follows:

- Protection of Human Health and the Environment
- Compliance with Applicable and Relevant and Appropriate Requirements
- Short-term Effectiveness
- Long-term Effectiveness
- Implementability
- Reduction of Toxicity, Mobility, and Volume
- Cost
- State acceptance
- Community acceptance

To complete the FS, response media, areas of concern, institutional and technological response measures were established. Remedial alternatives were then developed and a detailed evaluation performed. The remedial alternatives shown below underwent a detailed evaluation for the identified media for each discrete Upland Area:

Remedial Alternatives Evaluated for Soil

- No Action/Institutional Controls
- Containment
- Excavation and Treatment
- Excavation and Offsite Disposal
- In-situ Treatment

Contaminants Addressed by Area

- PCB and cPAH soils in Areas 1, 2, and 5
- VOC soils in Areas 1A and 2
- Lead soils in Areas 1, 1A and 5

Remedial Alternatives Evaluated for Groundwater

- No Action/Monitoring and Institutional Controls
- Extraction and Treatment

Contaminants Addressed by Area

- VOCs in Areas 1, 1A and 2

Record of Decision

Based on the findings presented in the RI and the Remedial Alternatives recommended in the FS, the NJDEP issued a Record of Decision (ROD) for Upland Areas 1, 1A, 2 and 5 in October 1993. The ROD required the following actions be performed:

- Excavate soils with total PCB concentrations greater than 2 mg/kg;
- Excavate soils with total cPAH concentrations greater than 29 mg/kg;
- Excavate soils with individual cPAH concentrations as follows:

	<u>(mg/kg)</u>
- Benzo(b)fluoranthene	4
- Benzo(a)anthracene	4
- Benzo(a)pyrene	0.66
- Benzo(k)fluoranthene	4
- Chrysene	40
- Dibenzo(a,h)anthracene	0.66
- Indeno(1,2,3-cd)pyrene	4

- Excavate soils with total VOC concentrations greater than 1000 mg/kg;
- Excavate soils with 1,1,2,2-Tetrachloroethane concentration greater than 21 mg/kg;
- Excavate soils with lead concentration greater than 600 mg/kg;
- Thermally treat excavated soils with total PCB concentrations greater than or equal to 25 mg/kg and/or total cPAH concentrations greater than or equal to 29 mg/kg;
- Thermally treat excavated soils with total VOC concentrations greater than or equal to 1000 mg/kg;
- Thermally treat excavated soils with 1,1,2,2-Tetrachloroethane concentration greater than or equal to 21 mg/kg;
- Place excavated and successfully treated soils under an on-site multi-media cap;
- Extract and treat shallow groundwater. A total minimum volume of 5.6 million gallons was specified as an aggregate amount to be extracted from Areas 1, 1A and 2. As part of Area 2 remedial activities, groundwater impacted by the leaching of surface water (referred to as leachate in the ROD) through VOC impacted soil areas was collected and treated on-site.

The October 1993 ROD provided for an interim remedy for groundwater. Subsequent to the issuance of the ROD, the shallow groundwater was designated in 1996 as a Class III-B aquifer, non-potable, and hydraulically connected to a saline surface water body. To date, Class III-B groundwater quality standards have not been promulgated by NJDEP. Since the ultimate

receptor of the site groundwater is Berry's Creek via the tidally influenced Ackerman's Creek it was deemed appropriate to establish discharge limits that would be protective of these nearby surface water bodies.

In addition to the remedial action specified by the ROD, the NJDEP also required that all sewers (process, sanitary and storm) be cleaned of sediment or removed. In cooperation with the New Jersey Department of Transportation (NJDOT), approximately 800 linear feet of new storm sewer was installed in Area 2 to replace an out-of-service storm sewer system (Storm Sewer Network 5).

Remedial Design

A Remedial Design was completed to implement the ROD. In addition to eleven design drawings and twenty-seven construction and remediation specifications, the following supplemental plans were prepared (ENSR May 1995) in accordance with N.J.A.C. 7:26E - New Jersey Technical Requirements for Site Remediation:

- Remedial Action Work Plan (RAWP)
- Sampling and Analysis Plan (SAP)
- Quality Assurance Project Plan (QAPP)

The NJDEP approved the drawings, specifications and RAWP on November 6, 1995. The SAPP and QAPP were approved by the NJDEP on July 30, 1996.

The following permits were obtained from the respective Federal, New Jersey and local agencies as a part of the Remedial Action.

- U.S. Army Corps of Engineers Nationwide Permit No. 38 (No. 95-05320-J2 - August 22, 1995)
- Bergen County Soil Conservation Commission Soil Erosion and Sediment Control Plan (No. 95-B5125 - August 17, 1995)
- East Rutherford Borough - Building, Plumbing, Fire Protection (No. 96-054-March 1996)
- East Rutherford Borough - Electrical (No. 96-029 - April 18, 1996)
- Hackensack Meadowland Development Commission Zoning Certification for Site Improvements (CZC-95-038 - June 7, 1995)
- NJDEP - Air Pollution Control Permit (BNSR Log No. 01-96-2164 - October 1, 1996)
- NJDEP - Air Pollution Control Permit (BNSR Log No. 01-96-2706 - October 15, 1996)
- NJDEP - Discharge to Groundwater (Permit Equivalent - May 15, 1996)

- NJDEP - Discharge to Stormwater (NJ0088323 - August 17, 1995)
- NJDEP - Stream Encroachment Permit (0212-95-0001.2SE - June 27, 1995)
- NJDEP - Waterfront Development Permit and Water Quality Certificate (0212-95-0001.3 - June 27, 1995)
- NJDEP - Monitoring Well Permits (No. 2644-386, 387 and 388 - April 24, 1996)
- NJDEP - Wetlands Deed Restriction (No. 7008 - April 2, 1996)
- New Jersey Transit Access Permit (February 19, 1996)

Remedial Action

As of November 1997, remediation of Areas 1, 1A, and 5 was in progress. Remediation of Area 2 was completed November 1996.

Work completed for Area 2 (area west of the Conrail/NJ Transit ROW) is as follows:

- 9353 cubic yards (in-place volume) of PCB/cPAH soils were excavated (this volume includes the removal of 200 cy of sediment from the storm sewer systems)
- 337 cubic yards (in-place volume) of VOC soils were excavated
- A total of 4031 yds³ of excavated soil and collected sediment required thermal treatment
- 270 linear feet of temporary groundwater extraction trench was installed
- 2920 linear feet of existing storm sewer was cleaned
- 1058 linear feet of storm sewer was excavated
- 1942 linear feet of process sewer was excavated
- 800 linear feet of new 48-inch storm sewer was installed
- 175,000 gallons (May 1997 estimate) of groundwater were treated

As part of an engineering evaluation to determine whether additional future groundwater remediation would be warranted for Area 2, the groundwater analytical data was compared to the NJDEP Surface Water Quality Criteria for Ackerman's Creek and Berry's Creek, which are the receptors. As noted previously, the shallow groundwater within Area 2 is hydraulically connected to these saline receptors. Five rounds of groundwater analytical data, from select sumps in Area 2, were compared to the NJDEP Surface Water Quality Criteria. All detected VOCs are within acceptable limits, and most continue to exhibit a decreasing trend in concentration.

Sampling during remediation of Area 2 included the following:

- 32 in-situ soil samples to further delineate extent of soil contamination

- 108 post-excavation samples to document removal of contamination
- 9 soil samples for management of the onsite soil stockpile
- 1 sediment sample
- 15 groundwater samples

Sample analysis was performed by Intertek Testing Laboratories (NJ Certification No 82716)

Segregation and Closure of Uplands Area 2

In accordance with the soil and sediment remediation goals established by the 1993 ROD, remediation and restoration within Area 2 has been achieved.

Area 2 (Lot 2/Block 104), is physically segregated from Areas 1, 1A, and 5 (Lot 8/Block 105.01) by an active ConRail/N.J. Transit right-of-way. Additionally, except for a small radial area adjacent to the ConRail/N.J. Transit right-of-way, the majority of Area 2 is not within the jurisdiction of the Hackensack Meadowlands Development Commission (HMDC).

For these reasons, Area 2 is being segregated for the purposes of establishing it as a distinct remediated section of the UOP Superfund Site.

Remedial Action Report Organization

This report details the soil and groundwater remedial action completed within Area 2 (Lot 2/Block 104) at the UOP Uplands site during 1996 and 1997. This report is structured to include the information specified in Section 7:26E of the NJDEP Technical Requirements for Site Remediation (N.J.A.C. 7:26E) and other pertinent information as follows:

- Introduction - Summary of site assessment and characterization work, and Regulatory Framework
- Engineering and Permitting
- Site preparation and Mobilization (including Health, Safety and Environment)
- Findings/Remedial Action Report
- Regulatory Compliance Summary
- Remedial Action Cost Summary

Of necessity, many of these aspects of the Area 2 remedial action cannot be presented without discussion of the aspects of Areas 1, 1A, and 5; however, the focus of this report is Area 2.

1.0 INTRODUCTION

1.1 Background

The Universal Oil Products (UOP) Site, is located in northeastern New Jersey, occupying approximately 75 acres in an industrial area of East Rutherford, Bergen County (Figure 1-1). The property was initially developed in 1932 by Trubeck Laboratories (Trubeck) which built and operated an aroma chemicals laboratory. Trubeck began operating a solvent recovery facility in 1955. In 1956, Trubeck constructed a wastewater treatment plant and began utilizing two wastewater holding lagoons. UOP, a division of the Signal Companies, acquired the property and facilities in 1960. Use of the wastewater treatment plant and wastewater lagoons ceased in 1971. All remaining operations at the facility were terminated in 1979 and the site became inactive. In 1980 all structures, except concrete slabs and a foot-bridge over the NJ Transit railroad tracks, were demolished.

In 1983, UOP entered into an Administrative Consent Order (ACO) with the NJDEP to investigate potential sources and the extent of contamination. Remedial investigations commenced at the site in 1983. UOP entered into a second ACO in May 1986 in which UOP agreed to continue site investigations and conduct a feasibility study (FS) of remedial action alternatives for the various areas at the site. In 1986, Allied Corporation merged with the Signal Companies, forming AlliedSignal. AlliedSignal acquired the UOP property as part of the merger and thereby became responsible for completing the characterization activities initiated in 1983. In accordance with the ACO, remedial investigations and studies continued at the site until 1990. Based on the completed Remedial Investigation, a Feasibility Study was conducted and subsequently approved by the NJDEP in September 1992. In October 1993, the NJDEP issued the Record of Decision (ROD) for Operable Unit One of this Superfund site which is known as the UOP Uplands Site.

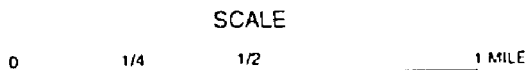
The UOP Uplands Site, which consists of designated Areas 1, 1A, 2, and 5 (See Figure 1-2), became the location of a remedial action starting in April 1996. Site soils and sewer sediments targeted for remediation contained the following contaminants of concern: Polychlorinated Biphenyls (PCBs), carcinogenic Polycyclic Aromatic Hydrocarbons (CPAHS), and Volatile Organic Compounds (VOCs). Shallow groundwater impacted by VOC contaminated soils was also targeted for remediation.



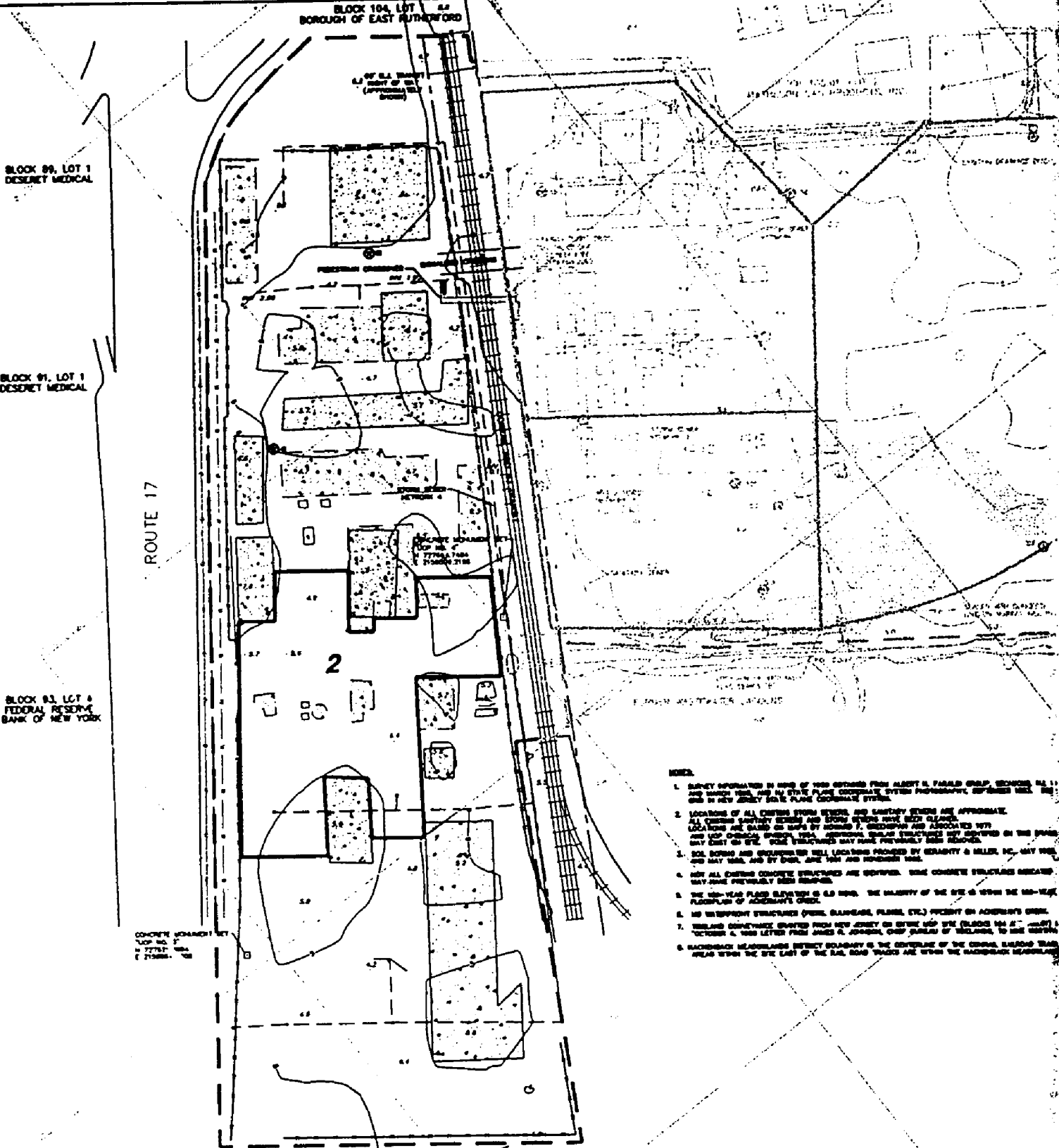
SOURCE USGS 7 1/2 Minute Topographic Quadrangle,
Weshawkin Quadrangle New Jersey - New
York 1981

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FIGURE 1-1
LOCATION OF UOP SITE
East Rutherford, New Jersey



DRAWN S Surman	DATE June 15, 1997	PROJECT NO. 0186-050-610	REV.
FILE NO. F-0118A	CHECKED SS		



BLOCK 89, LOT 1
DESERT MEDICAL

BLOCK 91, LOT 1
DESERT MEDICAL

BLOCK 93, LOT 4
FEDERAL RESERVE
BANK OF NEW YORK

ROUTE 17

BLOCK 104, LOT 4.2
BOROUGH OF EAST RUTHERFORD

AS OF 2.5. 1987
AS PART OF THE
(PROPOSED) SITE

CONCRETE FOUNDATION
TOP NO. 1
117737
117888

2

- NOTES:**
1. SURVEY OPERATED IN ACCORD WITH RECORD PLAN ALBERT S. FARBER GROUP, SERIES 84-11 AND 84-12, 1985, AND ALL STATE PLANS CURRENTLY ON FILE WITH THE ENGINEERING BOARD IN NEW JERSEY STATE COURTHOUSE, TRENTON, N.J.
 2. LOCATIONS OF ALL EXISTING FOUNDATION, STRUCTURE AND CONCRETE FOUNDATION ARE APPROXIMATE. ALL EXISTING FOUNDATION, STRUCTURE AND CONCRETE FOUNDATION ARE BASED ON DATA BY GEORGE J. GREGORIO AND ASSOCIATES WITH THE NEW JERSEY ENGINEERING BOARD. FOUNDATION STRUCTURES NOT SHOWN ON THE PLAN MAY EXIST ON SITE. THESE STRUCTURES MAY HAVE PREVIOUSLY BEEN REMOVED.
 3. ALL EXISTING AND PROPOSED WELL LOCATIONS PROVIDED BY GRANITE & MILLER, INC., MAY 1985, AND MAY 1986, AND BY D&S, APRIL 1984 AND NOVEMBER 1984.
 4. NOT ALL EXISTING CONCRETE STRUCTURES ARE SHOWN. SOME CONCRETE STRUCTURES SHOWN MAY HAVE PREVIOUSLY BEEN REMOVED.
 5. THE 100-YEAR FLOOD ELEVATION IS 4.5' ABOVE THE FINISH GRADE OF THE SITE AS SHOWN ON THE FLOODPLAIN OF ACHERMAN'S CREEK.
 6. NO UNDERGROUND STRUCTURES (PILES, SLABPILES, PILES, ETC.) EXIST ON ACHERMAN'S CREEK.
 7. RECORD CONVEYANCE GRANTED FROM NEW JERSEY TO STATE OF N.J. (BLOCK 104 A, LOT 1) BY OCTOBER 4, 1988 LETTER FROM JAMES R. JOHNSON, CHIEF CLERK OF RECORDS TO THE CLERK.
 8. BACKGROUND MEASUREMENTS SURVEY BOUNDARY IS THE CENTERLINE OF THE CONCRETE BARBED WIRE FENCE WITHIN THE EAST OF THE RAIL ROAD TRACKS AND WITHIN THE BACKGROUND MEASUREMENTS.

NOTICE

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NO.	REVISION	BY	APPR.	APPR.	APPR.	APPR.	DATE	NO.	REVISION	BY	APPR.	APPR.	APPR.

BLK. 100.01 LOT 3
OMAHA HOLDING CO

SECTION 16.01 LOT 7
WADSWORTH MEADOWS 1.00

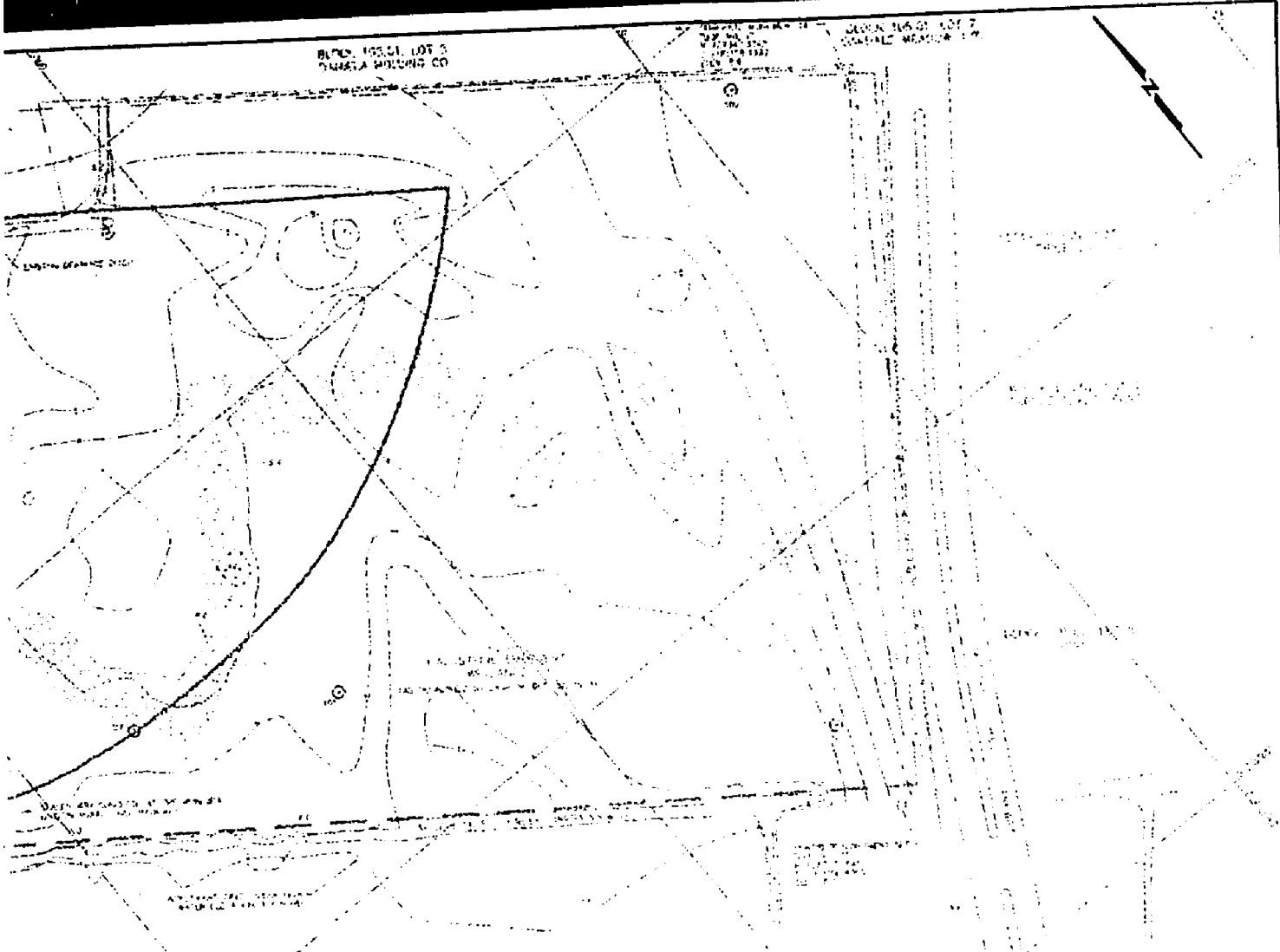
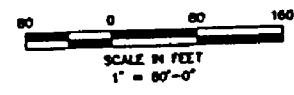


TABLE GROUP, SECTIONS 16.01 AND 16.02
REVISIONS, SEPTEMBER 1981, 800-FOOT
IS ARE APPROXIMATE
LINES
ASSOCIATES 1979
AND NOT SHOWN ON THE PLANS
AND RECORDS
TARRANT & MILLER, INC. MAY 1981
CONCRETE STRUCTURES INDICATED
THE SITE IS WITHIN THE 100-YEAR
FLOODPLAIN OF ACHERMAN'S CREEK.
IF THE (BLACK AND WHITE) REFERENCE
AND OF RECORDS, TO LINE NORTH, EAST,
AND OF THE CORNER, SHOWN BLACK, ALL
ON THE BACKGROUND HEADLINES REFLECT.

- LEGEND**
- 1.1 --- EXISTING TOPOGRAPHY (NOTE 1)
 - APPROXIMATE LOCATION OF BURIED NATURAL GAS LINE
 - DRAINAGE (NOTE 2)
 - APPROXIMATE LOCATION OF SANITARY SEWER AND MANHOLE
 - APPROXIMATE LOCATION OF STORM SEWER AND DITCH BANK
 - APPROXIMATE LOCATION OF 6" FIBER OPTIC LINE
 - APPROXIMATE LOCATION OF UNDERGROUND MONITORING WELL
 - RECOMMENDED WELLS/WATERS BOUNDARY LINE
 - RECOMMENDED WELLS/WATERS TRANSFER AREA (TYPED BY FROM BOUNDARY LINE)
 - EXISTING CONCRETE STRUCTURE VERIFIED BY FIELD SURVEY (NOTE 4)
 - METRIC CONCRETE STRUCTURE (NOTE 4)
 - EXISTING SECURITY FENCE
 - PROPERTY LINE
 - SITE BOUNDARY
 - REMEDIAL AREA DEMARCATION



BY	APPR.	APPR.	APPR.	APPR.	DATE	REFERENCE	DWG. NO.

ENR
ENVIRONMENTAL CONSULTING, ENGINEERING AND REMEDIATION

**UOP UPLANDS SITE REMEDIATION
AREA 2 REMEDIAL ACTION REPORT
SITE PLAN**

FIGURE 1-2

1.2 Separating Area 2 for Site Closure

The Uplands Area 2 is being segregated from the other Upland areas for separate closure based on the completion of the required soil and sediment remedial activities. In addition, Area 2 is physically separated from the remainder of the site. Area 2 is bounded on the east by the Conrail/NJ Transit right-of-way; and on the west by the Route 17 right-of-way.

The goals and scope of work for remediation at the UOP Uplands Site were developed in the Remedial Action Work Plan (RAWP), approved by NJDEP on November 6, 1995. The RAWP contained the following site-specific Plans: Sampling and Analysis Project Plan/Quality Assurance Project Plan (SAP/QAPP), Construction Plans, and Technical Specifications.

The purpose of this report is to document the completion of remedial actions for the soils and sewer sediments within Area 2, and to demonstrate that the remedial actions have successfully met the intended objectives set forth in the Declaration for the ROD which were to "address the threats due to contaminated soils and contaminated leachate". The scope and role of Operable Unit One is defined on page 3 of the ROD as "an interim action that addresses all known soil contamination and leachate that serves as a source of groundwater contamination" [As part of Area 2 remedial activities, groundwater impacted by the leaching of surface water (referred to as leachate in the ROD) through VOC impacted soil areas was collected and treated on-site]. Groundwater in Area 2 continues to be collected, sampled and monitored on a monthly basis.

1.3 Site Characterization Summary

1.3.1 Remedial Investigation and Feasibility Study

In response to the 1983 ACO, UOP performed a hydrogeologic site investigation in 1984 as part of the Phase I remedial investigation with the results reported to the NJDEP in 1984. Pursuant to a 1984 ACO Addendum, additional remedial investigations were performed. These remedial investigations resulted in four areas, Areas 1 through 4, being designated as areas of environmental concern at the site. These investigations were reported in the "Phase II Investigation" and "Initial Screening of Remedial Action Alternatives", submitted to the NJDEP in 1985.

AlliedSignal was requested by the NJDEP to investigate the potential sources and extent of contamination in the original four identified areas of environmental concern (Areas 1-4), and two additional areas of environmental concern, identified as Areas 1A and 5. AlliedSignal also agreed to conduct feasibility studies to identify potential remedial actions for these defined areas. The additional remedial investigation was presented in the revised 1988 Remedial Investigation

Report. After the remedial investigation was completed, a risk assessment of potential human health and ecological risks associated with the site contaminants was conducted. In November 1990, additional sampling at the site was conducted to further delineate the extent of PCB/CPAH contamination in the southern portion of Area 5 and lead contamination in the northern portion of Area 5.

In response to a seep emanating from the northern bank of Ackerman's Creek, a Seep/Sewer Network Investigation was conducted by AlliedSignal to determine the source of the seep and to delineate the configuration of the storm, process, and sanitary sewer network at the site. In 1991, three monitoring wells were installed on site as part of the proposed interim remedial measure (IRM) for groundwater treatment. Based on the results of these remedial investigations, the risk assessment, supplemental data collection, the Seep/Sewer Network Investigation, and the IRM groundwater data, AlliedSignal conducted a Feasibility Study (FS) and prepared an FS Report entitled "Feasibility Study, UOP Site, East Rutherford, New Jersey; June 1992" which was subsequently approved by the NJDEP in September 1992. The FS Report provided a detailed evaluation of recommended remedial options to address the contaminants within Areas 1, 1A, 2, and 5 of the site.

1.3.2 Supplemental Investigation

During the FS phase, supplemental investigations were initiated in 1993 to complete the delineation of surface soil and shallow groundwater contamination in preparation for remedial action activities. Analytical field screening was conducted for PCBs, cPAH, and VOCs using the Immunoassay Technique, Select Ion Method, and Gas Chromatograph (GC) technique, respectively, on soil samples. Based on these investigations, the areas of potential concern were more specifically delineated. The findings of the investigations were presented in the February 1994 Supplemental Investigation Summary Report.

In summary, the supplemental investigation accomplished the following:

- In the areas identified in the FS report as requiring remediation, soil samples were collected for lead analysis to identify the areal limits of lead impacted surface soil. Area 5 was determined to have surficial lead concentrations above the 600 mg/kg NJDEP Soil Cleanup Criteria.
- Soil samples were collected from Area 2 to further delineate soils contaminated with PCBs. Samples were collected from Areas 1 and 5 to further delineate soils contaminated with PCB and cPAH compounds. The only detected PCB was Aroclor 1248. The seven (7) cPAHs of concern include: Benzo(b)fluoranthene;

Benzo(a)anthracene; Benzo(a)pyrene; Benzo(k)fluoranthene; Chrysene; Dibenzo(a)anthracene and; Indeno(1,2,3-cd)pyrene.

- Soil samples were collected for VOC analysis during the investigation. The investigation identified Areas 1A and 2 as exceeding acceptable threshold concentrations for VOCs in soils.
- The collection and analysis of groundwater samples resulted in identifying areas of shallow groundwater which exceeded the remediation goals of 1 mg/l for individual VOCs; or 10 mg/l for total VOCs.

1.3.3 Risk Assessment

As a component of the RI, human health and ecological risk assessments were conducted to determine the potential risks from the present and potential future use of the UOP site. The results of these risk assessments were reported in a two-volume report entitled "Risk Assessment Report, UOP Site, East Rutherford, New Jersey" Volume 1 Human Health Risks, June 1989 and "Risk Assessment Report, UOP Site, East Rutherford, New Jersey" Volume 2 Ecological Risks, November 1989. Volume I presented the human health risk assessment which concentrated on the possible health effects due to contamination on the Uplands area of the site, and Volume II, which mainly focused on the contamination in the stream channels, presented the ecological risk assessment and human health food chain assessment. The ecological risk assessment for the Uplands portion of the site consisted of a preliminary ecological survey. Results of the risk assessments were incorporated into the October 1993 ROD issued for Areas 1, 1A, 2, and 5 of the site. The major findings of the human health risk assessment that provided a basis for soil excavation were:

- 1) PCB and cPAH contaminated soils presented unacceptable carcinogenic risk levels;
- 2) Concentrations of 1,1,2,2-Tetrachloroethane in some site soils presented carcinogenic risk levels, and
- 3) Concentrations of lead in some site soils exceeded EPA guidelines and NJDEP's general guidance (based on the remedial investigation lead was not a contaminant of concern in Area 2).

The ecological risk assessment indicated no differences between study and reference areas that might be associated with environmental impact. These findings were considered in the soil removal plan implemented in Area 2.

1.4 CERCLA Compliance

1.4.1 Record of Decision

In October 1993, the NJDEP issued the ROD for the UOP Uplands Site, located in the Borough of East Rutherford, Bergen County. The site was evaluated in accordance with the requirements of CERCLA, which was amended by the Superfund Amendments and Reauthorization Act of 1986. The ROD serves as the decision document which presents the factual and legal basis for selecting the remedy that is protective of human health and the environment, complies with Federal and State requirements, and is cost effective.

The ROD granted a waiver of the Toxic Substances Control Act (TSCA) in regard to the disposal of PCB contaminated soil. TSCA, which regulates the management and disposal of PCBs, requires PCB contaminated material to be disposed of as TSCA waste if concentrations exceed 2 mg/kg after treatment. A waiver of this requirement was granted when the ROD established the PCB treatment goal at 10 mg/kg.

The ROD determined the remedial alternatives and the remediation goals for the site contaminants and their media as follows:

- PCB/cPAH Impacted Soil: Excavation and on-site thermal desorption of soils containing total PCB concentrations greater than 25 mg/kg and/or total cPAHs concentrations greater than 29 mg/kg. At a minimum, the ROD required total PCBs to be treated to less than 10 mg/kg and total cPAHs to less than 20 mg/kg. The ROD allowed for successfully treated PCB and cPAH impacted soils to be returned to the excavation as backfill. Soils containing total PCB concentrations between 2 mg/kg and 25 mg/kg and/or total cPAH concentrations of 29 mg/kg and below would be placed beneath the multi-media cap without treatment. Table 1-1 summarizes the remediation goals.

Voluntarily, AlliedSignal conservatively modified the thermal treatment goals for total PCBs to <2 mg/kg and additionally included thermal treatment goals for the seven (7) individual cPAHs listed in Table 1-2 under RAWP Treatment Goals. Additionally, AlliedSignal proposed a modification to place all successfully treated PCB and cPAH soil beneath the cap, instead of using the treated soil to backfill the excavations. In a January 8, 1997 correspondence, NJDEP approved of AlliedSignal's request to place all successfully treated PCB and cPAH soil beneath the cap.

AlliedSignal formally requested NJDEP in a January 6, 1997 correspondence, to approve the modification to Specification 13020 which listed the thermal treatment goals for soils. Since all thermally treated soils would be placed beneath the cap, AlliedSignal requested that only total PCBs less than 10 mg/kg and total cPAHs less than 20 mg/kg and not the seven (7) individual cPAHs be used to determine "Pass" or "Fail" of a treated pile. This proposed modification continued to satisfy the requirements of the ROD and the NJDEP Impact to Groundwater Soil Cleanup Criteria. The NJDEP approved of this modification to Specification 13020 in their January 8, 1997 correspondence.

- VOC Impacted Soil: On-site thermal desorption of soils containing total VOCs greater than or equal to 1,000 mg/kg and 1,1,2,2 - Tetrachloroethane greater than or equal to 21 mg/kg. Thermally treated soils with total VOC concentrations equal to or less than 100 mg/kg would be placed on-site under the multi-media cap.
- Lead Impacted Soil: Placement of soils containing lead greater than 600 mg/kg beneath the multi-media cap.
- VOC Impacted Groundwater: Install shallow groundwater collection trenches for collecting groundwater containing individual VOC concentrations greater than 1 mg/l and total VOC concentrations greater than 10 mg/l. The total volume of groundwater to be collected, treated, and discharged to approved on-site areas was estimated at 5.7 million gallons.

Table 1-1 summarizes the remediation goals for the UOP Uplands Site Remediation.

Table 1-2 summarizes the treatment goals for the UOP Uplands Site Remediation.

TABLE 1-1
SUMMARY OF REMEDIATION GOALS
UOP - AREA 2
REMEDIAL ACTION REPORT

Medium	Compound	Remediation Goals (mg/kg)
Surface Soil	Individual cPAHs	
	Benzo (b) fluoranthene	4*
	Benzo (a) anthracene	4*
	Benzo (k) fluoranthene	4*
	Benzo (a) pyrene	0.66*
Surface and Subsurface Soils	Chrysene	40*
	Dibenzo (a,h) anthracene	0.66*
	Indeno (1,2,3 - cd) pyrene	4*
	Total cPAHs	<29 (Cap) >29 (Thermal)
	Total PCBs	2-25 (Cap) ≥25 (Thermal)
Sewer Sediments	Total VOCs	<1000** (Cap)/≥1000 (Thermal)
	1,1,2,2 - Tetrachloroethane	<21** (Cap) ≥21 (Thermal)
Groundwater	VOC (Total) VOC (Individual)	10 mg/l 1 mg/l

Notes:

VOCs - Volatile Organic Compounds

cPAHs - Carcinogenic Polycyclic Aromatic Hydrocarbons

PCBs - Polychlorinated Biphenyls

(Cap) - Placed under on-site multi-media cap without treatment

(Thermal) - Treated via thermal desorption and placed under on-site multi-media cap

* - Soil was placed beneath cap when any individual cPAH remediation goal was exceeded and Total cPAHs were at or below 29 mg/kg.

** - All VOC impacted soil areas were excavated. VOC soil stockpile characterized as having Total VOCs <1000 mg/kg and 1,1,2,2 - Tetrachloroethane <21 mg/kg were placed beneath the cap.

**TABLE 1-2
SUMMARY OF TREATMENT GOALS
UOP - AREA 2
REMEDIAL ACTION REPORT**

Compound	RAWP Treatment Goals (mg/kg)	Revised Treatment Goals (mg/kg)**
Individual cPAHs		
Benzo (b) fluoranthene	4	N/A*
Benzo (a) anthracene	4	N/A*
Benzo (k) fluoranthene	4	N/A*
Benzo (a) pyrene	0.66	N/A*
Chrysene	20	N/A*
Dibenzo (a,h) anthracene	0.66	N/A*
Indeno (1,2,3 - cd) pyrene	4	N/A*
Total cPAHs	20	<20
Total PCBs	2	<10
Total VOCs	100	100
1,1,2,2 - Tetrachloroethane	21	21

Notes:
VOCs - Volatile Organic Compounds
cPAHs - carcinogenic Polycyclic Aromatic Hydrocarbons
PCBs - Polychlorinated Biphenyls
N/A* - Not Applicable. No Treatment Goals Required for Individual cPAHs, only Total cPAHs
** - Revised Treatment Goals as per January 8, 1997 NJDEP approval letter (Satisfied requirements of the 1993 ROD).

1.5 Requirements for Site Remediation

The UOP Uplands Area 2 Remedial Action Report (RAR) was prepared to document the achievement of remediation goals established in the October 1993 ROD under appropriate and applicable guidelines set forth by New Jersey Administrative Code 7 - Department of Environmental Protection, Subtitle F - Division of Waste Management, Chapter 26E - Technical Requirements for Site Remediation, Subchapter 6 - Remedial Action, and Section 6.6 - Remedial Action Report (N.J.A.C. 7:26E-6.6).

1.5.1 Remedial Action Work Plan

The NJDEP approved Remedial Action Work Plan (RAWP) for the UOP Uplands Site Remediation in East Rutherford, New Jersey was prepared to provide the information required by New Jersey Administrative Code Title 7 - Department of Environmental Protection, Subtitle F - Division of Waste Management, and Chapter 26E - Technical Requirements for Site Remediation, Subchapter 6 - Remedial Action, Section N.J.A.C. 7:26E-6.2(a) Remedial Action Work Plan (RAWP).

The RAWP provided detailed information regarding the remedial action for soils in Areas 1, 1A, 2, and 5 of the UOP Site and outlined the remedial alternatives for these soil areas. The information contained in the RAWP is based upon:

- Phase I investigation (May 1984); and the Phase II Investigation Report (May 1985), prepared by Geraghty & Miller;
- Remedial Investigation Report (RIR) prepared by Geraghty & Miller, (May 1988);
- Available analytical data from sampling reports for on-site soils and groundwater sampling conducted by ENSR in late 1989, early 1990, and late 1990;
- ENSR's Risk Assessment Report, Volume 1 (June 1989) and Volume 2 (November 1989);
- Seep/Sewer Network Investigation Report, prepared by ENSR, (January 1991);
- Preliminary Design Report for the Interim Remedial Measure for Groundwater, prepared by ENSR, (September 1991);

- The Supplemental Investigation Report, prepared by ENSR, (1994);
- Record of Decision signed September 30, 1993;
- Wetlands Characterization Report, prepared by ENSR, (January 1994); and
- Supplemental lead sampling information collected during the summer of 1994.

The RAWP for the UOP site addressed the major findings of the human health risk assessment (Section 1.3.3) and provided engineering and regulatory requirements to complete the soil remediation activities.

1.6 List of Supporting References

The following is a list of supporting documents which serve as references within this Remedial Action Report:

N.J. Department of Environmental Protection. "Administrative Consent Order, UOP Site, East Rutherford, New Jersey, July 1983.

Geraghty & Miller, Inc. "Phase I Investigation Report, UOP Site, East Rutherford, New Jersey", May 1984.

Geraghty & Miller, Inc. "Initial Screening of Remedial Action Alternatives, UOP Site, East Rutherford, New Jersey, July 1985.

Geraghty & Miller, Inc. "Phase II Investigation Report, UOP Site, East Rutherford, New Jersey", May 1985.

N.J. Department of Environmental Protection. "Administrative Consent Order, UOP Site, East Rutherford, New Jersey", May 1986.

Geraghty & Miller, Inc. "Remedial Investigation Report, Areas 1, 1A, 2, and 5, UOP Site East Rutherford, New Jersey" Revision No. 1, Vol. 1 & 2, May 1988.

ENSR Consulting and Engineering. "Risk Assessment Report, UOP Site, East Rutherford, New Jersey" Volume 1 Human Health Risks, June 1989.

ENSR Consulting and Engineering. "Risk Assessment Report, UOP Site, East Rutherford, New Jersey" Volume 2 Ecological Risks, November 1989.

ENSR Consulting and Engineering. "Seep/Sewer Network Investigation Report, UOP Site, East Rutherford, New Jersey", January 1991.

ENSR Consulting and Engineering. "Preliminary Design Report for Interim Remedial Measure for Groundwater, UOP Site, East Rutherford, New Jersey", September 1991.

ENSR Consulting and Engineering. "Feasibility Study, UOP Site, East Rutherford, New Jersey", June 1992.

ENSR Consulting and Engineering. "Supplemental Investigation Work Plan, East Rutherford, New Jersey", September 1992.

U.S. Environmental Protection Agency, and N.J. Department of Environmental Protection and Energy. "Record of Decision, UOP Site, East Rutherford, New Jersey", September 1993.

ENSR Consulting and Engineering. "Supplemental Investigation Report, UOP Site, East Rutherford, New Jersey", February 1994.

ENSR Consulting and Engineering. "Remedial Action Work Plan (RAWP) for Uplands Portion of UOP Superfund Site, East Rutherford, New Jersey", May 1995.

Canonie Technologies, Inc. "Sampling and Analysis Plan/Quality Assurance Project Plan for the Site Closure, UOP Uplands Site, East Rutherford, New Jersey", February 1996.

ENSR Consulting and Engineering. "Data Validation Report", August 20, 1996.

Canonie Technologies. "Results of Sewer Evaluation, UOP Uplands Site, East Rutherford, New Jersey", September 10, 1996.

Canonie Technologies. "Data Validation Inquiry", September 1996.

Canonie Technologies. "Field Quality Assurance Audit Report", September 18, 1996.

ENSR Consulting and Engineering. "Data Validation Report", September 27, 1996.

Canonie Technologies. "Field Quality Assurance Report", December 12, 1996.

ENSR

Canonie Technologies. "Data Validation Inquiry", January 9, 1997.

Agency for Toxic Substances and Disease Registry - Toxicological Profiles on CD-ROM, 1997.

2.0 ENGINEERING AND PERMITTING

Project workplans, drawings, specifications, and regulatory permits for the UOP Uplands Site Remediation were prepared in accordance with the ROD and NJDEP Technical Requirements for Site Remediation - N.J.A.C. 7:26E, to serve as requirements for the site remediation and construction activities.

2.1 Quantity Estimates

Based on the chemical constituent areal boundaries and depths delineated in the Remedial Investigation and subsequent supplemental investigations, the RAWP included an engineering estimate for the Area 2 pre-remedial volume of soil to be excavated and the volume of sediment to be removed from the sewer network.

The soil and sediment volume estimates in the RAWP are as follows for Area 2:

- excavation of a minimum of 5,000 cy of soil,
- removal of less than 150 cy of sediment from the sewer network.

Actual volumes of excavated soil and sediments exceeded these estimates, as presented in Table 4-1.

Note: Actual excavated soil and sediment volume (9,690 cy) presented in Table 4-1 exceeds the estimated excavation volume (5,150 cy). Excavation quantities are summarized in Table 4-1. One of the reasons the actual volume of excavated soils exceeded estimated volumes in the RAWP was AlliedSignal's decision to excavate to the clay soil strata as an added measure of remediation.

2.1.1 Drawings and Specifications

Project drawings and specifications were prepared in conjunction with the RAWP to further establish a scope of work, sequence, and detailed construction specifications. The Project Drawings (C-1 thru C-11), dated April 4, 1995, were approved and certified by a NJ Licensed Professional Engineer (GE 034274) prior to commencement of work. Project Specifications supplemented the Drawings and were prepared in accordance with applicable engineering codes.

2.2 Sampling and Analysis Plan/Quality Assurance Project Plan (SAP/QAPP)

The NJDEP approved Sampling and Analysis Plan/Quality Assurance Project Plan (SAP/QAPP) was prepared in accordance with the U.S. Environmental Protection Agency (EPA) Quality Assurance Management Staff guidance document, "Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans", QAMS 005/80, the NJDEP Technical Requirements for Site Remediation N.J.A.C. 7:26E, and the NJDEP Field Sampling Procedures Manual (FSPM), May 1992.

The SAP/QAPP was prepared to indicate the prime responsibilities and prescribe the necessary procedures to ensure the project is executed in a manner consistent with the RAWP and with approved quality assurance (QA) and quality control (QC) objectives. The SAP/QAPP also identified procedures for generating data that is precise, accurate, representative, complete, and comparable.

The SAP/QAPP was designed to ensure that field sampling procedures, analytical methods, and chemical analytical data are of sufficient quality to meet the intended use. The SAP/QAPP provided guidance for the overall QA/QC for both field and laboratory activities, including data quality assurance and reporting, field sampling and laboratory analysis, field and laboratory auditing programs, and field and laboratory instrument calibration protocol. Table 2-1 displays the sample designation convention used during remediation activities.

2.3 Permits

In accordance with N.J.A.C. 7:26E-6.2(a)8, all required permits were identified and obtained for the UOP Uplands Site Remediation. The list of acquired permits is presented below along with the applicable permit or certificate number and issuing authority in parenthesis:

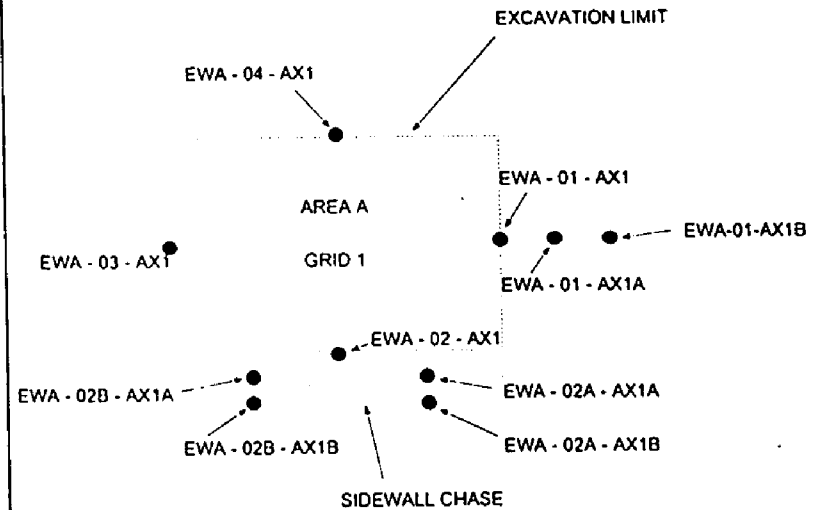
- Army Corps of Engineers Nationwide Permit No. 38 (No. 95-05320-J2 - August 22, 1995)
- Bergen County Soil Conservation Commission Soil Erosion and Sediment Control Plan (No. 95-B5125 - August 17, 1995)
- East Rutherford Borough - Building, Plumbing, Fire Protection (No. 96-054-March 1996)
- East Rutherford Borough - Electrical (No. 96-029 - April 18, 1996)
- Hackensack Meadowland Development Commission Zoning Certification for Site Improvements (CZC-95-038 - June 7, 1995)

-
- NJDEP - Air Pollution Control Permit (BNSR Log NO. 01-96-2164 - October 1, 1996)
 - NJDEP - Air Pollution Control Permit (BNSR Log No. 01-96-2706 - October 15, 1996)
 - NJDEP - Discharge to Groundwater (Permit Equivalent - May 15, 1996)
 - NJDEP - Authorization to Discharge Stormwater (NJ0088323 - August 17, 1995)
 - NJDEP - Stream Encroachment Permit (0212-95-0001.2SE - June 27, 1995)
 - NJDEP - Waterfront Development Permit and Water Quality Certificate (0212-95-0001.3 - June 27, 1995)
 - NJDEP - Monitoring Well Permits (No. 2644-386, 387 and 388 - April 24, 1996)
 - NJDEP - Wetlands Deed Restriction (No. 7008 - April 2, 1996)
 - New Jersey Transit Access Permit (February 19, 1996)

TABLE 2-1
 SAMPLE DESIGNATION CONVENTION
 AAⁿ - CC(F) - D(G)(E)
 UOP - AREA 2
 REMEDIAL ACTION REPORT

AA = Sample Type/Location/Matrix	D = Depth Identifier
IS = In-Situ	AX = 0-2 feet
EB = Excavated Bottom	B = 2-4 feet
ES = Excavated Soil	C = 4-8 feet
EW = Excavated Sidewall	D = > 8 feet
SH = Sewer Sediments	E = 0-8 feet
LS = Leachate (Groundwater) Sump	F = No Special Depth
B = Sample Location By Remediation Area	G = Grid Number
A, B, C, ... = Excavation Areas	1, 2, 3, 4, 5, ...
PC = Pipe Chase	E = Special Identifier
X = No Special Identifier	D = Duplicate
CC = Sidewall Location Identifier	E = Equipment Rinse Blank
01 = East Sidewall	M = Matrix Spike
02 = South Sidewall	N = Matrix Spike Duplicate
03 = West Sidewall	T = Trip Blank
04 = North Sidewall	X = No Special Identifier
00 = No Special Identifier	For Sidewall Samples:
	A = After First Chase
	B = After Second Chase
	C = After Third Chase
	G = After Fourth Chase
	H = After Fifth Chase
	I = After Sixth Chase
F = Unique Alphabetical Sidewall Identifier	
A = First Sidewall Sample Encountered In A Clockwise Rotation	
B = Second Sidewall Sample Encountered In A Clockwise Rotation	

POST- EXCAVATION SAMPLE ILLUSTRATION
 (NOT TO SCALE)



Notes:
 The above post-excavation sample illustration is for illustration purposes only. It does not represent actual samples collected from Area A, Grid 1.

3.0 SITE PREPARATION AND MOBILIZATION

3.1 Site Access and Layout

During initial remediation mobilization activities, site access was provided by a macadam and stone access road on the western side of the Site, from Rt. 17 North, just prior to the Paterson Plank, Rt. 120 exit. A N.J. Transit rail line and active grade crossing with mechanical gates and warning signals permitted access to the eastern portion of the site. The access road provided access to site personnel trailers.

After completion of the clearing and grubbing activities, access at the western side of the Site was closed and relocated to the eastern side of the site, via Murray Hill Parkway, through a chain link double gate entrance.

3.2 Health, Safety, and Environment

3.2.1 Soil Erosion and Sediment Control

The Soil Erosion and Sediment Control Plan (SESCP) for the UOP Uplands Site Remediation was developed in accordance with the Soil Erosion and Sediment Control Act, N.J.S.A. 4:24-42, and N.J.A.C. 2:890-1.1 et seq, and outlined in the "Standards for Soil Erosion and Sediment Control in New Jersey" (April 1987). The SESCO was approved by the Bergen County Soil Conservation District (BCSCD) and issued Permit No. 95-B5125. As a result of AlliedSignal's proposed modification to the areal limits of the Cap and requests from BCSCD, the SESCO was revised.

All soil erosion and sediment control devices such as filter fabric, haybales, and crushed stone were constructed in accordance with the SESCO prior to any ground intrusion or soil movement. Ackerman's Creek was protected from sedimentation by installation of silt fence, hay bales, or imported crushed stone around catchbasins.

Filter fabric was constructed in the following areas: 1) along the northern fringe of the delineated wetlands, 2) along upgradient non-vegetated areas adjacent to Ackerman's Creek, 3) along the perimeter of the North Drainage Ditch and, 4) on top of all catch basin grates downgradient of excavated areas.

Where filter fabric was not applied, haybales and/or clean quarry stone was placed around the perimeter of catch basin grates to prevent soil fines from entering the catch basin and causing sedimentation in Ackerman's Creek.

To suppress airborne dust migration during excavation activities and windy periods, a 500-gallon mobile water sprayer was used to wet dry areas of the Site that were conducive to ambient dust problems.

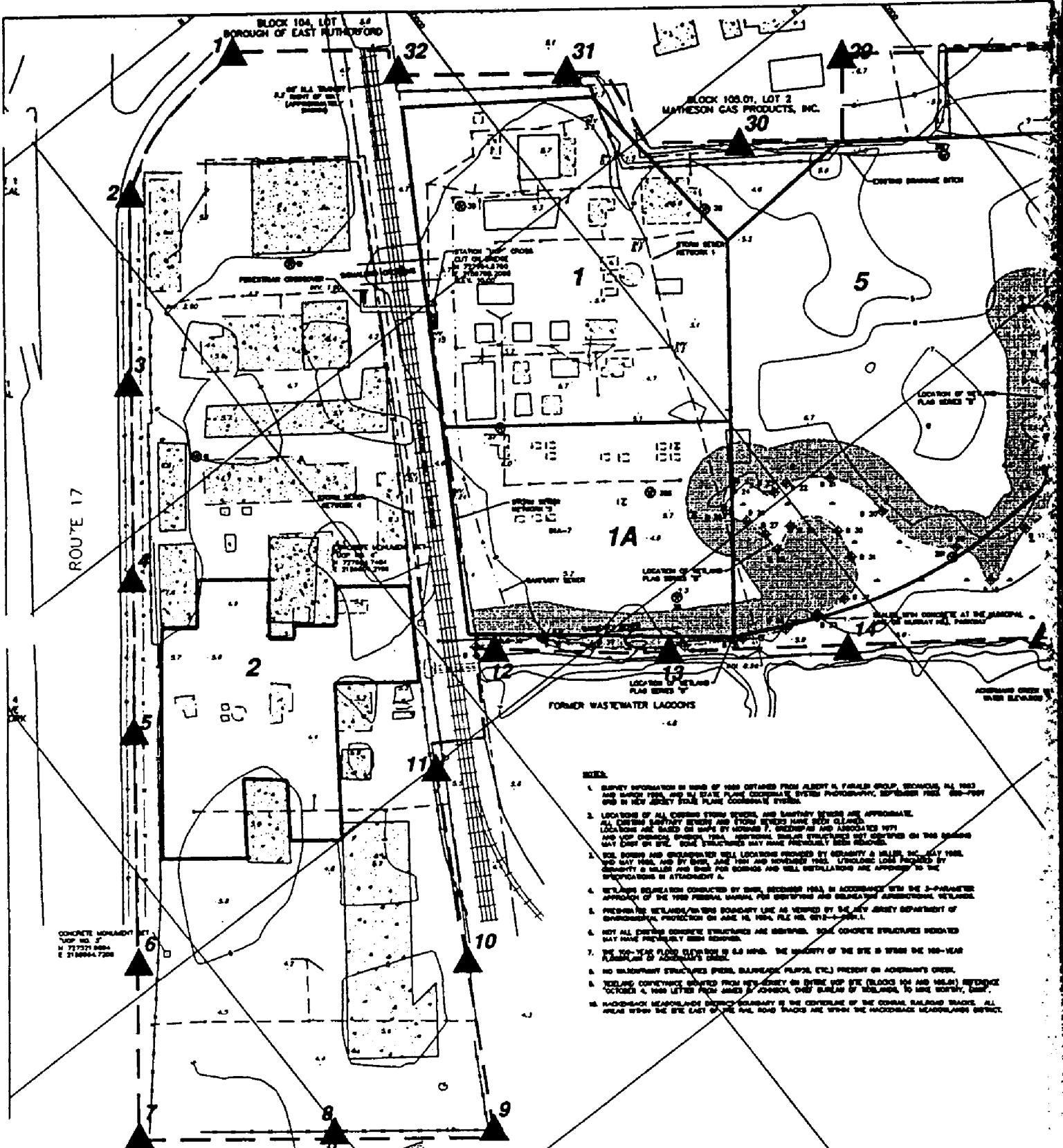
In preparation for soil remedial activities, clearing and grubbing was necessary in Areas 1, 1A, 2, and 5. Approximately 10 vegetated acres were cleared of surface refuse, grubbed of trees, shrubs, and dense phragmites. All refuse was placed beneath the multi-media low permeability cap. Grubbed trees, shrubs, and phragmites were shredded and the wood chips spread within the Cap perimeter.

3.2.2 Air Monitoring

In accordance with the Site specific Health and Safety Plan (HASP - Canonie, February 1996) ambient air monitoring was conducted by the Site Health and Safety Officer (SHSO) to determine air quality during all phases of remediation and construction. The following portable ambient air monitoring instruments were utilized during Site activities:

- MiniRam: airborne particulate monitor,
- MSA-361 Combustible Gas Indicator: measures O₂ concentration, lower explosive limit, and hydrogen sulfide concentration,
- 11.2 eV OVM: Organic Vapor Monitor for total volatile organics,
- 10.2 eV Photovac Snapshot: portable gas chromatograph for measuring individual volatile organics,
- Gilian Pump: portable air pump for personnel samples.

Real-time baseline ambient air monitoring was performed by the SHSO using the 10.2 eV Photovac Snapshot and the MiniRam. Readings were taken at the Site boundary three times daily during the first three days of mobilization to establish baseline air readings. The monitoring locations were spaced 100 feet apart along the downwind Site boundaries and 250 feet apart along the upwind Site boundaries. A total of 32 baseline ambient air monitoring stations were established. Figure 3-1 shows the locations of the baseline air monitoring points.



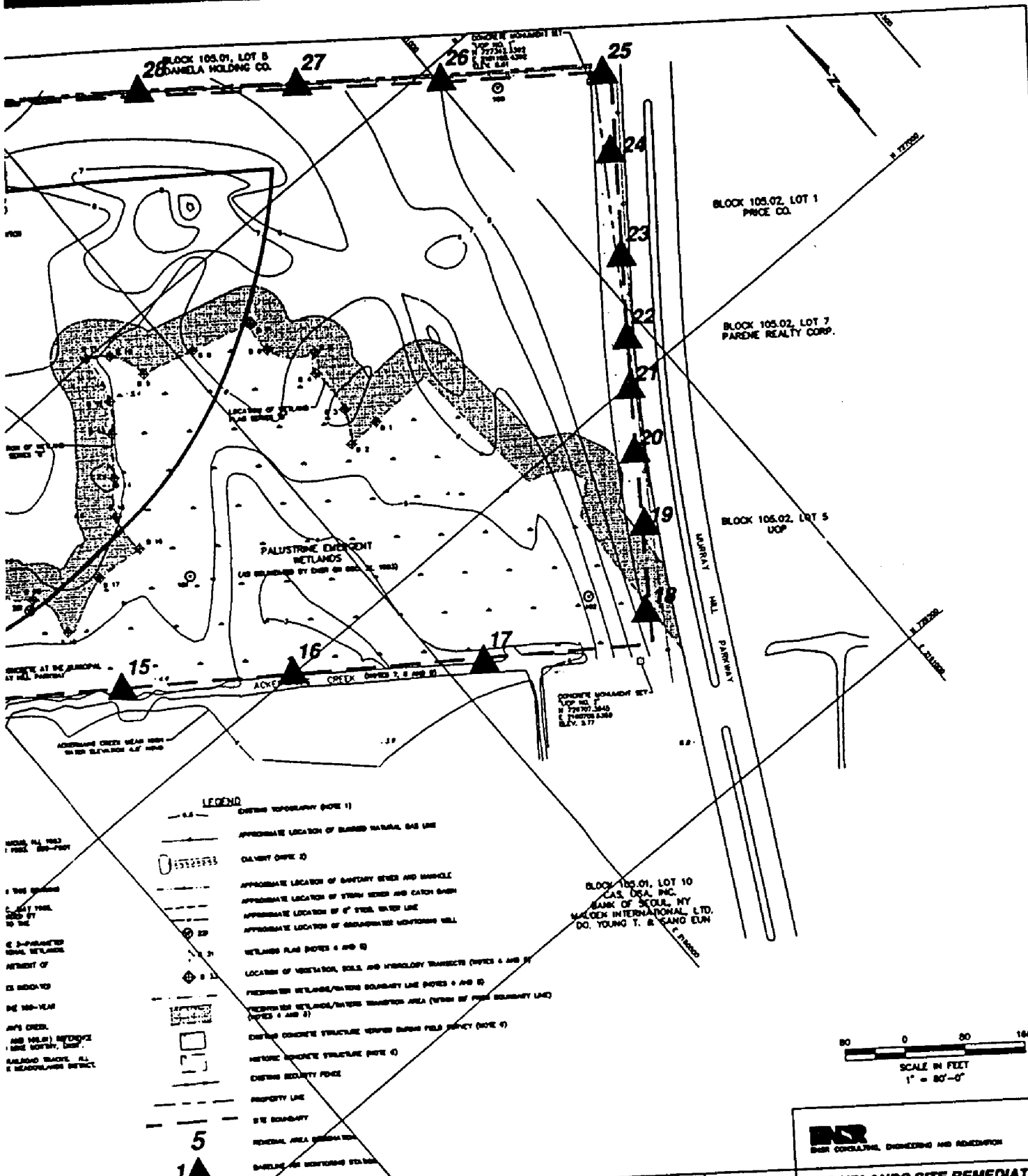
- NOTES:**
1. SURVEY INFORMATION IN THIS PLAN OBTAINED FROM ALBERT A. FARBER GROUP, BRONXVILLE, N.Y. 10883 AND BROWN PIERCE AND JENCKES PLANNING ARCHITECTURE ENGINEERS PHOTOGRAPHY, SEPTEMBER 1982. 500-POY 010 IN NEW JERSEY STATE PLANNING COMMISSION'S FILES.
 2. LOCATIONS OF ALL CONCRETE STORM SEWERS AND SANITARY SEWERS ARE APPROXIMATE. ALL EXISTING SANITARY SEWERS AND STORM SEWERS HAVE BEEN GLEARED. LOCATIONS ARE BASED ON MAPS BY MOHRING P. GREENSPAN AND ASSOCIATES 1979 AND NOT CURRENT SURVEYS. OTHER SANITARY SEWERS OR STRUCTURES NOT SHOWN ON THIS DRAWING MAY EXIST ON SITE. SOME STRUCTURES MAY HAVE PREVIOUSLY BEEN REMOVED.
 3. SOLE SOURCE AND OVERFLOWER WELL LOCATIONS PROVIDED BY DEWARTY & MILLER, INC. MAY 1982. THE MAY 1982 AND BY OTHER JUNE 1981 AND NOVEMBER 1982. UNUSUAL LOSS PROVIDED BY DEWARTY & MILLER AND SOLE FOR SOILS AND WELL INSTALLATIONS ARE APPROXIMATE TO THE SPECIFICATIONS IN ATTACHMENT A.
 4. SETBACKS RESEARCH CONDUCTED BY DMR, RECORDER 1984, IN ACCORDANCE WITH THE 3-PARAMETER APPROACH OF THE 1982 FEDERAL MANUAL FOR DETERMINING AND REGULATING AEROSOL RELEASES.
 5. PREVIOUS SETBACKS/STOPS BOUNDARY LINE AS VERIFIED BY THE NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION ON APRIL 16, 1984, FILE NO. 8212-1-1000.1.
 6. NOT ALL EXISTING CONCRETE STRUCTURES ARE SHOWN. SOME CONCRETE STRUCTURES REMOVED MAY HAVE PREVIOUSLY BEEN REMOVED.
 7. THE 100-YEAR FLOOD ELEVATION IS 6.8' ABOVE THE SURFACE OF THE SITE IS WITHIN THE 100-YEAR FLOODPLAIN OF ADEQUATE'S CREEK.
 8. NO SANITARY STRUCTURES (PUMP, SANITARY PUMPS, ETC.) PRESENT ON ADEQUATE'S CREEK.
 9. YELLOW CONVEYANCE GRANTED FROM NEW JERSEY ON SURFACE TOP OF SITE (BLOCKS 104 AND 105) REFERENCE TO ORDER A 1988 LETTER FROM JAMES J. COOKSON, CHIEF CLERK OF THE BOARD, TO THE BOARD, DEPT. OF ENVIRONMENTAL PROTECTION.
 10. BACKLASH RESEARCH/STUDY DISTRICT BOUNDARY IS THE CENTERLINE OF THE CONCRETE RAILROAD TRACKS. ALL AREAS WITHIN THE SITE EAST OF THE RAILROAD TRACKS ARE WITHIN THE BACKLASH RESEARCH/STUDY DISTRICT.

CONCRETE MONUMENT SET
 MAP NO. 3
 H 772731-1884
 E 216644-728

NOTICE

THIS DRAWING, THE PROPERTY OF ALLEGIANCE, IS PROVIDED SUBJECT TO RETURN ON DEMAND AND THE CONDITION THAT THE APPLICANT AND RELEVANT ENGINEERING FIRM SHALL NOT BE ENCOURAGED TO USE AND THE DRAWING SHALL NOT BE REPRODUCED OR COPIED IN WHOLE OR IN PART EXCEPT AS PREVIOUSLY APPROVED IN WRITING. ANY PERSON WHO MAY REPRODUCE OR OTHERWISE THIS DRAWING WILL BE HELD STRICTLY LIABLE FOR ANY VIOLATION THEREOF. WILLIAM O. WELLS, INC.

NO.	REVISION	BY	APPR.	APPR.	APPR.	APPR.	DATE	NO.	REVISION	BY	APPR.	APPR.	APPR.



BY	APPR.	APPR.	APPR.	APPR.	DATE	REFERENCE	DWG. NO.

UOP UPLANDS SITE REMEDIATION
AREA 2 REMEDIAL ACTION REPORT
BASELINE AIR MONITORING LOCATIONS

11/20/07

FIGURE 3-1

3.2.3 Storm Water Management

Storm water that ponded on the thermal treatment pad and within diked impacted soil stockpiles was collected, treated, and discharged in accordance with the NJDEP Discharge to Groundwater Permit Equivalent which was issued for this project.

3.2.4 Well Abandonment

Monitoring Wells

In Area 2, a total of fourteen (14) single-cased, unconsolidated monitoring wells were abandoned in accordance with N.J.A.C., 7:9-9.0 Sealing of Abandoned Wells.

Attempts were made to remove the inner well casing and screen at each location. If the inner casing and screen could not be removed, they were left in-place. Each well was sealed with a mixture of a sterilized cement/bentonite grout and city water. The grout was discharged at the bottom of the well via tremmie pipe. The grout was allowed to settle for 24-hours. After the 24-hour settling period expired, the remaining space at the top of the grouted well was filled with concrete forming a concrete slab flush with grade, 6-inches thick and 3-feet in diameter.

Production Well

Former Production well No. 1, abandoned circa 1981, located west of the NJ Transit and ConRail Right of Way and northeast of Area 2, was uncovered during process sewer excavation activities. The concrete seal around its outer casing was damaged by heavy machinery. Production well No. 1 was re-sealed in accordance with N.J.A.C. 7:9-9.0 - Sealing of Abandoned Wells.

Well Abandonment Forms are located in Appendix F.

4.0 FINDINGS/REMEDIAL ACTION

4.1 Work Sequence

Remediation and construction work in Area 2 was sequenced in the following phases:

- clearing and grubbing,
- in-situ soil sampling,
- monitoring well abandonment,
- initiation of soil excavation in subareas A and B in preparation for NJDOT twin 48-inch storm sewer installation,
- backfilling of remediated soil excavation areas with clean off-site fill immediately after excavating,
- excavation of storm sewer network 5 and sediments,
- installation of NJDOT twin 48-inch storm sewer,
- continued soil excavation in subareas A, B, and C along with post-excavation sampling,
- excavation of process/sanitary sewers and select storm sewers,
- continued backfilling of excavations with clean off-site fill,
- cleaning of existing storm sewers,
- installation of groundwater collection trenches, and
- surface grading and restoration of Area 2 with clean off-site fill

An activity chronology of the remediation and construction activities of Area 2 is located in Appendix E.

4.2 Soil

Area 2 soil excavation operations were completed in accordance with the requirements of the Record of Decision, the RAWP, Construction Drawings, and Technical Specifications. A total of 9,690 cubic yards (cy) (in-place volume) of soil and sediment was excavated from Area 2 during remediation of PCB/cPAH soils (9,153 cy) and sewer sediments (200 cy), and VOC impacted soils (337 cy). The limits of excavation were determined by the clean-up criteria established by the ROD, RAWP, and the SAP. Area 2 was divided into subareas A, B, and C (Figure 4-1) to segregate soil areas into similar chemical constituent groups. Subareas A and C contained PCB/cPAH impacted soils. During the Remedial Investigation, Subarea C was designated as a subarea with higher PCB/cPAH concentrations requiring thermal treatment. Subarea B contained VOC impacted soils as determined by the remedial investigation. Excavation of contaminated soils continued in each of the Area 2 subareas A, B, and C until one of the following occurred:

- post-excavation samples indicated the remediation goals were achieved,
- concrete foundations greater than two feet below grade were encountered by the excavation,
- the site property line was encountered,
- the NJ Transit/ConRail R-O-W was encountered, or
- a utility easement was in close proximity to excavation activities.

Excavation quantities are summarized in Table 4-1. One of the reasons the actual volume of excavated soils exceeded estimated volumes in the RAWP was AlliedSignal's decision to excavate to the clay soil strata as an added measure of remediation.

4.2.1 PCB/cPAH

Soils impacted with PCB/cPAH concentrations above remediation goals were excavated to 2 feet below grade and to the areal limits shown on Drawing 2, located in Appendix C. A total of 2,993 cy of soil with PCB/cPAH concentrations above remediation goals, but below thermal treatment goals was excavated to a depth of 2 feet below grade and transported to the on-site multi-media cap. A total of 2,156 cy of soil with PCB/cPAH concentrations above thermal treatment goals was excavated and stockpiled for subsequent treatment via the on-site low temperature thermal desorption unit.

TABLE 4-1
SUMMARY OF EXCAVATION QUANTITIES
UOP - AREA 2
REMEDIAL ACTION REPORT

Impacted Soil	VOLUMES (CY)*				Total	
	Excavated Soil	Process/Sanitary Sewer Excavation	Storm Sewer Excavation	Storm Sewer Cleaning/Flushing Sediments		
PCB/cPAH	5149 (1)	2569 (2)	1435 (3)	200 (4)	9353	
VOC	337(5)	0	0	0	337	
Notes:					Actual Total Excavated Material	9,690
1. 2,156 cy characterized as requiring thermal treatment 2. 1,000 cy characterized as requiring thermal treatment 3. 600 cy characterized as requiring thermal treatment 4. All sediment characterized as requiring thermal treatment 5. 75 cy characterized by bottom post-excavation sample as requiring thermal treatment * - Based on in-place volume Excavated soil volume includes the soil characterized by the RI samples, in-situ grid samples, and post-excavation samples Process/sanitary sewer excavation volume includes the process pipe, sewer sediments, manhole(s), and surrounding and underlying (to clay layer) soil. Storm sewer cleaning/flushing volume includes the sediment removed from the storm sewer Storm sewer excavation volume includes the cleaned storm pipe, catch basin(s), and surrounding and underlying (to clay layer) soil					Estimated Excavation Quantity Per RAWP	5,150

R:\common\0186-050\T4-1RAR1.wk4

4.2.2 VOC

Area 2 soils impacted with VOC concentrations above remediation goals were excavated to 4 feet below grade and to the areal limits shown on Drawing 2, located in Appendix C. A total of 262 cy of soil with VOC concentrations above remediation goals, but below thermal treatment goals was excavated and transported to the on-site multi-media cap. A total of 75 cy of soil with VOC concentrations above thermal treatment goals was excavated and stockpiled for subsequent treatment via the on-site low temperature thermal desorption unit.

4.2.3 Soil Analytical Results

In accordance with the SAP/QAPP field Standard Operating Procedures (SOPs), in-situ soil samples were collected prior to excavation activities to chemically characterize 50' wide x 50' long x 2' deep soil grids. All soil samples were sent off-site for analysis by an NJDEP Certified Laboratory. The results of in-situ soil sample analytical results are summarized in Appendix A - Table 1.

In accordance with the SAP/QAPP field SOPs, post-excavation soil samples were collected along each of the excavated sidewalls. Sidewall sampling was limited by the same factors which limited the soil excavation, namely, post-excavation sample results below the remediation goal, concrete foundations greater than 2 feet below grade, the site property line, or NJ Transit and ConRail Right of Way. The results of post-excavation soil sample analytical results are summarized in Appendix A - Table 2.

Drawing 2 in Appendix C shows the soil sample locations and final limits of excavation. For clarity purposes, only the final post-excavation soil sample locations are shown on Drawing 2.

4.3 Sewer Network

A sewer evaluation consisting of a field survey and findings report was conducted on the storm and process sewers in Area 2. The results of the sewer evaluation were reported in "Results of Sewer Evaluation, UOP Uplands Site, East Rutherford, New Jersey" (Canonie Technologies, September 1996). The sewer evaluation provided information that served as a basis for developing a scope of work and strategy to clean and/or flush the sewers, rehabilitate select storm sewers that were designated to remain in service, and to remove and abandon all process sewers and non-usable storm sewers. Inspection activities included field notes of catch basins and sewer pipe conditions and dimensions.

Figure 4-1 shows the location of remedial subareas A, B, and C within Area 2.

BLOCK 104, LOT 1
BOROUGH OF EAST RUTHERFORD

BLOCK 89, LOT 1
OCSERET MEDICAL

BLOCK 91, LOT 1
OCSERET MEDICAL

BLOCK 93, LOT 4
FEDERAL RESERVE
BANK OF NEW YORK

ROUTE 17

CONCRETE MONUMENT SET
TOP NO. 3
777571 8804
714884-728

NOTES

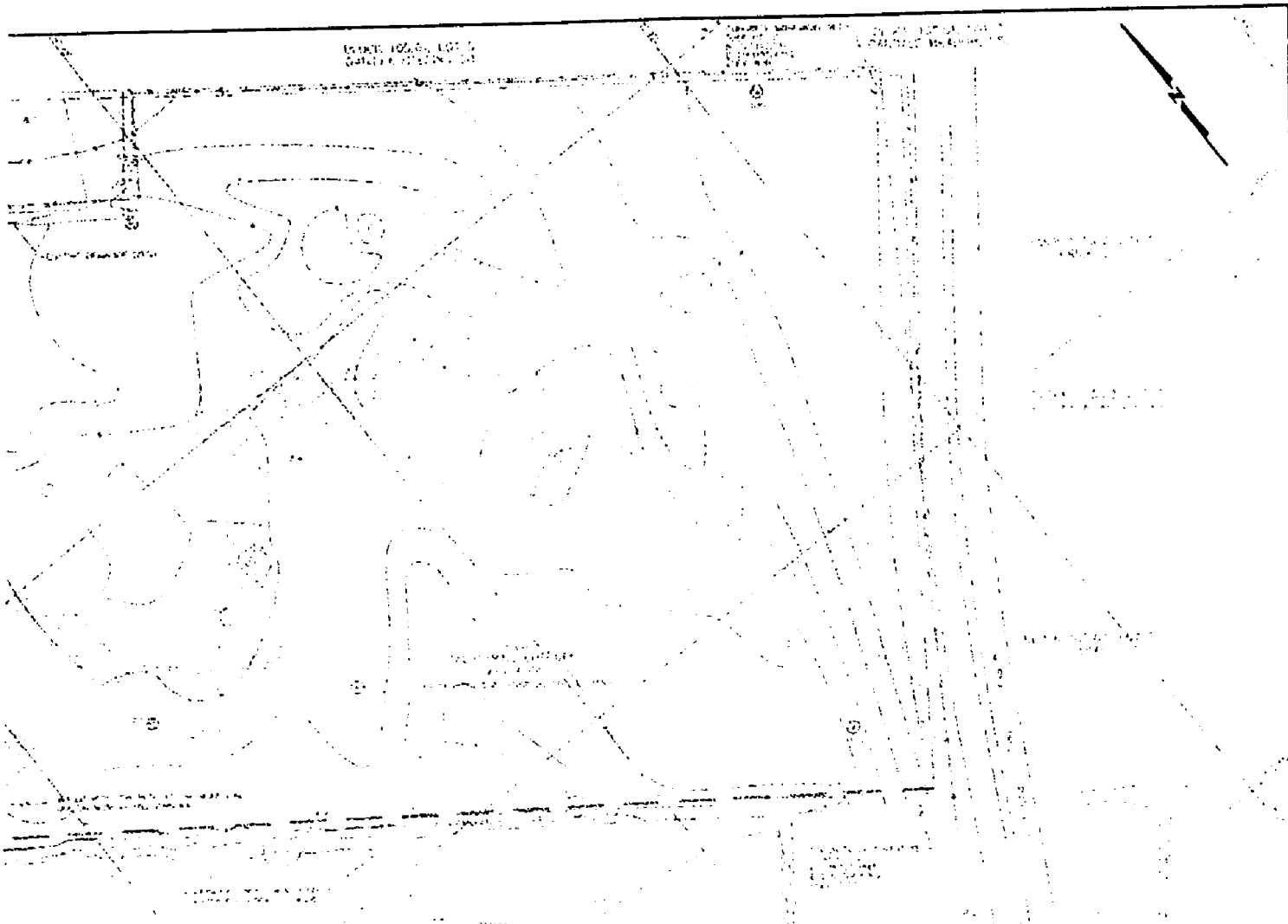
1. SURVEY INFORMATION IS BASED ON INFO OBTAINED FROM ALBERT S. FARMER GROUP, RECORDS SA AND SURCH 1950, AND BY STATE PLANNING COMMISSION (STATE PHOTOGRAPHY, SEPTEMBER 1951) AND BY NEW JERSEY STATE PLANNING COMMISSION SYSTEM.
2. LOCATIONS OF ALL EXISTING STORM SEWERS AND SANITARY SEWERS ARE APPROXIMATE. ALL EXISTING SANITARY SEWERS AND STORM SEWERS HAVE BEEN CLEANED. LOCATIONS ARE BASED ON MAPS BY HENNING & ASSOCIATES 1977 AND NEW JERSEY GROUP, 1950. STRUCTURAL TRUSS STRUCTURES NOT SHOWN ON THIS DRAWING MAY EXIST ON SITE. SOME STRUCTURES MAY HAVE PREVIOUSLY BEEN REMOVED.
3. SEE NOTES AND SPECIFICATIONS FOR LOCATIONS PROVIDED BY HENNING & ASSOCIATES, INC. MAY 1977 AND MAY 1980, AND BY CH2M, INC. 1981 AND SEPTEMBER 1982.
4. NOT ALL EXISTING CONCRETE STRUCTURES ARE REMOVED. SOME CONCRETE STRUCTURES REMOVED MAY HAVE PREVIOUSLY BEEN REMOVED.
5. THE 10'-0" HIGH FLOOD ELEVATION IS 64.0' MSL. THE MAJORITY OF THE SITE IS WITHIN THE 100-YEAR FLOODPLAIN OF ADEQUATELY OBEY.
6. NO SANITARY STRUCTURES (PUMP, BALANCE, PUMPS, ETC.) PRESENT ON ADEQUATELY OBEY.
7. EASEMENT CONVEYANCE GRANTED FROM NEW JERSEY TO STATE ASP SITE (BLOCKS 94 AND 95) BY OCTOBER 4, 1980 LETTER FROM JAMES B. JOHNSON, CHIEF BUREAU OF ESTATE, TO STATE OF NEW JERSEY.
8. BACKSLOPE MEADOWLANDS DISTRICT BOUNDARY IS THE CENTERLINE OF THE CONRAIL RAILROAD TRACKS AREAS WITHIN THE SITE EAST OF THE RAIL ROAD TRACKS AND WITHIN THE BACKSLOPE MEADOWLANDS.

NOTICE

THIS DRAWING, THE PROPERTY OF ALLESTREE, IS LOANED SUBJECT TO RETURN TO SOURCE AND THE OWNER OF THE INFORMATION AND TECHNOLOGY THEREON SHALL NOT BE REPRODUCED OR USED IN WHOLE OR IN PART EXCEPT AS PREVIOUSLY AUTHORIZED IN WRITING BY THE OWNER WHO MAY RECORD OR REPRODUCE THIS DESIGN WILL BE HELD STRICTLY LIABLE FOR ANY VIOLATION WHETHER WILLFUL OR NEGLIGENCE.

NO.	REVISION	BY	APPR.	APPR.	APPR.	APPR.	DATE	NO.	REVISION	BY	APPR.	APPR.	APPR.

ESTABLISHED 1928
DATE: 11/27/97

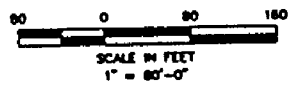


LEGEND

- EXISTING TOPOGRAPHY (NOTE 1)
- APPROXIMATE LOCATION OF BURNED NATURAL GAS LINE
- DRAINAGE (NOTE 2)
- APPROXIMATE LOCATION OF SANITARY SEWER AND MANHOLE
- APPROXIMATE LOCATION OF STORM SEWER AND CATCH BASIN
- APPROXIMATE LOCATION OF 6" STEEL WATER LINE
- EXISTING LOCATION OF GROUNDWATER MONITORING WELL
- FRESHWATER WETLANDS/WATERS BOUNDARY LINE
- FRESHWATER WETLANDS/WATERS TRANSITION AREA (WITHIN 50' FROM BOUNDARY LINE)
- EXISTING CONCRETE STRUCTURE VERIFIED DURING FIELD SURVEY (NOTE 3)
- HISTORIC CONCRETE STRUCTURE (NOTE 4)
- EXISTING SECURITY FENCE
- PROPERTY LINE
- SITE BOUNDARY
- REMEDIAL AREA BOUNDARY
- REMEDIAL SUBAREAS

B. FIELD GROUP RECORDS IN THIS REPORT ARE APPROXIMATE. THE INFORMATION REPORTED WILL BE 90-100% ACCURATE. THESE ARE APPROXIMATE. NO ASSURANCE IS GIVEN. CHECKS MAY BE REQUIRED BY THE BUREAU OF REVENUE. SECURITY & SELLER, INC. MAY HAVE. THE CONCRETE STRUCTURES INDICATED OF THE SITE IS WITHIN THE 100-YEAR C.J. PRESENT OR ACCORDANTY ORDER. (UOP SITE (BLOCK 104 AND 105.0) REFERENCE PLAN OF ISLANDS TO MAKE SURVEY. SURVEY. PLANE OF THE CORNER, BALCONY TRACKS. ALL WITHIN THE 100-YEAR WETLANDS BOUNDARY.

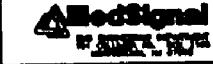
2
A,B,C



ENR
ENGINEERING CONSULTANTS, DESIGNERS AND ROADWORKERS

BY	APPR.	APPR.	APPR.	APPR.	DATE	REFERENCE	DRG. NO.

UOP UPLANDS SITE REMEDIATION
AREA 2 REMEDIAL ACTION REPORT
LOCATIONS OF SUBAREAS A, B & C



11/27/97
11/27/97
FIGURE 4-1

4.3.1 Process and Sanitary Sewer

All process sewers and sanitary sewers located within Area 2, including the pipe, sediments, masonry manholes and cleanouts contained within these systems were excavated. All sewer pipes, manholes, and cleanouts were placed in the cap area. Based on the analytical results, sewer sediments were directly placed in the cap area or stockpiled for thermal treatment. Process sewers varied in size from 4-inches to 18-inches in diameter, and were constructed of terra cotta (clay). Due to the fragile nature of the process sewers it was not feasible to flush the process sewers with high pressure water as planned. A total of 1,942 lf of process sewer and 470 lf of sanitary sewer within Area 2 was excavated, removed, and placed in the cap area.

In addition to the sewer pipe, sewer sediments, and appurtenances, the surrounding and underlying soil were excavated and removed down to the confining clay layer (7'-8' below grade). Although this additional soil removal was not mandated by the ROD, it was removed to provide additional assurance of source removal. A total of 2,134 cy of process sewer sediment and soil was excavated, along with 435 cy of sanitary sewer sediment and soil. Sewer fragments and manholes/cleanouts were screened from the sediments and placed within the confines of the multi-media cap area. Sediments removed from the sewer fragments and manholes/cleanouts were stockpiled and characterized.

Drawing 3, in Appendix C, shows the location of onsite process and sanitary sewers that were remediated within Area 2.

4.3.2 Storm Sewer

Storm sewer networks 4 and 5 were visually inspected for the purpose of determining which sewer sections were functional, and which sewer sections were to be excavated. Removing a storm sewer consisted of removing the sewer pipe, catch basins/manholes, sediments, and the surrounding and underlying soil (to the confining clay layer). Based on the analytical results, sewer sediments were directly placed in the cap area or stockpiled for thermal treatment. Sewer pipeline sections and catch basins/manholes were screened from the sediments and placed within the confines of the multi-media cap. Sediments removed from the sewer pipeline sections and catch basins/manholes were stockpiled and characterized.

The site storm sewer networks are connected directly to Ackerman's Creek. During high tide the storm sewer systems are at capacity. Therefore, storm sewer cleaning was scheduled to occur during low tide of Ackerman's Creek. Prior to the cleaning or removing of a storm sewer, rubber inflatable plugs were inserted in the storm sewer at the discharge end to Ackerman's Creek to prevent sedimentation discharge to the Creek. The storm sewer cleaning/flushing was

completed using a 2,000 psi water jet which broke up accumulation of sediments and debris inside the pipelines. Flushing of storm sewers started at the most upgradient manhole/catch basin and proceeded downgradient. Approximately, 2,920 lf of storm sewer was cleaned/flushed in Area 2.

By utilizing plugs strategically located at various points within the storm sewers, all flush water, sediment, and debris accumulated from cleaning was contained in a downstream manhole/catch basin. A 3,000 gallon high pressure vacuum truck was used to collect the flush water, sediment and debris. The flush water was decanted from the sediments and pumped to the on-site WTP for treatment. Sediments were stockpiled and characterized.

A total of 200 cy of sediment was generated during the cleaning of the storm sewer system in Area 2. Approximately 1,058 lf of storm sewer was excavated along with the sediments and soil underlying and surrounding the sewer pipelines and structures. The volume of excavated sewer sediments and soil totalled 1,435 cy. Drawing 3, in Appendix C, shows the location of remediated storm sewers within Area 2.

4.3.3 NJDOT Storm Sewer Replacement

To improve site drainage in Area 2, Storm Sewer Network 5, which was excavated along with its sediments and the underlying soil down to the confining clay layer (7'-8' below grade). Storm Sewer Network 5 collects runoff from Rt. 17 and Area 2 and discharges into Ackerman's Creek. However, the existing pipe was found to be severely damaged, filled with sediment, and inoperable.

Storm Sewer Network 5 was replaced with approximately 800 lf of dual 48-inch Class V reinforced concrete pipe along with two concrete catch basins and four manholes. The new system more than doubles the capacity of the previous single 36-inch line.

To further improve drainage, NJDOT cleaned/flushed an existing 36" X 40" pipe beneath Route 17. An inflatable rubber plug was inserted in the downgradient catch basin (catch basin B) prior to flushing to prevent the discharge of sediments to Ackerman's Creek. The piping was flushed with a high pressure water jet, and the flushwater and sediments were collected via vacuum truck and subsequently decanted and treated in the on-site WTP. Sediments were stockpiled and characterized for either thermal treatment or placement under the multi-media cap.

4.3.4 Sewer Sediment/Soil Analytical Results

Sewer sediments and the surrounding soil removed during the sewer excavation activities were stockpiled and sampled in accordance with the SAP/QAPP, Section 4.2.1.2 - Materials Management, and the SAP/QAPP field SOPs. Sewer sediment/soil analytical summary results are tabulated in Appendix A - Table 3.

4.4 Backfill Operations, Source and Quality

Backfilling operations within remediated areas were performed concurrently with excavation activities. As contaminated areas were excavated, certified clean imported fill was placed as backfill. Backfilling to original grade immediately after excavating quickly restored the site and re-established prior drainage patterns.

Specification No. 0220 called for backfill with maximum particle sizes of 6-inches and no more than 20% passing the No. 200 sieve. The 6-inch maximum particle size specification was modified by AlliedSignal to allow the use of common fill that consisted of boulders, reddish brown coarse to fine gravel and coarse to fine sand with little silt. Backfill consistently met the No. 200 sieve analysis specification. Additionally, a 4-inch lift of recycled concrete was used for final grading purposes. Documentation from each backfill supplier was provided certifying that the quality of the fill was virgin, uncontaminated, and identified the source of the fill.

Approximately 12,000 cy of clean select fill material was imported from offsite borrow sources and utilized in Area 2 for backfilling excavations, grading, and restoration. Documentation as to the source, description, environmental quality, and other data of each type of imported fill is included in Appendix G.

4.5 Groundwater

4.5.1 Temporary Collection Trenches

A total of 270 lf of groundwater collection trenches, along with four sumps, four pumps, and underground piping were constructed in Area 2 to extract, collect and convey groundwater from the Class III-B aquifer to the WTP. The groundwater collection system in Area 2 is shown on Drawing 1 in Appendix C. Each collection trench was excavated down to the top of the confining clay layer (7'-8' below grade). The bottom of the trench was backfilled with 6-inches of clean off-site bedding sand. A 4-inch diameter perforated polyethylene pipe was placed on top of the bedding material and covered with a filter sock to filter out the fines. The pipe was pitched to allow groundwater to flow to a 12-inch diameter corrugated plastic standpipe installed to function

as a collection sump. Each sump was equipped with an electrical submersible pump capable of conveying groundwater to the WTP via PVC piping. Each trench was backfilled with No. 3 size stone.

The excavated soil from the collection trenches was stockpiled and sampled in accordance with the SAP/QAPP, Section 4.2.1.2 - Materials Management, and the SAP/QAPP field SOPs.

4.5.2 Water Treatment

A temporary 40,000-gallon storage capacity on-site Water Treatment Plant (WTP), located in Area 1, was constructed to manage and treat on-site groundwater, stormwater, and other liquids during remedial activities. Liquids were transported to the WTP via submersible and centrifugal pumps through Schedule 80 Poly Vinyl Chloride (PVC) piping at a rate of approximately 40 gallons per minute (gpm). The WTP collected, treated, and discharged liquids to select on-site areas.

A Discharge to Groundwater (DGW) Permit Equivalent was obtained from the NJDEP, which authorized the discharge of all treated liquids on-site under the established permit limits. The DGW permit also established guidelines for the WTP operations and effluent discharge limits. The WTP effluent was sampled every month in accordance with SAP/QAPP Section 4.2.2.2 - Effluent Sampling. A Effluent Monitoring Report was submitted by the Contractor to the NJDEP once a month which included the WTP effluent results. Each Effluent Monitoring Report was signed by an N₂ licensed operator (N₂ Registry No. 0015330). Additionally, downgradient monitoring well(s) from the WTP effluent discharge area were sampled quarterly to compare groundwater analytical results to the treated effluent analytical results.

4.5.3 Groundwater Analytical Results

Upon start-up of the collection system, the groundwater was sampled at one-month intervals from selected collection sumps. Samples collected from Area 2 temporary groundwater collection trenches were sampled in accordance with SAP/QAPP, Section 4.2.2.1 - Liquids Management, and the SAP/QAPP field SOPs. Samples were sent off-site for analysis by Intertek Testing Services (NJDEP Laboratory Certification No. 82716). Groundwater summary analytical results are tabulated in Appendix A - Table 4. Groundwater VOC trends are included in Appendix A showing the concentration-time correlation for Area 2.

As part of an engineering evaluation to determine whether additional future groundwater remediation would be warranted for Area 2, the groundwater analytical data was compared to the NJDEP Surface Water Quality Criteria for Ackerman's Creek and Berry's Creek, which are

the receptors. As noted previously, the shallow groundwater within Area 2 is hydraulically connected to these saline receptors. Five rounds of groundwater analytical data, from select sumps in Area 2, were compared to the NJDEP Surface Water Quality Criteria. All detected VOCs are within acceptable limits, and most continue to exhibit a decreasing trend in concentration.

The groundwater analytical results were compared to the NJDEP Chronic Aquatic Saltwater Surface Water Quality Criteria. If a Chronic Aquatic Saltwater Surface Water Quality Criterion was not listed for a particular compound, the Chronic Human Health Surface Water Quality Criterion was used as a measure of comparison for evaluation. The NJDEP Class III-B determination letter and Surface Water Quality Criteria are provided in Appendix B.

All detected VOC and Semi-VOC compounds in Area 2 groundwater were below NJDEP Surface Water Quality Criteria.

Lead was detected above NJDEP Chronic Aquatic Saltwater Surface Water Quality Criterion (8.1 ug/l) in groundwater collection trench No. 17 in one sampling round, at a concentration of 10.8 ug/l (sampled 7/23/97 and labelled LS-1(17)-02). Subsequent sampling of collection trench No. 17 on 8/27/97 and 9/26/97 showed no detection of lead in groundwater samples LS-1(17)-03 and LS-1(17)-04, respectively. The detection of lead in groundwater sample LS-1(17)-02 is likely an artifact of total suspended solids because the sample was not field filtered and the insolubility of lead in water.

Select Aroclors (PCBs) were detected in all Area 2 groundwater collection trenches at concentrations above the NJDEP Human Health Surface Water Quality Criterion (0.000045 ug/l) ranging from the method detection limit of 0.50 ug/l to 1.97 ug/l. The detection of Aroclors in the groundwater samples is likely an artifact of total suspended solids present in the unfiltered samples. The solubility of PCBs in water is 0.054 mg/l. To verify that the detection of PCBs in the shallow groundwater was an artifact of total suspended solids, a round of groundwater samples collected 9/26/97 from select collection trenches were field filtered and analyzed for PCBs. The results of all the filtered samples showed that all Aroclors were below the method detection limit of 0.50 ug/l.

The shallow groundwater in Area 2 has been classified as a non-potable, Class III-B aquifer, hydraulically connected to a saline surface water body

A total of sixty-four (64) submittals were approved by the Site Engineer during Area 2 remediation activities.

A copy of the Construction Submittal Log is included in Appendix D.

4.6.2 Data Validation

Analytical reports met the requirements of the Reduced Laboratory Data Deliverables (Non-EPA Contract Laboratories Program Methods) as defined in the Data Quality Objectives in the SAP/QAPP. Two separate internal data validation reports were published by ENSR on August 30, 1996 and September 27, 1996 for samples collected during Site remediation activities. Data were reviewed using the NJDEP Standard Operating Procedures (SOP) Quality Assurance Data Validation of Analytical Deliverables-TCL-Organics (SOP No. 5.A.13) as guidance. The SOP was modified to reflect the level of data deliverable and the use of non-CLP methods. In summary, based on the laboratory data audits, all validated data was useful and informative, and therefore was used for field decision-making purposes.

In addition, the Contractor's Laboratory Quality Assurance Manager and the Construction Quality Assurance Engineer continuously reviewed the Level IV analytical data packages for any deficiencies or inconsistencies. Two individual data validation inquiries were submitted by the Contractor's Laboratory Quality Assurance Manager to the certified laboratory on September 13, 1996 and January 9, 1997. The certified laboratory responded to each inquiry to make all data usable for field decision-making purposes.

Two individual field quality assurance audits were also conducted and reported by the Contractor's Quality Assurance Manager on September 18, 1996 and December 12, 1996. The audit reports served to document the field audit findings, to notify field personnel and project management of all deficiencies encountered, and to provide a mechanism for corrective actions and quality assurance recommendations.

4.7 Sampling and Analysis Plan (SAP) Modifications and Variances

The following project modifications and variances relevant to Area 2 were implemented during remediation activities.

- 1) On-site PCB soil immunoassay analyses ceased June 1996 after results determined the inconsistent accuracy compared to the certified laboratory results. It was determined that non-targeted organic analyte concentrations caused interference with the immunoassay results. All samples were therefore, sent off-site to a certified laboratory for analysis.

-
- 2) On-site soil and water gas chromatography analysis was not implemented during remediation activities. All samples were sent off-site to the certified laboratory for analysis.

5.0 REGULATORY COMPLIANCE SUMMARY - AREA 2

5.1 Soil

Excavation of impacted soil in Area 2 was accomplished in accordance with the requirements of the ROD as approved by the NJDEP. All thermally treated soils were not used as on-site backfill, but rather, were placed in the area to be capped. Imported fill was used to backfill all excavations.

Area 2 PCB impacted soils with concentrations greater than 25 mg/kg were excavated and stockpiled for thermal treatment. PCB impacted soils with concentrations between 2 mg/kg and 25 mg/kg were excavated and placed in the cap area. cPAH impacted soils with total cPAH concentrations 29 mg/kg and greater were excavated and stockpile for thermal treatment. cPAH impacted soils with total cPAH concentrations below 29 mg/kg, in conjunction with individual cPAH concentrations greater than remedial standards, were excavated and placed in the cap area. VOC impacted soils with total concentration greater 1,000 mg/kg were excavated and stockpile for thermal treatment. Soils with 1,1,2,2 - Tetrachloroethane concentrations greater than 21 mg/kg were excavated and stockpiled for treatment. Soils below these VOC remedial standards were excavated and placed beneath the multi-media cap.

In accordance with the approved RAWP, excavation of contaminated soils continued in each of the subareas A, B, and C within Area 2 until one of the following occurred:

- post-excavation samples indicated the remedial goals were achieved,
- concrete foundations greater than two feet below grade were encountered,
- the site property line was encountered, or
- the NJ Transit/ConRail ROW was encountered.

In conclusion, all soil remediation requirements, goals, and objectives have been achieved in accordance with the ROD, RAWP and Site specific permits. Therefore, soil remediation within Area 2 is considered final and complete.

5.2 Groundwater

5.2.1 Groundwater Quality Criteria

The shallow groundwater in Area 2 has been classified as a non-potable, Class III-B aquifer, hydraulically connected to a saline surface water body. NJDEP provided Surface Water Quality Criteria to AlliedSignal as a measure of comparison for evaluation with groundwater analytical data. To apply these surfacewater standards to the Area 2 groundwater, the groundwater collection trench data was compared to the NJDEP Chronic Aquatic Saltwater Quality Criteria. If a Chronic Aquatic Saltwater Surface Water Quality Criteria was not listed for a particular compound, the Chronic Human Health Surface Water Quality Criteria was used for comparison.

5.3 Off-Site Waste Management

No excavated material from Area 2 was disposed of off-site. Excavated soils, thermally treated soils, concrete rubble, construction debris, and surface refuse from Area 2 was placed in the cap area.

5.4 Site Restoration

Area 2 was restored in accordance with the Construction Drawings and all permit requirements. All excavations were backfilled with clean imported fill. A 6-inch lift of imported recycled concrete was placed on top of the fill for grading and stabilization purposes. Appendix C - Drawing 1, is the as-built of Area 2. Restoration of Area 2 is considered to be complete.

5.5 Temporary Remedial Action Structures

A temporary groundwater collection system operates in Area 2. The collection system contains three collection trenches. Each of the collection trenches is constructed of a 4-inch diameter perforated polyethylene pipe, 12-inch diameter standpipe, 2-inch diameter conveyance piping, electric sump pump, and weather-proof electrical wiring. Appendix C - Drawing 1, shows the plan view of the groundwater collection system. This system is currently operable, and will be maintained until the requirements in the ROD have been satisfied.

5.6 Approved Use Restrictions

Upon approval of the Area 2 Remedial Action Report, applications and submissions for all required land use restrictions and/or institutional controls will be prepared. AlliedSignal anticipates that a declaration of environmental use restriction will be required for soils below

anticipates that a declaration of environmental use restriction will be required for soils below existing intact concrete foundations equal to or greater than 24-inches below grade, and the two (2) areas of soil above remediation goals located along the north-west and south-east property boundaries as shown on Drawing 2. Groundwater has been classified by the NJDEP as a non-potable Class III-B aquifer. No added use restrictions on groundwater are anticipated.

5.7 Remedial Action Tasks Completion Summary

The following is a summary of the key tasks associated with UOP Uplands Area 2 site remediation and the completion status for these tasks.

<u>Key Remediation Tasks (Per RAWP Chapter 3)</u>	<u>Status of Completion</u>
Development of final construction documents for site excavation and capping activities;	Task Completed
Submission of permits required for site wide construction activities;	Task Completed
Mobilization and construction of support zones, soil erosion and sediment control features, required material handling, and staging/storage facilities;	Task Completed
Mobilization and operation of process water treatment plant capable of treating collected groundwater and supporting dewatering and sewer cleaning efforts in Area 2;	Task Completed
Storm, process, and sanitary sewer evaluation, cleaning, and storm sewer replacement in Area 2;	Task Completed
Excavation of surficial soils in Area 2;	Task Completed
Construction of access roads;	Task Completed
Thermal treatment of VOC containing soil;	Not Applicable
Installation of temporary groundwater collection system;	Task Completed
Groundwater collection and treatment;	Task Continues
Backfilling of treated soils;	Not Applicable (All thermally treated PCB/cPAH soils placed in cap area); clean imported fill was used as backfill

Collection and treatment of groundwater continues as part of the overall site remediation. A final action for groundwater will be addressed in a subsequent Record of Decision as discussed on page 3 of the 1993 ROD in Section entitled "Scope and Role of Operable Unit or Response Action Within Site Strategy."

6.0 REMEDIAL ACTION COST SUMMARY

**REMEDIAL COSTS - ACTUAL AND ESTIMATED
AREA 2**

<u>ACTIVITY</u>	<u>COST</u>
Clearing and Grubbing	\$28,000
Construction of Access Road	\$41,000
Security	\$56,000
Groundwater Collection System	\$9,000
Mobilize/Operate WTP	\$18,000
Sewer Evaluation	\$36,000
Excavate Process Sewers	\$150,000
Clean/Rehabilitate Storm Sewers	\$101,000
Install NJDOT Twin 48-inch Storm Sewer	\$169,000
Excavation of Contaminated Soil	\$60,000
Backfill with Clean Imported Fill	\$90,000
Thermal Treatment of PCB/cPAH Soil	\$403,000
Place Treated Soil	\$13,000
Wastewater Tank Excavation	\$7,000
Abandonment of Production Well No. 1	\$3,000
Site Clearing	\$5,000
Additional PCB Analysis	\$21,000
Cap Construction(1)	\$275,000
Remedial Action Report	\$25,000
Engineering Oversight	<u>\$45,900</u>

TOTAL \$1,555,900

Estimated Annual Cost for Operation and Maintenance of Area 2: \$5,000.

Note: This cost estimate is based on pro-rated share of Area 2 work and volume

7.0 PROFESSIONAL ENGINEER APPROVAL AND AS-BUILT CERTIFICATION

This Remedial Action Report entitled "Remedial Action Report; Area 2 - Block 104, Lot 2; UOP Uplands Site Remediation; East Rutherford, New Jersey"; prepared by ENSR Consulting and Engineering dated November 1997 has been reviewed and approved, and is hereby certified by the Engineer of Record, Michael C. Worthy, P.E. (NJ P.E. license GE 034274). The NJ Professional Engineer's seal is affixed to this Approval and As-Built Certification page, and to the three drawings (0186-8; 0186-1A; 0186-5) located in Appendix C of this report.



Signature

Michael C. Worthy, P.E.
NJ License #GE034274



Date

APPENDIX

A

TABLE 1
SUBAREA A
IN-SITU SOIL SAMPLE ANALYTICAL RESULTS
UOP - AREA 2
REMEDIAL ACTION REPORT

Field Sample No.	ISA-01A	ISA-02A	ISA-03A	ISA-04A	ISA-05A	ISA-06A	ISA-07A	ISA-08A	Remediation Goals (mg/kg)
Laboratory Sample No.	D96-6270-1 (cPAHs) D96-6806-1 (PCBs)	D96-6270-2 (cPAHs) D96-6806-2 (PCBs)	D96-6270-3 (cPAHs) D96-6806-3 (PCBs)	D96-6270-6 (cPAHs, PCBs)	D96-6270-5 (cPAHs) D96-6806-5 (PCBs)	D96-6270-4 (cPAHs) D96-6806-4 (PCBs)	D96-6270-11 (cPAHs) D96-6806-10 (PCBs)	D96-6270-23 (cPAHs) D96-6806-17 (PCBs)	
Depth (feet)	0-2	0-2	0-2	0-2	0-2	0-2	0-2	0-2	
Type	Soil/Composite	Soil/Composite	Soil/Composite	Soil/Composite	Soil/Composite	Soil/Composite	Soil/Composite	Soil/Composite	
Date Collected	6/11/96	6/11/96	6/11/96	6/11/96	6/11/96	6/11/96	6/11/96	6/11/96	
Compound (mg/kg)									
cPAHs									
Benzo(a)anthracene	16.5	2.09	<0.713	<0.881	4.92	3.38	<1.49	<1.57	4
Benzo(b)fluoranthene	10.7	2.50	<0.713	1.15	7.59	5.01	<1.49	<1.57	4
Benzo(k)fluoranthene	11.1	0.819	<0.713	<0.881	2.70	1.74	<1.49	<1.57	4
Benzo(a)pyrene	8.87	1.82	0.203	0.705	4.89	3.15	<0.372	0.642	0.66
Chrysene	15.6	1.97	<0.713	<0.881	6.39	3.64	<1.49	<1.57	40
Dibenzo(a,h)anthracene	4.78	0.271	<0.178	<0.220	0.848	0.790	<0.372	<0.391	0.66
Indeno(1,2,3-cd)pyrene	8.58	0.819	<0.713	<0.881	3.56	2.33	<1.49	<1.57	4
Total cPAHs	76.1	10.3	0.203	1.86	31.0	20.0	<1.49	0.642	29
Total PCBs	1.95/2.9	<0.119/0.76	3.43/4.4	3.95/0.35	0.535/0.50	1.95/<0.25	35.6/30.1	9.62/25.8	2

NOTES
All analyses performed by Inchope Testing Services NJDEP Laboratory Certification No. B2716
NA - Not Analyzed
EPA Method 8270 - carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)
EPA Method 8080 - Polychlorinated Biphenyls (PCBs)
Method 4020 - PCBs (On-site Analysis)
Total PCBs (Off-site Analysis/On-site Analysis)
Shaded Concentrations Exceed Remediation Goal

TABLE 1 (Cont'd)
SUBAREA A
IN-SITU SOIL SAMPLE ANALYTICAL RESULTS
UOP - AREA 2
REMEDIAL ACTION REPORT

Field Sample No	ISA-09A	ISA-09AD	ISA-10A	ISA-11A	ISA-12A	ISA-13A	ISA-14A	ISA-15A	ISA-16A	Remediation Goals (mg/kg)
Laboratory Sample No			D96-6582-4 (VOCs) D96-6270-10 (cPAHs) D96-6806-9 (PCBs)		D96-6582-1 (VOCs) D96-6270-8 (cPAHs) D96-6806-7 (PCBs)		D96-6582-7 (VOCs) D96-6270-26 (cPAHs, PCBs)	D96-6582-10 (VOCs) D96-6270-25 (cPAHs) D96-6806-19 (PCBs)	D96-6270-18 (cPAHs) D96-6806-15 (PCBs)	
Depth (feet)	0-2	0-2	0-2 1.5-2.0(VOCs)	0-2	0-2 1.5-2.0(VOCs)	0-2	0-2 1.5-2.0(VOCs)	0-2 1.5-2.0(VOCs)	0-2	
Type	Soil/Composite	Soil/Composite	Soil/Composite	Soil/Composite	Soil/Composite	Soil/Composite	Soil/Composite	Soil/Composite	Soil/Composite	
Date Collected	6/11/96	6/11/96	6/11/96 6/18/96(VOCs)	6/11/96	6/11/96 6/18/96(VOCs)	6/11/96	6/11/96 6/18/96(VOCs)	6/11/96 6/18/96(VOCs)	6/11/96	
Compound (mg/kg)										
VOLATILES										
1,1,2,2-tetrachloroethane	NA	NA	<0.0059	NA	<0.0098	NA	<0.0052	<0.0059	NA	21
Total VOCs	NA	NA	<0.12	NA	0.053	NA	<0.10	<0.12	NA	1000
cPAHs										
Benzo(a)anthracene	<1.68	<0.772	<0.820	4.18	2.65	<0.723	<1.49	3.00	<1.43	4
Benzo(b)fluoranthene	<1.68	<0.772	<0.820	4.51	3.66	<0.723	<1.49	3.35	<1.43	4
Benzo(k)fluoranthene	<1.68	<0.772	<0.820	<4.15	<2.43	<0.723	<1.49	4.00	<1.43	4
Benzo(a)pyrene	0.473	0.274	0.232	4.50	2.44	0.300	<0.374	3.77	<0.441	0.66
Chrysene	<1.68	<0.772	<0.820	6.13	2.92	<0.723	<1.49	3.73	<1.43	40
Dibenzo(a,h)anthracene	<0.420	<0.193	<0.205	1.08	<0.607	<0.181	<0.374	0.875	<0.441	0.66
Indeno(1,2,3-cd)pyrene	<1.68	<0.772	<0.820	<4.15	<2.43	<0.723	<1.49	2.85	<1.43	4
Total cPAHs	0.473	0.274	0.232	20.8	11.7	0.300	<1.49	21.6	<1.43	29
Total PCBs	5.33/3.6	NA	0.584/1.5	5.16/<0.25	2.46/0.69	4.75/5.9	11.3/4.7	24.3/10.4	23.0/26.5	2
<p>NOTES All analyses performed by InChcape Testing Services. NJDEP Laboratory Certification No. 82716 NA - Not Analyzed EPA Method 8240 - Volatile Organic Compounds (VOCs) EPA Method 8270 - carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) EPA Method 8080 - Polychlorinated Biphenyls (PCBs) Method 4020 - PCBs (On-site Analysis) Total PCBs (Off-site Analysis/On-site Analysis) Shaded Concentrations Exceed Remediation Goal VOC soil samples were not composited Sample ISA-09AD is a duplicate sample of ISA-09</p>										

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TABLE 1 (Cont'd)
SUBAREA A
IN-SITU SOIL SAMPLE ANALYTICAL RESULTS
UOP - AREA 2
REMEDIAL ACTION REPORT

Field Sample No	ISA-17A	ISA-18A	ISA-19A	ISA-20A	ISA-20AD	ISA-21A	ISA-22A	ISA-23A	Remediation Goals (mg/kg)
Laboratory Sample No	D96-6270-17 (cPAHs) D96-6806-14 (PCBs)	D96-6270-18 (cPAHs) D96-6806-13 (PCBs)	D96-6582-7 (VOCs) D96-6270-15 (cPAHs) D96-6808-12 (PCBs)	D96-6582-3 (VOCs) D96-6270-13 (cPAHs, PCBs)	D96-6582-8 (VOCs) D96-6270-14 (cPAHs, PCBs)	D96-6582-8 (VOCs) D96-6270-12 (cPAHs) D96-6806-11 (PCBs)	D96-6270-24 (cPAHs) D96-6806-18 (PCBs)	D96-6270-7 (cPAHs) D96-6806-8 (PCBs)	
Depth (feet)	0-2	0-2	0-2 1.5-2.0(VOCs)	0-2 1.5-2.0(VOCs)	0-2 1.5-2.0(VOCs)	0-2 1.5-2.0(VOCs)	0-2	0-2	
Type	Soil/Composite	Soil/Composite	Soil/Composite	Soil/Composite	Soil/Composite	Soil/Composite	Soil/Composite	Soil/Composite	
Date Collected	6/11/96	6/11/96	6/11/96 6/18/96(VOCs)	6/11/96 6/18/96(VOCs)	6/11/96 6/18/96(VOCs)	6/11/96 6/18/96(VOCs)	6/11/96	6/11/96	
Compound (mg/kg)									
VOLATILES									
1,1,2,2-tetrachloroethane	NA	NA	<0.0052	<3.0	<3.0	<0.0079	NA	NA	21
Total VOCs	NA	NA	0.018	89.5	110	0.024	NA	NA	1000
cPAHs									
Benzo(a)anthracene	<1.67	<0.939	<1.42	<1.53	<1.55	<2.27	6.88	5.81	4
Benzo(b)fluoranthene	<1.67	<0.939	<1.42	<1.53	<1.55	<2.27	6.84	7.33	4
Benzo(k)fluoranthene	<1.67	<0.939	<1.42	<1.53	<1.55	<2.27	5.85	7.37	4
Benzo(a)pyrene	1.15	0.528	<0.355	<0.384	<0.387	1.77	6.06	5.28	0.66
Chrysene	<1.67	<0.939	<1.42	<1.53	<1.55	2.32	6.68	5.51	40
Dibenz(a,h)anthracene	<0.417	<0.235	<0.355	<0.384	<0.387	<0.568	2.84	<0.480	0.66
Indeno(1,2,3-cd)pyrene	<1.67	<0.939	<1.42	<1.53	<1.55	<2.27	6.28	3.10	4
Total cPAHs	1.15	0.528	<1.42	<1.53	<1.55	4.10	45.2	34.2	29
Total PCBs	13.9/17.5	8.04/7.7	5.33/10.4	35.1/16.8	51.5/NA	18.8/2.8	95.8/18.4	3.85/1.78	2
<p>NOTES</p> <p>All analyses performed by Incharge Testing Services. NJDEP Laboratory Certification No. 82716</p> <p>NA - Not Analyzed</p> <p>EPA Method 8240 - Volatile Organic Compounds (VOCs)</p> <p>EPA Method 8270 - carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)</p> <p>EPA Method 8080 - Polychlorinated Biphenyls (PCBs)</p> <p>Method 4020 - PCBs (On-site Analysis)</p> <p>Total PCBs (Off-site Analysis/On-site Analysis)</p> <p>Shaded Concentrations Exceed Remediation Goal</p> <p>VOC soil samples were not composited</p> <p>Sample ISA-20AD is a duplicate sample of ISA-20</p>									

TABLE 1 (Cont'd)
 SUBAREA A
 IN-SITU SOIL SAMPLE ANALYTICAL RESULTS
 UOP - AREA 2
 REMEDIAL ACTION REPORT

Field Sample No.	ISA-24A	ISA-24AD	ISA-25A	ISA-26A	ISA-27A	ISA-28A	ISA-28AD	Remediation Goals (mg/kg)
Laboratory Sample No.	D96-6313-1	D96-6313-6	D96-6313-2	D96-6313-3	D96-6313-4	D96-6313-5	D96-6313-7	
	(cPAHs, PCBs)	(cPAHs, PCBs)	(cPAHs)	(cPAHs)	(cPAHs)	(cPAHs)	(cPAHs)	
			D96-6803-1	D96-6803-2	D96-6803-3	D96-6803-4	D96-6803-5	
			(PCBs)	(PCBs)	(PCBs)	(PCBs)	(PCBs)	
Depth (feet)	0-2	0-2	0-2	0-2	0-2	0-2	0-2	
Type	Soil/Composite	Soil/Composite	Soil/Composite	Soil/Composite	Soil/Composite	Soil/Composite	Soil/Composite	
Date Collected	6/12/06	6/12/06	6/12/06	6/12/06	6/12/06	6/12/06	6/12/06	
Compound (mg/kg)								
cPAHs								
Benzo(a)anthracene	6.66	5.81	<2.00	2.06	7.76(J)	<1.68	<1.67	4
Benzo(b)fluoranthene	9.17	7.41	<2.00	2.48	8.99	<1.68	<1.67	4
Benzo(k)fluoranthene	2.98	3.12	<2.00	<2.02	3.45(J)	<1.68	<1.67	4
Benzo(a)pyrene	6.66	5.87	0.701	2.66	7.11	<0.421	<0.417	0.66
Chrysene	6.38	5.34	<2.00	3.31	8.09	<1.68	<1.67	40
Dibenzo(a,h)anthracene	1.46	1.31	<0.499	<0.504	1.41(J)	<0.421	<0.417	0.66
Indeno(1,2,3-cd)pyrene	4.69	4.00	<2.00	<2.02	4.23(J)	<1.68	<1.67	4
Total cPAHs	38.0	33.0	0.791	11.4	41.0	<1.68	<1.67	29
Total PCBs	17.0/3.1	22.3/NA	29.2/11.3	19.3/2.3	29.2/3.4	29.2/NA	51.3/22.9	2

NOTES
 All analyses performed by Inchoape Testing Services - NJDPE Laboratory Certification No. 82716
 (J) - Indicates an estimated value. This flag is used if the compound is detected but is below the reporting limit
 NA - Not Analyzed
 EPA Method 8240 - Volatile Organic Compounds (VOCs)
 EPA Method 8270 - Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)
 EPA Method 8080 - Polychlorinated Biphenyls (PCBs)
 Method 4020 - PCBs (On-site Analysis)
 Total PCBs (Off-site Analysis/On-site Analysis)
 Shaded Concentrations Exceed Remediation Goal
 Sample ISA-24AD is a duplicate sample of ISA-24
 Sample ISA-28AD is a duplicate sample of ISA-28

TABLE 1 (Cont'd)
SUBAREA B
IN-SITU SOIL SAMPLE ANALYTICAL RESULTS
UOP - AREA 2
REMEDIAL ACTION REPORT

Field Sample No.	ISB-01A	ISB-02A	Remediation Goals (mg/kg)
Laboratory Sample No.	D96-6063-3	D96-6063-4	
Depth (feet)	0-2 1.5-2.0(VOCs)	0-2 1.5-2.0(VOCs)	
Type	Soil/Composite	Soil/Composite	
Date Collected	6/5/96	6/5/96	
Compound (mg/kg)			
VOLATILES			
1,1,2,2 - tetrachloroethane	<0.006	<0.006	21
Total VOCs	0.015	0.006	1000
cPAHs			
Benzo(a)anthracene	<0.818	<0.771	4
Benzo(b)fluoranthene	<0.818	<0.771	4
Benzo(k)fluoranthene	<0.818	<0.771	4
Benzo(a)pyrene	<0.204	<0.193	0.66
Chrysene	<0.818	<0.771	40
Dibenzo(a,h)anthracene	<0.204	<0.193	0.66
Indeno(1,2,3-cd)pyrene	<0.818	<0.771	4
Total cPAHs	<0.818	<0.771	29
Total PCBs	NA	NA	2
NOTES All analyses performed by inchcape Testing Services NJDEP Laboratory Certification No. 82716 NA - Not Analyzed EPA Method 8240 - Volatile Organic Compounds (VOCs) EPA Method 8270 - carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) VOC Soil Samples Collected At 1.5-2.0' (No Composite)			

TABLE 1 (Cont'd)
SUBAREA C
IN-SITU SOIL SAMPLE ANALYTICAL RESULTS
UOP - AREA 2
REMEDIAL ACTION REPORT

Field Sample No.	ISC-01A	ISC-02A	Remediation Goals (mg/kg)
Laboratory Sample No.	D96-6063-1 (cPAHs) D96-6476-1 (PCBs)	D96-6063-2 (cPAHs) D96-6495-1 (PCBs)	
Depth (feet)	0-2	0-2	
Type	Soil/Composite	Soil/Composite	
Date Collected	6/05/96	6/05/96	
Compound (mg/kg)			
cPAHs			
Benzo(a)anthracene	<0.795	2.02	4
Benzo(b)fluoranthene	<0.795	2.64	4
Benzo(k)fluoranthene	<0.795	1.16	4
Benzo(a)pyrene	<0.199	1.88	0.66
Chrysene	<0.795	2.32	40
Dibenzo(a,h)anthracene	<0.199	<0.230	0.66
Indeno(1,2,3-cd)pyrene	<0.795	0.981	4
Total cPAHs	<0.795	11	29
Total PCBs	235/28	64 7/7.0	2
NOTES:			
All analyses performed by Inchcape Testing Services NJDEP Laboratory Certification No. 82716			
EPA Method 8270 - carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)			
EPA Method 8080 - Polychlorinated Biphenyls (PCBs)			
Method 4020 - PCBs (On-site Analysis)			
Total PCBs (Off-site Analysis/On-site Analysis)			
Shaded Concentrations Exceed Remediation Goal			

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TABLE 2
SUBAREA A
SIDEWALL POST-EXCAVATION ANALYTICAL RESULTS
UOP - AREA 2
REMEDIAL ACTION REPORT

Field Sample No.	EWA-02B-AX1B	EWA-02B-AX7	EWA-02A-AX7B	EWA-04-AX9	EWA-01A-AX5	EWA-01B-AX5	EWA-02A-AX5	Remediation Goals (mg/kg)
Laboratory Sample No.	D96-9560-2	D96-9560-3	D96-9560-4	D96-9560-5	D96-9560-6	D96-9560-7	D96-9560-8	
Depth (feet)	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	
Type	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	
Date Collected	8/26/96	8/26/96	8/26/96	8/28/96	8/28/96	8/28/96	8/28/96	
Compound (mg/kg)								
cPAHs								
Benzo(a)anthracene	<0.737	<1.46	NA	<1.60	6.23	<1.59	<1.48	4
Benzo(b)fluoranthene	<0.737	<1.46	NA	<1.60	9.80	<1.59	<1.48	4
Benzo(k)fluoranthene	<0.737	<1.46	NA	<1.60	3.90	<1.59	<1.48	4
Benzo(a)pyrene	<0.184	<0.366	NA	<0.400	5.28	0.490	<0.369	0.66
Chrysene	<0.737	<1.46	NA	<1.60	7.41	<1.59	<1.48	40
Dibenzo(a,h)anthracene	<0.184	<0.366	NA	<0.400	1.13	<0.398	<0.369	0.66
Indeno(1,2,3-cd)pyrene	<0.737	<1.46	NA	<1.60	2.95	<1.59	<1.48	4
Total cPAHs	<0.737	<1.46	NA	<1.60	36.7	0.490	<1.48	29
Total PCBs	NA	3.99	3.68	1.87	14.7	3.13	1.45	2

NOTES
 All analyses performed by Inchepe Testing Services. NJDEP Laboratory Certification No. 82716
 All post-excavation sample results are summarized for information purposes. Only final post-excavation samples are shown on Drawing 2 in Appendix C.
 NA - Not Analyzed
 EPA Method 8270 - carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)
 EPA Method 8080 - Polychlorinated Biphenyls (PCBs)
 Shaded Concentrations Exceed Remediation Goal

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TABLE 2 (Cont'd)
 SUBAREA A
 SIDEWALL POST-EXCAVATION ANALYTICAL RESULTS
 UOP - AREA 2
 REMEDIAL ACTION REPORT

Field Sample No	EWA-02B-AX5	EWA-03A-AX5	EWA-03B-AX5	EWA-01-AX19	EWA-01B-AX20	EWA-01A-AX20	EWA-02A-AX28	Remediation Goals (mg/kg)
Laboratory Sample No.	D96-9560-9	D96-9560-10	D96-9560-11	D96-9408-1	D96-9408-2	D96-9408-3	D96-9408-4	
Depth (feet)	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	
Type	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	
Date Collected	8/28/96	8/28/96	8/28/96	8/23/96	8/23/96	8/23/96	8/23/96	
Compound (mg/kg)								
cPAHs								
Benzo(a)anthracene	<0.733	<0.746	10.0	<1.54	<0.749	<0.824	<0.754	4
Benzo(b)fluoranthene	<0.733	<0.746	7.33	1.70	1.08	<0.824	<0.754	4
Benzo(k)fluoranthene	<0.733	<0.746	4.21	<1.54	<0.749	<0.824	<0.754	4
Benzo(a)pyrene	<0.183	0.349	0.973	1.57	0.829	0.407	<0.189	0.66
Chrysene	<0.733	<0.746	8.48	1.88	1.07	<0.824	<0.754	40
Dibenzo(a,h)anthracene	<0.183	<0.186	1.25	<0.386	<0.187	<0.206	<0.189	0.66
Indeno(1,2,3-cd)pyrene	<0.733	<0.746	<1.71	<1.54	<0.749	<0.824	<0.754	4
Total cPAHs	<0.733	0.349	32.2	4.95	2.98	0.407	<0.754	29
Total PCBs	0.167	1.63	4.00	5.44	33.1	10.3	4.18	2

NOTES

All analyses performed by Inchope Testing Services. NJDEP Laboratory Certification No. 82718
 All post-excauation sample results are summarized for information purposes. Only final post-excauation samples are shown on Drawing 2 in Appendix C.
 EPA Method 8270 - carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)
 EPA Method 8080 - Polychlorinated Biphenyls (PCBs)
 Shaded Concentrations Exceed Remediation Goal.

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TABLE 2 (Cont'd)
SUBAREA A
SIDEWALL POST-EXCAVATION ANALYTICAL RESULTS
UOP - AREA 2
REMEDIAL ACTION REPORT

Field Sample No	EWA-02B-AX26	EWA-02C-AX26	EWA-02A-AX25	EWA-02B-AX25	EWA-03-AX3	EWA-03-AX14	EWA-03-AX14D	EWA-03B-AX1B	Remediation Goals (mg/kg)
Laboratory Sample No	D06-9406-5	D06-9406-6	D06-9406-7	D06-9406-8	D06-9406-9	D06-9406-10	D06-9406-11	D06-9560-1	
Depth (feet)	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	
Type	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	
Date Collected	8/23/96	8/23/96	8/23/96	8/23/96	8/23/96	8/23/96	8/23/96	8/26/96	
Compound (mg/kg)									
VOLATILES									
1,1,2,2-Tetrachloroethane	NA	NA	NA	NA	NA	<0.006	NA	NA	21
Total VOCs	NA	NA	NA	NA	NA	<0.115	NA	NA	1000
cPAHs									
Benzo(a)anthracene	<0.832	<0.779	82.9	<0.838	<0.940	<0.757	<0.773	<1.61	4
Benzo(b)fluoranthene	<0.832	<0.779	60.9	<0.838	1.51	<0.757	<0.773	<1.61	4
Benzo(k)fluoranthene	<0.832	<0.779	67.1	<0.838	<0.940	<0.757	<0.773	<1.61	4
Benzo(a)pyrene	<0.208	<0.195	70.6	0.398	1.23	0.233	0.368	<0.403	0.66
Chrysene	<0.832	<0.779	72.3	<0.838	<0.940	<0.757	<0.773	<1.61	40
Dibenzo(a,h)anthracene	<0.208	<0.195	17.6	<0.209	0.274	<0.189	<0.193	<0.403	0.66
Indeno(1,2,3-cd)pyrene	<0.832	<0.779	<41.0	<0.838	<0.940	<0.757	<0.773	<1.61	4
Total cPAHs	<0.832	<0.779	371	0.398	3.01	0.233	0.368	<1.61	29
Total PCBs	1.99	2.00	5.34	15.6	0.185	1.01	1.07	NA	2

NOTES

All analyses performed by Inchope Testing Services NJDEP Laboratory Certification No. 82716
All post-excauation sample results are summarized for information purposes. Only final post-excauation samples are shown on Drawing 2 in Appendix C
NA - Not Analyzed
EPA Method 8240 - Volatile Organic Compounds (VOCs)
EPA Method 8270 - carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)
EPA Method 8080 - Polychlorinated Biphenyls (PCBs)
Shaded Concentrations Exceed Remediation Goal
Sample EWA-03-AX14D is a duplicate of sample EWA-03-AX14

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TABLE 2 (Cont'd)
 SUBAREA A
 SIDEWALL POST-EXCAVATION ANALYTICAL RESULTS
 UOP - AREA 2
 REMEDIAL ACTION REPORT

Field Sample No.	EWA-04D-AX24	EWA-04C-AX24	EWA-04B-AX24	EWA-02A-AX22	EWA-02B-AX22	EWA-02A-AX23	Remediation Goals (mg/kg)
Laboratory Sample No.	D96-9732-9	D96-9732-10	D96-9732-11	D96-9732-12	D96-9732-13	D96-9732-14	
Depth (feet)	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	
Type	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	
Date Collected	9/3/96	9/3/96	9/3/96	9/3/96	9/3/96	9/3/96	
Compound (mg/kg)							
cPAHs							
Benzo(a)anthracene	2.35	0.895	<0.747	<7.21	<0.786	<0.779	4
Benzo(b)fluoranthene	3.45	1.09	0.860	<7.21	<0.786	<0.779	4
Benzo(k)fluoranthene	1.10	<0.743	<0.747	<7.21	<0.786	<0.779	4
Benzo(a)pyrene	1.01	0.193	<0.187	<1.80	<0.196	<0.195	0.66
Chrysene	2.25	0.851	<0.747	<7.21	<0.786	<0.779	40
Dibenzo(a,h)anthracene	0.331	<0.186	<0.187	<1.80	<0.196	<0.195	0.66
Indeno(1,2,3-cd)pyrene	0.782	<0.743	<0.747	<7.21	<0.786	<0.779	4
Total cPAHs	11.3	3.03	0.860	<7.21	<0.786	<0.779	29
Total PCBs	1.77	4.29	8.38	1.69	0.275	0.579	2

NOTES

All analyses performed by Inchcape Testing Services - NJDEP Laboratory Certification No. 82716
 All post-excauation sample results are summarized for information purposes. Only final post-excauation samples are shown on Drawing 2 in Appendix C.
 EPA Method 8270 - carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)
 EPA Method 8080 - Polychlorinated Biphenyls (PCBs)
 Shaded Concentrations Exceed Remediation Goal.

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TABLE 2 (Cont'd)
SUBAREA A
SIDEWALL POST-EXCAVATION ANALYTICAL RESULTS
UOP - AREA 2
REMEDIAL ACTION REPORT

Field Sample No.	EWA-02B-AX23	EWA-04A-AX24	EWA-02A-AX26A	EWA-02A-AX25A	EWA-02B-AX25A	EWA-01A-AX20A	EWA-01B-AX20A	EWA-01-AX19A	Remediation Goals (mg/kg)
Laboratory Sample No.	D06-9732-15	D06-9732-16	D06-9847-1	D06-9847-2	D06-9847-3	D06-9847-4	D06-9847-5	D06-9847-6	
Depth (feet)	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	
Type	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	
Date Collected	9/3/06	9/3/06	9/5/06	9/5/06	9/5/06	9/5/06	9/5/06	9/5/06	
Compound (mg/kg)									
VOLATILES									
1,1,2,2-Tetrachloroethane	NA	NA	NA	NA	NA	NA	NA	<32	21
Total VOCs	NA	NA	NA	NA	NA	NA	NA	<648	1000
cPAHs									
Benzo(a)anthracene	<0.748	<0.726	NA	<0.753	NA	NA	<0.792	<0.853	4
Benzo(b)fluoranthene	<0.748	<0.726	NA	0.842	NA	NA	<0.792	<0.853	4
Benzo(k)fluoranthene	<0.748	<0.726	NA	<0.753	NA	NA	<0.792	<0.853	4
Benzo(a)pyrene	<0.187	<0.182	NA	0.533	NA	NA	<0.198	<0.213	0.66
Chrysene	<0.748	<0.726	NA	<0.753	NA	NA	<0.792	<0.853	40
Dibenzo(a,h)anthracene	<0.187	<0.182	NA	<0.188	NA	NA	<0.198	<0.213	0.66
Indeno(1,2,3-cd)pyrene	<0.748	<0.726	NA	<0.753	NA	NA	<0.792	<0.853	4
Total cPAHs	<0.748	<0.726	NA	1.38	NA	NA	<0.792	<0.853	29
Total PCBs	2.66	0.260	14.3	11.0	<2.30	25.8	14.4	1.38	2

NOTES
All analyses performed by Inchope Testing Services. NJDEP Laboratory Certification No. 82716
All post-excauation sample results are summarized for information purposes. Only final post-excauation samples are shown on Drawing 2 in Appendix C
NA - Not Analyzed
EPA Method 8240 - Volatile Organic Compounds (VOCs)
EPA Method 8270 - carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)
EPA Method 8080 - Polychlorinated Biphenyls (PCBs)
Shaded Concentrations Exceed Remediation Goal

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TABLE 2 (Cont'd)
 SUBAREA A
 SIDEWALL POST-EXCAVATION ANALYTICAL RESULTS
 UOP - AREA 2
 REMEDIAL ACTION REPORT

Field Sample No	EWA-02C-AX28A	EWA-02A-AX7C (EWA-02-AX7C)	EWA-03-AX3A	EWA-03B-AX5A	EWA-01A-AX17B	EWA-01B-AX17B	EWA-01-AX18A	EWA-01-AX18B	Remediation Goals (mg/kg)
Laboratory Sample No	D06-0847-7	D06-10022-2	D06-10022-5	D06-10022-6	D06-10098-2	D06-10098-3	D06-10098-4	D06-10098-5	
Depth (feet)	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	
Type	Soil Grab	Soil Grab	Soil Grab	Soil Grab	Soil Grab	Soil Grab	Soil Grab	Soil Grab	
Date Collected	9/5/96	9/10/96	9/10/96	9/10/96	9/11/96	9/11/96	9/11/96	9/11/96	
Compound (mg/kg)									
cPAHs									
Benzo(a)anthracene	NA	NA	<0.812	2.40	<17.8	<1.67	NA	NA	4
Benzo(b)fluoranthene	NA	NA	<0.812	2.09	<17.8	<1.67	NA	NA	4
Benzo(k)fluoranthene	NA	NA	<0.812	1.37	<17.8	<1.67	NA	NA	4
Benzo(a)pyrene	NA	NA	0.282	2.15	<4.45	<0.417	NA	NA	0.66
Chrysene	NA	NA	<0.812	2.42	<17.8	<1.67	NA	NA	40
Dibenzo(a,h)anthracene	NA	NA	<0.203	0.391	<4.45	<0.417	NA	NA	0.66
Indeno(1,2,3-cd)pyrene	NA	NA	<0.812	1.14	<17.8	<1.67	NA	NA	4
Total cPAHs	NA	NA	0.282	12.9	<17.8	<1.67	NA	NA	29
Total PCBs	2.95	8.92	NA	5.92	67.7	24.1	0.530	<0.112	2

NOTES
 All analyses performed by InChcape Testing Services. NJDEP Laboratory Certification No. 82716
 All post-excauation sample results are summarized for information purposes. Only final post excavation samples are shown on Drawing 2 in Appendix C.
 N/A - Not Analyzed
 EPA Method 8270 - carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)
 EPA Method 8080 - Polychlorinated Biphenyls (PCBs)
 Shaded Concentrations Exceeds Remediation Goal
 Sample EWA-02A-AX7C incorrectly reported as EWA-02-AX7C

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TABLE 2 (Cont'd)
 SUBAREA A
 SIDEWALL POST-EXCAVATION ANALYTICAL RESULTS
 UOP - AREA 2
 REMEDIAL ACTION REPORT

Field Sample No.	EWA-01-AX16BD	EWA-02-AX11	EWA-03-AX4	EWA-03B-AX5A	EWA-03-AX6	EWA-04D-AX24A	EWA-04C-AX24A	EWA-04B-AX24A (EWA-04B-AX24AD)	Remediation Goals (mg/kg)
Laboratory Sample No.	D96-10098-6	D96-10098-9	D96-10098-10	D96-10098-11	D96-10098-12	D96-10098-13	D96-10098-14	D96-10098-15	
Depth (feet)	15.20	15.20	15.20	15.20	15.20	15.20	15.20	15.20	
Type	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	
Date Collected	9/11/96	9/11/96	9/11/96	9/11/96	9/11/96	9/11/96	9/11/96	9/11/96	
Compound (mg/kg)									
cPAHs									
Benzo(a)anthracene	NA	<7.88	<0.748	1.87	<0.753	<0.724	NA	NA	4
Benzo(b)fluoranthene	NA	<7.88	<0.748	1.65	<0.753	<0.724	NA	NA	4
Benzo(k)fluoranthene	NA	<7.88	<0.748	2.78	<0.753	<0.724	NA	NA	4
Benzo(a)pyrene	NA	<1.97	<0.187	1.88	0.202	<0.181	NA	NA	0.66
Chrysene	NA	<7.88	<0.748	2.28	<0.753	<0.724	NA	NA	40
Dibenz(a,h)anthracene	NA	<1.97	<0.187	0.733	<0.188	<0.181	NA	NA	0.66
Indeno(1,2,3-cd)pyrene	NA	<7.88	<0.748	<1.65	<0.753	<0.724	NA	NA	4
Total cPAHs	NA	<7.88	<0.748	11.2	0.202	<0.724	NA	NA	29
Total PCBs	<0.113	3.63	<0.113	16.4	2.63	NA	<0.109	<0.111	2

NOTES

All analyses performed by Inchope Testing Services - NJDEP Laboratory Certification No. 82716
 All post-excavation sample results are summarized for information purposes. Only final post-excavation samples are shown on Drawing 2 in Appendix C.
 NA - Not Analyzed
 EPA Method 8270 - carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)
 EPA Method 8080 - Polychlorinated Biphenyls (PCBs)
 Shaded Concentrations Exceed Remediation Goal
 Sample EWA-01-AX16BD is a duplicate of sample EWA-01-AX16B
 Sample EWA-04B-AX24A incorrectly reported as EWA-04B-AX24AD

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TABLE 2 (Cont'd)
SUBAREA A
SIDEWALL POST-EXCAVATION ANALYTICAL RESULTS
UOP - AREA 2
REMEDIAL ACTION REPORT

Field Sample No	EWA-01-AX8	EWA-02A-AX26B	EWA-01A-AX17C	EWA-01B-AX17C	EWA-02-AX11A	EWA-01A-AX4A	EWA-01B-AX4A	EWA-02-AX7G	Remediation Goals (mg/kg)
Laboratory Sample No	D96-10098-18	D96-10430-1	D96-10623-1	D96-10623-2	D96-10623-3 (PCBs) D96-11225-1 (cPAHs)	D96-10623-4	D96-10623-5 (PCBs) D96-11225-2 (cPAHs)	D96-10623-6	
Depth (feet)	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	
Type	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	
Date Collected	9/11/96	9/18/96	9/23/96	9/23/96	9/23/96	9/23/96	9/23/96	9/23/96	
Compound (mg/kg)									
cPAHs									
Benzo(a)anthracene	<14.9	NA	NA	NA	<0.795	NA	<0.717	NA	4
Benzo(b)fluoranthene	<14.9	NA	NA	NA	<0.795	NA	<0.717	NA	4
Benzo(k)fluoranthene	<14.9	NA	NA	NA	<0.795	NA	<0.717	NA	4
Benzo(a)pyrene	<3.73	NA	NA	NA	0.345	NA	<0.179	NA	0.66
Chrysene	<14.9	NA	NA	NA	<0.795	NA	<0.717	NA	40
Dibenz(a,h)anthracene	<3.73	NA	NA	NA	<0.199	NA	<0.179	NA	0.66
Indeno(1,2,3-cd)pyrene	<14.9	NA	NA	NA	<0.795	NA	<0.717	NA	4
Total cPAHs	<14.9	NA	NA	NA	0.345	NA	<0.717	NA	29
Total PCBs	31.4	<0.111	23.1	30.7	1.58	10.2*	<0.109	0.213	2

NOTES
 All analyses performed by InChcape Testing Services. NJDEP Laboratory Certification No. 827-6
 All post-excauation sample results are summarized for information purposes. Only final post-excauation samples are shown on Drawing 2 in Appendix C.
 NA - Not Analyzed
 EPA Method 8270 - carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)
 EPA Method 8080 - Polychlorinated Biphenyls (PCBs)
 Shaded Concentrations Exceed Remediation Goal

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TABLE 2 (Cont'd)
SUBAREA A
SIDEWALL POST-EXCAVATION ANALYTICAL RESULTS
UOP - AREA 2
REMEDIAL ACTION REPORT

Field Sample No.	EWA-02A-AX1	EWA-02B-AX1	EWA-03-AX1 (EWA-03A-AX1)	EWA-03B-AX1	EWA-04A-AX1	EWA-04A-AX7	EWA-04B-AX7	EWA-02A-AX7 (EWA-02A-AX1)	Remediation Goals (mg/kg)
Laboratory Sample No.	D06-7771-7	D06-7771-8	D06-7771-1	D06-7771-2	D06-7771-3	D06-7771-4	D06-7771-5	D06-7771-6	
	(cPAHs,PCBs)	(cPAHs,PCBs)	(cPAHs,PCBs)	(cPAHs,PCBs)	(cPAHs,PCBs)	(cPAHs,PCBs)	(cPAHs,PCBs)	(cPAHs,PCBs)	
Depth (feet)	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	
Type	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	
Date Collected	7/16/96	7/16/96	7/16/96	7/16/96	7/16/96	7/16/96	7/16/96	7/16/96	
Compound (mg/kg)									
cPAHs									
Benzo(a)anthracene	<0.720	0.705	<0.753	1.07	2.16	<0.747	0.849	<0.727	4
Benzo(b)fluoranthene	<0.720	0.920	<0.753	0.894	1.43	<0.747	0.952	<0.727	4
Benzo(k)fluoranthene	<0.720	<0.747	<0.753	<0.767	1.28	<0.747	<0.717	<0.727	4
Benzo(a)pyrene	<0.182	0.999	<0.188	0.895	1.77	0.416	0.841	<0.182	0.66
Chrysenes	<0.729	0.822	<0.753	0.972	1.97	<0.747	0.925	<0.727	40
Dibenzo(a,h)anthracene	<0.182	<0.187	<0.188	<0.192	0.266	<0.187	<0.179	<0.182	0.66
Indeno(1,2,3-cd)pyrene	<0.729	<0.747	<0.753	<0.767	<0.740	<0.747	<0.717	<0.727	4
Total cPAHs	<0.729	3.55	<0.753	3.83	8.89	0.416	3.57	<0.727	29
Total PCBs	<0.111	0.882	<0.114	<0.116	1.57	1.24	0.250	3.26	2

NOTES

All analyses performed by Incisape Testing Services - NJDEP Laboratory Certification No. 82716
 All post-excavation sample results are summarized for information purposes. Only final post-excavation samples are shown on Drawing 2 in Appendix C
 EPA Method 8270 - Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)
 EPA Method 8080 - Polychlorinated Biphenyls (PCBs)
 Shaded Concentrations Exceed Remediation Goal
 Sample EWA-03-AX1 incorrectly reported as EWA-03A-AX1
 Sample EWA-02A-AX7 incorrectly reported as EWA-02A-AX1

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TABLE 2 (Cont'd)
 SUBAREA A
 SIDEWALL POST-EXCAVATION ANALYTICAL RESULTS
 UOP - AREA 2
 REMEDIAL ACTION REPORT

Field Sample No	EWA-01-AX17	EWA-03-AX17	EWA-01-AX18	EWA-01-AX18	EWA-01-AX18D	EWA-03-AX18	EWA-03-AX2	EWA-01-AX28	EWA-01-AX27	Remediation Goals (mg/kg)
Laboratory Sample No	D96-7947-3	D96-7947-4	D96-7947-5	C96-7835-1 (cPAHs,PCBs)	D96-7835-14 (cPAHs,PCBs)	D96-7835-2 (cPAHs,PCBs)	D96-7835-3 (cPAHs,PCBs)	D96-7835-4 (cPAHs,PCBs)	D96-7835-5 (cPAHs,PCBs)	
Depth (feet)	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	
Type	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	
Date Collected	7/18/96	7/18/96	7/18/96	7/17/96	7/17/96	7/17/96	7/17/96	7/17/96	7/17/96	
Compound (mg/kg)										
VOLATILES										
1,1,2,2-tetrachloroethane	<6.8	<0.008	<0.0059	N/A	NA	NA	NA	NA	NA	21
Total VOCs	<135	<0.11	0.524	NA	NA	NA	NA	NA	NA	1000
cPAHs										
Benzo(a)anthracene	<3.57	<0.752	<1.57	<1.55	<1.50	<0.759	<1.30	<1.09	<0.784	4
Benzo(b)fluoranthene	<3.57	<0.752	<1.57	<1.55	<1.50	<0.759	<1.30	<1.09	<0.784	4
Benzo(k)fluoranthene	<3.57	<0.752	<1.57	<1.55	<1.50	<0.759	<1.30	<1.09	<0.784	4
Benzo(a)pyrene	2.52	<0.188	<0.392	0.513	1.09	<0.190	<0.325	0.464	<0.198	0.66
Chrysene	<3.57	<0.752	<1.57	<1.55	<1.50	<0.759	<1.30	<1.09	<0.784	40
Dibenzo(a,h)anthracene	<0.893	<0.188	<0.392	<0.388	0.398	<0.190	<0.325	<0.274	<0.198	0.66
Indeno(1,2,3-cd)pyrene	<3.57	<0.752	<1.57	<1.55	<1.50	<0.759	<1.30	<1.09	<0.784	4
Total cPAHs	2.52	<0.752	<1.57	0.513	1.49	<0.759	<1.30	0.464	<0.784	29
Total PCBs	40.2	5.85	2.85	155	7.64	1.38	<0.197	14.4	198	2

NOTES

All analyses performed by Incisape Testing Services. NJDEP Laboratory Certification No. 82716
 All post-excavation sample results are summarized for information purposes. Only final post-excavation samples are shown on Drawing 2 in Appendix C
 N/A - Not Analyzed
 EPA Method 8240 - Volatile Organic Compounds (VOCs)
 EPA Method 8270 - carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)
 EPA Method 8080 - Polychlorinated Biphenyls (PCBs)
 Shaded Concentrations Exceed Remediation Goal

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TABLE 2 (Cont'd)
 SUBAREA A
 SIDEWALL POST-EXCAVATION ANALYTICAL RESULTS
 UOP - AREA 2
 REMEDIAL ACTION REPORT

Field Sample No.	EWA-01-AX28	EWA-01-AX29	EWA-03A-AX29	EWA-04A-AX29	EWA-04B-AX29	EWA-04C-AX29	EWA-04D-AX29	Remediation Goals (mg/kg)
Laboratory Sample No.	D96-7835-6	D96-11801-5	D96-11801-9	D96-11801-8	D96-11801-7	D96-11801-1	D96-11801-4	
Depth (feet)	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	
Type	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	
Date Collected	7/17/96	10/18/96	10/18/96	10/18/96	10/18/96	10/18/96	10/18/96	
Compound (mg/kg)								
cPAHs								
Benzo(a)anthracene	<0.779	<0.757	<1.63	<0.214	<0.730	<0.724	<0.774	4
Benzo(b)fluoranthene	<0.779	<0.757	<1.63	<0.214	<0.730	<0.724	<0.774	4
Benzo(k)fluoranthene	<0.779	<0.757	<1.63	<0.214	<0.730	<0.724	<0.774	4
Benzo(a)pyrene	<0.195	<0.189	<0.408	<0.535	<0.183	<0.181	<0.193	0.66
Chrysene	<0.779	<0.757	<1.63	<2.14	<0.730	<0.724	<0.774	40
Dibenzo(a,h)anthracene	<0.195	<0.189	<0.408	<0.535	<0.183	<0.181	<0.193	0.66
Indeno(1,2,3-cd)pyrene	<0.779	<0.757	<1.63	<2.14	<0.730	<0.724	<0.774	4
Total cPAHs	<0.779	<0.757	<1.63	<2.14	<0.730	<0.724	<0.774	29
Total PCBs	188	107	8.45	0.360	0.220	7.45	1.15	2

NOTES:

All analyses performed by Incharge Testing Services NJDEP Laboratory Certification No 82716

All post-excavation sample results are summarized for information purposes. Only final post-excavation samples are shown on Drawing 2 in Appendix C.

EPA Method 8270 - carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)

EPA Method 8080 - Polychlorinated Biphenyls (PCBs)

Shaded Concentrations Exceed Remediation Goal

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TABLE 2 (Cont'd)
 SUBAREA A
 SIDEWALL POST-EXCAVATION ANALYTICAL RESULTS
 UOP - AREA 2
 REMEDIAL ACTION REPORT

Field Sample No	EWA-01A-AX16A	EWA-01B-AX16A (EWH-01B-AX16A)	EWA-02A-AX7A	EWA-02B-AX1A	EWA-03B-AX1A	EWA-01-AX17A	Remediation Goals (mg/kg)
Laboratory Sample No	D96-8395-14	D96-8395-13	D96-8395-15	D96-8395-16	D96-8395-17	D96-8395-18	
Depth (feet)	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	
Type	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	
Date Collected	7/30/96	7/30/96	7/30/96	7/30/96	7/30/96	7/30/96	
Compound (mg/kg)							
cPAHs							
Benzo(a)anthracene	NA	NA	NA	48.2	1.47	<1.55	4
Benzo(b)fluoranthene	NA	NA	NA	32.5	1.36	<1.55	4
Benzo(k)fluoranthene	NA	NA	NA	19.7	<0.806	<1.55	4
Benzo(a)pyrene	NA	NA	NA	27.0	1.19	0.912	0.66
Chrysene	NA	NA	NA	16.6	1.27	<1.55	40
Dibenzo(a,h)anthracene	NA	NA	NA	1.53	<0.201	<0.89	0.66
Indeno(1,2,3-cd)pyrene	NA	NA	NA	10.3	<0.806	<1.55	4
Total cPAHs	NA	NA	NA	156	5.29	0.912	29
Total PCBs	13.9	4.81	2.76	NA	NA	29.4	2

NOTES
 All analyses performed by Inchope Testing Services NJDEP Laboratory Certification No. 82716
 All post-excavation sample results are summarized for information purposes. Only final post-excavation samples are shown on Drawing 2 in Appendix C
 NA - Not Analyzed
 EPA Method 8270 - carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)
 EPA Method 8080 - Polychlorinated Biphenyls (PCBs)
 Shaded Concentrations Exceed Remediation Goal.
 Sample EWA-01B-AX16A incorrectly reported as EWH-01B-AX16A

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TABLE 2 (Cont'd)
 SUBAREA A
 SIDEWALL POST-EXCAVATION ANALYTICAL RESULTS
 UOP - AREA 2
 REMEDIAL ACTION REPORT

Field Sample No.	EWA-01-AX19B	EWA-01B-AX17G	EWA-01B-AX17H (EWA-01B-AX174)	Remediation Goals (mg/kg)
Laboratory Sample No.	D96-11160-1	D96-11160-2	D96-11511-1	
Depth (feet)	1.5-2.0	1.5-2.0	1.5-2.0	
Type	Soil/Grab	Soil/Grab	Soil/Grab	
Date Collected	10/3/96	10/3/96	10/10/96	
Compound (mg/kg)				
VOLATILES				
1,1,2,2-Tetrachloroethane	<0.028	NA	NA	21
Total VOCs	0.601	NA	NA	1000
cPAHs				
Benzo(a)anthracene	NA	NA	NA	4
Benzo(b)fluoranthene	NA	NA	NA	4
Benzo(k)fluoranthene	NA	NA	NA	4
Benzo(a)pyrene	NA	NA	NA	0.66
Chrysene	NA	NA	NA	40
Dibenzo(a,h)anthracene	NA	NA	NA	0.66
Indeno(1,2,3-cd)pyrene	NA	NA	NA	4
Total cPAHs	NA	NA	NA	29
Total PCBs	NA	21.0	<0.114	2
NOTES All analyses performed by Incharge Testing Services - NJDEP Laboratory Certification No. 82716 All post-excavation sample results are summarized for information purposes. Only final post-excavation samples are shown on Drawing 2 in Appendix C. NA - Not Analyzed EPA Method 8240 - Volatile Organic Compounds (VOCs) EPA Method 8270 - carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) EPA Method 8080 - Polychlorinated Biphenyls (PCBs) Shaded Concentrations Exceed Remediation Goal Sample EWA-01B-AX17H incorrectly reported as EWA-01B-AX174				

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TABLE 2 (Cont'd)
 SUBAREA B
 SIDEWALL POST-EXCAVATION ANALYTICAL RESULTS
 UOP - AREA 2
 REMEDIAL ACTION REPORT

Field Sample No.	EWB-01A-AX	EWB-02A-AX	EWB-03A-AX	EWB-03B-AX	EWB-4A-AX	EWB-4B-AX	Remediation Goals (mg/kg)
Laboratory Sample No.	D96-8285-1	D96-8285-2	D96-8285-3	D96-8285-4	D96-8285-5	D96-8285-6	
Depth (feet)	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	
Type	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	
Date Collected	7/26/96	7/26/96	7/26/96	7/26/96	7/26/96	7/26/96	
Compound (mg/kg)							
VOLATILES							
1,1,2,2-Tetrachloroethane	<0.37	<0.007	<0.007	<0.007	<0.01	<0.013	21
Total VOCs	2260	0.057	<0.15	<0.13	0.043	0.066	1000

NOTES

All analyses performed by Inchope Testing Services. NJDEP Laboratory Certification No. 82716
 All post-excavation sample results are summarized for information purposes. Only final post-excavation samples are shown on Drawing 2 in Appendix C.
 EPA Method 8240 - Volatile Organic Compounds (VOCs)
 Shaded Concentrations Exceed Remediation Goal

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TABLE 2 (Cont'd)
 SUBAREA B
 BOTTOM POST-EXCAVATION ANALYTICAL RESULTS
 UOP - AREA 2
 REMEDIAL ACTION REPORT

Field Sample No	EBB-05-A	EBB-04-A	EBB-03-A	EBB-03-AD	EBB-02-A	EBB-01-A	EBB-05-AA	Remediation Goals (mg/kg)
Laboratory Sample No.	D96-9732-1	D96-9732-2	D96-9732-3	D96-9732-4	D96-9732-7	D96-9732-8	D96-10021-2	
Depth (feet)	2.0-2.5	2.0-2.5	2.0-2.5	2.0-2.5	2.0-2.5	2.0-2.5	4.0-4.5	
Type	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	
Date Collected	9/3/96	9/3/96	9/3/96	9/3/96	9/3/96	9/3/96	9/10/96	
Compound (mg/kg)								
VOLATILES								
1,1,2,2-Tetrachloroethane	<0.008	<0.009	<0.006	<0.006	<0.007	<0.006	<0.032	21
Total VOCs	1.202	0.047	0.307	0.058	0.020	0.022	0.562	1000

NOTES

All analyses performed by Inchope Testing Services. NJDEP Laboratory Certification No. 82716
 All post-excavation sample results are summarized for information purposes. Only final post-excavation samples are shown on Drawing 2 in Appendix C.
 EPA Method 8240 - Volatile Organic Compounds (VOCs)
 Shaded Concentrations Exceed Remediation Goal
 Sample EBB-03-AD is a duplicate of sample EBB-03-A

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TABLE 2 (Cont'd)
 SUBAREA B
 SIDEWALL POST-EXCAVATION ANALYTICAL RESULTS
 UOP - AREA 2
 REMEDIAL ACTION REPORT

Field Sample No.	EWB-01A-AX5	EWB-03B-AX5	EWB-03A-AX5	EWB-02-AX5	EWB-01B-AX5	Remediation Goals (mg/kg)
Laboratory Sample No.	D96-10021-1	D96-10021-3	D96-10021-4	D96-10021-5	D96-10021-6	
Depth (feet)	3.5-4.0	3.5-4.0	3.5-4.0	3.5-4.0	3.5-4.0	
Type	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	
Date Collected	9/10/96	9/10/96	9/10/96	9/10/96	9/10/96	
Compound (mg/kg)						
VOLATILES						
1,1,2,2-Tetrachloroethane	<1.0	<14	<0.006	<0.005	<0.028	21
Total VOCs	76.8	379	<0.113	<0.107	0.205	1000

NOTES:
 All analyses performed by Incharge Testing Services. NJDEP Laboratory Certification No. 82716
 All post-excavation sample results are summarized for information purposes. Only final post-excavation samples are shown on Drawing 2 in Appendix C.
 EPA Method 8240 - Volatile Organic Compounds (VOCs)

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TABLE 2 (Cont'd)
SUBAREA C
SIDEWALL POST-EXCAVATION ANALYTICAL RESULTS
UOP - AREA 2
REMEDIAL ACTION REPORT

Field Sample No.	EWC-03-AX2	Remediation Goals (mg/kg)
Laboratory Sample No.	D96-11801-6	
Depth (feet)	1.5-2.0	
Type	Soil/Grab	
Date Collected	10/18/96	
Compound (mg/kg)		
cPAHs		
Benzo(a)anthracene	2.63	4
Benzo(b)fluoranthene	3.28	4
Benzo(k)fluoranthene	1.56	4
Benzo(a)pyrene	2.75	0.66
Chrysene	2.41	40
Dibenzo(a,h)anthracene	0.391	0.66
Indeno(1,2,3-cd)pyrene	1.20	4
Total cPAHs	14.2	29
Total PCBs	14.7	2

NOTES:

All analyses performed by Inchcape Testing Services.
 NJDEP Laboratory Certification No. 82716
 All post-excavation sample results are summarized for information purposes. Only final post-excavation samples are shown on Drawing 2 in Appendix C.
 EPA Method 8270 - carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)
 EPA Method 8080 - Polychlorinated Biphenyls (PCBs)
 Shaded Concentrations Exceed Remediation Goal

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**TABLE 3
STORM SEWER SEDIMENT STOCKPILE ANALYTICAL RESULTS
UOP - AREA 2
REMEDIAL ACTION REPORT**

Field Sample No.	SH-001-X	Remediation Goals (mg/kg)
Laboratory Sample No.	D97-1471-1	
Depth (feet)	1.5-2.0	
Type	Soil/Grab	
Date Collected	2/5/97	
Compound (mg/kg)		
VOLATILES		
1,1,2,2 - Tetrachloroethane	<10	21
Total VOCs	1600	1000
cPAHs		
Benzo(a)anthracene	6.12	4
Benzo(b)fluoranthene	7.23	4
Benzo(k)fluoranthene	<5.23	4
Benzo(a)pyrene	3.76	0.66
Chrysene	5.96	40
Dibenz(a,h)anthracene	<1.31	0.66
Indeno(1,2,3-cd)pyrene	<5.23	4
Total cPAHs	23.1	29
Total PCBs	54.1	2

NOTES:

All analyses performed by Incheape Testing Services,
 NJDEP Laboratory Certification No. 82716
 EPA Method 8240 - Volatile Organic Compounds (VOCs)
 EPA Method 8270 - carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)
 EPA Method 8080 - Polychlorinated Biphenyls (PCBs)
 Shaded Concentrations Exceed Remediation Goal

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TABLE 3 (Cont'd)
 PROCESS SEWER SEDIMENT STOCKPILE ANALYTICAL RESULTS
 UOP - AREA 2
 REMEDIAL ACTION REPORT

Field Sample No	ESPC-01-B	ESPC-01-BD (ESPC-02-BD)	ESPC-02-B	ESPC-03-B	ESPC-04-B	Remediation Goals (mg/kg)
Laboratory Sample No	D96-11311-3	D96-11311-4	D96-11311-2	D96-11511-2	D96-11511-3	
Depth (feet)	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	
Type	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	
Date Collected	10/8/96	10/8/96	10/8/96	10/11/96	10/11/96	
Compound (mg/kg)						
VOLATILES						
1,1,2,2-Tetrachloroethane	<0.008	<0.008	<0.006	<0.25	<0.25	21
Total VOCs	0.554	0.296	0.383	18.77	11.53	1000
cPAHs						
Benzo(a)anthracene	10.7	11.3	<7.53	3.10	<2.85	4
Benzo(b)fluoranthene	12.6	13.7	<7.53	3.59	<2.85	4
Benzo(k)fluoranthene	<10.6	<10.0	<7.53	<2.48	<2.85	4
Benzo(a)pyrene	11.6	11.9	<1.88	3.13	2.58	0.66
Chrysene	11.2	11.5	<7.53	2.87	<2.58	40
Dibenz(a,h)anthracene	<2.64	2.55	<1.88	<0.620	<0.713	0.66
Indeno(1,2,3-cd)pyrene	<10.6	<10.0	<7.53	<2.48	<2.85	4
Total cPAHs	46.1	51.0	<7.53	12.7	2.58	29
Total PCBs	104	121	2.78	2.17	10.6	2
NOTES All analyses performed by Indscape Testing Services, NJDEP Laboratory Certification No. 82716 EPA Method 8240 - Volatile Organic Compounds (VOCs) EPA Method 8270 - carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) EPA Method 8080 - Polychlorinated Biphenyls (PCBs) Shaded Concentrations Exceed Remediation Goal Sample ESPC-01-BD incorrectly reported as ESPC-02-BD Sample ESPC-01-BD is a duplicate of sample ESPC-01-B						

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TABLE 3 (Cont'd)
 PROCESS SEWER SEDIMENT STOCKPILE ANALYTICAL RESULTS
 UOP - AREA 2
 REMEDIAL ACTION REPORT

Field Sample No	ESPC-05-E	ESPC-05-ED	ESPC-06-E	ESPC-07-E	ESPC-08-E	ESPC-09-E	ESPC-10-E	ESPC-11-E	Remediation Goals (mg/kg)
Laboratory Sample No	D96-13079-1	D96-13079-4	D96-13079-5	D96-13079-6	D96-13079-7	D96-13079-8	D96-13079-9	D96-13079-10	
Depth (feet)	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	
Type	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	Soil/Grab	
Date Collected	11/14/96	11/14/96	11/14/96	11/14/96	11/14/96	11/14/96	11/14/96	11/14/96	
Compound (mg/kg)									
VOLATILES									
1,1,2,2-Tetrachloroethane	<0.032	<0.006	<0.036	<0.009	<0.007	<0.13	<0.07	<0.006	21
Total VOCs	0.329	0.041	0.012	0.100	0.013	2.68	10.64	0.029	1000
cPAHs									
Benzo(a)anthracene	<0.841	0.999	<0.818	<1.18	<0.862	5.42	3.20	<0.809	4
Benzo(b)fluoranthene	<0.841	1.23	0.973	<1.18	<0.862	5.81	3.31	<0.809	4
Benzo(k)fluoranthene	<0.841	<0.848	<0.818	<1.18	<0.862	2.94	2.31	<0.809	4
Benzo(a)pyrene	0.516	0.983	0.765	<0.295	0.615	3.94	2.91	<0.202	0.66
Chrysene	<0.841	1.06	<0.818	<1.18	<0.862	4.58	3.03	<0.809	40
Dibenzo(a,h)anthracene	<0.210	<0.212	<0.234	<0.295	<0.215	0.898	0.798	<0.202	0.66
Indeno(1,2,3-cd)pyrene	<0.841	<0.848	<0.818	<1.18	<0.862	2.19	1.50	<0.809	4
Total cPAHs	0.516	4.27	1.61	<1.18	0.615	25.8	16.9	<0.809	29
Total PCBs	16.1	9.42	16.9	258	9.49	10.5	9.50	7.83	2

NOTES
 All analyses performed by Inchope Testing Services. NJDEP Laboratory Certification No. 82716
 EPA Method 8240 - Volatile Organic Compounds (VOCs)
 EPA Method 8270 - Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)
 EPA Method 8080 - Polychlorinated Biphenyls (PCBs)
 Shaded Concentrations Exceed Remediation Goal
 Sample ESPC-05-ED is a duplicate of sample ESPC-05-E

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TABLE 3 (Cont'd)
STORM SEWER NETWORK 5 SEDIMENT STOCKPILE ANALYTICAL RESULTS
UOP - AREA 2
REMEDIAL ACTION REPORT

Field Sample No	ESA-01-EP (EWB-01-PX)	ESA-02-EP	ESA-03-EP	ESA-04-EP	ESA-05-EP	ESA-06-EP	ESA-07-EP	ESA-08-EP	Remediation Goals (mg/kg)
Laboratory Sample No	DWS-R285-1	DWS-R105-10	DWS-R304-20	DWS-R105-21	DWS-R706-1	DWS-R706-2	DWS-R706-3	DWS-R706-4	
Depth (feet)	1.5-2.0(VOCs) 0.0-0.5(cPAHs, PCBs)	1.5-2.0(VOCs)	1.5-2.0(VOCs)	1.5-2.0(VOCs)	1.5-2.0(VOCs)	1.5-2.0(VOCs)	1.5-2.0(VOCs)	1.5-2.0(VOCs)	
Type	Soil Grab	Soil Grab	Soil Grab	Soil Grab	Soil Grab	Soil Grab	Soil Grab	Soil Grab	
Date Collected	7/25/98	7/30/98	7/30/98	7/30/98	8/7/98	8/7/98	8/7/98	8/7/98	
Compound (mg/kg)									
VOLATILES									
1,1,2,2-Tetrachloroethane	<0.8	<0.8	<0.8	ND	<0.005	<0.15	<0.13	<0.006	21
Total Volatiles	25.2	0.7	<12.2	<1.70	<0.109	25.4	9.65	0.042	1000
cPAHs									
Benzo(a)anthracene	<0.855	0.888	0.883	0.889	5.10	<1.98	2.17	4.10	4
Benzo(b)fluoranthene	<0.855	<0.889	1.03	<0.764	4.81	<1.98	1.67	4.88	4
Benzo(k)fluoranthene	<0.855	<0.889	<0.889	<0.764	4.77	<1.98	1.88	4.04	4
Benzo(a)pyrene	0.707	0.871	0.703	0.818	5.18	0.877	2.03	4.85	0.88
Chrysene	<0.85	0.887	1.02	0.818	5.50	<1.98	2.59	4.48	40
Dibenz(a,h)anthracene	<0.214	<0.202	<0.201	0.214	1.89	<0.495	0.702	1.51	0.88
Indeno(1,2,3-cd)pyrene	<0.855	<0.889	<0.889	<0.764	3.24	<1.98	<1.75	2.75	4
Total cPAHs	0.707	2.80	3.65	2.79	30.3	0.877	11.2	26.4	29
Total PCBs	7.22	21.8	195	20.0	42.9	5.98	28.8	16.0	2

NOTES
 All analyses performed by InChape Testing Services. NJDEP Laboratory Certification No. 82718
 Method 8240 - Volatile Organic Compounds (VOCs)
 EPA Method 8270 - carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)
 EPA Method 8080 - PCBs
 Shaded Concentrations Exceed Remediation Goal
 Sample ESA-01-EP incorrectly reported as EWB-01-PX

TABLE 4
ALLIEDSIGNAL MONTHLY GROUNDWATER MONITORING PROGRAM
GROUNDWATER SAMPLE ANALYTICAL RESULTS
SUMP 14
UOP AREA 2
REMEDIAL ACTION REPORT

Field Sample No.	LS-1(14)-01	LS-1(14)-02	LS-1(14)-03	LS-1(14)-04	LS-1(14)-05
Lab Sample No.	D96-11901-3	D96-13518-3	D97-6478-1	D97-10473-2	D97-11758-1
Depth (feet)	N/A	N/A	N/A	N/A	N/A
Type	Aqueous	Aqueous	Aqueous	Aqueous	Aqueous
Date Collected	10/21/96	11/25/96	5/27/97	8/27/97	9/26/97
Compound (ug/l)					
VOLATILES					
Chloromethane	<10.0	<10.0	<10.0	<10.0	<10.0
Bromomethane	<10.0	<10.0	<10.0	<10.0	<10.0
Vinyl chloride	<10.0	<10.0	<10.0	<10.0	<10.0
Chloroethane	<10.0	<10.0	<10.0	<10.0	<10.0
Methylene chloride	<5.0	<5.0	<5.0	<5.0	<5.0
Acetone	<100	<100	<100	<100	<100
Carbon disulfide	<5.0	<5.0	<5.0	<5.0	<5.0
1,1-Dichloroethene	<5.0	<5.0	<5.0	<5.0	<5.0
1,1-Dichloroethane	<5.0	<5.0	<5.0	<5.0	<5.0
cis-1,2-Dichloroethene	<5.0	<5.0	<5.0	<5.0	<5.0
trans-1,3-Dichloroethene	<5.0	<5.0	<5.0	<5.0	<5.0
Chloroform	<5.0	<5.0	<5.0	<5.0	<5.0
1,2-Dichloroethane	<5.0	<5.0	<5.0	<5.0	<5.0
2-Butanone	<50.0	<5.0	<50.0	<50.0	<50.0
1,1,1-Trichloroethane	<5.0	<5.0	<5.0	<5.0	<5.0
Carbon tetrachloride	<5.0	<5.0	<5.0	<5.0	<5.0
Bromodichloromethane	<5.0	<5.0	<5.0	<5.0	<5.0
1,2-Dichloropropane	<5.0	<5.0	<5.0	<5.0	<5.0
cis-1,3-Dichloropropene	<5.0	<5.0	<5.0	<5.0	<5.0
Trichloroethene	<5.0	<5.0	<5.0	<5.0	<5.0
Chlorodibromomethane	<5.0	<5.0	<5.0	<5.0	<5.0
1,1,2-Trichloroethane	<5.0	<5.0	<5.0	<5.0	<5.0
Benzene	<5.0	12.2*	<5.0	23.1*	12.6*
trans-1,2-Dichloropropene	<5.0	<5.0	<5.0	<5.0	<5.0
Bromoform	<5.0	<5.0	<5.0	<5.0	<5.0
4-Methyl-2-pentanone	<50.0	<5.0	<50.0	<50.0	<50.0
2-Hexanone	<50.0	<50.0	<50.0	<50.0	<50.0
Tetrachloroethene	<5.0	<5.0	<5.4	<5.8	<5.0
Toluene	<5.0	10.1*	5.5	<5.9	<5.0
1,1,2,2-Tetrachloroethane	<5.0	<5.2	<5.6	<5.10	<5.0
Chlorobenzene	<5.0	<5.3	<5.7	<5.11	<5.0
Ethylbenzene	<5.0	<5.0	<5.0	<5.0	<5.0
Styrene	<5.0	<5.0	<5.0	<5.0	<5.0
o-Xylene	<5.0	<5.0	<5.0	<5.0	<5.0
m,p-Xylene	<5.0	<5.0	<5.0	<5.0	<5.0
Total VOCs	<100	22.3	<5.0	23.1	12.6
METALS					
Lead	2.81*	2.32*	3.0*	<1.5	<2.0
Arsenic	7.22*	1.44*	<5.0	<2.0	<2.0

NOTES
All analyses performed by Intertek Testing Services.
NJDEP Laboratory Certification No. 82716
N/A - Not Applicable
EPA Method 8240 - Volatile Organic Compounds (VOCs)
EPA Method 7060 - Arsenic
EPA Method 7421 - Lead
* - Concentration is above method detection limit
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TABLE 4 (Cont'd)
 ALLIEDSIGNAL MONTHLY GROUNDWATER MONITORING PROGRAM
 GROUNDWATER SAMPLE ANALYTICAL RESULTS
 SUMP 14
 UOP AREA 2
 REMEDIAL ACTION REPORT

Field Sample No.	LS-1(14)-01	LS-1(14)-02	LS-1(14)-03	LS-1(14)-04	LS-1(14)-05
Lab Sample No.	D96-11901-3	D96-13518-3	D97-6478-1	D97-10473-2	D97-11758-1
Depth (feet)	N/A	N/A	N/A	N/A	N/A
Type	Aqueous	Aqueous	Aqueous	Aqueous	Aqueous
Date Collected	10/21/96	11/25/96	5/27/97	8/27/97	9/26/97
Compound (ug/l)					
BNAs					
N-Nitrosodimethylamine	<5.0	<5.0	<5.5	<5.5	<6.1
Phenol	<1.5	<1.5	<1.7	<1.7	<1.8
Bis(2-chloroethyl)ether	<5.7	<5.7	<6.3	<6.3	<7.0
2-Chlorophenol	<3.3	<3.3	<3.6	<3.6	<4.0
1,3-Dichlorobenzene	<1.9	<1.9	<2.1	<2.1	<2.3
1,4-Dichlorobenzene	<4.4	<4.4	<4.8	<4.8	<5.4
1,2-Dichlorobenzene	<1.9	<1.9	<2.1	1.5J*	<2.3
Bis(2-chloroisopropyl)ether	<5.7	<5.7	<6.3	<6.3	<7.0
Hexachloroethane	<1.6	<1.6	<1.8	<1.8	<2.0
Nitrobenzene	<1.9	<1.9	<2.1	<2.1	<2.3
Isophorone	<2.2	<2.2	<2.4	<2.4	<2.7
2,4-Dimethylphenol	<2.7	<2.7	<3.0	<3.0	<3.3
2-Nitrophenol	<3.8	<3.8	<4.2	<4.2	<4.6
2,4-Dichlorophenol	<2.7	<2.7	<3.0	<3.0	<3.3
1,2,4-Trichlorobenzene	<1.9	<1.9	<2.1	<2.1	<2.3
Naphthalene	<1.8	<1.8	<2.0	<2.0	<2.2
Hexachlorobutadiene	<0.9	<0.9	<1.0	<1.0	<1.1
Hexachlorocyclopentadiene	<5.0	<5.0	<5.5	<5.5	<6.1
2,4,6-Trichlorophenol	<2.7	<2.7	<3.0	<3.0	<3.3
Dimethylphthalate	<1.8	<1.8	<2.0	<2.0	<2.2
2,6-Dinitrotoluene	<1.9	<1.9	<2.1	<2.1	<2.3
Acenaphthylene	<3.5	<3.5	<3.9	<3.9	<4.3
2,4-Dinitrophenol	<42.0	<42.0	<46.2	<46.2	<51.2
4-Nitrophenol	<3.8	<3.8	<4.2	<4.2	<4.6
2,4-Dinitrotoluene	<5.7	<5.7	<6.3	<6.3	<7.0
Diethylphthalate	<1.9	<1.9	<2.1	<2.1	<2.3
Fluorene	<1.9	<1.9	<2.1	<2.1	<2.3
4,6-Dinitro-2-methylphenol	<24.0	<24.0	<26.4	<26.4	<29.3
N-Nitrosodiphenylamine	<1.9	<1.9	<2.1	<2.1	<2.3
Hexachlorobenzene	<1.9	<1.9	<2.1	<2.1	<2.3
Pentachlorophenol	<3.5	<3.5	<3.9	<3.9	<4.3
Phenanthrene	<5.4	<5.4	<5.9	<5.9	<6.6
Anthracene	<1.9	<1.9	<2.1	<2.1	<2.3
Di-n-butylphthalate	<2.5	<2.5	<2.8	<2.8	<3.1

NOTES

All analyses performed by Intertek Testing Services.
 NJDEP Laboratory Certification No. B2716
 N/A - Not Applicable
 J - Estimated Concentration
 EPA Method 625 - Base Neutrals and Acid Extractables (BNAs)
 * - Concentration is above method detection limit

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TABLE 4 (Cont'd)
 ALLIEDSIGNAL MONTHLY GROUNDWATER MONITORING PROGRAM
 GROUNDWATER SAMPLE ANALYTICAL RESULTS
 SUMP 14
 UOP AREA 2
 REMEDIAL ACTION REPORT

Field Sample No.	LS-1(14)-01	LS-1(14)-02	LS-1(14)-03	LS-1(14)-04	LS-1(14)-05
Lab Sample No.	D96-11901-3	D96-13518-3	D97-6478-1	D97-10473-2	D97-11758-1
	N/A	N/A	N/A	N/A	N/A
Type	Aqueous	Aqueous	Aqueous	Aqueous	Aqueous
Date Collected	10/21/96	11/25/96	5/27/97	8/27/97	9/26/97
Compound (ug/l)					
BNAs					
Fluoranthene	<2.2	<2.2	<2.4	<2.4	<2.7
Benzdine	<5.7	<5.7	<6.3	<6.3	<7.0
Pyrene	<1.9	<1.9	<2.1	<2.1	<2.3
Butylbenzylphthalate	<2.5	<2.5	<2.8	<2.8	<3.1
Bis(2-Ethylhexyl)phthalate	<2.5	<2.5	<2.8	2.6J*	<3.1
3,3'-Dichlorobenzidine	<16.5	<16.5	<18.2	<18.2	<20.1
Benzo(a)anthracene	<7.8	<7.8	<8.6	<8.6	<9.5
Chrysene	<2.5	<2.5	<2.8	<2.8	<3.1
Benzo(b)fluoranthene	<4.8	<4.8	<5.3	<5.3	<5.9
Benzo(k)fluoranthene	<2.5	<2.5	<2.8	<2.8	<3.1
Benzo(a)pyrene	<2.5	<2.5	<2.8	<2.8	<3.1
Indeno(1,2,3-cd)pyrene	<3.7	<3.7	<4.1	<4.1	<4.5
Dibenzo(a,h)anthracene	<2.5	<2.5	<2.8	<2.8	<3.1
Benzo(g,h,i)perylene	<4.1	<4.1	<4.5	<4.5	<5.0
1,2,4,5-Tetrachlorobenzene	<10.0	<10.0	<11.0	<11.0	<12.2
Pentachlorobenzene	<10.0	<10.0	<11.0	<11.0	<12.2
Total PCBs					
Aroclor 1016	<0.50	<0.50	<0.50	<0.55	<0.50
Aroclor 1221	<0.50	<0.50	<0.50	<0.55	<0.50
Aroclor 1232	<0.50	<0.50	<0.50	<0.55	<0.50
Aroclor 1242	<0.50	<0.50	<0.50	<0.55	<0.50
Aroclor 1248	0.880	0.890	0.94	0.74	<0.50
Aroclor 1254	<0.50	<0.50	<0.50	<0.55	<0.50
Aroclor 1260	<0.50	<0.50	<0.50	<0.55	<0.50
Dissolved PCBs					
Aroclor 1016	NA	NA	NA	NA	<0.50
Aroclor 1221	NA	NA	NA	NA	<0.50
Aroclor 1232	NA	NA	NA	NA	<0.50
Aroclor 1242	NA	NA	NA	NA	<0.50
Aroclor 1248	NA	NA	NA	NA	<0.50
Aroclor 1254	NA	NA	NA	NA	<0.50
Aroclor 1260	NA	NA	NA	NA	<0.50

NOTES

All analyses performed by Intertek Testing Services
 NJDEP Laboratory Certification No. 82716
 N/A - Not Applicable
 NA - Not Analyzed
 J - Estimated Concentration
 EPA Method 625 - Base Neutrals and Acid Extractables (BNAs)
 EPA Method 608 - Polychlorinated Biphenyls (PCBs)
 * - Concentration is above method detection limit
 Concentrations with bold border exceed NJDEP Human Health Surface Water Quality Criteria
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TABLE 4 (Cont'd)
ALLIEDSIGNAL MONTHLY GROUNDWATER MONITORING PROGRAM
GROUNDWATER SAMPLE ANALYTICAL RESULTS
SUMP 15
UOP AREA 2
REMEDIAL ACTION REPORT

Field Sample No.	LS-1(15)-01	LS-1(15)-02
Lab Sample No.	D97-4155-1	D97-11758-2
Depth (feet)	N/A	N/A
Type	Aqueous	Aqueous
Date Collected	4/4/97	9/26/97
Compound (ug/l)		
VOLATILES		
Chloromethane	<10.0	<10.0
Bromomethane	<10.0	<10.0
Vinyl chloride	<10.0	<10.0
Chloroethane	<10.0	<10.0
Methylene chloride	<5.0	<5.0
Acetone	<100	<100
Carbon disulfide	<5.0	<5.0
1,1-Dichloroethene	<5.0	<5.0
1,1-Dichloroethane	<5.0	<5.0
cis-1,2-Dichloroethene	<5.0	<5.0
trans-1,3-Dichloroethene	<5.0	<5.0
Chloroform	<5.0	<5.0
1,2-Dichloroethane	<5.0	<5.0
2-Butanone	<50.0	<50.0
1,1,1-Trichloroethane	<5.0	<5.0
Carbon tetrachloride	<5.0	<5.0
Bromodichloromethane	<5.0	<5.0
1,2-Dichloropropane	<5.0	<5.0
cis-1,3-Dichloropropene	<5.0	<5.0
Trichloroethene	<5.0	<5.0
Chlorodibromomethane	<5.0	<5.0
1,1,2-Trichloroethane	<5.0	<5.0
Benzene	<5.0	<5.0
trans-1,2-Dichloropropene	<5.0	<5.0
Bromoform	<5.0	<5.0
4-Methyl-2-pentanone	<50.0	<50.0
2-Hexanone	<50.0	<50.0
Tetrachloroethene	<5.0	<5.0
Toluene	<5.0	124*
1,1,2,2-Tetrachloroethane	<5.0	<5.0
Chlorobenzene	<5.0	<5.0
Ethylbenzene	<5.0	<5.0
Styrene	<5.0	<5.0
o-Xylene	<5.0	<5.0
m,p-Xylene	<5.0	<5.0
Total VOCs	<100	124
METALS		
Lead	<1.7	<2.0
Arsenic	<4.8	<2.0

NOTES
All analyses performed by Intertek Testing Services
NJDEP Laboratory Certification No. 82716
N/A - Not Applicable
EPA Method 8240 - Volatile Organic Compounds (VOCs)
EPA Method 7060 - Arsenic
EPA Method 7421 - Lead
* - Concentration is above method detection limit
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TABLE 4 (Cont'd)
ALLIEDSIGNAL MONTHLY GROUNDWATER MONITORING PROGRAM
GROUNDWATER SAMPLE ANALYTICAL RESULTS
SUMP 15
UOP AREA 2
REMEDIAL ACTION REPORT

Field Sample No.	LS-1(15)-01	LS-1(15)-02
Lab Sample No.	D97-4155-1	D97-11758-2
Depth (feet)	N/A	N/A
Type	Aqueous	Aqueous
Date Collected	4/4/97	9/26/97
Compound (ug/l)		
BNAs		
N-Nitrosodimethylamine	<5.0	<5.5
Phenol	<1.5	<1.7
Bis(2-chloroethyl)ether	<5.7	<6.3
2-Chlorophenol	<3.3	<3.6
1,3-Dichlorobenzene	<1.9	<2.1
1,4-Dichlorobenzene	<4.4	<4.8
1,2-Dichlorobenzene	<1.9	<2.1
Bis(2-chloroisopropyl)ether	<5.7	<6.3
Hexachloroethane	<1.6	<1.8
Nitrobenzene	<1.9	<2.1
Isophorone	<2.2	<2.4
2,4-Dimethylphenol	<2.7	<3.0
2-Nitrophenol	<3.8	<4.2
2,4-Dichlorophenol	<2.7	<3.0
1,2,4-Trichlorobenzene	<1.9	<2.1
Naphthalene	<1.8	<2.0
Hexachlorobutadiene	<0.9	<1.0
Hexachlorocyclopentadiene	<5.0	<5.5
2,4,6-Trichlorophenol	<2.7	<3.0
Dimethylphthalate	<1.8	<2.0
2,6-Dinitrotoluene	<1.9	<2.1
Acenaphthylene	<3.5	<3.9
2,4-Dinitrophenol	<42.0	<46.2
4-Nitrophenol	<3.8	<4.2
2,4-Dinitrotoluene	<5.7	<6.3
Diethylphthalate	<1.9	<2.1
Fluorene	<1.9	<2.1
4,6-Dinitro-2-methylphenol	<24.0	<26.4
N-Nitrosodiphenylamine	<1.9	<2.1
Hexachlorobenzene	<1.9	<2.1
Pentachlorophenol	<3.5	<3.9
Phenanthrene	<5.4	<5.9
Anthracene	<1.9	<2.1
Di-n-butylphthalate	<2.5	<2.4

NOTES
All analyses performed by Intertek Testing Services.
NJDEP Laboratory Certification No. 82716
N/A - Not Applicable
EPA Method 625 - Base Neutrals and Acid Extractables (BNAs)
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TABLE 4 (Cont'd)
ALLIEDSIGNAL MONTHLY GROUNDWATER MONITORING PROGRAM
GROUNDWATER SAMPLE ANALYTICAL RESULTS
SUMP 15
UOP AREA 2
REMEDIAL ACTION REPORT

Field Sample No.	LS-1(15)-01	LS-1(15)-02
Lab Sample No.	D97-4155-1	D97-11758-2
	N/A	N/A
Type	Aqueous	Aqueous
Date Collected	4/4/97	9/26/97
Compound (ug/l)		
BNAs		
Fluoranthene	<2.2	<2.4
Benzidine	<5.7	<6.3
Pyrene	<1.9	<2.1
Butylbenzylphthalate	<2.5	<2.8
Bis(2-Ethylhexyl)phthalate	<2.5	<2.8
3,3'-Dichlorobenzidine	<16.5	<18.2
Benzo(a)anthracene	<7.8	<8.6
Chrysene	<2.5	<2.8
Benzo(b)fluoranthene	<4.8	<5.3
Benzo(k)fluoranthene	<2.5	<2.8
Benzo(a)pyrene	<2.5	<2.8
Indeno(1,2,3-cd)pyrene	<3.7	<4.1
Dibenzo(a,h)anthracene	<2.5	<2.8
Benzo(g,h,i)perylene	<4.1	<4.5
1,2,4,5-Tetrachlorobenzene	<10.0	<11.0
Pentachlorobenzene	<10.0	<11.0
Total PCBs		
Aroclor 1016	<0.50	0.50
Aroclor 1221	<0.50	0.50
Aroclor 1232	<0.50	0.50
Aroclor 1242	<0.50	0.50
Aroclor 1248	1.09	0.50
Aroclor 1254	<0.50	0.50
Aroclor 1260	<0.50	0.50
Dissolved PCBs		
Aroclor 1016	NA	<0.50
Aroclor 1221	NA	<0.50
Aroclor 1232	NA	<0.50
Aroclor 1242	NA	<0.50
Aroclor 1248	NA	<0.50
Aroclor 1254	NA	<0.50
Aroclor 1260	NA	<0.50
NOTES: All analyses performed by Intertek Testing Services. NJDEP Laboratory Certification No. 82716 N/A - Not Applicable NA - Not Analyzed EPA Method 625 - Base Neutrals and Acid Extractables (BNAs) EPA Method 608 - Polychlorinated Biphenyls (PCBs) Concentrations with bold border exceed NJDEP Human Health Surface Water Quality Criteria File: R:\common\0186-050\T4RAR1		

TABLE 4 (Cont'd)
 ALLIEDSIGNAL MONTHLY GROUNDWATER MONITORING PROGRAM
 GROUNDWATER SAMPLE ANALYTICAL RESULTS
 SUMP 18
 UOP AREA 2
 REMEDIAL ACTION REPORT

Field Sample No.	LS-1(16)-01	LS-1(16)-02
Lab Sample No.	D97-4155-2	D97-11758-3
Depth (feet)	N/A	N/A
Type	Aqueous	Aqueous
Date Collected	4/4/97	9/26/97
Compound (ug/l)		
VOLATILES		
Chloromethane	<10.0	<10.0
Bromomethane	<10.0	<10.0
Vinyl chloride	<10.0	<10.0
Chloroethane	<10.0	<10.0
Methylene chloride	<5.0	<5.0
Acetone	<100	<100
Carbon disulfide	<5.0	<5.0
1,1-Dichloroethene	<5.0	<5.0
1,1-Dichloroethane	<5.0	<5.0
cis-1,2-Dichloroethene	<5.0	<5.0
trans-1,3-Dichloroethene	<5.0	<5.0
Chloroform	<5.0	<5.0
1,2-Dichloroethane	<5.0	<5.0
2-Butanone	<50.0	<50.0
1,1,1-Trichloroethane	<5.0	<5.0
Carbon tetrachloride	<5.0	<5.0
Bromodichloromethane	<5.0	<5.0
1,2-Dichloropropane	<5.0	<5.0
cis-1,3-Dichloropropene	<5.0	<5.0
Trichloroethene	<5.0	<5.0
Chlorodibromomethane	<5.0	<5.0
1,1,2-Trichloroethane	<5.0	<5.0
Benzene	<5.0	22.1*
trans-1,2-Dichloropropene	<5.0	<5.0
Bromoform	<5.0	<5.0
4-Methyl-2-pentanone	<50.0	<50.0
2-Hexanone	<50.0	<50.0
Tetrachloroethene	<5.0	<5.0
Toluene	<5.0	<5.0
1,1,2,2-Tetrachloroethane	<5.0	<5.0
Chlorobenzene	<5.0	5.0*
Ethylbenzene	<5.0	<5.0
Styrene	<5.0	<5.0
o-Xylene	<5.0	<5.0
m,p-Xylene	<5.0	<5.0
Total VOCs	<100	27.1
METALS		
Lead	<2.0	<2.0
Arsenic	<4.8	<2.0

NOTES:
 All analyses performed by Intertek Testing Services,
 NJDEP Laboratory Certification No. 82716
 N/A - Not Applicable
 EPA Method 8240 - Volatile Organic Compounds (VOCs)
 EPA Method 7060 - Arsenic
 EPA Method 7421 - Lead
 * - Concentration is above method detection limit
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TABLE 4 (Cont'd)
ALLIEDSIGNAL MONTHLY GROUNDWATER MONITORING PROGRAM
GROUNDWATER SAMPLE ANALYTICAL RESULTS
SUMP 16
UOP AREA 2
REMEDIAL ACTION REPORT

Field Sample No.	LS-1(16)-01	LS-1(16)-02
Lab Sample No.	D97-4155-2	D97-11758-3
Depth (feet)	N/A	N/A
Type	Aqueous	Aqueous
Date Collected	4/4/97	9/26/97
Compound (ug/l)		
BNAs		
N-Nitrosodimethylamine	<5.0	<5.5
Phenol	<1.5	<1.7
Bis(2-chloroethyl)ether	<5.7	<6.3
2-Chlorophenol	<3.3	<3.6
1,3-Dichlorobenzene	<1.9	<2.1
1,4-Dichlorobenzene	<4.4	<4.8
1,2-Dichlorobenzene	<1.9	<2.1
Bis(2-chloroisopropyl)ether	<5.7	<6.3
Hexachloroethane	<1.6	<1.8
Nitrobenzene	<1.9	<2.1
Isophorone	<2.2	<2.4
2,4-Dimethylphenol	<2.7	<3.0
2-Nitrophenol	<3.8	<4.2
2,4-Dichlorophenol	<2.7	<3.0
1,2,4-Trichlorobenzene	<1.9	<2.1
Naphthalene	<1.8	<2.0
Hexachlorobutadiene	<0.9	<1.0
Hexachlorocyclopentadiene	<5.0	<5.5
2,4,6-Trichlorophenol	<2.7	<3.0
Dimethylphthalate	<1.8	<2.0
2,6-Dinitrotoluene	<1.9	<2.1
Acenaphthylene	<3.5	<3.9
2,4-Dinitrophenol	<42.0	<46.2
4-Nitrophenol	<3.8	<4.2
2,4-Dinitrotoluene	<5.7	<6.3
Diethylphthalate	<1.9	<2.1
Fluorene	<1.9	<2.1
4,6-Dinitro-2-methylphenol	<24.0	<26.4
N-Nitrosodiphenylamine	<1.9	<2.1
Hexachlorobenzene	<1.9	<2.1
Pentachlorophenol	<3.5	<3.9
Phenanthrene	<5.4	<5.9
Anthracene	<1.9	<2.1
Di-n-butylphthalate	<2.5	<2.8

NOTES:
 All analyses performed by Intertek Testing Services,
 NJDEP Laboratory Certification No. 82716
 N/A - Not Applicable
 EPA Method 625 - Base Neutrals and Acid Extractables (BNAs)
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TABLE 4 (Cont'd)
ALLIEDSIGNAL MONTHLY GROUNDWATER MONITORING PROGRAM
GROUNDWATER SAMPLE ANALYTICAL RESULTS
SUMP 16
UOP AREA 2
REMEDIAL ACTION REPORT

Field Sample No.	LS-1(16)-01	LS-1(16)-02
Lab Sample No.	D97-4155-2	D97-11758-3
	N/A	N/A
Type	Aqueous	Aqueous
Date Collected	4/4/97	9/26/97
Compound (ug/l)		
BNAs		
Fluoranthene	<2.2	<2.4
Benzdine	<5.7	<6.3
Pyrene	<1.9	<2.1
Butylbenzylphthalate	<2.5	<2.8
Bis(2-Ethylhexyl)phthalate	<2.5	<2.8
3,3'-Dichlorobenzidine	<16.5	<18.2
Benzo(a)anthracene	<7.8	<8.6
Chrysene	<2.5	<2.8
Benzo(b)fluoranthene	<4.8	<5.3
Benzo(k)fluoranthene	<2.5	<2.8
Benzo(a)pyrene	<2.5	<2.8
Indeno(1,2,3-cd)pyrene	<3.7	<4.1
Dibenzo(a,h)anthracene	<2.5	<2.8
Benzo(g,h,i)perylene	<4.1	<4.5
1,2,4,5-Tetrachlorobenzene	<10.0	<11.0
Pentachlorobenzene	<10.0	<11.0
Total PCBs		
Aroclor 1016	<0.50	<0.50
Aroclor 1221	<0.50	<0.50
Aroclor 1232	<0.50	<0.50
Aroclor 1242	<0.50	0.51
Aroclor 1248	0.85	<0.50
Aroclor 1254	<0.50	<0.50
Aroclor 1260	<0.50	<0.50
Dissolved PCBs		
Aroclor 1016	NA	<0.50
Aroclor 1221	NA	<0.50
Aroclor 1232	NA	<0.50
Aroclor 1242	NA	<0.50
Aroclor 1248	NA	<0.50
Aroclor 1254	NA	<0.50
Aroclor 1260	NA	<0.50

NOTES:

All analyses performed by Intertek Testing Services.
 NJDEP Laboratory Certification No 82716
 N/A - Not Applicable
 NA - Not Analyzed
 EPA Method 625 - Base Neutrals and Acid Extractables (BNAs)
 EPA Method 608 - Polychlorinated Biphenyls (PCBs)
 Concentrations with bold border exceed NJDEP Human Health
 Surface Water Quality Criteria

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TABLE 4 (Cont'd)
 ALLIEDSIGNAL MONTHLY GROUNDWATER MONITORING PROGRAM
 GROUNDWATER SAMPLE ANALYTICAL RESULTS
 SUMP 17
 UOP AREA 2
 REMEDIAL ACTION REPORT

Field Sample No.	LS-1(17)-01 (LS-1(17)-02)	LS-1(17)-02	LS-1(17)-03	LS-1(17)-04
Lab Sample No.	D97-6478-2	D97-9080-1	D97-10473-1	D97-11758-4
Depth (feet)	N/A	N/A	N/A	N/A
Type	Aqueous	Aqueous	Aqueous	Aqueous
Date Collected	5/27/97	7/23/97	8/27/97	9/26/97
Compound (ug/l)				
VOLATILES				
Chloromethane	<10.0	<10.0	<10.0	<10.0
Bromomethane	<10.0	<10.0	<10.0	<10.0
Vinyl chloride	<10.0	<10.0	<10.0	<10.0
Chloroethane	<10.0	<10.0	<10.0	<10.0
Methylene chloride	<5.0	<5.0	<5.0	<5.0
Acetone	<100	<100	<100	<100
Carbon disulfide	<5.0	<5.0	<5.0	<5.0
1,1-Dichloroethene	<5.0	<5.0	<5.0	<5.0
1,1-Dichloroethane	<5.0	<5.0	<5.0	<5.0
cis-1,2-Dichloroethene	12.9*	33.0*	<5.0	<5.0
trans-1,3-Dichloroethene	<5.0	<5.0	<5.0	<5.0
Chloroform	<5.0	<5.0	<5.0	<5.0
1,2-Dichloroethane	<5.0	<5.0	<5.0	<5.0
2-Butanone	<50.0	<50.0	<50.0	<50.0
1,1,1-Trichloroethane	<5.0	<5.0	<5.0	<5.0
Carbon tetrachloride	<5.0	<5.0	<5.0	<5.0
Bromodichloromethane	<5.0	<5.0	<5.0	<5.0
1,2-Dichloropropane	<5.0	<5.0	<5.0	<5.0
cis-1,3-Dichloropropene	<5.0	<5.0	<5.0	<5.0
Trichloroethene	<5.0	<5.0	<5.0	<5.0
Chlorodibromomethane	<5.0	<5.0	<5.0	<5.0
1,1,2-Trichloroethane	<5.0	<5.0	<5.0	<5.0
Benzene	<5.0	<5.0	7.3*	6.5*
trans-1,2-Dichloropropene	<5.0	<5.0	<5.0	<5.0
Bromoform	<5.0	<5.0	<5.0	<5.0
4-Methyl-2-pentanone	<50.0	<50.0	<50.0	<50.0
2-Hexanone	<50.0	<50.0	<50.0	<50.0
Tetrachloroethene	<5.0	<5.0	<5.0	<5.0
Toluene	74.6*	14.3*	<5.0	68.6*
1,1,2,2-Tetrachloroethane	<5.0	<5.0	<5.0	<5.0
Chlorobenzene	<5.0	6.7*	<5.0	<5.0
Ethylbenzene	<5.0	<5.0	<5.0	<5.0
Styrene	<5.0	<5.0	<5.0	<5.0
o-Xylene	<5.0	<5.0	<5.0	<5.0
m,p-Xylene	<5.0	<5.0	<5.0	<5.0
Total VOCs	87.5	54.0	7.3	75.1
METALS				
Lead	2.0*	10.8	<1.5	<2.0
Arsenic	9.5*	5.0*	7.8*	<2.0

NOTES:

All analyses performed by Intertek Testing Services.

NJDEP Laboratory Certification No. 82716

N/A - Not Applicable

EPA Method 8240 - Volatile Organic Compounds (VOCs)

EPA Method 7060 - Arsenic

EPA Method 7421 - Lead

Concentrations with bold border exceed NJDEP Chronic Aquatic Saltwater Surface Water Quality Criteria

* - Concentration is above method detection limit

Sample LS-1(17)-01 incorrectly reported as LS-1(17)-02

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TABLE 4 (Cont'd)
ALLIEDSIGNAL MONTHLY GROUNDWATER MONITORING PROGRAM
GROUNDWATER SAMPLE ANALYTICAL RESULTS
SUMP 17
UOP AREA 2
REMEDIAL ACTION REPORT

Field Sample No.	LS-1(17)-01 (LS-1(17)-02)	LS-1(17)-02	LS-1(17)-03	LS-1(17)-04
Lab Sample No.	D97-6478-2	D97-9080-1	D97-10473-1	D97-11758-4
Depth (feet)	N/A	N/A	N/A	N/A
Type	Aqueous	Aqueous	Aqueous	Aqueous
Date Collected	5/27/97	7/23/97	8/27/97	9/26/97
Compound (ug/l)				
BNAs				
N-Nitrosodimethylamine	<5.0	<5.0	<5.5	<6.1
Phenol	<1.5	<1.5	<1.7	<1.8
Bis(2-chloroethyl)ether	<5.7	<5.7	<6.3	<7.0
2-Chlorophenol	<3.3	<3.3	<3.6	<4.0
1,3-Dichlorobenzene	<1.9	<1.9	<2.1	<2.3
1,4-Dichlorobenzene	<4.4	<4.4	<4.8	<5.4
1,2-Dichlorobenzene	<1.9	<1.9	1.5J*	<2.3
Bis(2-chloroisopropyl)ether	<5.7	<5.7	<6.3	<7.0
Hexachloroethane	<1.6	<1.6	<1.8	<2.0
Nitrobenzene	<1.9	<1.9	<2.1	<2.3
Isophorone	<2.2	<2.2	<2.4	<2.7
2,4-Dimethylphenol	<2.7	<2.7	<3.0	<3.3
2-Nitrophenol	<3.8	<3.8	<4.2	<4.6
2,4-Dichlorophenol	<2.7	<2.7	<3.0	<3.3
1,2,4-Trichlorobenzene	<1.9	<1.9	<2.1	<2.3
Naphthalene	<1.8	<1.8	<2.0	<2.2
Hexachlorobutadiene	<0.9	<0.9	<1.0	<1.1
Hexachlorocyclopentadiene	<5.0	<5.0	<5.5	<6.1
2,4,6-Trichlorophenol	<2.7	<2.7	<3.0	<3.3
Dimethylphthalate	<1.8	<1.8	<2.0	<2.2
2,6-Dinitrotoluene	<1.9	<1.9	<2.1	<2.3
Acenaphthylene	<3.5	<3.5	<3.9	<4.3
2,4-Dinitrophenol	<42.0	<42.0	<46.2	<51.2
4-Nitrophenol	<3.8	<3.8	<4.2	<4.6
2,4-Dinitrotoluene	<5.7	<5.7	<6.3	<7.0
Diethylphthalate	<1.9	<1.9	<2.1	<2.3
Fluorene	<1.9	<1.9	<2.1	<29.3
4,6-Dinitro-2-methylphenol	<24.0	<24.0	<26.4	<2.3
N-Nitrosodiphenylamine	<1.9	<1.9	<2.1	<2.3
Hexachlorobenzene	<1.9	<1.9	<2.1	<4.3
Pentachlorophenol	<3.5	<3.5	<3.9	<6.6
Phenanthrene	<5.4	<5.4	<5.9	<3.1
Anthracene	<1.9	<1.9	<2.1	<2.3
Di-n-butylphthalate	<2.5	<2.5	<2.8	<3.1

NOTES:

All analyses performed by Intertek Testing Services.

NJDEP Laboratory Certification No. 82716

N/A - Not Applicable

J - Estimated Concentration

EPA Method 625 - Base Neutrals and Acid Extractables (BNAs)

Sample LS-1(17)-01 incorrectly reported as LS-1(17)-02

* - Concentration is above method detection limit

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TABLE 4 (Cont'd)
 ALLIEDSIGNAL MONTHLY GROUNDWATER MONITORING PROGRAM
 GROUNDWATER SAMPLE ANALYTICAL RESULTS
 SUMP 17
 UOP AREA 2
 REMEDIAL ACTION REPORT

Field Sample No.	LS-1(17)-01 (LS-1(17)-02)	LS-1(17)-02	LS-1(17)-03	LS-1(17)-04
Lab Sample No.	D97-6478-2	D97-9080-1	D97-10473-1	D97-11758-4
Depth (feet)	N/A	N/A	N/A	N/A
Type	Aqueous	Aqueous	Aqueous	Aqueous
Date Collected	5/27/97	7/23/97	8/27/97	9/26/97
Compound (ug/l)				
BNAs				
Fluoranthene	<2.2	<2.2	<2.4	<2.7
Benizidine	<5.7	<5.7	<6.3	<7.0
Pyrene	<1.9	<1.9	<2.1	<2.3
Butylbenzylphthalate	<2.5	<2.5	<2.8	<3.1
Bis(2-Ethylhexyl)phthalate	<2.5	<2.5	2.6 J*	<3.1
3,3'-Dichlorobenzidine	<16.5	<16.5	<18.2	<20.1
Benzo(a)anthracene	<7.8	<7.8	<8.6	<9.5
Chrysene	<2.5	<2.5	<2.8	<3.1
Benzo(b)fluoranthene	<4.8	<4.8	<5.3	<5.9
Benzo(k)fluoranthene	<2.5	<2.5	<2.8	<3.1
Benzo(a)pyrene	<2.5	<2.5	<2.8	<3.1
Indeno(1,2,3-cd)pyrene	<3.7	<3.7	<4.1	<4.5
Dibenzo(a,h)anthracene	<2.5	<2.5	<2.8	<3.1
Benzo(g,h,i)perylene	<4.1	<4.1	<4.5	<5.0
1,2,4,5-Tetrachlorobenzene	<10.0	<10.0	<11.0	<12.2
Pentachlorobenzene	<10.0	<10.0	<11.0	<12.2
Total PCBs				
Aroclor 1016	<0.50	<0.55	<0.50	<0.50
Aroclor 1221	<0.50	<0.55	<0.50	<0.50
Aroclor 1232	<0.50	<0.55	<0.50	<0.50
Aroclor 1242	<0.50	<0.55	<0.50	0.62
Aroclor 1248	1.97	1.89	0.91	<0.50
Aroclor 1254	<0.50	<0.55	<0.50	<0.50
Aroclor 1260	<0.50	<0.55	<0.50	<0.50
Dissolved PCBs				
Aroclor 1016	NA	NA	NA	<0.50
Aroclor 1221	NA	NA	NA	<0.50
Aroclor 1232	NA	NA	NA	<0.50
Aroclor 1242	NA	NA	NA	<0.50
Aroclor 1248	NA	NA	NA	<0.50
Aroclor 1254	NA	NA	NA	<0.50
Aroclor 1260	NA	NA	NA	<0.50

NOTES:

All analyses performed by Intertek Testing Services.

NJDEP Laboratory Certification No. 82716

N/A - Not Applicable

NA - Not Analyzed

J - Estimated Concentration

EPA Method 625 - Base Neutrals and Acid Extractables (BNAs)

EPA Method 608 - Polychlorinated Biphenyls

* - Concentration is above method detection limit

Concentrations with bold border exceed NJDEP Chronic Aquatic Surface Water Quality Criteria

Sample LS-1(17)-01 incorrectly reported as LS-1(17)-02

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TABLE 4 (Cont'd)
NJPDOS MONTHLY GROUNDWATER MONITORING PROGRAM
GROUNDWATER SAMPLE ANALYTICAL RESULTS
SUMPS 16 AND 17
UOP AREA 2
REMEDIAL ACTION REPORT

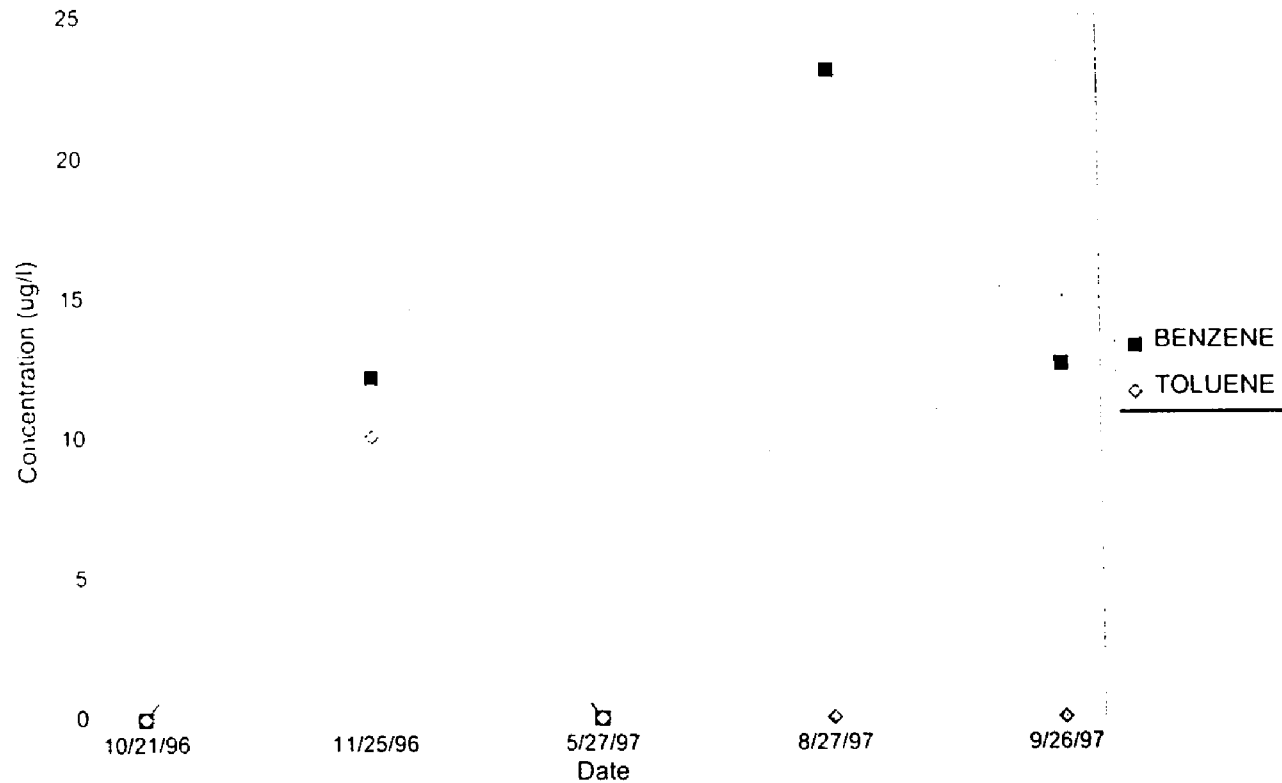
Field Sample No.	LS-1(16)-01	LS-1(17)-01
Lab Sample No.	D96-13392-2	D96-11994-5
Depth (feet)	N/A	NA
Type	Aqueous	Aqueous
Date Collected	11/21/96	10/23/96
Compound (ug/l)		
VOLATILES		
Chloromethane	<10.0	<10.0
Bromomethane	<10.0	<10.0
Vinyl chloride	3.3*	<10.0
Chloroethane	<10.0	<10.0
Methylene chloride	<5.0	<5.0
Acetone	<100	<100
Carbon disulfide	<5.0	<5.0
1,1-Dichloroethene	<5.0	<5.0
1,1-Dichloroethane	<5.0	<5.0
cis-1,2-Dichloroethene	13.8*	18.4*
trans-1,2-Dichloroethene	<5.0	<5.0
Chloroform	<5.0	<5.0
1,2-Dichloroethane	<5.0	<5.0
2-Butanone	<50.0	<50.0
1,1,1-Trichloroethane	<5.0	<5.0
Carbon tetrachloride	<5.0	<5.0
Bromodichloromethane	<5.0	<5.0
1,2-Dichloropropane	<5.0	<5.0
cis-1,3-Dichloropropene	<5.0	<5.0
Trichloroethene	<5.0	<5.0
Chlorodibromomethane	<5.0	<5.0
1,1,2-Trichloroethane	<5.0	<5.0
Benzene	17.2*	41.6*
trans-1,3-Dichloropropene	<5.0	<5.0
Bromoform	<5.0	<5.0
4-Methyl-2-pentanone	<50.0	<50.0
2-Hexanone	<50.0	<50.0
Tetrachloroethene	<5.0	<5.0
Toluene	815*	4740*
1,1,2,2-Tetrachloroethane	<5.0	<5.0
Chlorobenzene	<5.0	15.7*
Ethylbenzene	7.3*	14.0*
Styrene	<5.0	<5.0
o-Xylene	8.0*	9.8*
m,p-Xylene	15.9*	34.5*
Total VOCs	678.5	4874
METALS		
Lead	<1.49	NA
Arsenic	0.95*	NA

NOTES
All analyses performed by Intertek Testing Services.
NJDEP Laboratory Certification No. 82716
NA - Not Analyzed
N/A - Not Applicable
EPA Method 8240 - Volatile Organic Compounds (VOCs)
EPA Method 7060 - Arsenic
EPA Method 7421 - Lead
* - Concentration is above method detection limit

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GROUNDWATER VOC TRENDS

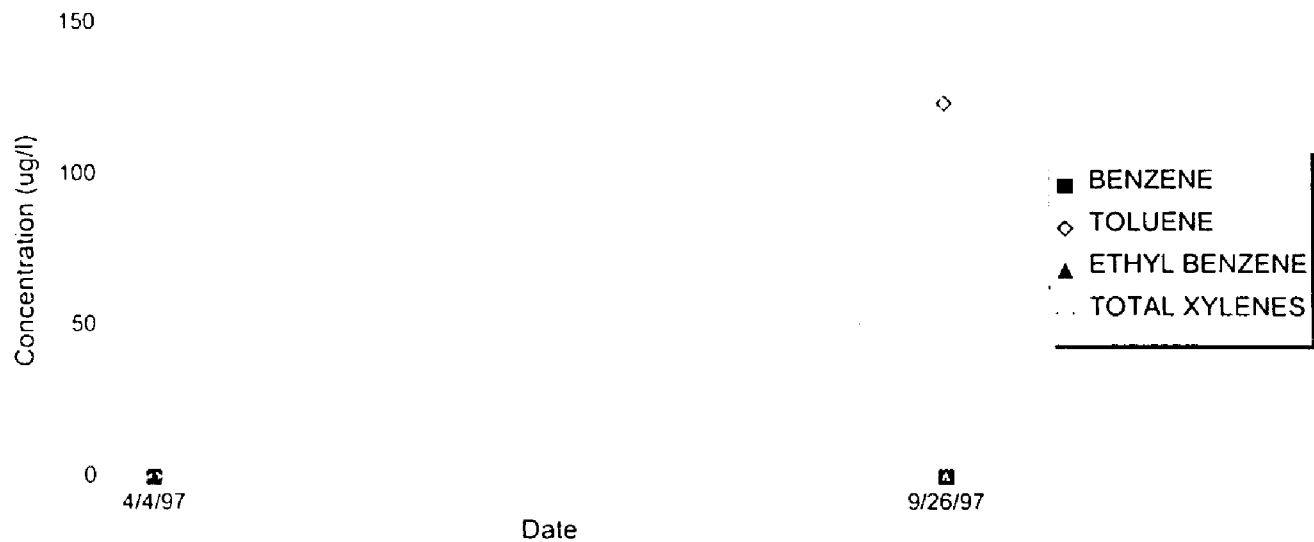
SUMP 14



UOP AREA 2
REMEDIAL ACTION REPORT

GROUNDWATER VOC TRENDS

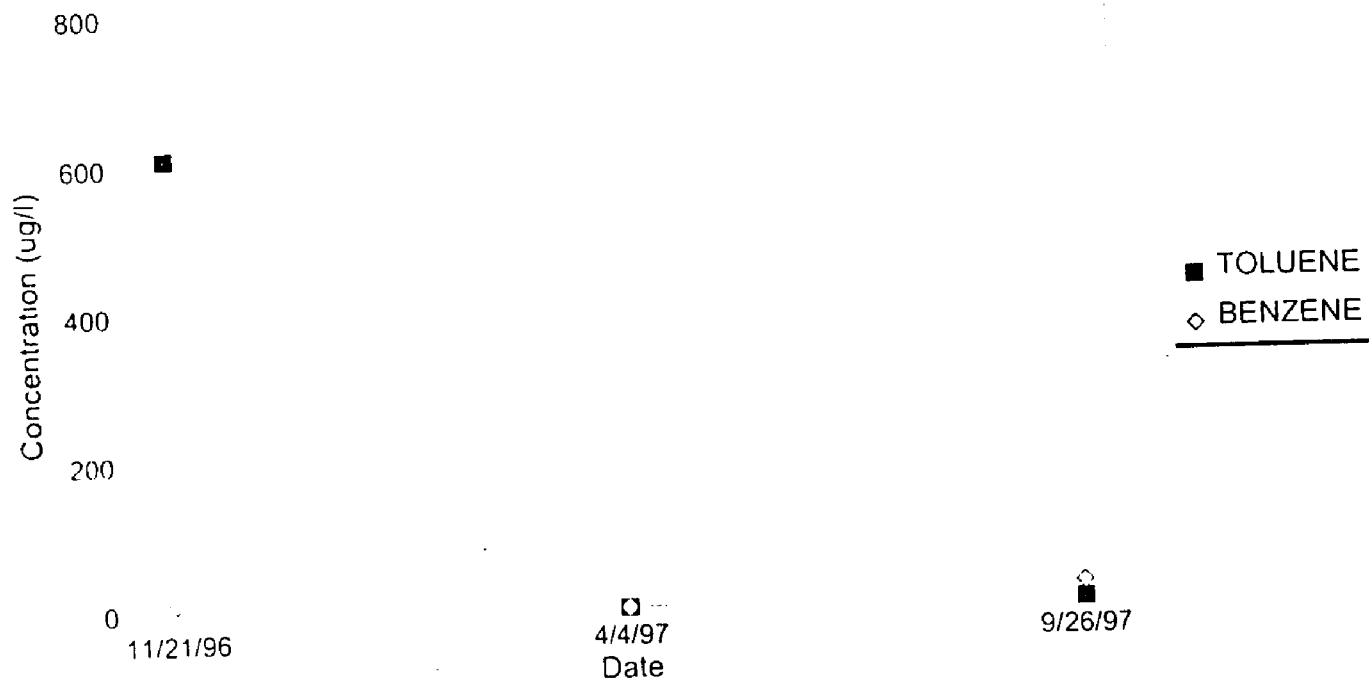
SUMP 15



Date
UOP AREA 2
REMEDIAL ACTION REPORT

GROUNDWATER VOC TRENDS

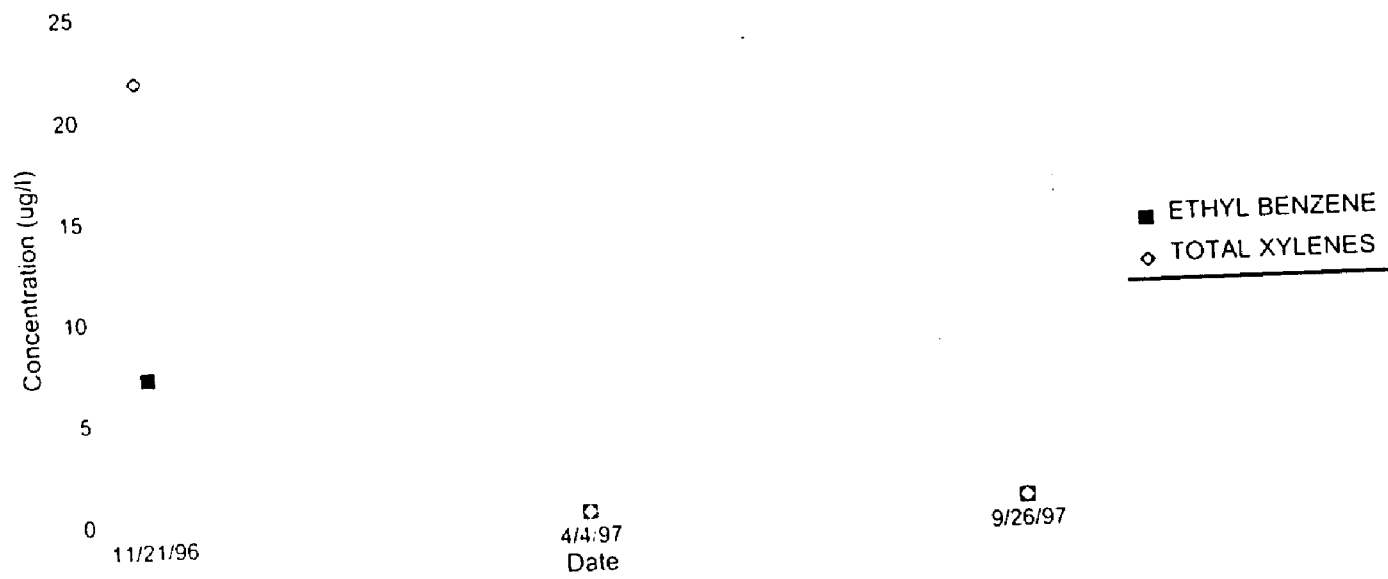
SUMP 16



UOP AREA 2
REMEDIAL ACTION REPORT

GROUNDWATER VOC TRENDS

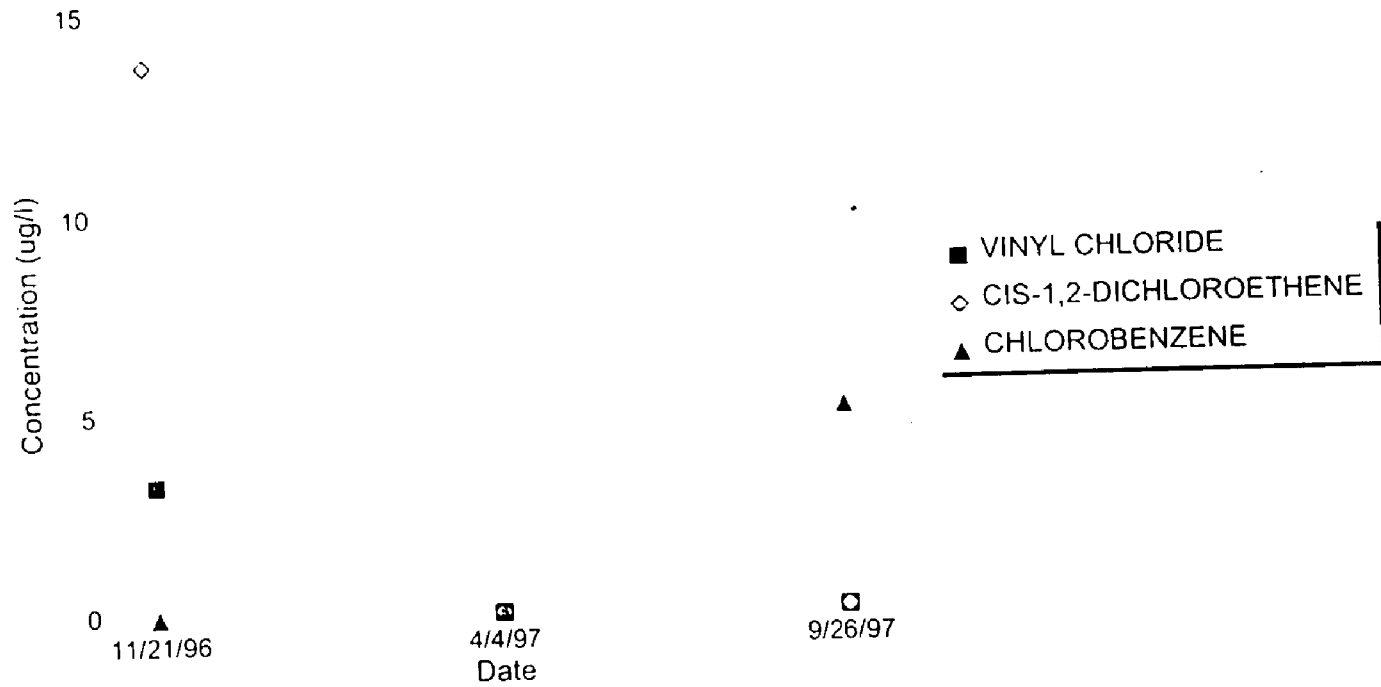
SUMP 16



UOP AREA 2
REMEDIAL ACTION REPORT

GROUNDWATER VOC TRENDS

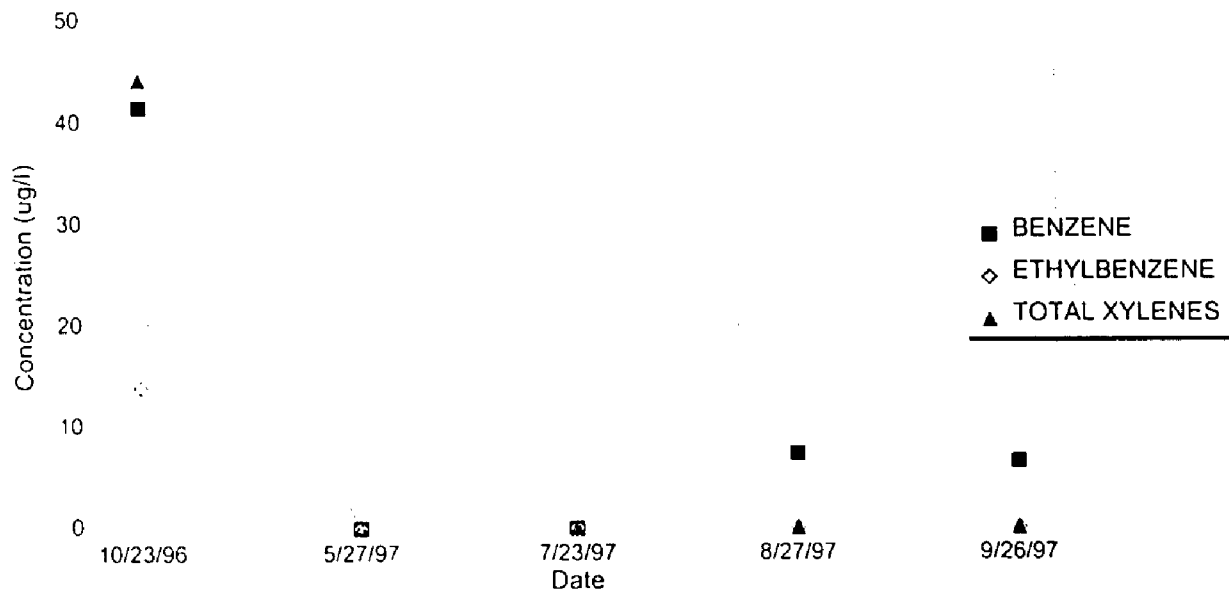
SUMP 16



UOP AREA 2
REMEDIAL ACTION REPORT

GROUNDWATER VOC TRENDS

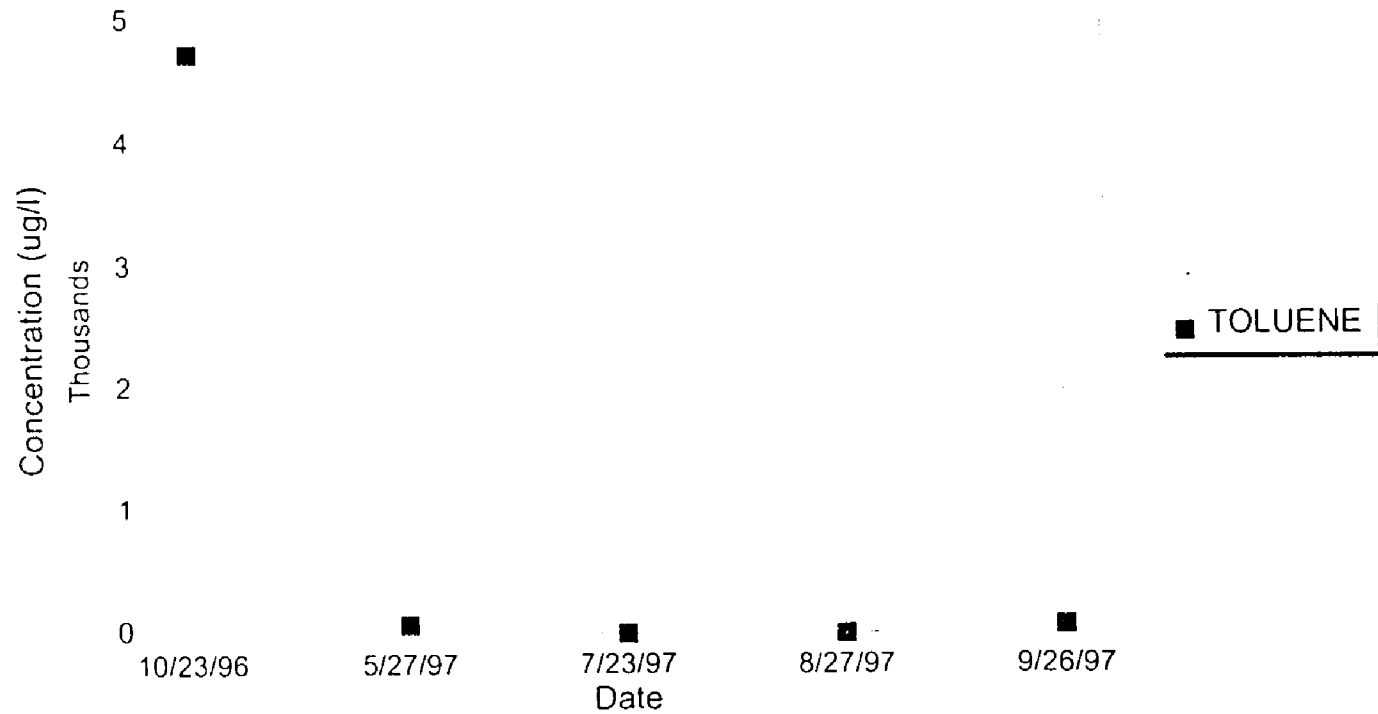
SUMP 17



UOP AREA 2
REMEDIAL ACTION REPORT

GROUNDWATER VOC TRENDS

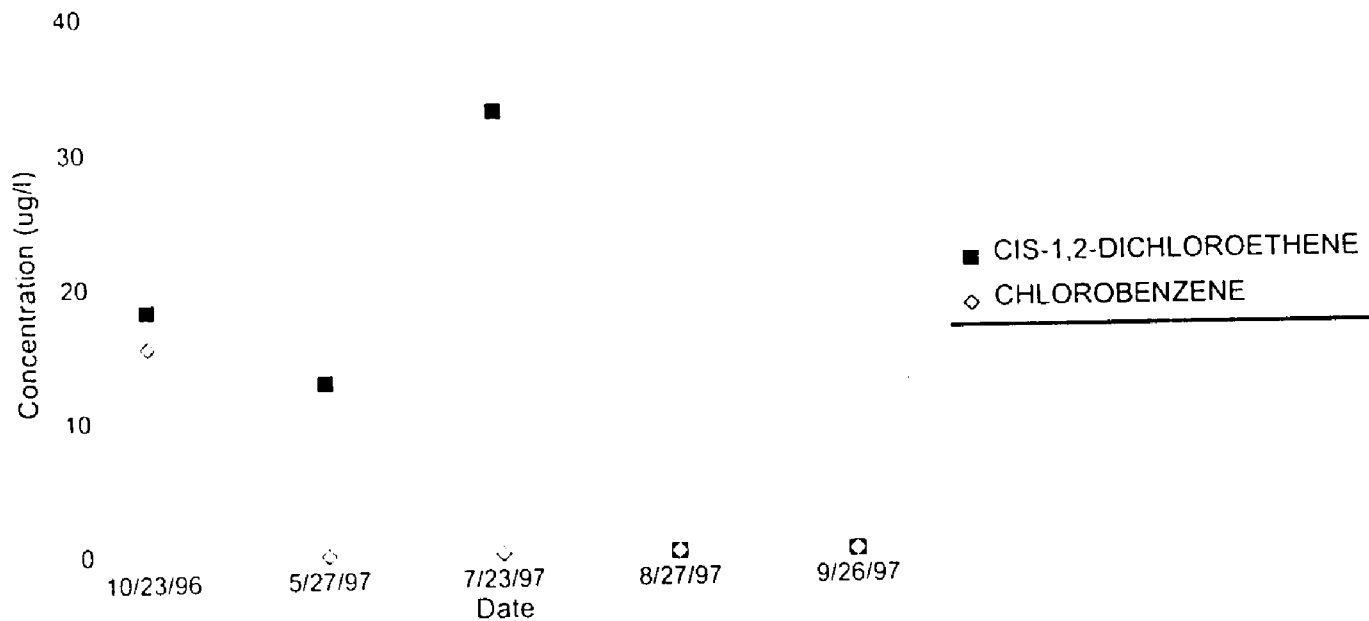
SUMP 17



UOP AREA 2
REMEDIAL ACTION REPORT

GROUNDWATER VOC TRENDS

SUMP 17



UOP AREA 2
REMEDIAL ACTION REPORT

TABLE 5
 QUALITY ASSURANCE/QUALITY CONTROL SAMPLE RESULTS
 UOP - AREA 2
 REMEDIAL ACTION REPORT

Field Sample No.	ISA-01-AE	ISA-09-AM	ISA-09-AN	ISA-19AM	ISA-19-AN	ISA-21AE (ICA-21AE)	EWA-01-AX16M	EWA-01-AX16N
Laboratory Sample No	D96-6270-19	D96-6270-21	D96-6270-22	D96-6582-2	D96-6582-5	D96-6582-11	D96-7835-15	D96-7835-16
Depth (feet)	N/A	0.2	0.2	0.2	0.2	N/A	1.5-2.0	1.5-2.0
Type	Field Blank	Matrix Spike	Matrix Spike Duplicate	Matrix Spike	Matrix Spike Duplicate	Field Blank	Matrix Spike	Matrix Spike Duplicate
Date Collected	06/11/96	06/11/96	06/11/96	06/18/96	06/18/96	06/18/96	07/17/96	07/17/96
Compound (mg/kg or ug/l)								
VOLATILES								
1,1,2,2-Tetrachloroethane	NA	NA	NA	0.047	0.053	<5.00	NA	NA
Total VOCs	NA	NA	NA	1.44	1.72	<100	NA	NA
cPAHs								
Benzo(a)anthracene	<10.0	<4.31	<4.08	NA	NA	NA	4.44	3.92
Benzo(b)fluoranthene	<10.0	<4.31	<4.08	NA	NA	NA	4.55	4.71
Benzo(k)fluoranthene	<10.0	<4.31	<4.08	NA	NA	NA	5.66	4.62
Benzo(a)pyrene	<10.0	2.64	2.22	NA	NA	NA	4.89	4.2
Chrysene	<10.0	<4.31	<4.08	NA	NA	NA	4.34	3.77
Dibenz(a,h)anthracene	<10.0	2	2.13	NA	NA	NA	5.43	4.25
Indeno(1,2,3-cd)pyrene	<10.0	<4.31	<4.08	NA	NA	NA	5.2	3.84
Total cPAHs	<10.0	4.64	4.35	NA	NA	NA	34.5	29.3
Total PCBs	<0.50	NA	NA	NA	NA	NA	49.9	0.99

NOTES

All analyses performed by Incape Testing Services NJDEP Laboratory Certification No. 82715

NA - Not Analyzed

N/A - Not Applicable

* - All field blank results are reported in ug/L

EPA Method 8240 - VOA, EPA Method 8270B - cPAH, EPA Method 8080 - PCB

Special Qualifiers: M = Matrix Spike, N = Matrix Spike Duplicate, E = Equipment Rinse Blank

Sample ISA-21AE incorrectly reported as ICA-21AE

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TABLE 5 (Cont'd)
 QUALITY ASSURANCE/QUALITY CONTROL SAMPLE RESULTS
 UOP - AREA 2
 REMEDIAL ACTION REPORT

Field Sample No	ISA-14-AM	ISA-14-AN	ISA-28AM	ISA-28AN	ISA-24AE	ISA-28AM	ISA-28AN	EWA-03-AX3E
Laboratory Sample No	D96-6270-28	D96-6270-29	D96-6313-8 (cPAHs) D96-6803-6 (PCBs)	D96-6313-9 (cPAHs) D96-6803-7 (PCBs)	D96-6313-10	D96-6803-6	D96-6803-7	D96-8407-2
Depth (feet)	0-2	0-2	0-2	0-2	0-2	0-2	0-2	N/A
Type	Matrix Spike	Matrix Spike Duplicate	Matrix Spike	Matrix Spike Duplicate	Field Blank	Matrix Spike	Matrix Spike Duplicate	Field Blank
Date Collected	06/11/96	06/11/96	06/12/96	06/12/96	06/12/96	06/12/96	06/12/96	08/23/96
Compound (mg/kg)or(ug/l)*								
VOLATILES								
1,1,2,2-Tetrachloroethane	NA	NA	NA	NA	NA	NA	NA	NA
Total VOCs	NA	NA	NA	NA	NA	NA	NA	NA
cPAHs								
Benzo(a)anthracene	3.94	4.14	6.79	6.75	<10.0	NA	NA	<10
Benzo(b)fluoranthene	4.46	4.28	6.77	7.45	<10.0	NA	NA	<10
Benzo(k)fluoranthene	3.75	4.32	7.18	7.00	<10.0	NA	NA	<10
Benzo(a)pyrene	3.97	4.21	6.4	6.65	<10.0	NA	NA	<10
Chrysene	4.08	4.3	6.62	6.67	<10.0	NA	NA	<10
Dibenz(a,h)anthracene	3.79	4.06	6.16	5.97	<10.0	NA	NA	<10
Indeno(1,2,3-cd)pyrene	3.83	4.1	6.01	5.7	<10.0	NA	NA	<10
Total cPAHs	27.8	29.4	45.9	46.2	<10.0	NA	NA	<10
Total PCBs	NA	NA	55.9	43.7	<0.50	55.9	43.7	<0.50
NOTES All analyses performed by Inchope Testing Services NJDEP Laboratory Certification No 82716 NA - Not Analyzed N/A - Not Applicable * - All field blank results are reported in ug/L. EPA Method 8240 - VOA, EPA Method 8270B - cPAH, EPA Method 8080 - PCB Special Qualifiers: M = Matrix Spike, N = Matrix Spike Duplicate, E = Equipment Rinse Blank								

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TABLE 5 (Cont'd)
 QUALITY ASSURANCE/QUALITY CONTROL SAMPLE RESULTS
 UOP - AREA 2
 REMEDIAL ACTION REPORT

Field Sample No	EWA-01-AX18E	EWA-01-AX16BM	EWA-01-AX16BN	EWA-01A-AX17CE	ESPC-01-BE	ESPC-01-BM	ESPC-01-BN	ESPC-05-EM	ESPC-05-EN
Laboratory Sample No	D96-10098-1	D96-10098-7	D96-10098-8	D96-10625-1	D96-11311-1	D96-11311-5	D96-11311-6	D96-13079-2	D96-13079-3
Depth (feet)	N/A	1.5-2.0	1.5-2.0	N/A	N/A	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0
Type	Field Blank	Matrix Spike	Matrix Spike Duplicate	Field Blank	Field Blank	Matrix Spike	Matrix Spike Duplicate	Matrix Spike	Matrix Spike Duplicate
Date Collected	09/11/96	09/11/96	09/11/96	09/23/96	10/8/96	10/8/96	10/8/96	11/14/96	11/14/96
Compound (mg/kg) or (ug/l)*									
VOLATILES									
1,1,2,2-Tetrachloroethane	NA	NA	NA	NA	NA	0.064	0.072	0.43	0.464
Total VOCs	N/A	NA	NA	NA	NA	3	3.04	14.7	14.2
cPAHs									
Benzo(a)anthracene	NA	NA	N/A	NA	<100	43.9	52.8	4.18	4.08
Benzo(b)fluoranthene	NA	NA	NA	NA	<100	45	56.5	4.37	5.21
Benzo(k)fluoranthene	NA	NA	NA	NA	<100	38.8	50.9	4.28	3.77
Benzo(a)pyrene	NA	NA	NA	NA	<100	45.7	57.2	4.12	4.05
Chrysene	NA	NA	NA	NA	<100	42.2	52.2	3.93	3.94
Dibenz(a,h)anthracene	NA	NA	NA	NA	<100	41.5	47.8	3.34	3.29
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	<100	42.3	48.9	3.43	3.38
Total cPAHs	NA	NA	NA	NA	<100	299	366	27.7	27.7
Total PCBs	<0.50	0.282	0.258	<0.50	<0.50	89.8	141	7.76	8.68
NOTES									
All analyses performed by Inchope Testing Services. NNJDEP Laboratory Certification No. 82716									
NA - Not Analyzed									
N/A - Not Applicable									
* - All field blank results are reported in ug/L.									
EPA Method 8240 - VOA, EPA Method 8270B - cPAH, EPA Method 8080 - PCB									
Special Qualifiers: M = Matrix Spike, N = Matrix Spike Duplicate, E = Equipment Rinse Blank									

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TABLE 5 (Cont'd)
 QUALITY ASSURANCE/QUALITY CONTROL SAMPLE RESULTS
 UOP - AREA 2
 REMEDIAL ACTION REPORT

Field Sample No.	ESPC-03-BE	ESPC-04-BE	EWA-03A-AX29E	EWA-04B-AX29E	EWA-03B-AX29E	EWA-04C-AX29E	EWA-04A-AX29E	EWA-01-AX29E
Laboratory Sample No.	D96-11511-4	D96-11511-5	D96-11798-1	D96-11798-2	D96-11817-1	D96-11817-2	D96-11800-2	D96-11800-1
Depth (feet)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Type	Field Blank	Field Blank	Field Blank	Field Blank	Field Blank	Field Blank	Field Blank	Field Blank
Date Collected	10/11/96	10/11/96	10/18/96	10/18/96	10/18/96	10/18/96	10/18/96	10/18/96
Compound (ug/l)								
VOLATILES								
1,1,2,2-Tetrachloroethane	NA	NA	NA	NA	NA	NA	NA	NA
Total VOCs	NA	NA	NA	NA	NA	NA	NA	NA
cPAHs								
Benzo(a)anthracene	<11	<10	<10	<10	<10.0	<10.0	<10	<10
Benzo(b)fluoranthene	<11	<10	<10	<10	<10.0	<10.0	<10	<10
Benzo(k)fluoranthene	<11	<10	<10	<10	<10.0	<10.0	<10	<10
Benzo(a)pyrene	<11	<10	<10	<10	<10.0	<10.0	<10	<10
Chrysene	<11	<10	<10	<10	<10.0	<10.0	<10	<10
Dibenz(a,h)anthracene	<11	<10	<10	<10	<10.0	<10.0	<10	<10
Indeno(1,2,3-cd)pyrene	<11	<10	<10	<10	<10.0	<10.0	<10	<10
Total cPAHs	<11	<10	<10	<10	<10.0	<10.0	<10	<10
Total PCBs	<0.50	<0.50	<0.50	<0.50	<0.500	NA	<0.50	<0.50

NOTES

All analyses performed by Inchope Testing Services. NJDEP Laboratory Certification No. 82716

NA - Not Analyzed

N/A - Not Applicable

EPA Method 8240 - VOA, EPA Method 8270B - cPAH, EPA Method 8080 - PCB

Special Qualifiers: M = Matrix Spike, E = Equipment Rinse Blank

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TABLE 5 (Cont'd)
 QUALITY ASSURANCE/QUALITY CONTROL SAMPLE RESULTS
 UOP - AREA 2
 REMEDIAL ACTION REPORT

Field Sample No.	EWA-04-AX9E	EBB-03-AM	EBB-03-AN	EWA-04D-AX24E	EWA-02A-AX26AE	EWA-02-AX7CE	EWA-03-AX14M	EWA-03-AX14N
Laboratory Sample No.	D96-9560-12	D96-9732-5	D96-9732-6	D96-9732-17	D96-9847-8	D96-10022-1	D96-9406-12	D96-9406-13
Depth (feet)	N/A	2.0-2.5	2.0-2.5	N/A	N/A	N/A	1.5-2.0	1.5-2.0
Type	Field Blank	Matrix Spike	Matrix Spike Duplicate	Field Blank	Field Blank	Field Blank	Matrix Spike	Matrix Spike Duplicate
Date Collected	08/28/96	9/3/96	9/3/96	9/3/96	09/05/96	09/10/96	08/23/96	08/23/96
Compound (mg/kg) or (ug/l)*								
VOLATILES								
1,1,2,2-Tetrachloroethane	NA	0.061	0.058	NA	NA	NA	NA	NA
Total VOCs	NA	1.95	1.67	NA	NA	NA	NA	NA
cPAHs								
Benzo(a)anthracene	<100	NA	NA	<10	NA	NA	3.54	3.65
Benzo(b)fluoranthene	<100	NA	NA	<10	NA	NA	4.23	4.32
Benzo(k)fluoranthene	<100	NA	NA	<10	NA	NA	3.18	3.28
Benzo(a)pyrene	<100	NA	NA	<10	NA	NA	3.36	3.33
Chrysene	<100	NA	NA	<10	NA	NA	3.3	3.19
Dibenz(a,h)anthracene	<100	NA	NA	<10	NA	NA	2.8	2.94
Indeno(1,2,3-cd)pyrene	<100	NA	NA	<10	NA	NA	2.73	3.02
Total cPAHs	<100	NA	NA	<10	NA	NA	23.1	23.7
Total PCBs	<0.50	NA	NA	<0.50	<0.50	<0.50	1.44	2.28

NOTES

All analyses performed by Inchepe Testing Services. NJDEP Laboratory Certification No. 82716

NA - Not Analyzed

N/A - Not Applicable

* - All field blank results are reported in ug/L.

EPA Method 8240 - VOA, EPA Method 8270B - cPAH, EPA Method 8080 - PCB

Special Qualifiers: M = Matrix Spike, N = Matrix Spike Duplicate, E = Equipment Rinse Blank

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TABLE 5 (Cont'd)
QUALITY ASSURANCE/QUALITY CONTROL SAMPLE RESULTS
UOP - AREA 2
REMEDIAL ACTION REPORT

Field Sample No.	EWA-04C-AX29M	EWA-04C-AX29N
Laboratory Sample No.	D96-11801-2	D96-11801-3
Depth (feet)	2-2.5	2-2.5
Type	Matrix Spike	Matrix Spike Duplicate
Date Collected	10/18/96	10/18/96
Compound (mg/kg)		
VOLATILES		
1,1,2,2-Tetrachloroethane	NA	NA
Total VOCs	N/A	N/A
cPAHs		
Benzo(a)anthracene	2.84	3.09
Benzo(b)fluoranthene	2.86	3.46
Benzo(k)fluoranthene	2.82	3.22
Benzo(a)pyrene	2.82	3.24
Chrysene	2.42	2.87
Dibenz(a,h)anthracene	2.52	2.67
Indeno(1,2,3-cd)pyrene	2.56	2.56
Total cPAHs	18.8	21.1
Total PCBs	7.83	6.89

NOTES

All analyses performed by Inchoape Testing Services
 NJDEP Laboratory Certification No. 82716

NA - Not Analyzed

All field blank results are reported in ug/L.

EPA Method 8240 - VOA, EPA Method 8270B - cPAH, EPA Method 8080 - PCB
 Special Qualifiers: M = Matrix Spike, N = Matrix Spike Duplicate

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SENTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT

REGION SITE NUMBER (to be assigned by HQ)

GENERAL INSTRUCTIONS: Complete Sections I and III through XV of this form as completely as possible. This is the information on this form to develop a Tentative Disposition (Section II). File this form in its entirety in the regional Hazardous Waste Log File. Be sure to include all appropriate Supplemental Reports in the file. Submit a copy of the form to: U.S. Environmental Protection Agency, Site Tracking System, Hazardous Waste Enforcement Task Force (EN-JJS), 401 M St., SW, Washington, DC 20460.

I. SITE IDENTIFICATION

A. SITE NAME <u>UNIVERSAL OIL PRODUCTS, CHEM. DIVISION</u>	D. STREET (or other identifier) <u>ROUTE 17</u>
C. CITY <u>EAST RUTHERFORD</u>	F. COUNTY NAME <u>BERGEN</u>
E. STATE <u>N.J.</u>	L. ZIP CODE <u>07073</u>

G. SITE OPERATOR INFORMATION	3. TELEPHONE NUMBER <u>(312) 391-2070</u>
1. NAME <u>UOP CORPORATION</u>	8. ZIP CODE <u>60016</u>
2. STREET <u>TEN UOP PLAZA</u>	9. STATE <u>ILL.</u>
4. CITY <u>DES PLAINES</u>	

H. REALTY OWNER INFORMATION (if different from operator of site)	2. TELEPHONE NUMBER
1. NAME	4. STATE
3. CITY	9. ZIP CODE

I. SITE DESCRIPTION
SITE PREVIOUSLY USED FOR MANUFACTURING VARIOUS INDUSTRIAL CHEMICALS.

J. TYPE OF OWNERSHIP
 1. FEDERAL 2. STATE 3. COUNTY 4. MUNICIPAL 5. PRIVATE

II. TENTATIVE DISPOSITION (complete this section last)

A. ESTIMATE DATE OF TENTATIVE DISPOSITION (mo., day, & yr.)	B. APPARENT SERIOUSNESS OF PROBLEM
	<input type="checkbox"/> 1. HIGH <input type="checkbox"/> 2. MEDIUM <input type="checkbox"/> 3. LOW <input type="checkbox"/> 4. NONE
C. PREPARER INFORMATION	3. DATE (mo., day, & yr.)
1. NAME <u>ARMANDO A. ARGENAL</u> <u>NJDEP, WATER RESCS.</u>	2. TELEPHONE NUMBER <u>(201) 648-2200</u> <u>July 22, 1982</u>

III. INSPECTION INFORMATION

A. PRINCIPAL INSPECTOR INFORMATION	2. TITLE <u>PRINCIPAL ENVT'L. ENGR.</u>
1. NAME <u>ARMANDO A. ARGENAL</u>	4. TELEPHONE NO. (area code & no.) <u>(201) 648-2200</u>
3. ORGANIZATION <u>NJDEP, DIV. OF WATER RESCS, REG. I - ENFORCEMENT</u>	

B. INSPECTION PARTICIPANTS		3. TELEPHONE NO.
1. NAME	2. ORGANIZATION	
<u>John Bolen</u>	<u>Hackensack Meadowlands Dev. Com.</u>	<u>201-460-1700</u>
<u>Richard Katz</u>	<u>NJDEP - Hazard Waste Program</u>	<u>609-984-7874</u>
<u>Mike Rosenberg</u>	<u>NJDEP - Hazardous Waste</u>	<u>609-984-7874</u>

C. SITE REPRESENTATIVES INTERVIEWED (corporate officials, workers, residents)		
1. NAME	2. TITLE & TELEPHONE NO.	3. ADDRESS
<u>John Schroeder</u>	<u>Director of Operations</u>	<u>UOP Chemical Division</u> <u>State Highway 17, East Rutherford, N.J.</u>
<u>Bob Simmons</u>	<u>Utilities Manager</u>	<u>- do -</u>
<u>Dana Lockwood</u>	<u>Env'tl. Engineer</u>	<u>- do -</u>

III. INSPECTION INFORMATION (cont.)

D. GENERATOR INFORMATION (row. of waste)			
1. NAME	2. TELEPHONE NO.	3. ADDRESS	4. WASTE TYPE GENERATED
UOP Chemical Div.	(201) 438-7800	State Highway 17, East Rutherford, New Jersey	Process waste - boiler & manufacturing waste.

E. TRANSPORTER/HAULER INFORMATION			
1. NAME	2. TELEPHONE NO.	3. ADDRESS	4. WASTE TYPE TRANSPORTED

F. IF WASTE IS PROCESSED ON SITE AND ALSO SHIPPED TO OTHER SITES, IDENTIFY OFF-SITE FACILITIES USED FOR DISPOSAL.			
1. NAME	2. TELEPHONE NO.	3. ADDRESS	

G. DATE OF INSPECTION (mo., day, & yr.)	H. TIME OF INSPECTION	I. ACCESS GAINED BY: (credentials must be shown in all cases)	
July 2, 1979 *		<input checked="" type="checkbox"/> 1. PERMISSION	<input type="checkbox"/> 2. WARRANT

J. WEATHER (describe) *Sunny* * And several site inspections after 7/2/79.

IV. SAMPLING INFORMATION Files available at DWR, Reg. I, NJDEP

A. Mark 'X' for the types of samples taken and indicate where they have been sent e.g., regional lab, other EPA lab, contractor, etc. and estimate when the results will be available.

1. SAMPLE TYPE	2. SAMPLE TAKEN (mark 'X')	3. SAMPLE SENT TO:	4. DATE RESULTS AVAILABLE
a. GROUNDWATER	X	NJDEP to UOP to NJ DEPT. OF HEALTH Chem Lab. Betz - Converse - Murdoch, Inc.	"available"
b. SURFACE WATER	X	NJ DEPT. OF HEALTH CHEMISTRY LAB	"available"
c. WASTE			
d. AIR			
e. RUNOFF			
f. SPILL			
g. SOIL	X	BETZ - CONVERSE - MURDOCH, Inc.	"available"
h. VEGETATION			
i. OTHER (specify)			

B. FIELD MEASUREMENTS TAKEN (e.g., radioactivity, explosivity, PH, etc.)			
1. TYPE	2. LOCATION OF MEASUREMENTS	3. RESULTS	
pH	Spill outside of boiler room.	3.0	} 7/2/79 DWR Inspection
pH	Chemical sewer overflowing to storm sewer catch basin	< 1.0	
pH	Spills of Salicylic Acid to storm sewer catch basin	3.0	
pH	Ground near manufacturing building.	< 1.0	

IV. SAMPLING INFORMATION (continued)

C. PHOTOS
 1. TYPE OF PHOTOS
 a. GROUND b. AERIAL
 2. PHOTOS IN CUSTODY OF
 REGION I - Enforcement, Div. of Water Res. NJDEP
D. SITE MAPPED
 YES, SPECIFY LOCATION OF MAPS
 Region I - Enforcement Div. of Water Res., NJDEP { July 29, 1981 Report Ground Water Tech. Inc.
E. COORDINATES
 1. LATITUDE (deg.-min.-sec.)
 N 40° 50' 00"
 2. LONGITUDE (deg.-min.-sec.)
 W 74° 05' 20"

V. SITE INFORMATION

A. SITE STATUS
 1. ACTIVE (Those industrial or municipal sites which are being used for waste treatment, storage, or disposal on a continuing basis, even if in large quantity.)
 2. INACTIVE (Those sites which no longer receive waste.)
 Company moved out from the site, 1980.
 3. OTHER (specify):
 (Those sites that include such incidents like "midnight dumping" where no regular or continuing use of the site for waste disposal has occurred.)
B. IS GENERATOR ON SITE?
 1. NO 2. YES (specify generator's four-digit SIC Code) 2518 Company operated on-site from 1950 - 1980.
C. AREA OF SITE (in acres)
 300 acres
D. ARE THERE BUILDINGS ON THE SITE?
 1. NO 2. YES (specify)
 Buildings demolished late in 1980.

VI. CHARACTERIZATION OF SITE ACTIVITY

Indicate the major site activity(ies) and details relating to each activity by marking 'X' in the appropriate boxes.

X	A. TRANSPORTER	X	U. STORER	X	C. TREATER	X	D. DISPOSER
	1. RAIL		1. PILE		1. FILTRATION		1. LANDFILL
	2. SHIP		2. SURFACE IMPOUNDMENT		2. INCINERATION		2. LANDFARM
	3. BARGE		3. DRUMS		3. VOLUME REDUCTION		3. OPEN DUMP
	4. TRUCK		4. TANK ABOVE GROUND		4. RECYCLING/RECOVERY		4. SURFACE IMPOUNDMENT
	5. PIPELINE		5. TANK BELOW GROUND		5. CHEM./PHYS./TREATMENT		5. MIDNIGHT DUMPING
	6. OTHER (specify):		6. OTHER (specify):		6. BIOLOGICAL TREATMENT		6. INCINERATION
					7. WASTE OIL REPROCESSING		7. UNDERGROUND INJECTION
					8. SOLVENT RECOVERY		8. OTHER (specify):
					9. OTHER (specify):		

Waste oil incinerated on-site.

E. SUPPLEMENTAL REPORTS: If the site falls within any of the categories listed below, Supplemental Reports must be completed. Indicate which Supplemental Reports you have filled out and attached to this form. NA

1. STORAGE 2. INCINERATION 3. LANDFILL 4. SURFACE IMPOUNDMENT 5. DEEP WELL
 6. CHEM/BIO/PHYS TREATMENT 7. LANDFARM 8. OPEN DUMP 9. TRANSPORTER 10. RECYCLOR/RECLAIMER

VII. WASTE RELATED INFORMATION

A. WASTE TYPE
 1. LIQUID 2. SOLID 3. SLUDGE 4. GAS
B. WASTE CHARACTERISTICS
 1. CORROSIVE 2. IGNITABLE 3. RADIOACTIVE 4. HIGHLY VOLATILE
 5. TOXIC 6. REACTIVE 7. INERT 8. FLAMMABLE
 9. OTHER (specify):
C. WASTE CATEGORIES
 1. Are records of wastes available? Specify items such as manifests, inventories, etc. below.
 NJDEP Hazardous Waste Manifest Reporting Records, 1979.

VII. WASTE RELATED INFORMATION (1)

2. Estimate the amount (specify unit of measure) of waste by category, mark 'X' to indicate which wastes are present.											
a. SLUDGE		b. OIL		c. SOLVENTS		d. CHEMICALS		e. SOLIDS		f. OTHER	
AMOUNT		AMOUNT		AMOUNT		AMOUNT		AMOUNT		AMOUNT	
UNIT OF MEASURE		UNIT OF MEASURE		UNIT OF MEASURE		UNIT OF MEASURE		UNIT OF MEASURE		UNIT OF MEASURE	
<input checked="" type="checkbox"/>	(1) PAINTS, PIGMENTS	<input checked="" type="checkbox"/>	(1) OILY WASTES	<input checked="" type="checkbox"/>	(1) HALOGENATED SOLVENTS	<input checked="" type="checkbox"/>	(1) ACIDS	<input type="checkbox"/>	(1) FLYASH	<input checked="" type="checkbox"/>	(1) LABORATORY PHARMACEUTICAL
	(2) METALS SLUDGES		(2) OTHER (specify):		(2) NON-HALOGENATED SOLVENTS		(2) PICKLING LIQUORS		(2) ASBESTOS		(2) HOSPITAL
	(3) POTW				(3) OTHER (specify):		(3) CAUSTICS		(3) MILLING/MINE TAILINGS		(3) RADIOACTIVE
	(4) ALUMINUM SLUDGE					<input checked="" type="checkbox"/>	(4) PESTICIDES		(4) FERROUS SMELTING WASTES		(4) MUNICIPAL
<input checked="" type="checkbox"/>	(5) OTHER (specify): <i>Industrial Waste Sludge</i>						(5) DYES/INKS		(5) NON-FERROUS SMELTING WASTES		(5) OTHER (specify):
							(6) CYANIDE				
							<input checked="" type="checkbox"/>	(7) PHENOLS			
							(8) HALOGENS				
							(9) PCB				
							(10) METALS				
							(11) OTHER (specify):				

D. LIST SUBSTANCES OF GREATEST CONCERN WHICH ARE ON THE SITE (place in descending order of hazard)

1. SUBSTANCE	2. FORM (mark 'X')			3. TOXICITY (mark 'X')				4. CAS NUMBER	5. AMOUNT	6. UNIT
	a. SOLID	b. LIQ.	c. VAPOR	a. HIGH	b. MED.	c. LOW	d. NONE			
Chloroform		X		X				67-66-3	10	PPB
Acrolein		X		X				107-02-8	1,000	"
Benzene		X		X				71-43-2	14,000	"
Toluene		X			X			108-88-3	8,000	"
Mercury		X		X				7439-97-6	20	PPB
Ethylbenzene		X			X			100-41-4	200	PPB
Tetrachloroethylene				X				127-18-4	100	"
Trichloroethylene				X				79-01-6	300	"

VIII. HAZARD DESCRIPTION

FIELD EVALUATION HAZARD DESCRIPTION: Place an 'X' in the box to indicate that the listed hazard exists. Describe the hazard in the space provided.

A. HUMAN HEALTH HAZARDS

The presence of extensive soil contamination poses a threat through direct contact.

[Soil sampling results in Region I, Enforcement, DWR, NJDep in Newark.]

VIII. HAZARD DESCRIPTION (continued)

B. NON-WORKER INJURY/EXPOSURE

C. WORKER INJURY/EXPOSURE

D. CONTAMINATION OF WATER SUPPLY

Ground Water Contamination by spillages from the plant.

E. CONTAMINATION OF FOOD CHAIN

Fishing, crabbing & hunting by Berry's Creek.

F. CONTAMINATION OF GROUND WATER

From spillages onto the ground.

G. CONTAMINATION OF SURFACE WATER

Run-off from the site.

H. DAMAGE TO FLORA/FAUNA

I. FISH KILL

Reports of incidents of dead fish in Berry's Creek.

J. CONTAMINATION OF AIR

K. NOTICEABLE ODORS

Yes, near the manufacturing buildings, boiler room and neutralization tank prior to discharge of wastewater into the sanitary sewer line.

L. CONTAMINATION OF SOIL

Yes. From spillages.

M. PROPERTY DAMAGE

N. FIRE OR EXPLOSION

O. SPILLS/LEAKING CONTAINERS/RUNOFF/STANDING LIQUID

P. SEWER, STORM DRAIN PROBLEMS

From boiler blowdown with pH < 3.0

Q. EROSION PROBLEMS

R. INADEQUATE SECURITY

S. INCOMPATIBLE WASTES

VIII. HAZARD DESCRIPTION (continued)

T. MIDNIGHT DUMPING

U. OTHER (specify):

IX. POPULATION DIRECTLY AFFECTED BY SITE

A. LOCATION OF POPULATION	B. APPROX. NO. OF PEOPLE AFFECTED	C. APPROX. NO. OF PEOPLE AFFECTED WITHIN UNIT AREA	D. APPROX. NO. OF BUILDINGS AFFECTED	E. DISTANCE TO SITE (specify units)
1. IN RESIDENTIAL AREAS	4,000 - 5,000	4,000 - 5,000	1150 - 1437	1/2 - mi
2. IN COMMERCIAL OR INDUSTRIAL AREAS	2000	2000	18-20	1/4 mi
3. IN PUBLICLY TRAVELLED AREAS	1,000	1,000	5	1/4 mi
4. PUBLIC USE AREAS (parks, schools, etc.)	- none -	- none -	- none -	1/4 mi.

X. WATER AND HYDROLOGICAL DATA

A. DEPTH TO GROUNDWATER (specify unit) 90 - 100 ft.	B. DIRECTION OF FLOW North to South, East	C. GROUNDWATER USE IN VICINITY Industrial
D. POTENTIAL YIELD OF AQUIFER From 100 to 600 gpm	E. DISTANCE TO DRINKING WATER SUPPLY (specify unit of measure) w/in 3-mi rad.	F. DIRECTION TO DRINKING WATER SUPPLY North-West from site
G. TYPE OF DRINKING WATER SUPPLY		
<input type="checkbox"/> 1. NON-COMMUNITY < 15 CONNECTIONS*	<input checked="" type="checkbox"/> 2. COMMUNITY (specify town): <u>Wallington & Lodi, N.J.</u>	
<input type="checkbox"/> 3. SURFACE WATER	<input checked="" type="checkbox"/> 4. WELL	

X. WATER AND HYDROLOGICAL DATA (continued)

M. LIST ALL DRINKING WATER WELLS WITHIN A 1/4 MILE RADIUS OF SITE

1. WELL	2. DEPTH (specify unit)	3. LOCATION (proximity to population/buildings)	4. NON-COMMUNITY (mark 'X')	5. COMMUNITY (mark 'X')
		NONE		

I. RECEIVING WATER

1. NAME: ACKERMAN'S CREEK

2. SEWERS 3. STREAMS/RIVERS TRIBUTARY TO BERRY'S CREEK

4. LAKES/RESERVOIRS 5. OTHER (specify): TO HACKENSACK RIVER.

6. SPECIFY USE AND CLASSIFICATION OF RECEIVING WATERS

TW-2 Waterway.

XI. SOIL AND VEGETATION DATA

LOCATION OF SITE IS IN:

A. KNOWN FAULT ZONE B. KARST ZONE C. 100 YEAR FLOOD PLAIN D. WETLAND

E. A REGULATED FLOODWAY F. CRITICAL HABITAT G. RECHARGE ZONE OR SOLE SOURCE AQUIFER

XII. TYPE OF GEOLOGICAL MATERIAL OBSERVED

Mark 'X' to indicate the type(s) of geological material observed and specify where necessary, the component parts.

A. OVERBURDEN	X	B. BEDROCK (specify below)	X	C. OTHER (specify below)
1. SAND	X	Newark Group of Triassic Age		
2. CLAY	X	Upper Unit - Brunswick Formation		
3. GRAVEL	X			

XIII. SOIL PERMEABILITY

A. UNKNOWN B. VERY HIGH (100,000 to 1000 cm/sec.) C. HIGH (1000 to 10 cm/sec.)

D. MODERATE (10 to .1 cm/sec.) E. LOW (.1 to .001 cm/sec.) F. VERY LOW (.001 to .00001 cm/sec.)

G. RECHARGE AREA

1. YES 2. NO 3. COMMENTS

H. DISCHARGE AREA

1. YES 2. NO 3. COMMENTS

I. SLOPE

1. ESTIMATE % OF SLOPE: 1 to 2% 2. SPECIFY DIRECTION OF SLOPE, CONDITION OF SLOPE, ETC.: Towards Ackerman's Creek; or West to East

J. OTHER GEOLOGICAL DATA

The Brunswick Formation is the bedrock at the site, composed of mudstone, siltstone sandstone and conglomerate and is reddish-brown in color. Depth to rock is typically between 150 to 200 ft. Overlying the Brunswick formation are deposits of glacial till and stratified drift.

XIV. PERMIT INFORMATION

List all applicable permits held by the site and provide the related information.

A. PERMIT TYPE (e.g., RCRA, State, NPDES, etc.)	B. ISSUING AGENCY	C. PERMIT NUMBER	D. DATE ISSUED (mo., day, & yr.)	E. EXPIRATION DATE (mo., day, & yr.)	F. IN COMPLIANCE (mark 'X')		
					1. YES	2. NO	3. UNKNOWN
NPDES	USEPA	NJ0001252	10-31-74	10-30-79		X	

XV. PAST REGULATORY OR ENFORCEMENT ACTIONS

NONE YES (summarize in this space)

The Division of Water Resources, NJDEP issued an Administrative Order & Penalty Assessment on March 27, 1980 in violation of its NPDES permit; UOP's failure to contain and remove chemical spills from plant premises; UOP's failure to observe non-compliance notification requirements.

July 27, 1982: DWR, NJDEP issued another Administrative Order and Directive Letter to UOP in violation of the Compensation and Control Act.

NOTE: Based on the information in Sections III through XV, fill out the Tentative Disposition (Section II) information on the first page of this form.

9/1/82

BBC000187

Universal Oil Products -
Chemical Division

SITE DESCRIPTION

Universal Oil Products Chemical Division is an inactive specialty chemicals manufacturing facility located in East Rutherford, Bergen County, New Jersey. The plant, razed in 1980 by the company, was located on a relatively flat 85 acre tract of land situated in the coastal wetland management area of the Hackensack River Basin. The site is bordered on the southeast by Berry's Creek with one of its tributaries, Ackerman's Creek, passing through it. Berry's Creek joins the Hackensack River about 3.5 miles downstream. Based upon manifest records, it is estimated that over 4.5 million gallons of waste solvents and solid chemical wastes were dumped into one (1) of two (2) unlined lagoons located on the eastern part of the property. Findings, resulting from the site inspections and an air and water testing program, revealed product contamination of surface and ground waters as well as a large quantity of soils. The lagoons have been filled in, however, contaminated soils are still present. The ground water aquifer is used by industry as process cooling water and also serves as a drinking water supply for residents of Wallington Township. Nearby surface waters are used for recreation.

RESPONSE AND REMEDIAL ACTIONS

A site inspection was made by the NJDEP on July 2, 1979. Findings revealed several hazardous chemical spills including an overflowing chemical sewer. After subsequent investigations where soil borings and surface water and monitoring well samples were taken, it was discovered that organic chemical concentrations were sufficient to prompt enforcement actions. Incidents of dead fish in Berry's Creek have been reported, however, other suspected sources of contamination may have contributed to the kill. Future actions will include further testing in order to develop a cost efficient cleanup program.

ENFORCEMENT ACTIONS

On March 27, 1980, the NJDEP issued an Administrative Order and penalty assessment in violation of UOP's NPDES permit, failure to contain and remove chemical spills from the plant premises, and failure to observe non-compliance notification requirements. On July 27, 1982, an Administrative Order and Directive Letter was issued to UOP in violation of the Spill Compensation and Control Act. Future actions would be geared toward site cleanup.



Public Meeting *Agenda*

DIVISION OF HAZARDOUS WASTE MANAGEMENT

BBC000194

Briefing of Officials
on
Interim Remedial Measure (IRM)/Removal of Lagoon Sludges
at the
Universal Oil Products (UOP) Superfund Site
April 10, 1990
10:00 AM
Municipal Building
1 Everett Place
East Rutherford, New Jersey

- | | |
|---|---|
| 1. Opening Remarks
and Introductions | Steve Anderson
Section Chief
Bureau of Federal Case Management
Division of Hazardous Waste
Management
New Jersey Department of
Environmental Protection (NJDEP) |
| 2. Site History and
Project Overview | Jamie Schnitzer
Case Manager
Bureau of Federal Case Management
Division of Hazardous Waste
Management
NJDEP |
| 3. Presentation of the
Wastewater Lagoons Remedial
Action Work Plan | Michael Worthy
Project Manager
ENSR Consulting and Engineering |
| 4. Comments/Questions | |



STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION

FACT SHEET

Briefing to Discuss
Excavation and Disposal of
Contaminated Sludges and Soil
from Two Inactive Waste Water Lagoons
at the Universal Oil Products (UOP)
Superfund Site

East Rutherford Municipal Building
Township of East Rutherford
Bergen County

April 10, 1990

Site Description

The Universal Oil Products (UOP) Superfund site is located along Route 17 just south of Paterson Plank Road on a relatively flat, approximately 75-acre tract of land within the coastal wetlands management area of the Hackensack River Basin. The site is bordered on the southeast by Berry's Creek which joins the Hackensack River about 3.5 miles downstream. Ackerman's Creek, a tributary of Berry's Creek, flows through the property.

Background

The property was formerly owned by Trubeck Laboratories which had operated a flavors and fragrances production plant at this location from the 1930's to 1960. During the 1950's the plant was also used for the recovery of Trubeck's solvents and waste chemicals. UOP acquired Trubeck Laboratories in 1960 and modified the plant for the development of specialty organic chemicals. Records indicate that 4.5 million gallons of chemical wastes were discharged to unlined lagoons on the site during the 1950s, 1960s and 1970s. The facility was closed during 1979-1980 and all existing structures were razed to their foundations. Only concrete slabs, a drainage system, residual demolition debris and some piping remain.

In accordance with various agreements with the New Jersey Department of Environmental Protection (NJDEP) dating from 1980, UOP has conducted several phased investigations of the site to assess the nature and extent of chemical contamination. This information is used to determine appropriate remedial measures to clean up the site. In October 1989, Allied-Signal, Inc. the successor in interest to UOP Inc., assumed management of the project under supervision of NJDEP.

New Jersey is an Equal Opportunity Employer

Status

In 1981 a hydrogeologic investigation was conducted by UOP in response to an Administrative Consent Order (ACO) from NJDEP. A series of studies based on this data followed pursuant to a 1982 Administrative Order issued by NJDEP and a 1983 ACO between UOP and NJDEP. In May 1986, an additional ACO was signed by UOP in which the company agreed to perform the third phase of a Remedial Investigation/Feasibility Study (RI/FS) and to undertake approved remedial measures for the site. The May 1986 ACO subdivided the site into six areas of concern: 1, 1A, 2, 3, 4 and 5. Areas 1, 1A, 2 and 5 encompass the location of the former production facility. Area 3 encompasses two inactive industrial wastewater lagoons. Area 4 is comprised of channels (Ackermans Creek) which flow to Berry's Creek.

A third phase Remedial Investigation report for areas 1, 1A, 2 and 5 was completed in May 1988. A Remedial Investigation of Area 4 began in November 1989 and will be completed in June 1990. Work on the Feasibility Study for areas 1, 1A, 2 and 5 began in August 1989 and is scheduled to be completed in the Summer of 1990.

To date, these investigations have identified significant soil, ground water and sediment contamination at the site. Soil on site has been found to be contaminated with volatile and semi-volatile organic compounds, PCB's and heavy metals. These same contaminants have been found in the shallow ground water beneath the site. Sediments in Ackerman's Creek were found to be heavily contaminated with PCBs, dichlorobenzene, chromium and mercury.

Area 3 Interim Remedial Measure (IRM)

The May 1986 ACO includes a provision directing UOP to excavate highly contaminated sludges and soils in Area 3 (see figure #1) which, as noted above, consists of two adjacent inactive industrial wastewater lagoons. Together these lagoons are about 1.2 acres in size. They are contaminated with PCBs, VOCs and heavy metals. This excavation, which is being conducted as an Interim Remedial Measure (IRM), will begin in April 1990 and is scheduled to be completed in June 1990. Preparatory work at the lagoons began in March 1990 and includes clearing vegetation from the lagoons and installing electrical lines and fencing.

Excavation of the two lagoons will involve the dredging and dewatering of approximately 12,000 cubic yards of contaminated sludges and soils which will first be removed to a controlled staging area adjacent to the lagoons and then dewatered with two filter presses. The dewatered material will be tested for PCBs, loaded into small dump trucks and removed to a larger staging area on the property (see diagram #2). Materials with PCB levels above 500 parts per million (ppm) will then be stored in roll off containers and shipped to either the Pyrochem/Aptus incineration facility in Coffeyville, Kansas or the Chemical Waste Management incineration facility in Chicago, Illinois. Materials containing less than 500 ppm will be loaded into lined, large-capacity dump trailers and covered with a secured tarpaulin for shipment to TSCA-permitted (Toxic Substances Control Act) landfills in Emelle, Alabama or Model City, New York. Water removed from the material by the filter presses will be treated using a mobile carbon adsorption unit and shipped in tanker trucks to an approved hazardous waste

disposal facility or, if a New Jersey Pollutant Discharge Elimination System (NJPDDES) permit is approved in time, discharged to Ackermans Creek. Water from equipment decontamination, as well as rainwater and groundwater encountered during the excavation work, will be handled in the same way as the water from the filter presses.

Off-site shipment of contaminated, dewatered sludges and soils will occur as materials are processed. It is estimated that a total of 600 truckloads of wastes will be shipped at the rate of 20-25 loads every other day. NJDEP personnel will oversee the excavation and shipment activities.

The berms surrounding the excavated lagoons will be covered with gravel and geotextile fabric. This action will prevent contaminants known to exist in the berms from migrating into the lagoon area once excavation of that area is completed. The contaminated berms will be addressed when remediation of Area 4 is undertaken.

NJDEP has established an Administrative Record for this IRM at two information repositories where documents relevant to this action will be available for public review. Information repositories have been established at the following locations:

The East Rutherford
Municipal Building
1 Everett Place
East Rutherford, NJ 07073
(201) 933-3444

The East Rutherford
Memorial Library
143 Boiling Spring Avenue
East Rutherford, NJ 07073
(201) 939-3930

Community participation is welcome throughout all phases of this project. For more information, contact George Tamaccio, Bureau of Community Relations, Division of Hazardous Site Mitigation, NJDEP, at (609) 984-3081.



AlliedSignal Inc.
P.O. Box 2105
Morristown, NJ 07962-2105

December 24, 1997

Ms. Gwen Barunas
Case Manager
NJDEP Bureau of Federal Case Management
401 East State Street, 5th Floor, West Wing
CN-028
Trenton, NJ 08625

**SUBJECT: UOP Uplands Site Closure
East Rutherford, New Jersey
AlliedSignal Project No. 32437-80
NJPDES-DGW Permit Equivalent**

Dear Ms. Barunas:

As required in paragraph II.C. of the subject Permit Equivalent, and as a follow up to my telephone message to you on Friday, December 19, 1997, this letter is sent to confirm that the effluent stream from the on-site temporary water treatment plant had concentration levels that exceeded those stipulated in the permit. The preliminary analytical data received on December 19, 1997 indicates that the concentration of Aroclor-1248 was 0.81 ug/L. Discharge Permit limits for this compound is set at 0.50 ug/L. The preliminary analytical report from Intertek Testing Services is attached for your reference.

At this time, the water treatment plant has been shut down for the winter months. The corrective action planned to mitigate the problem will be to change out the carbon beds prior to plant operation in the spring time.

Please review the attached information and if you have any questions please feel free to contact me at (201) 939-9127 or Mr. William Snyder at (973) 455-3190.

Sincerely,

Frank Leming
Project Engineer

cc: R. Galloway NIC-3
W. Snyder, MEY-
M. L. Smith, Handex of NJ
VPF-F0133-16.2

barunas10.doc

BBA000054

SUMMARY REPORT

CLIENT : Hardex of New Jersey
PROJECT : 115238-01 Allied Signal

JOB NUMBER : D97-14457
REPORT DATE : 18-DEC-1997

SAMPLE NO.	ID MARKS	MATRIX	DATE SAMPLED
1	WTP Influent	Water	1-DEC-1997
2	WTP Effluent	Water	1-DEC-1997
3	WTP 1st GAC Effluent	Water	1-DEC-1997
4	Trip Blank	Water	24-NOV-1997

CHLORINATED PCBs, EPA 508		1 INF	2 EFF	3 IA	4 TB
Aroclor-1016	µg/L	< 0.50	< 0.50	-	-
Aroclor-1221	µg/L	< 0.50	< 0.50	-	-
Aroclor-1232	µg/L	< 0.50	< 0.50	-	-
Aroclor-1242	µg/L	< 0.50	< 0.50	-	-
Aroclor-1248	µg/L	7.32	0.81	-	-
Aroclor-1254	µg/L	< 0.50	< 0.50	-	-
Aroclor-1260	µg/L	< 0.50	< 0.50	-	-
Decachlorobiphenyl (SS)	%	50.9	68.3	-	-
2,4,5,6-Tetrachloro- <i>m</i> -xylene (SS)	%	54.7	56.0	-	-

VOLATILE ORGANICS, EPA 624		1	2	3	4
Acetone	µg/L	< 50.0	< 50.0	< 50.0	< 50.0
Acrolein	µg/L	< 50.0	< 50.0	< 50.0	< 50.0
Acrylonitrile	µg/L	< 50.0	< 50.0	< 50.0	< 50.0
Benzene	µg/L	53.1	< 4.40	15.4	< 4.40
Bromodichloromethane	µg/L	< 2.20	< 2.20	< 2.20	< 2.20
Bromoform	µg/L	< 4.70	< 4.70	< 4.70	< 4.70
Bromomethane	µg/L	< 2.00	< 2.00	< 2.00	< 2.00
Carbon tetrachloride	µg/L	< 2.80	< 2.80	< 2.80	< 2.80
Chlorobenzene	µg/L	47.6	< 5.00	10.4	< 5.00

SUMMARY REPORT

CLIENT : Handex of New Jersey
 PROJECT : 115238-01 Allied Signal

JOB NUMBER : D97-14457
 REPORT DATE : 18-DEC-1997

SAMPLE NO.	ID PARKS	MATRIX	DATE SAMPLED
1	WTP Influent	Water	1-DEC-1997
2	WTP Effluent	Water	1-DEC-1997
3	WTP 1st GAC Effluent	Water	1-DEC-1997
4	Trip Blank	Water	24-NOV-1997

VOLATILE ORGANICS, EPA 624 (Continued..)		1	2	3	4
		INF	EFF	IA	
Vinyl chloride	µg/L	7.8	< 3.4	8.2	< 3.4
1,2-Dichloroethane-c4 (SS)	%	98.4	99.2	99.0	97.0
Toluene-oB (SS)	%	97.0	96.0	97.6	95.8
Bromofluorobenzene (SS)	%	99.2	98.4	98.6	99.8

ACID/BASE-NEUTRAL EXTRACTABLE ORGANICS, EPA 625		1	2	3	4
N-Nitrosodimethylamine	µg/L	< 5.1	< 5.1	-	-
Phenol	µg/L	< 1.5	< 1.5	-	-
Bis(2-chloroethyl)ether	µg/L	< 5.8	< 5.8	-	-
2-Chlorophenol	µg/L	< 3.4	< 3.3	-	-
1,3-Dichlorobenzene	µg/L	< 1.9	< 1.9	-	-
1,4-Dichlorobenzene	µg/L	< 4.5	< 4.4	-	-
1,2-Dichlorobenzene	µg/L	- 276	< 1.9	-	-
Bis(2-chloroisopropyl)ether	µg/L	< 5.8	< 5.8	-	-
Hexachloroethane	µg/L	< 1.6	< 1.6	-	-
Nitrobenzene	µg/L	< 1.5	< 1.9	-	-
Isophorone	µg/L	< 2.2	< 2.2	-	-
2,4-Dimethylphenol	µg/L	< 2.8	< 2.7	-	-
2-Nitrophenol	µg/L	< 3.9	< 3.8	-	-

SUMMARY REPORT

CLIENT : Handex of New Jersey
PROJECT : 115238-01 Allied Signal

JOB NUMBER : D97-14457
REPORT DATE : 18-DEC-1997

SAMPLE NO.	ID PARKS	MATRIX	DATE SAMPLED
1	WTP Influent	Water	1-DEC-1997
2	WTP Effluent	Water	1-DEC-1997
3	WTP 1st GAC Effluent	Water	1-DEC-1997
4	Trip Blank	Water	24-NOV-1997

ACID/BASE-NEUTRAL EXTRACTABLE ORGANICS, EPA 625 (Continued...)	1	2	3	4
2,4-Dichloropheno	μg/L < 2.6	< 2.7	-	-
1,2,4-Trichlorobenzene	μg/L < 1.9	< 1.9	-	-
Naphthalene	μg/L < 1.8	< 1.8	-	-
Hexachlorobutadiene	μg/L < 0.9	< 0.9	-	-
Hexachlorocyclopentadiene	μg/L < 5.1	< 5.1	-	-
2,4,6-Trichloropheno	μg/L < 2.6	< 2.7	-	-
Dimethylphthalate	μg/L < 1.8	< 1.8	-	-
2,6-Dinitrotoluene	μg/L < 1.9	< 1.9	-	-
Acenaphthylene	μg/L < 3.6	< 3.5	-	-
2,4-Dinitrophenol	μg/L < 42.8	< 42.4	-	-
4-Nitrophenol	μg/L < 3.9	< 3.8	-	-
2,4-Dinitrotoluene	μg/L < 5.8	< 5.8	-	-
Diethylphthalate	μg/L < 1.9	< 1.9	-	-
Fluorene	μg/L < 1.9	< 1.9	-	-
4,6-Dinitro-2-methylphenol	μg/L < 24.5	< 24.2	-	-
N-Nitrosodiphenylamine	μg/L < 1.9	< 1.9	-	-
Hexachlorobenzene	μg/L < 1.9	< 1.9	-	-
Pentachloropheno	μg/L < 3.6	< 3.5	-	-
Phenanthrene	μg/L < 5.5	< 5.5	-	-

SUMMARY REPORT

CLIENT : Handex of New Jersey
PROJECT : 115238-01 Allied Signal

JOB NUMBER : D97-14457
REPORT DATE : 18-DEC-1997

SAMPLE NO.	ID MARKS	MATRIX	DATE SAMPLED
1	WTP Influent	Water	1-DEC-1997
2	WTP Effluent	Water	1-DEC-1997
3	WTP 1st GAC Effluent	Water	1-DEC-1997
4	Trip Blank	Water	24-NOV-1997

ACID/BASE-NEUTRAL EXTRACTABLE ORGANICS, EPA 625 (Continued...)		1	2	3	4
Anthracene	µg/L	< 1.9	< 1.9	-	-
Di-n-butylphthalate	µg/L	< 2.6	< 2.5	-	-
Fluoranthene	µg/L	< 2.2	< 2.2	-	-
Benzidine	µg/L	< 5.8	< 5.8	-	-
Pyrene	µg/L	< 1.9	< 1.9	-	-
Butylbenzylphthalate	µg/L	< 2.6	< 2.5	-	-
bis(2-Ethylhexyl)phthalate	µg/L	< 2.6	< 2.5	-	-
3,3'-Dichlorobenzidine	µg/L	< 16.8	< 16.7	-	-
Benzo(a)anthracene	µg/L	< 8.0	< 7.9	-	-
Chrysene	µg/L	< 2.6	< 2.5	-	-
Benzo(b)fluoranthene	µg/L	< 4.9	< 4.8	-	-
Benzo(k)fluoranthene	µg/L	< 2.6	< 2.5	-	-
Benzo(a)pyrene	µg/L	< 2.6	< 2.5	-	-
Indeno(1,2,3-cd)pyrene	µg/L	< 3.8	< 3.7	-	-
Dibenzo(a,h)anthracene	µg/L	< 2.6	< 2.5	-	-
Benzo(g,h,i)perylene	µg/L	< 4.2	< 4.1	-	-
1,2,4,5-Tetrachlorobenzene	µg/L	< 10.2	< 10.1	-	-
Pentachlorobenzene	µg/L	< 10.2	< 10.1	-	-
Nitrobenzene-c5 (SS)	%	107	105	-	-

SUMMARY REPORT

CLIENT : Handex of New Jersey
PROJECT : 115238-01 Allied Signal

JOB NUMBER : D97-14457
REPORT DATE : 18-DEC-1997

SAMPLE NO.	ID MARKS	MATRIX	DATE SAMPLED
1	WTP Influent	Water	1-DEC-1997
2	WTP Effluent	Water	1-DEC-1997
3	WTP 1st GAC Effluent	Water	1-DEC-1997
4	Trip Blank	Water	24-NOV-1997

ACID/BASE-NEUTRAL EXTRACTABLE ORGANICS, EPA 625 (Continued...)		1	2	3	4
2-Fluorobiphenyl (SS)	%	96.5	93.3	-	-
Terphenyl-d14 (SS)	%	68.4	99.4	-	-
Phenol-d6 (SS)	%	80.9	79.5	-	-
2-Fluorophenol (SS)	%	71.9	75.5	-	-
2,4,6-Tribromophenol (SS)	%	104	103	-	-

ACID/BASE-NEUTRAL EXTRACTABLE ORGANICS, EPA 625		1	2	3	4
1,2-Dichlorobenzene	ug/L	276	-	-	-
Nitrobenzene-d5 (SS)	%	46.9	-	-	-
2-Fluorobiphenyl (SS)	%	43.9	-	-	-
Terphenyl-d14 (SS)	%	26.7	-	-	-
Phenol-d6 (SS)	%	33.4	-	-	-
2-Fluorophenol (SS)	%	30.9	-	-	-
2,4,6-Tribromophenol (SS)	%	29.9	-	-	-

TOTAL METALS		1	2	3	4
Arsenic	mg/L	< 0.002	< 0.002	-	-
Lead	mg/L	0.0198	0.0037	0.0063	-

SUMMARY REPORT

CLIENT : Handex of New Jersey
 PROJECT : 115238-01 Allied Signal

JOB NUMBER : D97-14457
 REPORT DATE : 18-DEC-1997

SAMPLE NO.	ID MARKS	MATRIX	DATE SAMPLED
5	LABCC MBLANK	Water	3-DEC-1997

VOLATILE ORGANICS, EPA 624		5		
Acetone	µg/l	<	50.0	
Acrolein	µg/L	<	50.0	
Acrylonitrile	µg/L	<	50.0	
Benzene	µg/L	<	4.40	
Bromodichloromethane	µg/L	<	2.20	
Bromoform	µg/L	<	4.70	
Bromomethane	µg/L	<	2.00	
Carbon tetrachloride	µg/L	<	2.80	
Chlorobenzene	µg/L	<	5.00	
Chlorodibromomethane	µg/L	<	2.20	
Chloroethane	µg/L	<	2.50	
Chloroform	µg/L	<	1.50	
Chloromethane	µg/L	<	3.00	
1,1-Dichloroethane	µg/L	<	4.70	
1,2-Dichloroethane	µg/L	<	2.80	
1,1-Dichloroethene	µg/L	<	2.80	
cis-1,2-Dichloroethene	µg/L	<	1.60	
trans-1,2-Dichloroethene	µg/L	<	1.60	
1,2-Dichloropropane	µg/L	<	5.00	
1,3-Dichloropropane	µg/L	<	5.00	

SUMMARY REPORT

CLIENT : Handex of New Jersey
PROJECT : 115238-01 Allied Signal

JOB NUMBER : D97-14457
REPORT DATE : 18-DEC-1997

SAMPLE NO.	TD MARKS	MATRIX	DATE SAMPLED
5	LABQC MBLANK	Water	3-DEC-1997

VOLATILE ORGANICS, EPA 624 (Continued..)		5		
Ethyl benzene	µg/L	<	7.20	
Methylene chloride	µg/L	<	2.80	
1,1,2,2-Tetrachloroethane	µg/L	<	6.90	
Tetrachloroethene	µg/L	<	4.10	
Toluene	µg/L	<	6.00	
1,1,1-Trichloroethane	µg/L	<	3.80	
1,1,2-Trichloroethane	µg/L	<	6.00	
Trichloroethene	µg/L	<	1.90	
Vinyl chloride	µg/L	<	3.4	
1,2-Dichloroethane-d1 (SS)	µg/L	*	94.0	
Toluene-d8 (SS)	µg/L	*	99.2	
Bromofluorobenzene (IS)	µg/L	*	99.6	

ACID/BASE-NEUTRAL EXTRACTABLE ORGANICS, EPA 625		5		
N-Nitrosodimethylamine	µg/L	<	5.0	
Phenol	µg/L	<	1.5	
Bis(2-chloroethyl) ether	µg/L	<	5.7	
2-Chlorophenol	µg/L	<	3.3	
1,3-Dichlorobenzene	µg/L	<	1.9	

SUMMARY REPORT

CLIENT : Handex of New Jersey
 PROJECT : 115238-01 Allied Signal

JOB NUMBER : D97-14457
 REPORT DATE : 18-DEC-1997

SAMPLE NO.	ID MARKS	MATRIX	DATE SAMPLED
5	LABO2 MBLANK	Water	3-DEC-1997

ACID/BASE-NEUTRAL EXTRACTABLE ORGANICS, EPA 625 (Continued..)		5		
1,4-Dichlorobenzene	µg/L	<	4.4	
1,2-Dichlorobenzene	µg/L	<	1.9	
Bis(2-chloroisopropyl)ether	µg/L	<	5.7	
Hexachloroethane	µg/L	<	1.6	
Nitrobenzene	µg/L	<	1.9	
Isopropene	µg/L	<	2.2	
2,4-Dimethylphenol	µg/L	<	2.7	
2-Nitrophenol	µg/L	<	3.8	
2,4-Dichlorophenol	µg/L	<	2.7	
1,2,4-Trichlorobenzene	µg/L	<	1.9	
Naphthalene	µg/L	<	1.8	
Hexachlorobutadiene	µg/L	<	0.9	
Hexachlorocyclopentadiene	µg/L	<	5.0	
2,4,6-Trichlorophenol	µg/L	<	2.7	
Dimethylphthalate	µg/L	<	1.8	
2,6-Dinitrotoluene	µg/L	<	1.9	
Acenaphthylene	µg/L	<	3.5	
2,4-Dinitrophenol	µg/L	<	42.0	
4-Nitrophenol	µg/L	<	1.8	

SUMMARY REPORT

CLIENT : Handex of New Jersey
PROJECT : 115238-01 Allied Signal

JOB NUMBER : D97-14457
REPORT DATE : 18-DEC-1997

SAMPLE NO.	ID MARKS	MATRIX	DATE SAMPLED
5	LABG: MBLANK	Water	3-DEC-1997

ACID/BASE-NEUTRAL EXTRACTABLE ORGANICS, EPA 625 (Continued..)		5		
2,4-Dinitrotoluene	µg/L	<	5.7	
Diethylphthalate	µg/L	<	1.9	
Fluorene	µg/L	<	1.9	
4,6-Dinitro-2-methylphenol	µg/L	<	24.0	
N-Nitrosodiphenylamine	µg/L	<	1.9	
Hexachlorobenzene	µg/L	<	1.9	
Pentachlorophenol	µg/L	<	3.5	
Phenanthrene	µg/L	<	5.4	
Anthracene	µg/L	<	1.9	
Di-n-butylphthalate	µg/L	<	2.5	
Fluoranthene	µg/L	<	2.2	
Benzidine	µg/L	<	5.7	
Pyrene	µg/L	<	1.9	
Butylbenzylphthalate	µg/L	<	2.5	
bis(2-Ethylhexyl)phthalate	µg/L	<	2.5	
3,3'-Dichlorobenzidine	µg/L	<	16.5	
Benzo(a)anthracene	µg/L	<	7.8	
Chrysene	µg/L	<	2.5	
Benzo(b)fluoranthene	µg/L	<	4.8	

SUMMARY REPORT

CLIENT : Hanhex of New Jersey
 PROJECT : 115238-01 Allied Signal

JOB NUMBER : D97-14457
 REPORT DATE : 18-DEC-1997

SAMPLE NO.	ID MARKS	MATRIX	DATE SAMPLED
5	LABQ: MBLANK	Water	3-DEC-1997

ACID/BASE-NEUTRAL EXTRACTABLE ORGANICS, EPA 825 (Continued...)		5		
Benzo(k)fluoranthene	µg/L	<	2.5	
Benzo(a)pyrene	µg/L	<	2.5	
Indeno(1,2,3-cd)pyrene	µg/L	<	3.7	
Dibenzo(a,h)anthracene	µg/L	<	2.6	
Benzo(g,h,i)perylene	µg/L	<	4.1	
1,2,4,5-Tetrachlorotoluene	µg/L	<	10.0	
Pentachlorobenzene	µg/L	<	10.0	
Nitrobenzene-d5 (SS)	%		99.8	
2-Fluorobiphenyl (S)	%		96.0	
Terphenyl-c14 (SS)	%		102	
Phenol-d6 (SS)	%		81.8	
2-Fluorophenol (SS)	%		58.2	
2,4,6-Tribromopheno (SS)	%		96.2	

WORK PLAN

BBC000146

SECTION 1

Former Universal Oil Products Area 4 - Work Plan

SECTION 2

Honeywell, Inc.
Morristown, New Jersey

January 2000



O'BRIEN & GERE
ENGINEERS, INC.



1063 24580

PLAN

Former Universal Oil Products Area 4 – Work Plan

*Holmeswell, Inc.
Morristown, New Jersey*



Steven J. Roland, P.E.
Executive Vice President

Prepared by

Neil R. Wilkinson
O'Brien & Gere Engineers, Inc.
Raritan Plaza I
Edison, New Jersey 08837

January 2000



Raritan Plaza I
Edison, New Jersey 08837

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SECTION 2

SECTION 3

SECTION 4

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1. Introduction

This work plan describes surface water and sediment sampling activities at a section of the former Universal Oil Product (UOP) site in East Rutherford, NJ.

SECTION 2

The UOP site is located near the intersection of Route 17 and Paterson Plank Road in the Borough of East Rutherford, Bergen County, New Jersey. The property is surrounded by tidal marshes, highways, and commercial and light industrial property. Immediately to the north is Matheson Gas, an automotive storage lot, a metal plating business and a Fairfield Inn Motel. Berry's Creek and tidal marshes are located to the east. Ackerman's Creek and commercial properties are located to the south. West of Route 17 are a Becton Dickenson building, catering, restaurant and other commercial properties. The closest residential area is approximately one-quarter mile to the west of Route 17.

SECTION 3

The UOP property is approximately seventy-five acres of which approximately fifty percent is developed land and built up with miscellaneous earthen fill, municipal type waste and rubble (elevations range from 4 to 9 feet above mean sea level). The developed area is commonly referred to as Uplands. The remaining half of the property is covered by a tidal salt marsh and man-made Ackerman's Creek. An active Conrail/NJ Transit right-of-way runs North-South and separates the Uplands into two unequal areas. The area east of the railroad tracks consists of 45 acres, and the area west of the tracks consists of 30 acres.

SECTION 4

From 1932 through 1979, an aroma and fragrance laboratory business, in addition to other industrial chemical companies, operated within the Uplands property. The Uplands area was initially developed in 1932 by Trubeck Laboratories (Trubeck) which built and operated the aroma chemicals laboratory. Trubeck began operating a solvent recovery facility in 1955. In 1956, Trubeck constructed a wastewater treatment plant, and in 1959 began utilizing two wastewater holding lagoons. UOP, a division of the Signal Companies, acquired the property and facilities in 1960. The wastewater treatment plant and wastewater lagoons ceased being used in 1971. All remaining operations at the facility were terminated in 1979. In 1980, all structures, except concrete slabs and a pedestrian bridge over the NJ Transit tracks, were demolished. The contents of the two wastewater lagoons were removed and transported offsite for disposal in 1990.

SECTION 5

SECTION 6

In 1986, Allied Corporation merged with the Signal Companies forming AlliedSignal. AlliedSignal acquired the UOP property as part of the merger and thereby acquired the inactive UOP property. In 1999, Honeywell, Inc. merged with AlliedSignal and in doing so became responsible for investigations at the UOP site.

The New Jersey Department of Environmental Protection (NJDEP), Bureau of Federal Case Management has been the lead oversight agency at the UOP site since 1982. In addition, both the USEPA Region II and the Hackensack Meadowlands Development Commission have provided an integral role in the regulatory oversight of all remedial activities.

The UOP site was added to the National Priorities List (NPL) on September 8, 1983 (Hazard Ranking Score of 54.65, Group 3). An Administrative Consent Order (ACO) was issued by NJDEP (NJDEP-1983) to perform a Remedial Investigation (RI), the purpose of which was to chemically characterize and delineate areas of soil and groundwater impacts that may require remedial action. UOP entered into a second ACO in May 1986 in which UOP agreed to continue site investigations, conduct a feasibility study (FS) of remedial action alternatives for the various areas at the site. In 1986, following the merger, AlliedSignal became responsible for completing the characterization activities initiated in 1983. In accordance with the ACO, remedial investigations and studies continued at the site. As components of the RI, a human health and ecological risk assessments were performed whose purpose was to establish specific numerical clean-up criteria for defining the limits of required remediation.

The UOP site was divided into five functional areas based on historic operations as indicated on Drawing 1:

- Area 1: North central part of property;
- Area 1A: Central part of property;
- Area 2: Western part of the property;
- Area 3: Wastewater lagoons;
- Area 4: Surface water channels;
- Area 5: Area East of Areas 1 and 1A.

The investigation at Areas 1, 2, 3, and 5 have been completed. The lagoon berm, on-site tidal stream channels, and upland/tidal areas at the site are consolidated into Area 4.

ENSR

Formerly ERT

ENSR Document No.: 0816-002-287
ENSR Reference No.: 220-DBU-014

ENSR Consulting
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35 Nagog Park
Acton, Massachusetts 01720
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April 20, 1990

Mr. James Schnitzer
Case Manager
NJDEP
Bureau of Federal Case Management
401 East State Street
5th Floor - West Wing
Trenton, New Jersey 08625

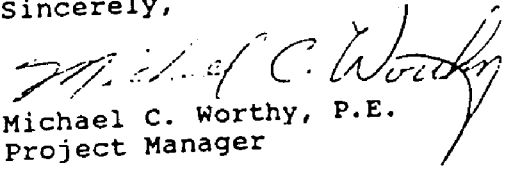
Re: Feasibility Study for Areas 1, 1A, 2, and 5
UOP Site, East Rutherford, NJ
VOC Addendum

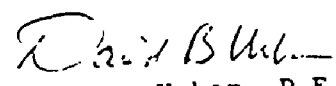
Dear Mr. Schnitzer:

Enclosed are three (3) copies of the VOC Addendum to the Feasibility Study for Areas 1, 1A, 2, and 5 of the UOP Site in East Rutherford, NJ. The Addendum, prepared by ENSR Corporation for Allied-Signal, is being submitted in response to NJDEP concern regarding VOCs in the UOP Site soils.

If you have any questions or comments, please direct them to Mr. Mark Kamilow at Allied-Signal, who can be reached at (201) 455-2119.

Sincerely,


Michael C. Worthy, P.E.
Project Manager


David B. Urban, P.E.
Senior Chemical Engineer

DBU:dsf

cc: Janet Feldstein - EPA (2 copies) ✓
Mark Kamilow - Allied-Signal

Allied-Signal Inc.

Morristown, NJ

**Feasibility Study for
Areas 1, 1A, 2 & 5
UOP Site, East Rutherford, NJ**

Addendum: VOCs in Soil

**ENSR Consulting and Engineering
(Formerly ERT)**

April 1990

Document Number 0186-002-284-A

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1. INTRODUCTION

1.1 Introduction

This Addendum was prepared for Allied-Signal Inc., the corporate successor of UOP, in response to New Jersey Department of Environmental Protection (NJDEP) concern for the concentrations of volatile organic compounds (VOCs) in the UOP Site soils.

The Feasibility Study for Areas 1, 1A, 2 & 5, UOP Site, East Rutherford, NJ (ENSR, 1990) was a human health and ecological risk-based study. The scope of the Feasibility Study (FS) was therefore limited to the identification and evaluation of remedial alternatives that address contaminants and media that alone or in combination pose a significant human health or an ecological risk.

The U.S. EPA defines acceptable risk as those levels within the 10^{-4} to 10^{-6} range, with the 10^{-6} as the point of departure for determining remediation goals (40 CFR 300.430(e)). Only polynuclear aromatic hydrocarbons (PAHs) and polychlorinated biphenyls (PCBs) in surface soils were found to exceed the low end of the range (10^{-6}). VOCs were not found to pose a risk and, therefore, were not addressed.

Nonetheless, in response to NJDEP concerns, this FS Addendum was prepared to address VOCs in soils. Like the FS, the Addendum was prepared in accordance with the May 1986 Administrative Consent Order (ACO) between UOP and NJDEP and the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986 and its governing regulations, the National



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ENSR Document No. 0186-002-295
ENSR Reference No. 22-MCW-679

June 22, 1992

BBC000005

Mr. Joseph Freudenburg
Case Manager
NJDEPE
Bureau of Federal Case Management
401 E. State Street
5th Floor - West Wing
Trenton, NJ 08625

Re: Feasibility Study for Areas 1, 1A, 2 and 5
UOP Site, East Rutherford, NJ

Dear Mr. Freudenburg:

Enclosed are four (4) copies of Revision 2 of the Feasibility Study (FS) for Areas 1, 1A, 2 and 5 of the UOP Site in East Rutherford, NJ. This latest submittal was prepared in response to comments, dated April 20, 1992, received from NJDEPE and EPA on Revision 1 of the FS submitted in November 1990. Three of the copies are "redline" versions, prepared at NJDEPE's request, to show changes in the text since the November 1990 submittal.

Per the NJDEPE's comments, the following changes are incorporated into this latest version:

- the addition of a remediation approach for groundwater containing total Volatile Organic Compounds (VOCs) in excess of 10 ppm and any singular VOC in excess of 1 ppm,
- the reduction of remediation goals to concentrations consistent with the proposed soil cleanup standards for: polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and lead.



Mr. Joseph Freudenburg
June 22, 1992
Page Two

Modifications are also incorporated to address EPA's comments.

If you have any questions or comments, please direct them to Mr. Mark Kamilow at Allied-Signal, who can be reached at 201/455-2119.

Sincerely,

David B. Urban, P.E.
Senior Chemical Engineer

Michael C. Worthy, P.E.
Project Manager

MCW/kls

enclosures

cc: Richard Puvogel, EPA (2 copies, 1 redline) ✓
Mark Kamilow, Allied-Signal (3 copies, 1 redline)

Allied - Signal Inc.

Morristown, NJ

**Feasibility Study for Areas
1, 1A, 2 & 5
UOP Site, East Rutherford, NJ**

Revision 2

ENSR Consulting and Engineering

June 1992

Document Number 0186-002-295

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1. INTRODUCTION

The UOP Site, shown in Figure 1-1, is located in northeastern New Jersey, occupying about 75 acres in an industrial area of East Rutherford. The property was developed by Trubeck Laboratories as the site of an aroma chemicals laboratory in 1932. UOP purchased the property and facilities in 1960 and operated the facility until it closed in 1979. In 1983, UOP entered into an Administrative Consent Order (ACO) with the New Jersey Department of Environmental Protection and Energy (NJDEPE) to investigate potential sources and the extent of contamination. NJDEPE requested additional studies upon completion of the initial investigations. UOP entered into a second ACO in May 1986 in which UOP agreed to continue site investigations, conduct a feasibility study (FS) of remedial action alternatives for the various areas at the site, and implement a remedial alternative

The FS was prepared in accordance with the ACO and the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986 and its governing regulations, the National Contingency Plan (NCP) as revised (40 CFR 300). The NCP provides decision-making guidance and a framework for the identification and evaluation of remedial action alternatives on a site-by-site basis. In addition, the procedures enumerated in the Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA (U.S. EPA, 1988b) were followed.

This FS, conducted for Allied-Signal Inc., the corporate successor of UOP, addresses the former process and storage areas of the UOP Site, referred to as the terrestrial upland or upland portions, designated as Areas 1, 1A, 2, and 5. This FS identifies and evaluates potential remedial alternatives for the upland areas of the UOP Site. The FS is based upon: (1) the Phase II Investigation Report (May 1985), which also includes data presented in the Phase I investigation (May, 1984), both of which were prepared by Geraghty & Miller; (2) the Remedial Investigation Report (RI) (Geraghty & Miller, May 1988); (3) available analytical data from on-site soils and ground water sampling conducted by ENSR in late 1989, early 1990, and late