REPORT OF FINDINGS DETERMINATION OF AMBIENT SITE CONDITIONS AND PHASE II SUPPLEMENTAL SAMPLING FORMER ALLIED SIGNAL DUNDEE WAREHOUSE PASSAIC, NEW JERSEY

29 April 1991

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File No.: 320.31.01.01

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SECTION 1
INTRODUCTION

The Environmental Cleanup and Responsibility Act (ECRA) enacted by the New Jersey Department of Environmental Protection (NJDEP) mandates that in cases involving property transfer and/or closure of facilities where contaminants may have entered the environment, the environmental conditions at the applicable facility be assessed by the collection of representative soil and/or ground water samples. In response to this requirement and in accordance with procedures outlined in the approved ECRA Sampling Plan, Environmental Resources Management, Inc. (ERM), under contract to Allied-Signal, Inc. (Allied-Signal), has collected soil and ground water samples during four sampling events (June 1987, August 1989, April 1990, and February/March 1991) at the former Dundee Warehouse, located in Passaic, New Jersey (hereinafter the "Site").

The approved ECRA Sampling Plan, with an Addendum incorporating NJDEP requested environmental samples, was implemented on 2 June 1987 and during the period from 1 August to 3 August 1989. Two underground storage tanks were removed in 1987 and "at risk" soil samples were collected to confirm the cleanup and/or potential for contaminated soil resulting from the tanks. Soil samples were collected at the base of the tank pit excavation and extent of stained soil. A report of findings presenting Sampling Plan analytical results (including the June 1987 and August 1989 sampling), data interpretation and recommendations was submitted to the NJDEP in December 1989. As an integral part of this report (Section 4), supplemental sampling activities were proposed to more completely define the horizontal and vertical extent of observed soil contamination at the Site. Subsequent to NJDEP's review of the Sampling Plan findings (December 1989 submittal), the recommended Supplemental Sampling Plan was amended to incorporate additional sample locations and analytes, thereby providing a comprehensive assessment of site soil conditions.

The approved Supplemental Sampling Plan was implemented during the period from 26 April to 27 April 1990. A report of findings (Supplemental Sampling Results), conclusions, and recommendations was submitted to NJDEP in August 1990. Based upon the investigation findings, ERM concluded that elevated concentrations of compounds observed in selected areas of concern were due to pre-existing conditions in the fill material imported for construction and not a result of operations conducted at the Site. NJDEP responded to the Supplemental Report of Findings by requiring that additional samples be collected in selected areas to further define the lateral and horizontal distribution of contaminants of concern.

Based upon findings obtained during the implementation of the Supplemental Sampling Plan and subsequent comments provided by the NJDEP, Allied-Signal directed ERM to prepare a Phase II Supplemental Sampling Plan (23 October 1990) with the objective of collecting data necessary to define the extent of the affected soils in the remaining areas of concern at the Site. The determination of ambient Site conditions was an integral part of the Phase II Supplemental Sampling Plan. In response to the conditional approval of the Phase II Supplemental Sampling Plan by NJDEP (correspondence dated 19 November 1990 from Ms. Dawn Pompeo), ERM prepared a two phased investigation approach to address concerns of the NJDEP and to effect an efficient completion of the investigative phase of this project. The initial phase of the investigation (Determination of Ambient Site Conditions) was developed to establish ambient, or background, Site conditions.

This report presents the investigation findings, conclusions, and recommendations generated as a result of implementing The Determination of Ambient Site Conditions work scope and approved portions of the Phase II Supplemental Sampling Plan.

SECTION 2
TECHNICAL OVERVIEW

2.1 Site History

Allied-Signal owned and operated the Site located in Passaic, New Jersey, from approximately 1899 through 1987. During this time period, the Site was utilized as a nitrating plant, a bulk acid distribution facility, and a warehouse for the storage of engineered plastics and pellets. Prior to 1899, the Site was owned by the Dundee Chemical Company. Site operations, associated with the Dundee Chemical Company have not been completely determined, but are assumed to have been acid packaging and distribution.

Presented below is a chronological Site history describing major operations and/or ownership changes, as well as ECRA related sampling events for the subject property.

- Prior to 1899 - Site owned by the Dundee Chemical Company.
- 1899 to 1960 - Site owned by Allied-Signal. Operated as a bulk acid distribution facility and nitrating plant.
- 1960 - Nitrating operations discontinued.
- 1974 to 1976 - Acid distribution operations discontinued.
- 1976 to 1986 - Storage of engineered plastics and pellets. It should be noted that all material was stored as finished product, no plastic manufacturing operations were conducted on-site. Plastic products stored included AC Polyethylene®, capron (Nylon)®, and high density polyethylene.
- 1986 to 1987 - Warehouse facilities remained vacant.
- 1987 (2 June) - "At Risk" collection of soil samples in Sample Area "A".
- 1989 (1 to 3 August) - Implementation of Approved ECRA Sampling Plan/Sampling Plan Addendum.
- 1990 (26 to 27 April) - Implementation of Supplemental Sampling Plan.
- 1990 (3 August) - Report of Findings, Supplemental Sampling Plan, submitted to NJDEP.

- 1990 (26 September) - NJDEP provides conditional approval of Phase II Supplemental Sampling Plan.
- 1990 - Allied-Signal, Inc. requests an extension to address NJDEP 26 September 1990 comments and modify the proposed Phase II Supplemental Sampling Plan.
- 1991 (15 February) - Based upon Allied-Signal's request, ERM proposes a two phased sampling plan for Phase II Supplemental Sampling including Determination of Ambient Site Conditions.
- 1991 (27 February) - Implementation of Determination of Ambient Site Conditions and approved portions of Phase II Supplemental Sampling Plan.
- 1991 (18 March) - Ground water sampling in monitoring wells installed during Determination of Ambient Site Conditions investigation.

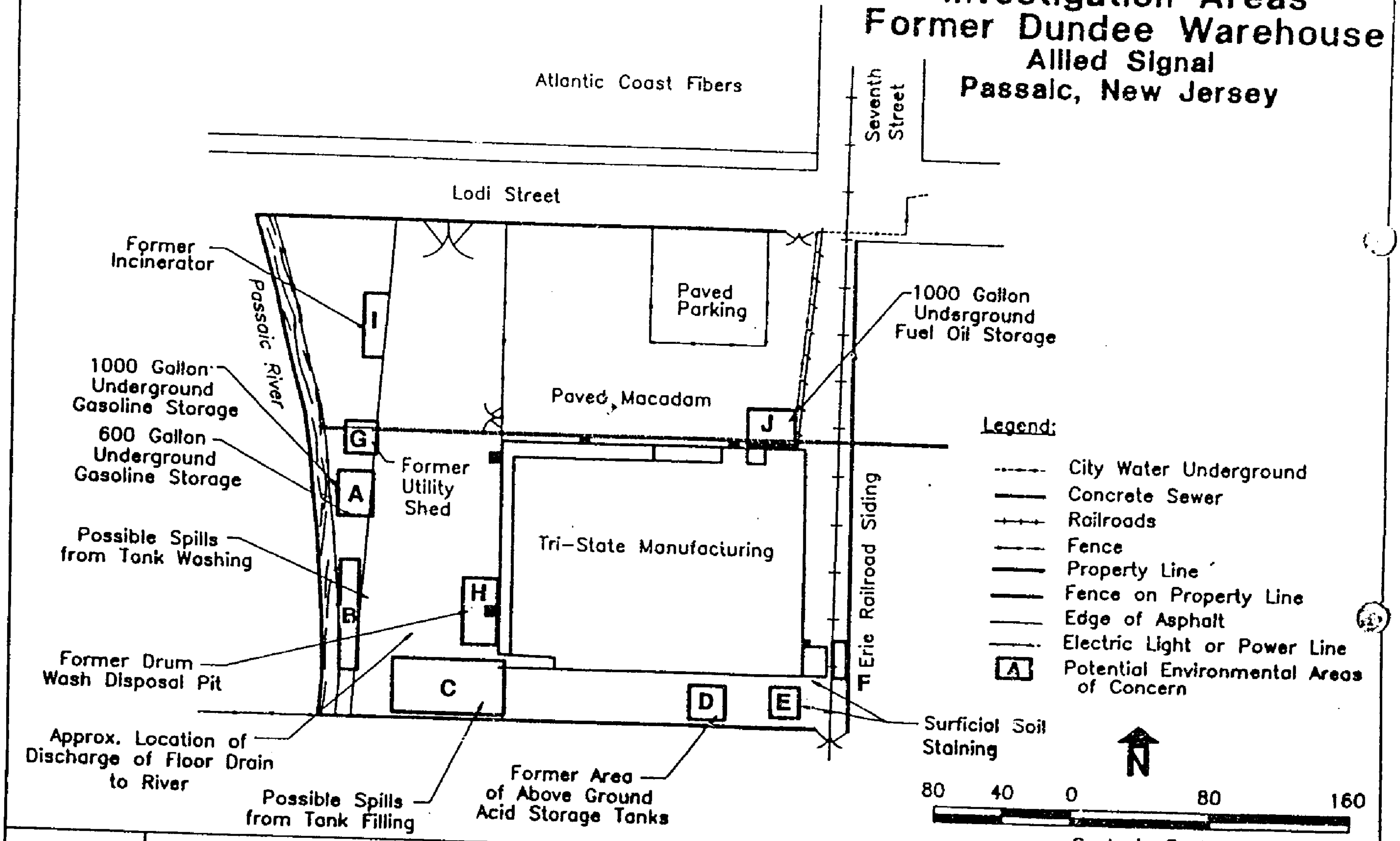
2.2 Previous Investigations

The investigation of the Site consisted of the identification of areas which exhibited potential for contamination on the basis of historic Site activities. Following the preliminary identification of each area of potential concern, an area-specific sampling plan was developed which detailed the parameters selected for analysis. A total of ten areas were identified for the procurement of soil samples (Figure 2-1).

Based upon the analytical results obtained during implementation of the August 1989 sampling event, ERM recommended additional soil sampling to further characterize the presence of soil contamination in areas of concern. On the basis of these results, six of the areas were targeted for further investigation. The areas identified for further study (Areas A, B, E, F, G, and I) demonstrated the presence of one or more constituents which exceeded ECRA guideline concentrations, thereby requiring additional sampling and analysis to more completely delineate the extent of the soil contamination. An area-specific sampling plan (Supplemental Sampling Plan) was developed which detailed the parameters selected for analysis.

The following discussion provides an area-specific summary of the soil sampling programs during the implementation of the Soil Investigation (June 1987 and August 1989) and Supplemental Sampling Plan (April 1990). Plates 1 and 2 provide a graphical description of the investigation areas and sampling locations in the June 1987 and August 1989, and April 1990 sampling events.

Figure 2-1
Investigation Areas
Former Dundee Warehouse
Allied Signal
Passaic, New Jersey



WO# 320.31.01.01	Drawn By / Date: C. Pomante 4.9.91	Checked By / Date:	Notes:
	Revised By / Date: T. Cassidy 4.24.91	Checked By / Date:	

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respectively. Analytical results of the previous sampling events are included in Appendix A.

2.2.1 *Sample Area A (Underground Fuel Storage Tanks)*

Sample Area A was characterized by the former presence of subsurface gasoline and diesel storage tanks (1000 gallons and 600 gallons, respectively). A precision test conducted on each tank implied a slight leak existed in the 1,000 gallon capacity gasoline storage tank. Prior to sample procurement, the subsurface tanks storage tanks and visually contaminated soils were removed from the former tank pit area.

A total of 14 soil samples were collected in June 1987 at the time of the tank removal activities; 12 samples were collected from 6 locations in the open excavation and two additional samples were collected from the excavated soil (Plate 1). The "surface" samples procured from the former tank excavation were analyzed for total petroleum hydrocarbons (TPH). The 18-inch deep samples procured from the former tank excavation were analyzed for benzene, toluene, and xylene (BTX), and Base Neutral Organic Compounds. Results of the analysis indicated the presence of TPH and Base Neutral Organic Compounds at concentrations above the respective ECRA guideline concentrations (Table 2-1).

Soil samples collected to characterize excavated soil (WSW 3 and 1P 12) indicated elevated concentrations of TPH exceeding the ECRA guideline. Sample WSW 3 exhibited negative results for EP Toxic Metals, ignitability, corrosivity, and reactivity. Sample 1P 12 exhibited Base Neutral Organic Compounds in excess of the ECRA guideline.

In order to characterize the extent of existing contamination, a total of six soil borings designated SB-1(I) through SB-6(I) were installed in a radial pattern approximately 10 feet from the former tank excavation during the April 1990 sampling event (Plate 2). The soil borings were advanced to a total depth of approximately 16 feet. Two soil samples from each boring were procured from the depth intervals of 12 to 14 feet and 14 to 16 feet. Samples were analyzed for TPH, benzene, toluene, ethylbenzene, xylene (BTEX), and Base Neutral Organic Compounds.

Sampling and analysis demonstrated elevated levels of TPH at concentrations exceeding ECRA guidelines in each of the soil samples with the exception of the soil samples collected from the 12 to 14 foot sample interval in SB-1 (I) and the 14 to 16 foot sample interval in SB-4 (I)). Base Neutral Organic Compounds were detected at

Table 2-1
NJDEP Guidelines* for Evaluating Possible ECRA Cleanup Requirements

	CONTAMINANT	SOIL (mg/Kg)	GROUND WATER (ug/L)
METALS	Arsenic	20	50
	Barium		1000
	Cadmium	3	10
	Chromium	100	50
	Copper	170	1000
	Lead	100	50
	Mercury	1	2
	Nickel	100	
	Selenium	4	10
	Silver	5	50
	Zinc	350	5000
ORGANICS	Total Volatiles	1	10
	Total Base Neutrals	10	50
	Total Acid-Extractables	10	50
	Total Petroleum-Hydrocarbons	100	1000
	Total PCBs	1 to 5	1
OTHER	Cyanide	12	200

* used informally in evaluating possible cleanup requirements

concentrations exceeding the ECRA guideline in the same samples that exhibited elevated TPH concentrations with the exception of the 14 to 16 foot sample interval in SB-3 (I).

TPH and Base Neutral Compound concentrations typically decreased from the June 1987 samples to the April 1990 samples, but remained greater than the respective ECRA guidelines. A noted exception was the 12 to 14 foot sample in boring SB-6(I) located south of the former excavation which contained TPH and Base Neutral Organic Compounds at elevated concentrations. In each of the borings with the exception of SB-1(I), concentrations of TPH and Base Neutral Organic Compounds detected decreased from the 12 to 14 foot sample to the 14 to 16 foot sample.

The analytical results of the previous sampling investigations are attached in Appendix A.

Based upon the results of the April 1990 sampling event, additional borings and soil samples were proposed in the Phase II Supplemental Sampling Plan in order to completely characterize the extent of the observed contamination.

2.2.2 Sample Area B (Former Tank Wash Area)

Sample Area B was utilized for both tank washing and above-ground acid storage. During the August 1989 sampling event, a total of five shallow soil samples were collected from three hand auger borings designated B-1, B-2, and B-3 (Plate 1). Boring B-1 produced three samples from the 0 to 6 inch, 12 to 18 inch, and 18 to 24 inch depth intervals. One sample was collected from the 12 to 18 inch depth interval in borings B-2 and B-3.

The results of the August 1989 sampling and analysis for TPH, Base Neutral Organic Compounds, and Priority Pollutant Metals indicated the presence of each of the above constituents, where analysis was conducted, at concentrations which exceed ECRA guidelines. Analysis for Priority Pollutant Metals in the 0 to 6 inch sample interval of B-1 indicated that the concentrations of two metals (zinc and lead) exceeded ECRA guideline concentrations.

To delineate the vertical extent of existing contamination, a total of three additional soil borings designated B-1(I), B-2(I), and B-3(I) were installed in Area B during the April 1990 sampling event (Plate 2). Each soil boring was advanced to a total depth of three feet using a hand bucket auger. A soil sample was procured from the 30 to 36 inch sampling interval in each boring and analyzed for TPH, Base Neutral Organic Compounds, and lead.

Results of the April 1990 sampling event indicated that TPH, Base Neutral Organic Compounds, and lead are present at each of the three additional sampling locations in concentrations which exceed ECRA guidelines.

2.2.3 Sample Area C (Former above ground tank filling area)

This area previously functioned as a tank truck delivery area. Raw materials handled in this area included hydrochloric acid, sulfuric acid, ammonia, and liquid silicates.

During the August 1989 sampling event a total of 6 soil samples were collected from five locations designated C-1 through C-5 (Plate 1). In location C-5 the sample collected from the 0 to 6 inch sample interval was analyzed for TPH, Base Neutral Organic Compounds, and PPL Metals; the sample collected from the 18 to 24 sample inch interval was analyzed for Volatile Organic Compounds and Acid Extractable Organic Compounds. One sample was collected at each of the locations C-1 through C-4 from the 12 to 18 inch sample interval and was analyzed for pH and an anion scan.

Sample location C-5 (0 to 6 inch sample interval) demonstrated the presence of TPH which exceeded the ECRA guideline (2300 mg/Kg). Analysis for VOCs, Semi-Volatile Organic Compounds, and Priority Pollutant metals demonstrated the absence of each of the above compounds at concentrations greater than the ECRA guideline concentrations. The pH values recorded from samples obtained in Area C ranged from a minimum of 4.66 to a maximum of 10.5. There are no ECRA guidelines for an anion scan and pH.

Based upon the results and approval of the NJDEP, Area C was eliminated from further study.

2.2.4 Sample Area D (Former location of above-ground acid tanks)

Sample Area D was characterized by the former presence of above-ground acid storage tanks.

Samples were collected during the August 1989 sampling event in accordance with the Sampling Plan. A total of two samples were collected from two locations (D-1 and D-2) and analyzed for pH and anion scans (Plate 1). Analysis for pH indicated slightly acidic conditions existing in the soil (3.7 and 3.84). There are no ECRA guideline concentrations for an anion scan and pH.

Based upon the results and approval of the NJDEP, Area D was eliminated from further study.

2.2.5 Sample Areas E and F

Areas E and F were characterized by the presence of surficial soil staining. Sampling during the August 1989 sampling event produced a total of six soil samples; four samples from two locations in Area E (E-1 and E-2) and two samples from one location in Area F (Plate 1). The samples procured from the surface interval (0 to 6 inch) at each location were analyzed for TPH, PPL Metals, and PCBs. The samples procured from the 12 to 18 inch sample interval at each location were analyzed for pH and an anion scan.

The 0 to 6 inch sample from location E-2 exhibited an elevated concentration of TPH that exceeded the ECRA guideline concentration. Analysis for Priority Pollutant Metals indicated elevated concentrations for lead which exceeded ECRA guideline concentrations in each of the 0 to 6 inch samples. In addition, arsenic was detected as a quantitative estimate in E-1 (0 to 6 inch sample interval) at a concentration slightly greater than the ECRA guideline.

In order to further delineate the extent of observed contamination, additional soil samples were subsequently procured in each of the areas during the April 1990 sampling program. A total of four borings were installed in each area designated E-1(I) through E-4(I) and F-1(I) through F-4(I), respectively (Plate 2). The borings were advanced to a total depth of two feet using a hand bucket auger. Soil samples were procured from the 6 to 12 inch and 18 to 24 inch sample intervals for each boring. Each sample was analyzed for TPH, arsenic, and lead.

In Area E, the concentrations of TPH and lead exceeded the established ECRA guideline in six of the eight samples collected. Arsenic concentrations exceeded the ECRA guideline in all samples collected and were greater in the 18 to 24 inch sample interval in three of four borings. Results of the two sampling rounds indicate that TPH concentrations vary within a range between 70 and 690 mg/Kg. No trend in TPH concentrations was observable with depth. In all but one sample collected during the second sampling round, lead concentrations were greater in the sample collected from the 18 to 24 inch sample interval.

TPH detected in Area F exceeded ECRA guideline concentrations in the 6 to 12 inch sample interval in each boring. TPH concentrations decreased in the 18 to 24 inch sample interval in each boring to non-detected or values below ECRA guideline concentrations. Lead concentrations exceeded ECRA guidelines in each of the eight samples collected, but exhibited decreasing concentrations in the sample collected from the 18 to 24 inch sample interval in all but one boring. The concentrations of arsenic decreased with depth and those samples which exceeded the ECRA guideline concentration where limited to the samples collected from the 0 to 6 inch sample interval from two borings.

2.2.6 Sample Area G (Utility Shed)

This sample area was characterized by the former presence of a small utility shed previously used for the storage of small quantities of gasoline and motor oil. Prior to sample acquisition, the shed was removed. Samples were collected during the August 1989 sampling event in accordance with the Sampling Plan. A total of four soil samples were collected from two locations (G-1 and G-2) (Plate 1). The samples procured from the surface interval (0 to 6 inch) at each location were analyzed for PCBs and PPL metals. The samples procured from the 18 inch sample interval in location G-1 and the 12 inch depth interval in location G-2 were analyzed for TPH and Volatile Organic Compounds plus 15 identifiable peaks (VOC + 15).

Elevated concentrations of TPH were detected exceeding the ECRA guideline concentration in the two sample intervals analyzed, G-1 at 18 inches and G-2 at 12 inches. Analysis for Priority Pollutant Metals indicated that lead was greater than the ECRA guideline in both of the 0 to 6 inch sample intervals analyzed. Cadmium exhibited a concentration greater than the ECRA guideline in G-1 (0 to 6 inch sample interval). In addition, arsenic was detected as a quantitative estimate exceeding the ECRA guideline in G-1 (0 to 6 inch sample interval)

In order to further delineate the extent of observed contamination, additional soil samples were subsequently procured in Area G during the April 1990 sampling program. A total of two samples were collected, one sample each from two borings designated G-1(I) and G-2(I)(Plate 2). The borings were advanced to a total depth of 3 feet using a hand bucket auger and soil samples were procured from the 24 to 36 inch sample intervals. Each sample was analyzed for TPH, arsenic, cadmium, and lead.

TPH and lead were detected at concentrations above their respective ECRA guideline levels in each of the samples analyzed.

2.2.7 *Sample Area H (Former Drum Wash Disposal Pit)*

2.2.7.1 Soil Samples

Area H contained a former drum wash disposal pit area that has been filled with cement making access to the pit impossible. Therefore, samples were collected during the August 1989 sampling event in Area H in accordance with the Sampling Plan Addendum. A total of nine soil samples were collected from three soil borings (H1 through H3) installed in Area H (Plate 1). Split spoon soil samples were collected from the depth intervals of 3 to 4 feet, 5 to 6 feet, and 7 to 8 feet below grade. The deep interval in boring H-1 was altered to 9 to 10 feet below grade. All samples were analyzed for TPH, Base Neutral and Acid Extractable Organic Compounds (with additional peak library search), PPL Metals, and VOC + 15.

TPH was detected but at concentrations considered to be invalid due to the presence of a similar concentration in a sample blank.

Based upon the results and approval of the NJDEP, Area H was eliminated from further study.

2.2.7.2 Stream Sediment Samples

As part of the August 1989 investigation of Area H, stream sediment samples (H-4 and H-5) were collected near the Site boundaries from a depth of 6 to 12 inches at locations down- and upstream, respectively, of the suspect drain pipe discharge into the Passaic River (Plate 1). The samples were analyzed for TPH, Base Neutral and Acid Extractable Compounds, VOCs, and PPL Metals.

Both samples exhibited elevated concentrations of TPH and Base Neutral Semi-Volatile Compounds which exceeded the respective ECRA guideline concentrations.

Lead concentrations exceeding the ECRA guideline were detected in both samples. Mercury was detected as a quantitative estimate slightly above the ECRA guideline concentration in the downstream sample (H-4).

Elevated concentrations of TPH and Base Neutral Organic Compounds were detected in the upstream sample (H-5) at concentrations greater than the respective concentrations detected in the downstream sample (H-4).

2.2.8 Sample Area I (Former Incinerator Location)

Sample Area I was characterized by the former presence of an incinerator. The operational history of the incinerator is not available. It is for this reason that sampling of near surface soils was implemented. Samples were collected during the August 1989 sampling event in accordance with the Sampling Plan Addendum. A total of eight soil samples were collected from four locations (I-1 through I-4) (Plate 1). Soil samples were collected from the depth intervals of 0 to 6 inches and 18 to 24 inches below the surface. The 0 to 6 inch sample at each location was analyzed for TPH, Base Neutral Organic Compounds, PPL Metals, and PCBs. The 18 to 24 inch sample at each location was analyzed for Base Neutral and Acid Extractable Compounds and VOCs plus appropriate library searches.

TPH was detected at concentrations greater than the ECRA guideline in each of the 0 to 6 inch sample intervals analyzed. Base Neutral Organic Compounds were detected at concentrations which exceed the ECRA guideline concentration in five of the eight samples analyzed. The concentration of Base Neutral Organic Compounds increased with depth significantly in location I-1 and also increased with depth in I-3 and I-4.

Analysis for Priority Pollutant Metals indicated that metal concentrations exceeded established ECRA guideline concentrations in all of the sampling locations. The respective ECRA guideline concentrations were exceeded for each of the following metals in at least one of the four (0 to 6 inch) samples analyzed: chromium, zinc, and lead. In addition, copper, arsenic, and mercury concentrations were reported as quantitative estimates greater than the respective ECRA guidelines. No PCBs were detected in samples removed from Area I.

In order to further characterize the extent of observed contamination, additional soil samples were subsequently procured in Area I during the April 1990 sampling program. A total of four additional soil borings designated I-1(I) through I-4(I) were installed approximately 10 feet from each of the existing sample locations in Area I (Plate 2). The borings were advanced to a total depth of three feet using a hand bucket auger. A single soil sample was procured from the depth interval of 24 to 36 inches in each boring and analyzed for TPH, VOCs, Base Neutral Organic Compounds, chromium, zinc, arsenic, and lead.

Results of analysis exhibited elevated levels of arsenic, lead, TPH, and Base Neutral Organic Compounds. TPH and Base Neutral Organic Compounds, and lead were detected at concentrations which exceed

ECRA guideline levels in borings I-1(I), I-2(I), I-3(I), and I-4(I). Arsenic was detected at a concentration which exceeded the ECRA guideline in boring I-4(I).

Based upon the results of the April 1990 sampling event, additional borings and soil samples were proposed in the Phase II Supplemental Sampling Plan in order to completely characterize the extent of the observed contamination.

2.2.9 Sample Area J (1000 gallon Fuel Oil Tank)

Sample Area J is characterized by the presence of an abandoned 1000 gallon underground storage tank previously used for storage of fuel oil. Samples were collected during the August 1989 sampling event in accordance with the Sampling Plan Addendum. A total of four soil samples were collected from four soil borings designated J-1 through J-4 (Plate 1). Split spoon soil samples were collected in each boring from the 7 to 8 foot sample interval. All samples were analyzed for TPH, Base Neutral Organic Compounds, and EP Toxicity parameters.

Sampling and analysis for TPH and Base Neutral Organic Compounds demonstrated the absence of these analytes above ECRA guideline concentrations. The EP Toxicity analysis demonstrated negative results.

Based upon the results and approval of the NJDEP, Area J was eliminated from further study.

2.3 Phase II Supplemental Sampling Plan

Based upon review of the findings and the response of NJDEP, Allied Signal directed ERM to prepare a Phase II Supplemental Sampling Plan in order to define the extent of the affected soils in the remaining areas of concern at the Site (Areas A, B, E, F, G, and I). ERM prepared a two-phased approach to the Phase II Supplemental Sampling to allow a focused completion of the investigation. In conjunction with the additional sampling required in Areas A and I to characterize the extent of the observed contamination, NJDEP approved the Determination of Ambient Site Conditions as a preliminary part of the Phase II Supplemental Sampling Plan required before implementing the proposed sampling in Areas B, E, F, and G.

2.3.1 Field Tasks

The scope of work in The Determination of Ambient Conditions included the following field tasks:

- the collection of a total of sixteen soil samples from three shallow soil borings located on the eastern property boundary and one boring on the northern facility boundary to establish background (ambient) concentrations for compounds of concern. All samples were submitted to the laboratory on a 5-day turnaround schedule;
- the installation of five shallow ground water monitoring wells to characterize the Site's hydrologic regime;
- the collection of two surface water samples from the Passaic River at the Site's northern and southern property boundaries;
- the compilation of data regarding all water wells located within one-half mile of the facility; and
- the collection of one complete round of synoptic liquid level measurements and ground water quality samples from the five proposed monitoring wells.

The scope of work in the approved portions (Areas A and I) of the Phase II Supplemental Sampling Plan included the following field tasks:

- the collection of soil samples from six soil borings located approximately 25 feet in a radial pattern around the former tank excavation in Area A. The borings were completed to a depth of 12 feet and each yielded three soil samples;
- the collection of soil samples from seven soil borings located approximately 10 feet in an offset pattern from the former borings located in Area I. The borings were completed to a depth of 12 feet and each yielded three soil samples.

2.4 Scope of Work

2.4.1 Background Samples

In order to determine ambient soil conditions that exist at the perimeter of the Site, four background soil borings designated BG-1, BG-2, BG-3, and BG-4 were installed. Three soil borings (BG-1, BG-2, and BG-3) were installed along the eastern property boundary topographically and hydraulically upgradient. A fourth soil boring (BG-4) was installed proximal to a fenced parking area midway along the northern property boundary adjacent to Lodi Street (Plate 3).

The borings were installed utilizing a truck mounted drill rig by B & B Drilling, Inc. of Landing, New Jersey. Soil samples were collected from 3 inch diameter split spoons (sampling method ASTM D1586) advanced from the surface to 12 feet below grade or refusal. BG-1, BG-2 and BG-4 were drilled to a depth of 12 feet. BG-3 was halted at a depth of 10 feet due to an unknown subsurface obstruction. The drilling rig and down hole equipment were steam cleaned upon arrival at the Site and subsequently between each boring to prevent cross contamination of the borings.

A total of four samples were collected from each boring at depth intervals of 0 to 2 feet, 2 to 4 feet, and 4 to 6 feet, and 10 to 12 below grade. Soil sampling was conducted in accordance with NJDEP's Field Sampling Procedures Manual (February 1988). However, the intervals for soil samples recovered for analysis in each boring were amended from the NJDEP-recommended analysis interval of 6 inches to approximately 1-foot to 2-foot intervals due to low or non-existent recovery of fill material during standard split-spoon sampling activities. The low recoveries obtained during split-spoon sampling did not produce sufficient volume of sampled material to be submitted to the laboratory. Based upon the observations of the ERM field geologist regarding the non-homogeneous nature of the fill, it was determined during the field activities that it was an appropriate step to increase the sampling interval to recover sufficient volume of material for laboratory analysis.

To prevent cross contamination between soil samples, the split spoon sample barrels were thoroughly decontaminated after each sample was collected. The decontamination procedure consisted of the following steps:

- fresh water rinse;
- distilled water/soap wash;
- distilled water rinse;
- methanol rinse; and
- air dry.

In order to prevent cross contamination of samples, the ERM geologist donned a clean pair of surgical gloves for each split spoon interval sample.

Soil samples were collected in 1000 ml glass soil jars, issued a traffic report number, logged on a chain of custody form (Appendix B). The samples were packaged in a cooler to maintain a temperature of approximately 4 degrees Centigrade and shipped to Lancaster Laboratories, Inc., in Lancaster, Pennsylvania for chemical analysis. Samples were submitted on a rush five day turnaround schedule. A quality assurance/quality control (QA/QC) travel blank sample was also submitted.

2.4.1.1 Laboratory Analysis

In accordance with the NJDEP conditional approval of the Phase II Supplemental Sampling Plan, all background soil samples were analyzed for total petroleum hydrocarbons (TPH) using EPA Method 418.1, and lead, arsenic, chromium, zinc, and selenium using EPA Method SW-846. In addition, 25 percent of the samples were analyzed for Priority Pollutant List (PPL) Base Neutral Organic Compounds plus 15 identifiable peaks (BN+15) using EPA Method 8270.

In order to assure that the holding times for BN + 15 analyses were not exceeded, samples were submitted on a 5-day turnaround schedule. In addition, samples held pending results were pre-extracted prior to performing the TPH analysis in accordance with the NJDEP conditional approval of the Sampling Plan.

A Tier II data package review was provided by Lancaster Laboratories in accordance with NJDEP requirements.

2.4.2 Ground Water Investigation

2.4.2.1 Monitoring Well Installation Procedures

A total of five monitoring wells (MW-1, MW-2, MW-3, MW-4, and MW-5) were installed during the period from 28 February to 4 March 1991 utilizing truck mounted drilling rig equipped with nominal 12-inch outside diameter (O.D.) hollow stem augers (Plate 3). All wells were installed under the continuous observation of an ERM hydrogeologist and were constructed to comply with NJDEP standards. The 12-inch O.D. augers were utilized in place of the proposed 6-inch O.D. augers due to the presence of large blocks of buried concrete in the fill material.

The monitoring wells were installed in borings advanced to a total depth approximately 10 feet below the ground water surface. MW-1, MW-2, MW-3, and MW-5 were completed to a total depth of 20 feet below ground surface. MW-4 was completed to a total depth of 22 feet below grade. Soil samples were collected from the 0 to 2 foot sample interval in each monitoring well boring and from the 18 to 20 foot sample interval in MW-2. All samples were analyzed for TPH and BN+15. Samples from MW-3, MW-4, and MW-5 were also analyzed for lead, arsenic, chromium, and zinc. In addition, the sample from MW-

5 was analyzed for selenium. Upon boring completion of the borings to the desired depth, a monitoring well was constructed in each of the boreholes.

Each monitoring well was constructed of 15 feet of 4-inch diameter PVC machine slotted screen (0.010-inch). The screened interval extended across the phreatic surface such that 5 feet of screen was placed above and 10 feet was placed below the inferred phreatic surface to allow for detection of a Non-Aqueous Phase Liquid (NAPL) layer, if present. A riser pipe was installed to extend from the screened interval to the ground surface. All screen and casing sections were joined with flush threaded joints.

A sand filter pack was installed in the annular space of each monitoring well to a depth approximately one foot above the top of the screened interval. A bentonite seal was then placed above the sand pack to a minimum thickness of 1 foot. The remaining annular space was filled with bentonite-cement grout and a locking protective cap placed over the casing. Figure 2-2 provides a schematic diagram of the construction specifications for monitoring wells.

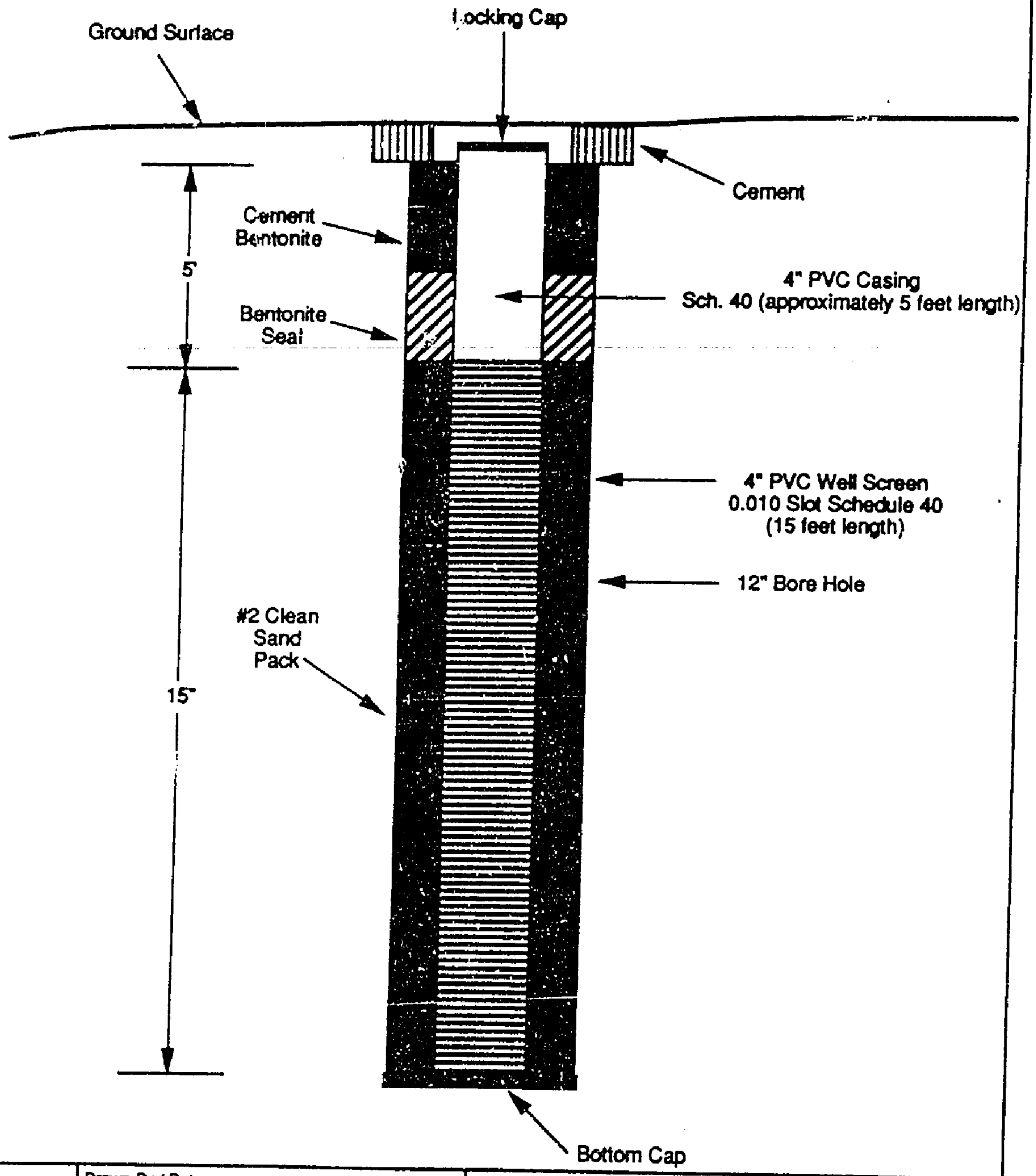
Upon completion of each monitoring well, an 8-inch steel flush-mount access box with bolted sanitary cover was installed around the PVC riser and encased in a 2 foot by 2 foot concrete pad to maintain long term structural integrity of the monitoring well.

2.4.2.2 Well Development and Elevation Survey

The ground water monitoring wells were developed to remove fine grained material from the sand pack using a centrifugal pump, 1 inch PVC pipe, and dedicated foot valves. The well development process flushes residual drilling material from the well annulus, allowing a representative ground water sample to be obtained. The wells were developed by evacuating the ground water in the screen and sand pack until the discharge water cleared indicating a decrease in suspended solids. All wells except MW-1 were pumped dry and allowed to recharge through a minimum of three cycles. MW-1 did not go dry and cleared of visible suspended solids after approximately three well volumes were evacuated.

The elevations of the five monitoring wells installed at the Site were surveyed to the nearest 0.01 foot by James M. Stewart, Inc., a New Jersey licensed land surveyor. All required state permits were completed and filed with the NJDEP upon completion of field activities. As required by NJDEP, Monitoring Well Permit Forms A (As-Built Certification) and B (Location Certification) were completed

Figure 2-2
Water Table
Monitoring Well Construction Schematic
Former Allied-Signal Dundee Warehouse
Passaic, New Jersey



WO# 320.31.01.01	Drawn By / Date: M. Smith 4.19.91	Checked By / Date: J. Marin 4.19.91	The ERM Group
	Revised By / Date:	Checked By / Date:	

and submitted to NJDEP Bureau of Water Quality (Appendix C). The individual monitoring well flush-mount casings were stamped on 26 April 1991 with the appropriate NJDEP well permit numbers by B & B Drilling, Inc.

2.4.2.3 Ground Water Sampling

Subsequent to monitoring well installation and development, all newly installed wells were allowed to equilibrate for a minimum of two weeks. Ground water sampling activities were conducted in accordance with the protocol described in detail in the approved Phase II Supplemental Sampling Plan (October 1990). Representative ground water samples were procured from each of the newly installed ground water monitoring wells. In addition, five QA/QC samples were prepared including a blind duplicate, matrix spike (MS), matrix spike duplicate (MSD), travel blank, and equipment blank. The samples were shipped to Lancaster Laboratories, Inc., Lancaster, Pennsylvania on a five day rush turnaround schedule.

The following sampling protocol was implemented to insure the collection of representative ground water samples:

- the depths to the water table were measured with a depth to water meter to the nearest 0.01 foot below the top of the PVC well casing (riser). These measurements determined the volume of water in each well and provided a data base for the construction of a ground water gradient map (Plate 3).
- all monitoring wells were gauged with an optical interface probe capable of measuring the presence of ground water and NAPL with an accuracy of 0.01 feet.
- each monitoring well was purged until three well volumes of ground water were evacuated. The purge water was contained in 55 gallon drums pending the analytical characterization of the ground water.
- wells were sampled with a 1-1/4-inch diameter stainless steel bailer. Dedicated bailer cord was employed for each well and subsequently disposed of following sampling. To prevent cross-contamination between wells, the bailer was thoroughly decontaminated after each sampling event. The decontamination procedure consisted of the following steps:
  - manual scrub with Alconox®, a non-phosphate detergent;
  - fresh water rinse;

- rinse with dilute (10%) nitric acid (HNO_3);
- rinse with pesticide-grade methanol;
- rinse three times with distilled water;
- air dry.

Field measurements for pH, specific conductance, and temperature were obtained on ground water samples immediately following sample collection. A grab sample collected in a beaker was used to obtain measurements. All measurement probes were rinsed with distilled water between samples.

To prevent cross-contamination of samples, field sampling personnel donned surgical gloves which were properly disposed of following sample collection at each well.

Ground water samples collected for metals analysis were field filtered through a 0.45 μm pore sized filter prior to preservation to allow determination of dissolved metal content. The filtering system used was a Millipore® OM100 Hazardous Waste Filtration System. This filtering system is completely constructed of stainless steel and Teflon material. Each ground water sample was decanted into the filtering system containing a new 0.45 μm pore sized filter. The sample was filtered under pressure using inert nitrogen gas. The sample was filtered directly into the sample container with the necessary preservation (HNO_3) already added. Duplicate unfiltered ground water samples were collected to provide total metals analysis.

Immediately after collection, samples were transferred to properly labeled sample containers with all necessary preservatives added. Samples requiring refrigeration for preservation were immediately transferred to coolers packed with ice packs. The samples were issued a traffic report numbers and logged on a chain of custody form in accordance with standard ERM procedures.

2.4.2.4 Laboratory Analysis

Ground water samples were sent to Lancaster Laboratories, Lancaster, Pennsylvania for chemical analysis. Each of the samples was analyzed for the following parameters:

- Priority Pollutant List (PPL) Volatile Organic Compounds (plus 15 identifiable peaks) using EPA Method 624;
- PPL Base Neutral Organic Compounds (plus 15 identifiable peaks) using EPA Method 625;

- PPL Metals (filtered and unfiltered) using EPA Method SW-846;
- Chloride, Nitrate, Fluoride, Sulfate, and Phosphate; and
- Total Dissolved Solids and pH.

A Tier II data package review was provided by Lancaster Laboratories in accordance with NJDEP requirements.

2.4.3 *Surface Water Sampling*

ERM collected two surface water samples at low tide from the east bank of the Passaic River adjacent to the Site (Plate 3). Surface water samples were collected at the northern and southern property boundaries. Immediately after collection, samples were transferred to properly labeled sample containers with all necessary preservatives added.

Each sample was labeled, issued a tracking number (ERM Traffic Report Number), logged on a chain-of-custody form, and placed on ice to maintain a temperature of approximately 4 degrees Centigrade.

Field sampling personnel wore surgical gloves which were discarded following sample collection at each sampling location.

Surface water samples collected for metals analysis were field filtered through a 0.45 µm pore sized filter prior to preservation to allow determination of dissolved metals using the same techniques as described above. In addition, three QA/QC samples were prepared including a matrix spike (MS), matrix spike duplicate (MSD), and travel blank.

Immediately after collection, samples were transferred to properly labeled sample containers with all necessary preservatives added. Samples requiring refrigeration for preservation were immediately transferred to coolers packed with ice packs. Proper chain-of-custody documentation was maintained in accordance with standard ERM procedures.

2.4.3.1 Laboratory Analysis

Surface water samples were sent to Lancaster Laboratories, Lancaster, Pennsylvania for chemical analysis. Each of the samples was analyzed for the following parameters:

- PPL Volatile Organic Compounds (plus 15 identifiable peaks) using EPA Method 624;

- PPL Base Neutral Organic Compounds (plus 15 identifiable peaks) using EPA Method 625;
- PPL Metals (filtered and unfiltered) using EPA Method SW-846;
- Chloride, Nitrate, Fluoride, Sulfate, and Phosphate; and
- Total Dissolved Solids and pH.

A Tier II laboratory data package was provided in accordance with NJDEP requirements.

2.4.4 Water Well Survey

A search for all wells located within one-half mile of the facility was conducted utilizing NJDEP computer files, microfiche and paper records as well as local Health Department records. The search included all domestic, monitoring, industrial and public supply wells in the area.

2.4.5 Phase II Supplemental Sampling

2.4.5.1 Area A

In order to establish the lateral and vertical extent of observed soil contamination in Area A, 6 soil borings (designated 91A-SB-1 through 91A-SB-6) were installed during the February/March 1991 sampling event (Plate 3). The borings were installed in a radial pattern approximately 25 feet from the inferred boundary of the former excavation. Soil samples were collected using 3 inch diameter split spoons (sampling method ASTM D1586) advanced from the surface to 12 feet below grade or refusal.

A total of three soil samples were collected from each boring. Samples were procured from the 0 to 2 foot and 10 to 12 foot depth intervals in all borings. In addition, a third sample was procured from each boring in either the 4 to 6 foot or 6 to 8 foot intervals based upon organic vapor content, visual staining, or sample recovery.

Equipment decontamination and sample management procedures described previously for soil boring activities were continued.

Samples were submitted on a normal three-week turnaround schedule.

In accordance with the NJDEP conditional approval of the Phase II Supplemental Sampling Plan, all soil samples were analyzed for TPH using EPA Method 418.1. In addition, a minimum of 25 percent of the samples were analyzed for BN + 15 using EPA Method 8270.

2.4.5.2 Area I

In order to establish the lateral and vertical extent of observed soil contamination in Area I, seven soil borings designated 91I-SB-1 through 91I-SB-7 were installed during the February/March 1991 sampling event (Plate 3).

The borings were installed 20 to 25 feet in a semi-circular radial pattern from the existing cement pad in Area I. Soil samples were collected from 3 inch diameter split spoons (sampling method ASTM D1586) advanced from the surface to 12 feet below grade or refusal.

A total of three soil samples were collected from each boring. Samples were procured from the 0 to 2 foot and 10 to 12 foot depth intervals in all borings except 91I-SB-2 (11 to 12 foot) and 91I-B-5 (9 to 10 foot). In addition, a third sample was procured from each boring in either the 4 to 6 foot, 4.5 to 5.5 foot, or 6 to 8 foot depth intervals based upon organic vapor content, visual staining, or sample recovery.

Equipment decontamination and sample management procedures described previously for soil boring activities were continued.

Samples were submitted on a normal three-week turnaround schedule.

In accordance with the NJDEP conditional approval of the Phase II Supplemental Sampling Plan, all soil samples were analyzed for TPH using EPA Method 418.1. In addition, a minimum of 25 percent of the samples were analyzed for Base Neutral Organic Compounds, lead arsenic, chromium, and zinc.

2.5 Quality Assurance Measures

The quality of all data generated and processed during this investigation were assessed for representativeness, precision, and completeness based upon the available external measures of quality. All data received from the laboratory has undergone an independent verification conducted by ERM's Quality Assurance Department.

In addition, a Tier II data package which includes method references, sample data, and internal Quality Control data was generated by Lancaster Laboratories for the data produced during this investigation.

SECTION 3
RESULTS

3.1 Geology/Hydrogeology

The Site is located within the Piedmont Plateau physiographic province. The Piedmont Plateau physiographic province is bordered on the east and south by the Atlantic and Gulf Coastal Plain and the west and north by the Appalachian Highlands region (Ridge and Valley and Appalachian Plateaus provinces).

The local topography in the vicinity of the Site is characterized by small variations in ground elevations with a slight east to west slope. The Passaic River, bounding the property to the west and flowing from south to north in the vicinity of the Site, functions as the local receptor for surface and ground water flow. The Site is located in the center of a sharp meander in the River's traverse from central New Jersey to Newark Bay on the Atlantic Ocean.

Surface and near-surface geology at the Site consists of Pleistocene aged stratified glacial drift and significant accumulations of fill material imported to the Site. The soil type is classified as the Urban-Riverhead complex and is composed of stratified and sorted material ranging from gravel to cobbles.

Underlying the glacial drift and fill overburden is the sedimentary bedrock of the Triassic aged Brunswick Formation. The Brunswick Formation is characterized as reddish brown shales, siltstones, and sandstones with occasional thin interfingered beds of dark grey to black shale and mudstone. The regional strike of the Brunswick Formation is northeast-southwest. Bedding planes dip to the northwest.

Stratigraphic cross-sections designated A-A' and B-B' show the interpreted subsurface conditions which exist on the Site in Figure 3-1 and Figure 3-2, respectively. The two cross-section traces are identified on Plate 3 for reference. Boring logs are presented in Appendix D.

3.1.1 Fill Material

The fill material is characterized as poorly sorted silt, sand, gravel, and cobbles with local brick, cement, wood, ash, and plastic waste. The fill was observed to extend to a maximum depth of 14 feet below grade in Area A (MW-2). The depth of the fill in Area I exceeded the maximum depth of two of the seven soil borings (12 feet below grade). The fill was also observed extending to a depth of 8 feet in the southeast portion of the Site near Area F (Figure 3-1). The fill was observed at a depth of 6 feet in the northeast corner of the Site (Figures 3-1 and 3-2). At this location, the fill material includes a 2-foot-thick interval of loose, medium grained sand. In contrast, the fill was observed to extend to a maximum depth of 2 feet in the southwest portion of site (MW-3) and 4 feet in the north central areas of the Site (BG-4). This depth represents the minimum thickness of the fill material observed on the site.

The inferred boundary of the fill material and native soil demonstrates that the thickest sections of fill are located at the Site boundaries, especially to the west adjacent to the River. The thinnest section appears to be present in the central portion of the Site adjacent to the building.

3.1.2 Native Soil

The native soil consists of glacial drift deposits (poorly sorted sediments ranging from silty clay to cobbles). Bedrock was not encountered in any of the borings therefore the total thickness of the native soil on the Site was not determined. Well sorted, continuous stringers of sand and silt were observed in the north-central portion of the Site up to a thickness of 4 feet.

3.1.3 Ground Water

The localized near-surface hydrogeology consists of a shallow water table aquifer which is influenced by seasonal variations in precipitation. Ground water levels measured at high tide in the monitoring wells indicate a hydraulic gradient from southeast to northwest under the eastern half of the Site. Under the western portion of the Site the ground water gradient flattens and trends westerly toward the Passaic River which functions as a localized ground water receptor (Plate 4). The location of the former excavation in Area A, which had been backfilled with unconsolidated fill. This material may have a localized influence on ground water flow. It is probable that tidal movements of up to 5 feet in the Passaic River influence the ground water gradient beneath the Site and create water table fluctuations near the river.

3.1.4 Surface Water

The Passaic River flows in a south to north direction adjacent to Areas A, B, G and I at the Site's western boundary (Figure 2-1). The Site is located at the center of a mature meander in the River's traverse from central New Jersey to Newark Bay on the Atlantic Ocean. The River is estimated to be approximately 10 feet deep in the vicinity of the Site, and flows with an approximate gradient of 1 foot per mile.

In the vicinity of the Site, the proximity to the Atlantic Ocean creates diurnal tidal fluctuations of up to 5 feet in the surface of the River. During high tidal cycles, debris such as drums, wood, paper and plastic waste were observed to float downstream.

3.2 Determination of Ambient Conditions

This section presents the results of the February/March 1991 Determination of Ambient Conditions investigation. Complete laboratory results are tabulated in Appendix A.

3.2.1 Soil Investigation

3.2.1.1 Background Soil Borings

In order to determine ambient soil conditions that exist at the perimeter of the Site, four background soil borings designated BG-1, BG-2, BG-3, and BG-4 were installed during the February/March 1991 Sampling Event (Plate 3). Four soil samples were procured from each boring (total of 16 samples) and analyzed for TPH, lead, arsenic, chromium, zinc, and selenium. In addition, 25 percent of the samples (total of four) were analyzed for Base Neutral Organic Compounds plus 15 identifiable peaks (BN + 15).

TPH was detected in eight of the sixteen samples analyzed with six of eight at concentrations greater than the ECRA guideline (Table 3-1). Samples in exceedance of ECRA guidelines ranged from a minimum of 180 mg/Kg in BG-1 (4 to 5 feet) and a maximum of 570 mg/Kg in the 2 to 4 foot sample in BG-2. Total Base Neutral Compound concentrations greater than the ECRA guideline in two of four samples analyzed were 83,800 µg/Kg in BG-2 (2 to 4 feet) and 66,300 µg/Kg in BG-4 (0 to 2 feet).

Lead was detected in seven soil samples at concentrations greater than the ECRA guideline ranging from a minimum of 108 mg/Kg in the 4 to 6 foot sample interval of BG-3 to a maximum of 1,120 mg/Kg in the 0 to 2 foot sample interval of BG-4. Arsenic was detected in

Table 3-1
Background Soil Sampling Results
Allied Signal
Passaic, N.J.

Sample Location	BG-1	BG-1	BG-1	BG-1	BG-2	BG-2	BG-2	BG-2	BG-3	BG-3	BG-3	BG-3
Traffic Report Number	34455	34456	34457	34458	34459	34460	34451	34462	34463	34464	34465	34466
Date of Collection	2/27/91	2/27/91	2/27/91	2/27/91	2/27/91	2/27/91	2/27/91	2/27/91	2/27/91	2/27/91	2/27/91	2/27/91
Sampling Interval	0-1'	2-3'	4-8'	11-12'	0-2'	2-4'	4-10'	11-12'	0-2'	2-4'	4-6'	8-10'
Total Base Neutral Organic Compounds (ug/Kg)		**				[illegible]**			9030**			
Total Tentatively Identified Base Neutral Compounds (ug/Kg)		10690 J				24300 9480J			15300J			
Metals (mg/Kg)												
Arsenic	204 J	ND	13 J	ND	6 J	130 J	4 J	ND	80 J	11 J	ND	ND
Lead	258	13	65	5 B	417	500	9	5 B	400	118	106	7
Selenium	2	ND	ND	ND	ND	2	ND	ND	1	ND	ND	ND
Chromium	19 B	15 B	16 B	14 B	16 B	15 B	18 B	12 B	19 B	13 B	19 B	29 B
Zinc	82 B	22 B	86 B	26 B	90 B	24 B	20 B	13 B	35 B	38 B	107 B	36 B
Total Petroleum Hydrocarbons (mg/Kg)	870	ND	180	ND	60	870	50	ND	80	240	ND	ND
	Fill				Fill				Fill			

Sample Location	BG-4	BG-4	BG-4	BG-4	BG-4*
Traffic Report Number	34467	34468	34469	34470	34478
Date of Collection	2/28/91	2/28/91	2/28/91	2/28/91	2/28/91
Sampling Interval	0-2'	2-4'	4-6'	11-13'	12-14'
Total Base Neutral Organic Compounds (ug/Kg)	[illegible]**				**
Total Tentatively Identified Base Neutral Compounds (ug/Kg)	10730J				10100 J
Metals (mg/Kg)					
Arsenic	80 J	8 J	3 J	4 J	ND
Lead	1120	61	14	12	1
Selenium	2	ND	ND	ND	ND
Chromium	24 B	11 B	10 B	32	5
Zinc	82 B	4 B	12 B	38 B	29
Total Petroleum Hydrocarbons (mg/Kg)	300	ND	ND	ND	ND
	Fill				

MW-5
Background
34484
3/1/91
0-2'
14100**
7770 J
28
1000
2
8
10 B
140
Fill

Notes:
Blank space indicates not analyzed.
ND indicates none detected.
* Identifies travel blank.
** Does not include data with (J) laboratory qualifier as quantitative estimate.
Bold indicates greater than ECRA guideline concentration.
B indicates that this result should be considered qualitatively invalid because this compound was detected in a blank at a similar concentration.

four samples at concentrations greater than the ECRA guideline ranging from a minimum of 30J mg/Kg in the 0 to 2 foot sample interval of BG-4 to a maximum of 204J mg/Kg in the 0 to 2 foot sample interval of BG-1.

It should be noted that the TPH results for this area were qualified as quantitative estimate ("J" qualifier code) based on validation of the results. The laboratory duplicate analyses exceeded the precision quality control criteria of 20% relative percent difference. This may be the result of poor sample homogeniety or an indication of poor laboratory precision for the method.

Samples procured from BG-1 (0 to 1 foot sample interval), BG-2 (2 to 4 foot sample interval), and BG-4 (0 to 2 foot sample interval) each demonstrated the presence of TPH, arsenic, and lead at concentrations greater than ECRA guidelines (Table 3-1). Of these three samples, the 2 to 4 foot sample interval in BG-2 and the 0 to 2 foot sample interval in BG-4 also exhibited Base Neutral Compound concentrations greater than the ECRA guideline. The occurrence of elevated TPH concentrations greater than the ECRA guideline was discontinuous in BG-1. Loose sand that demonstrated an absence of TPH in the 2 to 3 foot sample interval was contained within fill that exhibited TPH concentrations greater than the ECRA guideline in the 0 to 1 foot sample interval and the 4 to 5 foot sample interval. Lead concentrations greater than the ECRA guideline in BG-3 demonstrated a vertical distribution ranging from a maximum of 466 mg/Kg in the 0 to 2 foot sample interval to a minimum of 108 mg/Kg in the 4 to 6 foot sample interval.

As a supplement to the background soil samples obtained to determine ambient Site conditions, one soil sample was procured from monitoring well boring MW-5 which was located in a background location (Plate 3). The sample was procured from the 0 to 2 foot sample interval and analyzed for TPH, Base Neutral Organic Compounds, lead, arsenic, chromium, zinc, and selenium. Soil sample results from MW-5 are included on Table 3-1.

The soil sample from MW-5 demonstrated the presence of TPH at a concentration exceeding ECRA guidelines at 140 mg/Kg. Base Neutral Organic Compounds were exhibited at a concentration of 14,100 mg/Kg greater than the ECRA guideline. Lead was detected at concentrations greater than the ECRA guideline in MW-5 at 1080 mg/Kg. Arsenic was also detected at a concentration greater than the ECRA guideline in MW-5 (28 mg/Kg).

The analyte concentrations detected in soil from the monitoring well boring located in a background location were within the range of variability of the other ambient concentrations observed.

Laboratory analytical data forms for soil samples are included in Appendix E.

3.2.2 Ground Water Investigation

In order to characterize the Site's hydrologic regime, five monitoring wells designated MW-1, MW-2, MW-3, MW-4, and MW-5 were installed during the February/March 1991 Sampling Event (Plate 3). MW-1 and MW-5 were installed hydraulically upgradient at the eastern property boundary (Plate 4). MW-2, MW-3, and MW-4 were installed at the western property boundary adjacent to the river and downgradient from Areas A, H, and I, respectively. Upon completion of well installation and development procedures, representative ground water samples were collected from each of the newly installed monitoring wells. Samples were analyzed for PPL Base Neutral Organic Compounds, PPL Metals (filtered and unfiltered), PPL VOC + 15, chloride, fluoride, sulfate, nitrate, phosphate, Total Dissolved Solids (TDS), and pH. Field measurements including pH, specific conductance, and temperature were obtained from each well. QA/QC samples included a blind duplicate, an equipment blank, and a travel blank designated as MW-8.

Results of the analyses from ground water samples demonstrated the presence of Total VOCs in the ground water at concentrations greater than the ECRA guideline in MW-1 (Table 3-2). Trans 1,2-dichloroethene and trichloroethene were detected at concentrations of 10 µg/L and 7 µg/L, respectively (Appendix A).

Lead and chromium were detected in ground water from Area A at concentrations greater than the ECRA guideline (190 µg/L and 150 µg/L, respectively, in MW-2).

Analyses for pH ranged in value from a minimum of 5.24 in MW-3 to a maximum of 6.7 in MW-5. TDS ranged from a minimum of 250 mg/L in MW-5 to a maximum of 830 mg/L in MW-4. Nitrate was detected in one of the five ground water samples at a concentration of 3.2 mg/L in MW-1. Chloride was detected in each of the five ground water samples ranging from a minimum of 9 mg/L in MW-5 to a maximum of 55 mg/L in MW-3. Phosphate was detected at concentrations of 0.09 mg/L and 0.06 mg/L in MW-1 and MW-2, respectively. Sulfate was detected in each of the five ground water samples ranging from a minimum of 89 mg/L in MW-5 to a maximum of 455 mg/L in MW-4 (Table 3-2).

Laboratory analytical data forms for ground water samples are included in Appendix F.

3.2.3 Surface Water Sampling

Two surface water samples were collected on 27 and 28 February 1991. The samples were procured from the east bank of the Passaic River at the northern (downstream) and southern (upstream) property boundaries of the Site, (Plate 3, SW-1 and SW-2, respectively). Both samples were collected at low tide. The surface water samples were analyzed for the same parameters as the ground water samples.

No compounds were detected above ECRA guidelines (Table 3-3).

Analyses for pH exhibited values of 8.29 in SW-1 to 8.40 n SW-2. Estimated TDS concentrations in both samples were 260 mg/L. Nitrate was detected at 2 mg/L in SW-1 and 1.9 mg/L in SW-2. Chloride was detected at 101 mg/L in SW-1 and 85 mg/L in SW-2. Phosphate was detected at 0.18 mg/L in SW-1 and 0.19 mg/L in SW-2. Sulfate concentrations in both samples were 24 mg/L. Fluoride was not detected in either of the two surface water samples.

Laboratory analytical data forms for surface water samples are included in Appendix F.

3.3.4 Water Well Survey

A review of NJDEP files was performed at the NJDEP Bureau of Water Quality office in Trenton, New Jersey on 26 March 1991. The purpose of this file research was to determine the presence of all water wells located within a one-half mile radius of the Site. A computer and microfiche search was implemented resulting in a preliminary guide to ground water wells located near the Site (Appendix G).

A total of four wells that produce in excess of 100,000 gallons per day are located within the search radius (Figure 3-3). The two wells, located south of the Site and across the Passaic River, are registered to Wallington Borough (identified as 5198) and are believed to be utilized as public supply wells. Both wells are completed to a depth of 400 feet deep within the Triassic Brunswick Formation and produce 140 and 130 gallons per minute, respectively. In addition, two wells located north of the Passaic River and registered to Dundee Water Power & Land Co. (4006 PS) are completed to unknown specifications regarding the total depth and formation.

Table 3-2
Ground Water Sampling Results
Allied Signal
Passaic, N.J.

Sample Location	MW-1 Filtered	MW-1 Unfiltered	MW-2 Unfiltered	MW-2 Filtered	MW-3 Unfiltered	MW-3 Filtered	MW-4 Unfiltered	MW-4 Filtered	MW-5 Unfiltered	MW-5 Filtered	MW-6 Unfiltered*	MW-6 Filtered*
	Upgradient	Upgradient	Area A	Area A			Area I	Area I	Upgradient	Upgradient		
Traffic Report Number	34826	[illegible]826	34800	34800	34827	34827	34825	34800	34830	34830	34832	34832
Date of Collection	3/18/91	[illegible]18/91	3/18/91	3/18/91	3/18/91	3/18/91	3/18/91	3/18/91	3/18/91	3/18/91	3/18/91	3/18/91
Volatile Organic Compounds (µg/L)	37**						8		ND			
Tentatively Identified Volatile Compounds (µg/L)	ND		ND		ND		ND		ND		ND	
Semivolatile Organic Compounds (µg/L)	ND		8J		ND		ND		ND		ND	
Tentatively Indentified Semivolatile Organic Compounds (µg/L) Unknowns	26J		15J		ND		ND		ND		ND	
Metals (µg/L)												
Antimony	60J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic	ND	ND	40	30	ND	ND	ND	ND	ND	ND	ND	ND
Beryllium	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chromium	ND	ND	150	ND	ND	ND	ND	ND	ND	ND	ND	ND
Copper	30	30	205	ND	ND	ND	20	30	ND	ND	ND	ND
Lead	ND	ND	100	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mercury	ND	ND	0.9	ND	ND	ND	ND	ND	ND	ND	ND	ND
Nickel	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Selenium	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zinc	ND	ND	310	240	ND	ND	330	320	ND	ND	30	ND
Thallium	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Other Analytes (mg/L)												
pH (no units)	5.87		6.40		6.34		6.3		6.7		6.80	
Total Dissolved Solids	440		330		850		800		380		ND	
Nitrate	3.3		ND		ND		ND		ND		ND	
Chloride	24		49		55		41		6		ND	
Ortho-Phosphate as P	0.09		0.06		ND		ND		0.31		ND	
Sulfate	180		426		855		485		88		ND	
Fluoride	ND		ND		ND		0.7		ND		ND	

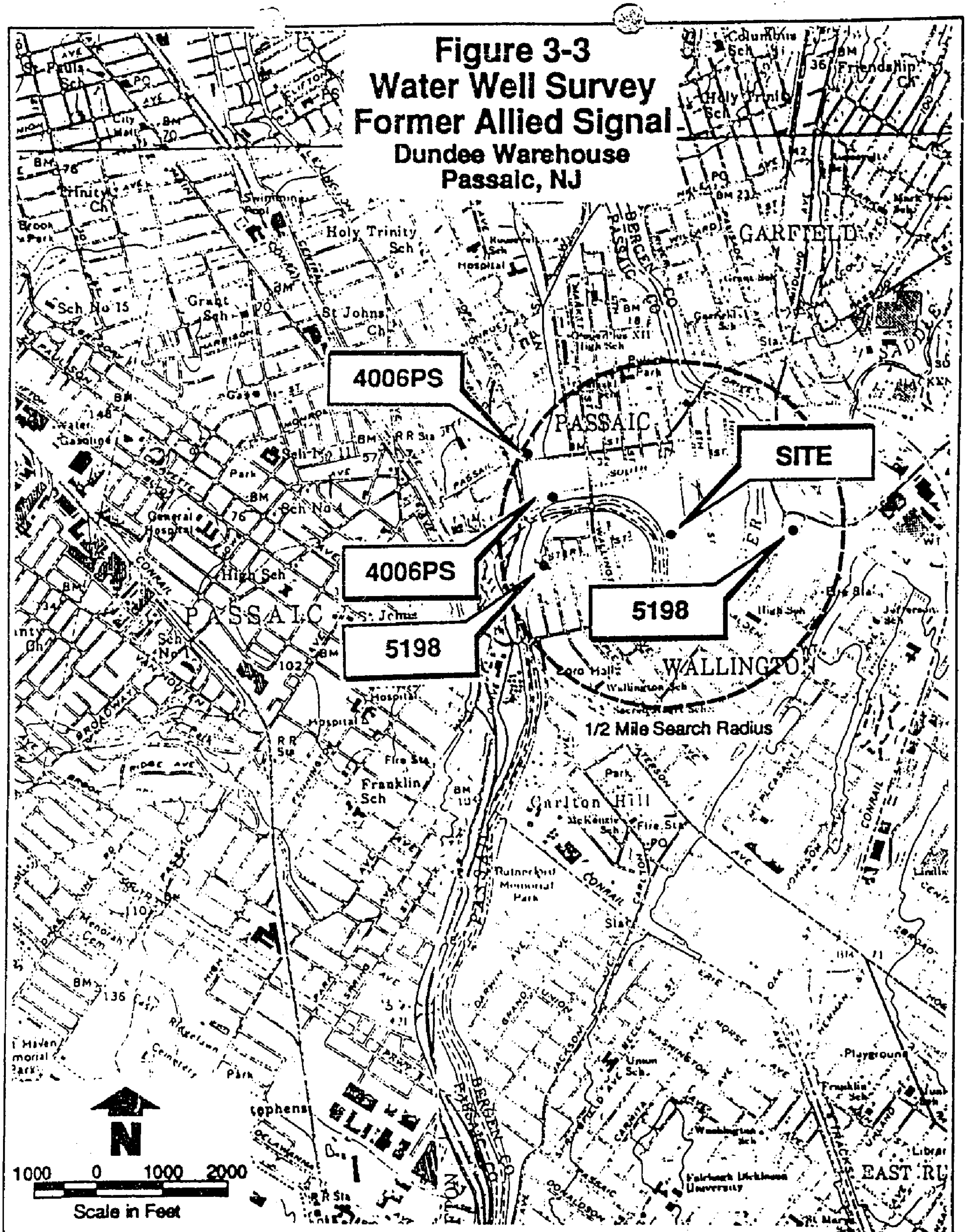
Notes:
ND indicates none detected.
Blank space indicates not analyzed.
J indicates estimated value.
* Identifies travel blank.
** Does not include data with (J) laboratory qualifier as quantitative estimate.

Table 3-2
Surface Water Sampling Results
Allied Signal
Passaic, N.J.

Sample Location	SW-1 Unfiltered	SW-1 Filtered	SW-2 Unfiltered	SW-2 Filtered	SW-3 Unfiltered	SW-3 Filtered*
Traffic Report Number	34471	34471	34472	34472	34475	34475
Date of Collection	2/27/91	2/27/91	2/28/91	2/28/91	2/28/91	2/28/91
Volatile Organic Compounds (μg/L)		ND		ND		ND
Tentatively Identified Volatile Compounds (μg/L)				ND		ND
Ethyl ether		13 J				
Semivolatile Organic Compounds (μg/L)		ND		ND		ND
Tentatively Indentified Semivolatile Organic Compounds (μg/L)						ND
Unknowns		82 J		13 J		
Metals (μg/L)						
Antimony	ND	ND	ND	ND	ND	ND
Arsenic	ND	ND	ND	ND	ND	ND
Beryllium	ND	ND	ND	ND	ND	ND
Cadmium	ND	ND	ND	ND	ND	ND
Chromium	ND	ND	ND	ND	ND	ND
Copper	ND	ND	ND	ND	ND	ND
Lead	ND	ND	ND	ND	ND	ND
Mercury	ND	ND	ND	ND	ND	ND
Nickel	ND	ND	ND	ND	ND	ND
Selenium	ND	ND	ND	ND	ND	ND
Silver	ND	ND	ND	ND	ND	ND
Zinc	30 B	90 B	110 B	80 B	ND	40
Thallium	ND	ND	ND	ND	ND	ND
Other Analyses (mg/l)						
pH (no units)		8.20		8.40		8.12
Total Dissolved Solids		280 J		280 J		ND
Nitrate		2		1.9		ND
Chloride		101		85		ND
Ortho-Phosphate as P		0.18		0.19		ND
Sulfate		24		24		ND
Fluoride		ND		ND		ND

ND indicates none detected.
Blank space indicates not analyzed.
J indicates estimated value.
* Identifies travel blank.
B: this result should be considered qualitatively invalid because this compound was detected in a blank at a similar concentration.

Figure 3-3
Water Well Survey
Former Allied Signal
Dundee Warehouse
Passaic, NJ



Source: USGS Topographic Quadrangle 7.5 Minute Series Paterson, New Jersey and Orange, New Jersey

WO# 320.31.01.01	Drawn by / Date:	M. Smith 4.16.91	Checked by / Date:	J. Marin 4.16.91	The ERM Group
	Revised by / Date:	M. Smith 4.22.91	Checked by / Date:	J. Marin 4.22.91	

Of the four wells producing greater than 100,000 gallons of water per day, three wells are located in a hydraulically downgradient direction and across the Passaic River from the Site. The remaining well registered to Wallington Borough is located to the east in a hydraulically upgradient location (Figure 3-3).

The preliminary search also identified 31 additional records of wells each producing less than 100,000 gallons of water per day. Of the additional wells, 20 have been identified as ground water monitoring wells. The monitoring wells were installed between February 1985 and July 1988 and range in depth from a minimum of 12.5 feet to a maximum of 20 feet deep. The wells are completed in unconsolidated overburden material. A summary list of these wells is contained in Table 3-4.

Two domestic water supply wells, registered to Tedeusz Kowalowitz (Wallington) and Rose Tuminia (Garfield), were identified within the search radius. The former is located approximately 2,000 feet east of the the Site in a hydraulicaly upgradient location. The latter is located in Garfield approximately 2,500 feet northeast of the Site in a hydraulically upgradient direction from the Site (Figure 3-3). The wells were completed to depths of 118 and 95 feet deep, respectively, within the consolidated sandstones and shales of the Brunswick Formation and each producing 20 gallons of water per minute. These wells were installed in August 1981 and August 1965, respectively.

One public water supply well was identified within the search radius. The well was completed to a depth of 300 feet. The well is registered to the City of Garfield and located hydraulically upgradient from the Site. The well was installed March 1967 and completed within the consolidated sandstones and shales of the Brunswick Formation.

A total of eight commercial/industrial water supply wells were identified within the search radius ranging in depth from 146 to 500 feet deep. These wells were installed during the period from August 1950 to November 1986 and are completed within the consolidated sandstones and shales of the Brunswick Formation.

3.3 Phase II Supplemental Sampling

3.3.1 Area A

In order to establish the lateral extent of observed contamination in Area A, a total of 6 soil borings (designated 91A-SB-1 through 91A-SB-6) were installed during the February/March 1991 sampling event

Table 3-4
Water Well Survey Summary Table
Allied Signal
Passaic, N.J.

Wells producing greater than 100,000 gallons per day

Well	Date Installed	Type	Permitted Owner	Location	Total Depth feet	Yield gpm	Specification Diameter/ Screen Length	Distance from Site miles	Direction from Site	Reference
4006 PS	?	?	Dundee Water Power & Land Co.	Ohonite Co.	?	> 70	?	0.5	Northwest	Figure 3-3
4006 PS	?	?	Dundee Water Power & Land Co.	Tuck Ind.	?	> 70	?	0.3	West	Figure 3-3
5198	?	?	Wallington Borough	Dul ?	400	140	?	0.4	East	Figure 3-3
5198	?	?	Wallington Borough	Lester St.	400	130	?	0.4	West	Figure 3-3

Wells producing less than 100,000 gallons per day

Well	Date Installed	Type	Permitted Owner	Location	Total Depth feet	Yield gpm	Specification Diameter/ Screen Length	Distance from Site miles	Direction from Site	Reference
MW-1	11/14/86	Monitoring	Molinelli Maychor Esq.	2 Mt. Pleasant Ave., Wallington, NJ	14	?	4"/10'	?	?	Appendix G
MW-2	11/14/86	Monitoring	Molinelli Maychor Esq.	2 Mt. Pleasant Ave., Wallington, NJ	14	?	4"/10'	?	?	Appendix G
MW-3	11/18/86	Monitoring	Molinelli Maychor Esq.	2 Mt. Pleasant Ave., Wallington, NJ	15	?	4"/10'	?	?	Appendix G
1	2/13/85	Monitoring	Amoco Oil Company	Main Avenue & Paterson Rd., Wallington, NJ	15	?	4"/10'	0.5	Southwest	Appendix G
2	2/13/85	Monitoring	Amoco Oil Company	Main Avenue & Paterson Rd., Wallington, NJ	18	?	4"/10'	0.5	Southwest	Appendix G
3	2/13/85	Monitoring	Amoco Oil Company	Main Avenue & Paterson Rd., Wallington, NJ	15	?	4"/10'	0.5	Southwest	Appendix G
4	2/13/85	Monitoring	Amoco Oil Company	Main Avenue & Paterson Rd., Wallington, NJ	15	?	4"/10'	0.5	Southwest	Appendix G
5	2/13/85	Monitoring	Amoco Oil Company	Main Avenue & Paterson Rd., Wallington, NJ	15	?	4"/10'	0.5	Southwest	Appendix G
6	2/14/85	Monitoring	Amoco Oil Company	Main Avenue & Paterson Rd., Wallington, NJ	15	?	4"/10'	0.5	Southwest	Appendix G
7	2/14/85	Monitoring	Amoco Oil Company	Main Avenue & Paterson Rd., Wallington, NJ	15	?	4"/10'	0.5	Southwest	Appendix G
8	2/14/85	Monitoring	Amoco Oil Company	Main Avenue & Paterson Rd., Wallington, NJ	15	?	4"/10'	0.5	Southwest	Appendix G
9	2/14/85	Monitoring	Amoco Oil Company	Main Avenue & Paterson Rd., Wallington, NJ	15	?	4"/10'	0.5	Southwest	Appendix G
10	2/14/85	Monitoring	Amoco Oil Company	Main Avenue & Paterson Rd., Wallington, NJ	15	?	4"/10'	0.5	Southwest	Appendix G
MP-1	10/27/85	Monitoring	J.L. Prescott	27 8th Street, Passaic, NJ	12.5	?	4"/10'	?	?	Appendix G
MP-2	10/27/85	Monitoring	J.L. Prescott	27 8th Street, Passaic, NJ	12.5	?	4"/10'	?	?	Appendix G
MP-3	10/27/85	Monitoring	J.L. Prescott	27 8th Street, Passaic, NJ	15	?	4"/10'	?	?	Appendix G
MP-4	10/28/85	Monitoring	J.L. Prescott	27 8th Street, Passaic, NJ	17	?	4"/10'	?	?	Appendix G
1	7/29/88	Monitoring	Atlantic Chesco Corp.	Atlantic Can Co., 101 7th St., Passaic, NJ	20	?	8"/15'	?	?	Appendix G
2	7/29/88	Monitoring	Atlantic Chesco Corp.	Atlantic Can Co., 101 7th St., Passaic, NJ	20	?	8"/15'	?	?	Appendix G
3	7/29/88	Monitoring	Atlantic Chesco Corp.	Atlantic Can Co., 101 7th St., Passaic, NJ	18	?	8"/14'	?	?	Appendix G
1	8/8/81	Domestic	Tedeusz Kowalowitz	31 Kossuth St., Wallington, NJ	122.67	20	6"/?	0.4	East	Appendix G
-	8/19/65	Domestic	Rose Tmuna	122 Prospect St., Garfield, NJ	95	20	6"/?	0.5	Northeast	Appendix G
R-1	2/1/82	Public Supply	City of Garfield	Lizette St. & Fleischers Brook, Garfield, NJ	300	68	10"/none	?	Northeast	Appendix G
1	11/5/86	Commercial	Carshel Realty	1033 Clifton Ave., Clifton, NJ	149	6	6"/?	?	?	Appendix G
1	1/16/86	Commercial	Quality Tropical	18 Hathaway St., Wallington, NJ	146	30	6"/?	?	?	Appendix G
1	6/6/72	Industrial	Royce Chemical	East Rutherford, Bergen County, NJ	188	35	8"/none	?	?	Appendix G
2	Apr-67	Industrial	Royce Chemical	East Rutherford, Bergen County, NJ	370	80	8"/none	?	?	Appendix G
A1	May-67	Industrial	Royce Chemical	East Rutherford, Bergen County, NJ	370	80	8"/none	?	?	Appendix G
6	4/25/59	Industrial	Royce Chemical	Carlton Hill, East Rutherford, NJ	378	40	8"/?	?	?	Appendix G
6	8/29/66	Industrial	Royce Chemical	Carlton Hill, East Rutherford, NJ	455	87	8"/none	?	?	Appendix G
2	5/14/62	Industrial	J.L. Prescott	Eight St., Passaic, NJ	500	25	8"/?	?	?	Appendix G
-	8/21/50	Commercial	Tender Brands Frozen Foods	176 Saddle River Rd., Garfield, NJ	230	100	8"/?	?	?	Appendix G

(Plate 3). Three soil samples were procured from each boring and analyzed for TPH. In addition, six samples were analyzed for BN + 15.

Fill material was observed in each boring ranging in thickness from a minimum of 6 feet in 91A-SB-2 to at maximum thickness of 14 feet deep in MW-2.

Analysis demonstrated the presence of TPH at concentrations greater than ECRA guidelines in each sample with the exception of 91A-SB-2 (10 to 12 foot sampling interval) and 91A-SB-3 (6 to 8 foot sample interval) (Table 3-5). TPH concentrations greater than ECRA guidelines ranged from a minimum of 170 mg/Kg in 91A-SB-2 (0 to 2 foot sample interval) to a maximum of 16,000 mg/Kg in 91A-SB-4 (4 to 6 foot sample interval). It should be noted that the TPH results for this area were qualified as quantitative estimate ("J" qualifier code) based on validation of the results. The laboratory duplicate analyses exceeded the precision quality control criteria of 20% relative percent difference. This may be the result of poor sample homogeniety or an indication of poor laboratory precision for the method.

Base Neutral Organic Compounds were demonstrated in three of the six samples analyzed at concentrations greater than the ECRA guideline ranging from a minimum of 18,290 µg/Kg in the 6 to 8 foot sample interval of 91A-SB-2 to a maximum of 546,000 µg/Kg in the 4 to 6 foot sample interval of 91A-SB-1.

As a supplement to the Area A soil sampling, two soil samples were collected from the monitoring well boring MW-2 in Area A and analyzed for TPH and Base Neutral Organic Compounds. TPH was detected at concentrations greater than the ECRA guideline in the 0 to 2 foot sample interval (6,600J mg/Kg) and the 18 to 20 foot sample interval (310J mg/Kg) (Table 3-6).

3.3.2 Area I

In order to establish the lateral extent of observed contamination in Area I, a total of 7 soil borings designated 91I-SB-1 through 91I-SB-7 were installed during the February/March 1991 sampling event (Plate 3). A total of three soil samples were procured from each boring for a total of 21 samples and analyzed for TPH.

Fill material was observed in all seven borings from a minimum thickness of 2 feet in 91I-SB-2 to a maximum of 12 feet in 91I-SB-4 and 91I-SB-6.

Detectable concentrations of TPH were exhibited in each of the 21 samples, 17 of which exceeded the ECRA guideline (Table 3-7).

Table 3-5
Area A Soil Boring Sampling Results
Allied Signal
Passaic, N.J.

Sample Location	91A-SB-1	91A-SB-1	91A-SB-1	91A-SB-2	91A-SB-2	91A-SB-2	91A-SB-3	91A-SB-3	91A-SB-3	91A-SB-4	91A-SB-4	91A-SB-4
Traffic Report Number	34487	34488	34488	34489	34490	34491	34492	34493	34494	34495	34496	34497
Date of Collection	3/4/91	3/4/91	3/4/91	3/5/91	3/5/91	3/5/91	3/5/91	3/5/91	3/5/91	3/5/91	3/5/91	3/5/91
Sampling Interval	0-2'	4-6'	10-12'	0-2'	6-8'	10-12'	0-2'	6-8'	10-12'	0-2'	4-6'	10-12'
Total Base Neutral Organic Compounds (ug/Kg)		**540000****			**18000****			**			**	
Total Tentatively Identified Base Neutral Compounds (ug/Kg)		106800 J			14470 J			3920 J			18370 J	
Total Petroleum Hydrocarbons (mg/Kg)	**200 J**	**190 J**	**650 J**	**170 J**	**210 J**	ND	**870 J**	ND	**770 J**	**4800 J**	**16000 J**	**1900 J**
	Fill			Fill			Fill			Fill		

Sample Location	91A-SB-5	91A-SB-5	91A-SB-5	91A-SB-6	91A-SB-6	91A-SB-6
Traffic Report Number	34498	34499	34500	34501	34502	2584
Date of Collection	3/5/91	3/5/91	3/5/91	3/5/91	3/5/91	3/5/91
Sampling Interval	0-2'	6-8'	10-12'	0-2'	6-8'	10-12'
Total Base Neutral Organic Compounds (ug/Kg)		**				9700**
Total Tentatively Identified Base Neutral Compounds (ug/Kg)		6600 J				8950 J
Total Petroleum Hydrocarbons (mg/Kg)	**3300 J**	**13063 J**	**3000 J**	**1900 J**	**6300 J**	**540 J**
	Fill			Fill		

Notes:
Blank space indicates not analyzed.
ND indicates none detected.
**** Does not include data with (J) laboratory qualifier as quantitative estimate.**
J represents a quantitative estimate.
Bold indicates greater than ECRA guideline concentration.

Table 3-6
Monitoring Well Soil Sampling Results
Allied Signal
Passaic, N.J.

Sample Location	MW-2	MW-2	MW-3	MW-4	MW-5
Traffic Report Number	Area A	Area A		Area I	Background
Date of Collection	34481	34482	34483	34483 .	34484
Sampling Interval	3/4/91	3/4/91	2/28/91	2/28/91	3/1/91
	0-2'	18-20'	0-2'	0-2'	0-2'
Total Base Neutral Organic Compounds (ug/Kg)	**	940**	18000**	88800**	14100**
Total Tentatively Identified Base Neutral Compounds (ug/Kg)	3140 J	3460 J	7020 J	12420 J	7770 J
Metals (mg/Kg)	NA	NA			
Arsenic			ND	**60**	**26**
Lead			**122**	**454**	**1800**
Selenium					2
Chromium			18	56	9
Zinc			120	**4100**	10
Total Petroleum Hydrocarbons (mg/Kg)	**6820 J**	**310 J**	**4700**	**230**	**140**
	Fill		Fill		

Notes:

Blank space indicates not analyzed.

NA indicates not analyzed.

ND indicates none detected.

* Identifies travel blank.

** Does not include data with (J) laboratory qualifier as quantitative estimate.

Bold indicates greater than ECRA guideline concentration.

Table 3-7
Area I Soil Sampling Results
Allied Signal
Passaic, N.J.

Sample Location	911-SB-1	911-SB-1	911-SB-1	911-SB-2	911-SB-2	911-SB-2	911-SB-3	911-SB-3	911-SB-3	911-SB-4	911-SB-4	911-SB-4
Traffic Report Number	34503	34504	34505	34506	34507	34508	34509	34510	34511	34512	34513	34514
Date of Collection	3/8/91	3/8/91	3/8/91	3/8/91	3/8/91	3/8/91	3/8/91	3/8/91	3/8/91	3/8/91	3/8/91	3/8/91
Sampling Interval	0-2'	4-10'	10-12'	0-2'	4.5-6.5'	11-12'	0-2'	4-8'	10-12'	0-2'	4-6'	10-12'
Total Base Neutral Organic Compounds (ug/Kg)	NA	NA	600**	NA	NA	NA	NA	NA	NA	NA	NA	86070**
Total Tentatively Identified Base Neutral Compounds (ug/Kg)	NA	NA	INC	NA	NA	NA	NA	NA	NA	NA	NA	INC
Total Petroleum Hydrocarbons (mg/Kg)	100	800	100	200			180	310		700	3100	1200
Metals (mg/Kg)	NA	NA		NA	NA	NA	NA	NA	NA	NA	NA	
Arsenic			ND									30
Lead			571									1230
Chromium			42									31
Zinc			5									108
	Fill	Fill		Fill			Fill	Fill		Fill	Fill	Fill

Sample Location	911-SB-5	911-SB-5	911-SB-5	911-SB-6	911-SB-6	911-SB-6	911-SB-7	911-SB-7	911-SB-7
Traffic Report Number	34515	34516	34517	34518	34519	34520	34521	34522	34523
Date of Collection	3/6/91	3/6/91	3/6/91	3/7/91	3/7/91	3/7/91	3/7/91	3/7/91	3/7/91
Sampling Interval	0-2'	4-6'	9-10'	0-2'	4-6'	10-12'	0-2'	4-6'	10-12'
Total Base Neutral Organic Compounds (ug/Kg)	NA	NA	21470**	NA	NA	177670	38420	NA	NA
Total Tentatively Identified Base Neutral Compounds (ug/Kg)	NA	NA	INC	NA	NA	INC	INC	NA	NA
Total Petroleum Hydrocarbons (mg/Kg)	400	200	440	300	800	3000	580	850	
Metals (mg/Kg)	NA	NA		NA	NA			NA	NA
Arsenic			30			34	58		
Lead			374			1110	1810		
Chromium			130			154	66		
Zinc			29			702	248		
	Fill	Fill		Fill	Fill	Fill	Fill	Fill	

Notes:
Blank space indicates not analyzed.
ND indicates none detected.
** Does not include data with (J) laboratory qualifier as quantitative estimate.
J represents a quantitative estimate.
Bold indicates greater than ECRA guideline concentration.
INC indicates laboratory results not received as of yet.

Concentrations greater than the ECRA guideline ranged from a minimum of 100 mg/Kg in 91I-SB-1 (10 to 12 feet), and 91I-SB-3 (0 to 2 feet) to a maximum concentration of 3,300 mg/Kg in 91I-SB-6 (10 to 12 feet).

Analysis demonstrated the presence of Base Neutral Compound concentrations greater than the ECRA guideline in four of the five samples analyzed. Total Base Neutral Compound concentrations greater than ECRA guidelines ranged from a minimum of 21,470 µg/Kg in 91I-SB-5 (9 to 10 feet) to a maximum of 177,670 µg/Kg in 91I-SB-6 (10 to 12 feet). The maximum Base Neutral concentration correlates with the maximum TPH concentration detected in Area I.

Concentrations detected in Area I were greater than the ECRA guideline for the following metals analytes: lead (five of five samples analyzed), arsenic (three of five samples analyzed), chromium (two of five samples analyzed) and zinc (one of five samples analyzed).

Lead was detected in Area I at concentrations exceeding ECRA guidelines ranging from a minimum of 374 mg/Kg in 91I-SB-5 (9 to 10 feet) to a maximum of 1,810 mg/Kg in 91I-SB-7 (0 to 2 feet). Arsenic was detected in Area I at concentrations exceeding ECRA guidelines ranging from a minimum of 30 mg/Kg in 91I-SB-5 (9 to 10 feet) to a maximum of 52 mg/Kg in 91I-SB-7 (0 to 2 feet). Chromium was detected in Area I at concentrations exceeding ECRA guidelines ranging from a minimum of 154 mg/Kg in 91I-SB-6 (10 to 12 feet) to a maximum of 189 mg/Kg in 91I-SB-5 (9 to 10 feet). Zinc was detected in Area I at concentrations ranging from a minimum of 5 mg/Kg in 91I-SB-1 (10 to 12 feet) to a maximum of 762 mg/Kg in 91I-SB-6 (10 to 12 feet).

As a supplement to the Area I soil sampling, one soil sample was collected from the monitoring well boring MW-4 depth in Area I and analyzed for TPH, Base Neutral Organic Compounds, arsenic, lead, chromium, and zinc. Each of these compounds were detected at concentrations greater than the respective ECRA guidelines with the exception of chromium. Concentrations were 220 mg/Kg TPH, 59,520 µg/Kg Base Neutral Organic Compounds, 63 mg/Kg arsenic, 454 mg/Kg lead, and 4,160 mg/Kg zinc (Table 3-6).

SECTION 4
FINDINGS AND RECOMMENDATIONS

The purpose of this section is to present a comprehensive, area-specific interpretation of all results obtained to date which exceed ECRA guidelines. The conclusions of the investigation results address soil, ground water, and surface water.

4.1 Soil

4.1.1 Ambient Soil Conditions

Ambient soil quality was established in order to determine whether the observed constituents on-site were the result of past Site activities or a result of ambient conditions in the native soil/fill profile. The locations of ambient soil borings were selected to eliminate the influence of Site activities. This allowed for the distinction between those conditions which existed in the fill and native soil prior to introduction to the Site and/or as a result of local industrial activities.

A total of seventeen soil samples were collected from four soil borings and one monitoring well boring (MW-5) located in background locations. Analytical results indicated that Petroleum Hydrocarbon Compounds, Metals (specifically, lead and arsenic), and Base Neutral Organic Compounds exceed ECRA guideline concentrations at ambient sampling locations (Plate 5).

Concentrations of TPH were detected in nine of seventeen background soil samples analyzed. Six of the detected concentrations were greater than the ECRA guideline. TPH concentrations exceeding the ECRA guideline ranged from a minimum of 140 mg/Kg to a maximum of 570 mg/Kg. Of the six concentrations exceeding the ECRA guideline, five concentrations were located in the fill material and one concentration was located in the native soil.

Concentrations of Base Neutral Organic Compounds were detected in four of five background soil samples analyzed. Three of the detected concentrations were greater than the ECRA guideline. Concentrations of Base Neutral Organic Compounds greater than the ECRA guideline ranged from a minimum of 25,730 µg/Kg to a maximum of 158,400 µg/Kg. The three concentrations exceeding the ECRA guideline were each located in the fill material.

Concentrations of lead were detected in each of the seventeen background soil samples analyzed. Eight of the detected concentrations were greater than the ECRA guideline. Lead concentrations exceeding the ECRA guideline ranged from a minimum of 108 mg/Kg to a maximum of 1120 mg/Kg. Of the eight concentrations greater than the ECRA guideline, six concentrations were located in the fill material and two concentrations were located in the native soil.

Concentrations of arsenic were detected in twelve of seventeen background soil samples analyzed. Five of the detected concentrations were greater than the ECRA guideline. Arsenic concentrations exceeding the ECRA guideline ranged from a minimum of 28 mg/Kg to a maximum of 204 mg/Kg. The five concentrations exceeding the ECRA guideline were each located in the fill material.

It is apparent that the fill material was imported and used to modify the Site's topography. The sporadic distribution of constituents in the fill at background locations suggests that the fill material was imported from different sources. In addition, results demonstrated that constituents inherent in the fill have impacted the native soil at one background location (BG-3).

The occurrence of the analytes in Areas B, E, F, and G, although at concentrations above ECRA guidelines, is considered to be within the range of expected variability based upon the range of analyte concentrations detected at background locations.

4.1.2 Phase II Supplemental Sampling

The presence of TPH and Base Neutral Compounds in the soil profile in Area A is consistent with the former use of this area for storage of fuel oil and gasoline. The occurrence of TPH, Base Neutral Compounds, and metals (lead, arsenic, chromium, and zinc) in Area I is, in part, attributable to the former existence of an incinerator in the area (Plate 5).

4.2 Ground Water

Five ground water monitoring wells were installed on the Site to determine the impact of the Site on the localized ground water quality. Analytical results indicate that the only concentration of total VOCs greater than the ECRA guideline was detected in MW-1 located in a hydraulically upgradient position on the Site (Plate 5). Chromium and lead were observed at concentrations slightly greater than ECRA guidelines in unfiltered samples MW-2, located in Area A. Filtered ground water samples collected from MW-2 demonstrated the absence of chromium and lead indicating that these compounds are entrained on sediments in ground water. No other constituents were detected above ECRA guidelines in ground water beneath the Site. These results from surface and ground water analyses demonstrate that the compounds of concern are relatively insoluble and immobile in water and therefore show only a slight potential for migration.

With the exception of metals in Area A, the absence of significant concentrations of compounds greater than the ECRA guideline in ground water supports the conclusion that previous Site activities have not adversely impacted the ground water quality.

The occurrence of VOC concentrations greater than the ECRA guideline in ground water procured from an upgradient monitoring well (MW-1) demonstrates that organic compounds migrating from an off-site source are impacting the ground water quality beneath the Site.

4.3 Surface Water

Analytical results of surface water samples collected from the Passaic River at two locations demonstrate the absence of compounds above ECRA guideline concentrations. The absence of detectable concentrations of compounds indicates that the Site is not impacting the Passaic River which functions as the local surface water receptor.

4.4 Recommendations

Based upon the results of extensive environmental sampling, ERM on behalf of Allied-Signal, recommends that no further investigation activities be performed at the Site. This recommendation is made based upon the following conclusions.

1. The Site is located in a highly industrialized, urban location bounded on three sides by industrial operations. The regional and local industrialization has resulted in degradation of soil and ground water quality.
2. The Site has undergone topographic modifications requiring the use of non-indigenous fill material imported to the Site dating back to the inception of Site activities in the late 1800s. Analytical results of fill deposits indicate the presence of elevated

analyte concentrations in a sporadic distribution not associated with past Site activities.

3. There are no domestic or municipal potable supply wells that are impacted by ground water migrating from the Site. It has been determined that shallow ground water beneath the Site migrates in a generally west direction to the Passaic River.
4. With the exception of Area A, the Site has apparently not impacted the local ground water beneath the Site. Unfiltered ground water samples in Area A indicated the presence of chromium and lead at concentrations greater than ECRA guidelines, however, no analytes were detected in the filtered samples (dissolved metals) which demonstrate the analytes are adsorbed on suspended solids in the ground water.
5. The Site has not impacted the water quality of the Passaic River.
6. Surficial soils in Areas A and I exhibit the presence of analytes (in particular, petroleum hydrocarbon compounds) at concentrations greater than ECRA guidelines. However, these concentrations are considered to be within the range of expected variability based upon the range of analyte concentrations detected at background locations. The spatial distribution of locations exhibiting elevated concentrations of analytes is sporadic and discontinuous.
7. The compounds of concern (petroleum hydrocarbon compounds, base neutral organic compounds, and metals) are relatively insoluble and immobile and as a result, exhibit a limited potential for off-site migration as exhibited by ground water and surface water analytical results.

4.5 Recommendation for Remedial Action

Based upon the findings obtained from the four sampling events (June 1987, August 1989, April 1990, and February/March 1991) and for the reasons stated above, ERM on behalf of Allied-Signal recommends that no additional remedial action is warranted at the Site.

Table 1-1
Sampling Data
Allied Signal
Passaic, New Jersey

ERM Traffic #	Sample Location	Sample Depth (ft)	Sample Matrix	Date Sampled	Lancaster #	Analyses Performed **
34503	91I-SB-1	0-2	soil	3/6/91	1641076	1
34504	91I-SB-1	4-10	soil	3/6/91	1641077	1
34505	91I-SB-1	10-12	soil	3/6/91	1652654	1,3,6
34506	91I-SB-2	0-2	soil	3/6/91	1641079	1
34507	91I-SB-2	4.5-5.5	soil	3/6/91	1641080	1
34508	91I-SB-2	11-12	soil	3/6/91	1641081	1
34509	91I-SB-3	0-2	soil	3/6/91	1641082	1
34510	91I-SB-3	4-8	soil	3/6/91	1641083	1
34511	91I-SB-3	10-12	soil	3/6/91	1641084	1
34512	91I-SB-4	0-2	soil	3/6/91	1641085	1
34513	91I-SB-4	4-8	soil	3/6/91	1641086	1
34514	91I-SB-4	10-12	soil	3/6/91	1652653	1,3,6
34515	91I-SB-5	0-2	soil	3/6/91	1641088	1
34516	91I-SB-5	4-6	soil	3/6/91	1641089	1
34517	91I-SB-5	9-10	soil	3/6/91	1652655	1,3,6
34518	91I-SB-6	0-2	soil	3/7/91	1641091	1
34519	91I-SB-6	4-6	soil	3/7/91	1641092	1
34520	91I-SB-6	10-12	soil	3/7/91	1652656	1,3,6
34521	91I-SB-7	0-2	soil	3/7/91	1652657	1,3,6
34522	91I-SB-7	4-6	soil	3/7/91	1641207	1
34523	91I-SB-7	10-12	soil	3/7/91	1641208	1
34486	91A-SB-1	4-6	soil	3/4/91	1639293	1,3
34457	91A-SB-1	0-2	soil	3/4/91	1639294	1
34488	91A-SB-1	10-12	soil	3/4/91	1639295	1
34489	91A-SB-2	0-2	soil	3/5/91	1639296	1
34490	91A-SB-2	6-8	soil	3/5/91	1639279	1,3
34491	91A-SB-2	10-12	soil	3/5/91	1639280	1
34492	91A-SB-3	0-2	soil	3/5/91	1639281	1
34493	91A-SB-3	6-8	soil	3/5/91	1639282	1,3
34494	91A-SB-3	10-12	soil	3/5/91	1639283	1
34495	91A-SB-4	0-2	soil	3/5/91	1639284	1
34496	91A-SB-4	4-6	soil	3/5/91	1639285	1,3
34497	91A-SB-4	10-12	soil	3/5/91	1639286	1
34498	91A-SB-5	0-2	soil	3/5/91	1639287	1
34499	91A-SB-5	6-8	soil	3/5/91	1639288	1,3
34500	91A-SB-5	10-12	soil	3/5/91	1639289	1
34501	91A-SB-6	0-2	soil	3/5/91	1639290	1
34502	91A-SB-6	6-8	soil	3/5/91	1639291	1

The ERM Group

QUALITY ASSURANCE SUMMARY

INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE NO.

34483

Lab Name: LANCASTER_LABORATORIES_INC.___
SDG No.: ALS4
Matrix (soil/water): SOIL_
Level (low/med): LOW
% Solids: _90.1

Lab Sample ID: 1641071
Date Received: 03/09/91

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				
7440-36-0	Antimony				NR
7440-38-2	Arsenic				NR
7440-39-3	Barium	1.4	B	N*	F
7440-41-7	Beryllium				NR
7440-43-9	Cadmium				NR
7440-70-2	Calcium				NR
7440-47-3	Chromium				NR
7440-48-4	Cobalt	18.2			A
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead				NR
	Lithium	122		*	F
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury				NR
	Molybdenu				NR
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium				NR
	Silicon				NR
7440-22-4	Silver				NR
7440-23-5	Sodium				NR
	Strontium				NR
	Tin				NR
	Titanium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Boron	120			A
7440-28-0	Thallium				NR
					NR

Color Before: ________
Color After: ________

Clarity Before: ______
Clarity After: ______

Texture: ______
Artifacts: ______

Comments:

QUALITY ASSURANCE SUMMARY

INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE NO.

34484

Lab Name: LANCASTER_LABORATORIES_INC.___
SDG No.: ALS4___
Matrix (soil/water): SOIL_
Level (low/med): LOW
% Solids: _85.3

Lab Sample ID: 1641072___
Date Received: 03/09/91

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic	62.6		N*	F
7440-39-3	Barium				NR
7440-41-7	Beryllium				NR
7440-43-9	Cadmium				NR
7440-70-2	Calcium				NR
7440-47-3	Chromium	57.6			A
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead	454		*	F
	Lithium				NR
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury				NR
	Molybdenu				NR
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium				NR
	Silicon				NR
7440-22-4	Silver				NR
7440-23-5	Sodium				NR
	Strontium				NR
	Tin				NR
	Titanium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	4160			A
	Boron				NR
7440-28-0	Thallium				NR

Color Before: ______
Color After: ______
Clarity Before: ______
Clarity After: ______
Texture: ______
Artifacts: ______

Comments:

QUALITY ASSURANCE SUMMARY

INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE NO.

34485

Lab Name: LANCASTER_LABORATORIES_INC.___
SDG No.: ALS4___
Matrix (soil/water): SOIL_
Level (low/med): LOW
% Solids: _86.4

Lab Sample ID: 1641073___
Date Received: 03/09/91

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic	28.1		N*	F
7440-39-3	Barium				NR
7440-41-7	Beryllium				NR
7440-43-9	Cadmium				NR
7440-70-2	Calcium				NR
7440-47-3	Chromium	9.0	B		A
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead	1080		*	F
	Lithium				NR
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury				NR
	Molybdenu				NR
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	1.7			F
	Silicon				NR
7440-22-4	Silver				NR
7440-23-5	Sodium				NR
	Strontium				NR
	Tin				NR
	Titanium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	10.1			A
	Boron				NR
7440-28-0	Thallium				NR

Color Before: ______
Color After: ______
Clarity Before: ______
Clarity After: ______
Texture: ______
Artifacts: ______
Comments:

<u>**CERTIFIED MAIL**</u>
<u>**RETURN RECEIPT REQUESTED**</u>

Mr. William Hague
Allied Corporation
Engineered Materials Sector
P.O. Box 2105R
Morristown, NJ 07962-2105

Re: Administrative Consent Order (ACO) in the matter of Allied-Signal, Inc., (Allied-Signal ACO)
Allied Corporation - Dundee Warehouse
Passaic City, Passaic County
ECRA Case #87133
Sampling Proposal Dated: August 8, 1991

Dear Mr. Hague:

Pursuant to the authority vested in the Commissioner of the New Jersey Department of Environmental Protection and Energy (NJDEPE) by the Environmental Cleanup Responsibility Act (ECRA), (N.J.S.A. 13:1K-6et seq.), and delegated to the Chief of the Bureau of Environmental Evaluation and Cleanup Responsibility Assessment (BEECRA) pursuant to N.J.S.A. 13:1B-4, the referenced Sampling Plan is hereby approved as conditioned below:

I Soil Conditions

At a minimum, delineation is required for many areas at this site. The need for a deed restriction or further remediation will then be assessed after review of the post-excavation and delineation sample results. Future submissions shall include figures for all AECs indicating results above action levels (including CaPAH/PAH concentrations) at all depth intervals.

Since the site re-use is industrial, the target cleanup levels for the Base Neutral compounds shall be as follows:

benzo-a-pyrene	2.5 ppm
dibenzo(a,h)anthracene	2.5 ppm
other CaPAHs	25 ppm each

As previously stated in the NJDEPE's letter dated June 19, 1991, the target cleanup levels for Priority Pollutant Metals shall be as follows:

Lead	1,000 ppm
Arsenic	20 ppm
Chromium	200 ppm
Zinc	1,500 ppm

1. Area A - Former Underground Fuel Storage Tanks

No further soil sampling or remediation is proposed since only four sample locations exceeded the 10,000 ppm PHC target cleanup level. It has been proposed to collect a confirmatory round of ground water samples.

The proposal for no further soil sampling or remediation is not acceptable and additional investigation, as presented below, shall be required.

a. At sample location 91A-SB-4 (4-6') and 91A-SB-5 (6-8'), elevated PHC levels (above 10,000) are present in the unsaturated zone. Therefore, the following actions shall be required:

i) delineation for PHCs so as to establish a decreasing gradient and determine if a deminimus quantity of contaminated soil is present. If PHC delineation samples exceed 1,000 ppm then BN+15 and VO+15, xylene analyses are also required; or

ii) excavation with post-excavation sampling for PHC, BN+15 (on 25% of the samples), and VO+15 including xylenes (on any post-excavation samples exceeding 1,000 ppm PHC).

b. A review of CaPAH/PAH results indicate the following:

March 1991 - 91A-SB-1 (4-6'), benzo-a-pyrene at 30 ppm, dibenzo (a,h)anthracene at 6.2 ppm and total CaPAHs at 198 ppm.

April 1990 - In general, SB-1 through SB-6 indicate elevated levels of CaPAH/PAHs at depths of 12-14' and 14-16'.

June 1987 - 1 MID 18B, benzo-a-pyrene at 21 ppm and total CaPAHs at 425 ppm
1 N 18B, benzo-a-pyrene at 13.7 ppm
2 S 18B, benzo-a-pyrene at 9.1 ppm
2 N 18B, benzo-a-pyrene at 6.9 ppm
IP 12, benzo-a-pyrene at 22 ppm, dibenzo(a,h) anthracene at 7.1 ppm, total CaPAHs at 152 ppm

Depth intervals were not listed for the June 1987 samples.

Based upon these results, Allied shall complete the following investigation:

i) At 91A-SB-1 (4-6'), Allied Corporation shall either collect delineation samples for BN+15 analysis to determine the extent of soil impacted or excavate this area with post-excavation sampling for BN+15 analysis.

ii) The depth intervals for the June 1987 samples shall be submitted. Depending on the interval impacted and its relationship to ground water, delineation and/or excavation may be required for these sample locations.

2) Area B - Former Tank Wash Area

Allied Corporation has proposed no further action in this area based on all lead levels being below 1,000 ppm. This proposal is conditionally acceptable.

Although lead was considered a parameter of concern, previous results (B-1 through B-3) detected PHCs at 550-1300 ppm and BNs at 39.8 to 633.7 ppm (depth of 30-36"). Therefore, before the proposal for no further action can be accepted for this area of concern all CaPAH/PAH results shall be submitted. A figure shall be submitted indicating these results at the appropriate depth intervals and locations.

3) Area E - Surficial Soil Staining

Allied Corporation has proposed no further action based upon the conclusion that this area has been impacted by off-site sources due to flooding (the present property owner has backfilled this area to mitigate the impact of flooding) and the fact that the Arsenic concentrations detected in this area are greater than background conditions.

The proposal for no further action is not acceptable as discussed below:

a. In reviewing AEC E (E1-E4) sample results (April 24-25, 1990), it is shown that not only are arsenic results elevated (896 ppm at E-1 (18-24") and 803 ppm at E-3 (18-24") with an average As concentration of 375 ppm), but lead levels are also of concern (8,030 ppm at E-4 (6-12"), 3,680 ppm at E-4 (18-24") 3,780 ppm at E-1 (18-24") with average Pb concentration of 2354 ppm). Therefore, lead is also a parameter of concern for this area.

b. Since industrial target cleanup levels have been exceeded, excavation with post-excavation sampling is required for As and Pb.

c. Allied Corporation may wish to sample off-site to determine if the Arsenic and Lead contamination detected originated from the adjacent property.

4) Area F - Surficial Soil Staining

Allied Corporation has proposed to excavate the impacted soil in this area to a depth of 1.5'. X-Ray Fluorescence (XRF) will be used to guide the excavation limits. Six post-excavation samples will be collected for Pb analysis only.

Allied Corporation's proposal for this area is conditionally acceptable as discussed below:

a. Arsenic was only seen elevated at F-4 (6-12") at 47 ppm, whereas F-4 (18-24") indicated As at 14 ppm. In addition, the As average for F-1 through F-4 samples (April, 1990) was 19 ppm, therefore the proposal not to analyze the post-excavation samples for Arsenic is acceptable.

b. Post-excavation sample frequency shall be as follows:

   i) sidewall - one soil sample per thirty linear feet of sidewall, with a minimum of one per sidewall.

   ii) base - one sample shall be taken per one hundred and eighty (180) square feet of excavation area up to the first nine hundred (900) square feet. One additional sample shall be taken for each additional nine hundred (900) square feet of excavation.

5) Area G - Former Utility Shed

Allied Corporation has proposed to incorporate this area into the expanded areas of influence in Area A and I, and is therefore removed as a separate area of concern.

Sample G-1 (3') detected Pb at 3,560 ppm (April, 1990 results). In addition, G-1 (0-6") detected Cd at 6.1 ppm, and As at 31 ppm. Therefore, the proposal is acceptable provided that, during excavation activities in AEC I, this sample location is excavated with post-excavation sampling (minimum of 4 sidewall samples and 1 base sample) for Pb, As, and Cd analyses.

6) Area H - Former Drum Wash Disposal Pit

Allied Corporation has proposed to utilize ground penetrating radar (GPR) or equivalent techniques to determine the presence of the storm water drainage pipe. If the pipe is found, a sediment sample at the outfall location will be taken and analyzed for VO+15, Priority Pollutant Metals (PPM) and Total Organic Carbon (TOC).

This proposal is conditionally acceptable provided the sediment sample is also analyzed for PHC and BN+15 and the sample for VO+15 analysis is collected from the 18-24" depth.

7) Area I - Former Incinerator

Allied Corporation has proposed to utilize XRF to sample the surface soils proximal to sample locations SB-1 (I) and SB-3 (I) for Lead only. If the surface soils demonstrate the absence of contamination above the targeted cleanup levels, no further action is proposed. However, if these samples detect Lead at levels above the targeted cleanup levels, excavation of the "hotspots" shall occur. XRF will be used to define the limits of excavation. Post-excavation samples (4 sidewall/2 base) from each excavation will be analyzed for lead only.

Previous sample results in this area were as follows:

8/3/89 - I-1 (0-6"), benzo-a-pyrene at 5.7 ppm
I-4 (0-6"), Pb at 1,610 ppm and As at 79 ppm

4/25/90 - I-1 (3'), Pb at 2,050 ppm, benzo-a-pyrene at 4.6 ppm

4/11/90 - I-3 (3'), Pb at 5,350 ppm, benzo-a-pyrene at 3.1 ppm
I-4 (3'), Pb at 1,010 ppm
I-2 (3'), benzo-a-pyrene at 9.7 ppm and dibenzo(a,h)anthracene at 2.8 ppm

3/7/91 - 91I-SB-7 (0-2"), benzo-a-pyrene at 1,810 ppm and dibenzo(a,h)anthracene at 5.5 ppm

Soil excavation at sample locations SB-1(I) and SB-3(I) shall be required; therefore additional sampling of the surface soils is not necessary.

Depths for the required SB-1 (I-1) and SB-3 (I-3) excavations shall be extended to the 3' depth. In addition, the required excavation shall include sample locations I-2, I-4 and SB-7. Minimum excavation depths shall be 3', 3', and 2', respectively.

Post-excavation parameters shall be as follows:

I-1	Pb and BN+15
I-2	BN+15
I-3	Pb and BN+15
I-4	Pb and As
I-7	Pb and BN+15

8. Background Samples

Arsenic levels at sample locations BG-1 (0-1') - 204 ppm and at BG-2 (2-4') - 129 ppm required delineation. This is required due to the extremely elevated levels of arsenic.

Allied Corporation may wish to sample off-site in order to determine if this is the source of Arsenic contamination on site. However, it should be noted that sample location BG-1 is located near the entrance gate (Lodi Street) well over 300' feet from Paterson Parchment Paper Co. (potential off-site source of As).

9. BN Cleanup Methods

For all future BN analysis, where PHC values exceed 500 ppm, it is recommended that EPA method 3650 (matrix cleanup) and 3611 (alumina partition) precede the PAH+15 analysis of the aromatic fraction. EPA method 3640 (Gel Permeation) is also an acceptable matrix cleanup method.

II Ground Water Conditions

1. The proposal to collect an additional round of ground water samples from the five on-site monitoring wells for VO+15, BN+15, Priority Pollutant Metals (filtered only), pH, and Total Dissolved Solids is acceptable.

III General Requirements

1. Pursuant to Paragraph 6 of the Allied-Signal ACO, Allied Corporation shall accomplish this investigation and any further analytical investigations by the methods outlined in this sampling plan. If any change in methods outlined in the sampling plan is necessary or if any delays are encountered, Allied Corporation shall inform BEECRA in writing prior to implementation.

2. Pursuant to Paragraph 6 of the Allied-Signal ACO, Allied Corporation shall submit the results in triplicate within 90 calendar days of the receipt of this approval. Please note that only one copy of the Quality Assurance/Quality Control Deliverables is needed.

3. Allied Corporation shall submit summarized analytical results in tabular form. Allied Corporation shall also submit with the analytical data, all documents associated with the sampling and testing, including, but not limited to, lab sheets, chain of custodies, results of blank analyses, lab chronicles, summaries of analytical instrument tuning and analytical methods used.

The NJDEPE recommends that Allied Corporation refer to the attached "ECRA Guidelines for Data Presentation and Proposals" for guidance in the preparation of its submittal.

4. Allied Corporation shall notify NJDEPE at least 14 calendar days prior to implementation of all field activities included in the sampling plan. If Allied Corporation fails to initiate sampling within 30 calendar days of the receipt of this approval, any requests for an extension of the required time frames may be denied.

5. Allied Corporation shall submit the appropriate fee as required by N.J.A.C. 7:26B-1.10. The enclosed Fee Submittal Form, is provided for guidance to determine the fees required; this form shall be completed and returned with the submittal package.

6. Allied Corporation shall submit the sampling results, along with a data presentation and proposal for further action that is fully supported by that data, pursuant to N.J.A.C. 7:26B-4.3 and Paragraph 6 of the Allied-Signal ACO. The Remedial Investigation Guide (RIG), specifically Section VI, should be consulted for details on the presentation of analytical data to be prepared for the NJDEPE's review. In addition, the ECRA Cleanup Plan Guide (ECPG) should be consulted to ensure the development of a technically and administratively adequate Cleanup Plan pursuant to N.J.A.C. 7:26B-5.3. Clear, concise and complete presentations that meet the minimum requirements of the RIG and ECPG are essential to ensure a complete and timely review by the NJDEPE. Failure to provide documents that meet the minimum guidance of the RIG and ECPG may lengthen the case processing time and may result in the rejection of the document. Technically and administratively incomplete submissions not prepared pursuant to N.J.A.C. 7:26B-3.2, 4.3, and 5.3 and the Allied-Signal ACO may result in the initiation of enforcement action including, but not limited to, the assessment of penalties pursuant to the Allied-Signal ACO.

7. If contamination is determined to exist above a level found acceptable by NJDEPE, then pursuant to Paragraph 6 of the Allied-Signal ACO, Allied Corporation shall prepare and submit a Cleanup Plan developed pursuant to N.J.A.C. 7:26B-5.3 to address said contamination. If the data from implementation of the approved Sampling Plan indicate the presence of contamination, but is not sufficient to define the full horizontal and vertical extent, then such areal definition shall be proposed as a Sampling Plan Addendum in a form which meets the criteria of N.J.A.C. 7:26B-3.2(c)11. The horizontal and vertical extent of contamination shall be determined before an approvable Cleanup Plan can be developed.

If you have any questions, please contact the Case Manager, Bryan Moore, at (609) 633-7141.

Sincerely,

Douglas Stuart, Chief
Bureau of Environmental Evaluation
and Cleanup Responsibility Assessment

enclosure

c: Frank Camera, BEERA
Renee Bancroft, BGWDC
Henry McCafferty, Passaic City Health Dept.

State of New Jersey
Department of Environmental Protection and Energy
Division of Responsible Party Site Remediation
CN 028
Trenton, NJ 08625-0028

Scott A. Weiner
Commissioner

Karl J. Dela
Dire

JUN 15 1992

CERTIFIED MAIL
RETURN RECEIPT REQUESTED
Mr. William Hague
Allied Corporation
Engineered Materials Sector
P.O. Box 2105R
Morristown, NJ 07962-2105

Re: Allied Corporation - Dundee Warehouse
Passaic City, Passaic County
ECRA Case #87133

Dear Mr. Hague:

Please be advised that the New Jersey Department of Environmental Protection and Energy (Department) has recently proposed Cleanup Standards for Contaminated Sites (February 3, 1992 New Jersey Register). These proposed rules shall be used as guidance to determine: what concentration of contaminants need to be present at a site to consider the site contaminated; which areas of environmental concern need additional investigation; and the concentration of a contaminant allowed to remain for a site to be considered "clean".

Consequently, the Department has completed a review of the results of sampling conducted on the above referenced site as they compare to the proposed rules. For the purpose of this review, it was assumed that the site would remain industrial and as a result the sample results were compared with the proposed non-residential standards. However, please be advised, the use of the proposed non-residential standards will require a notice in the deed that contaminant levels above residential standards exist on site. Be further advised, to avoid the need for any institutional controls, remediation of the contaminants to the appropriate proposed residential standards throughout the soil column must be accomplished.

Based upon our review, the following sample locations are above the proposed non-residential standards:

<u>August 1989 Sampling Event</u>

B-1 (0-6") - 6.0 ppm Benzo(a)anthracene, 5.6 ppm Chrysene, 3.8 ppm Benzo(b)fluoranthene, 4.2 ppm Benzo(k)fluoranthene, 5.0 ppm Benzo(a)pyrene, 2.8 ppm Benzo(ghi)perylene, 1.2 ppm Dibenzo(a,h)anthracene

(18-24") - 2.9 ppm Chrysene, 2.4 ppm Benzo(a)pyrene, 0.89 ppm Dibenzo(a,h)anthracene

F-1 (0-6") - 1,260 ppm Lead

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I-1 (0-6") - 0.88 ppm Benzo(a)Pyrene, 880 ppm Lead

(18-24") - 15 ppm Benzo(a)anthracene, 22 ppm Chrysene, 6.0 ppm Benzo(b)fluoranthene, 5.3 ppm Benzo(k)fluoranthene, 5.7 ppm Benzo(a)pyrene, 3.4 ppm Indeno(1,2,3-cd)pyrene, 3.6 ppm Benzo(ghi)perylene, 1.2 ppm Dibenzo(a,h)anthracene

I-3 (0-6") - 3.8 ppm Chrysene, 2.96 ppm Benzo(b)fluoranthene, 3.46 ppm Benzo(k)fluoranthene, 2.73 ppm Benzo(a)pyrene, 40 ppm Arsenic, 934 ppm Lead

(18-24") - 2.9 ppm Benzo(a)anthracene, 3.5 ppm Chrysene, 2.7 ppm Benzo(b)fluoranthene, 2.9 ppm Benzo(a)pyrene

I-4 (0-6") - 7.91 ppm Benzo(a)anthracene, 8.9 ppm Chrysene, 9.82 ppm Benzo(b)fluoranthene, 6.84 ppm Benzo(k)fluoranthene, 9.23 ppm Benzo(a)pyrene, 5.97 ppm Indeno(1,2,3-cd)pyrene, 6.9 ppm Benzo(ghi)perylene, 2.33 ppm Dibenzo(a,h)anthracene, 79 ppm Arsenic, 1,610 ppm Lead

(18-24") - 9.2 ppm Benzo(a)anthracene, 11 ppm Chrysene, 8.4 ppm Benzo(b)fluoranthene, 7.4 ppm Benzo(k)fluoranthene, 8.3 ppm Benzo(a)pyrene, 4.9 ppm Indeno(1,2,3-cd)pyrene, 4.5 ppm Benzo(ghi)perylene

April 1990 Sampling Event

E-1(I) (6-12") - 140 ppm Arsenic

(18-24") - 896 ppm Arsenic, 1,150 ppm Lead

E-2(I) (6-12") - 116 ppm Arsenic

(18-24") - 361 ppm Arsenic, 1,150 ppm Lead

E-3(I) (6-12") - 222 ppm Arsenic

(18-24") - 803 ppm Arsenic, 1,880 ppm Lead

E-4(I) (6-12") - 264 ppm Arsenic, 8,030 ppm Lead

(18-24") - 198 ppm Arsenic, 3,680 ppm Lead

F-1(I) (6-12") - 1,940 ppm Lead

(18-24") - 954 ppm Lead

F-2(I) (6-12") - 1,890 ppm Lead

F-3(I) (6-12") - 30 ppm Arsenic, 2,250 ppm Lead

(18-24") - 684 ppm Lead

F-4(I) (6-12") - 47 ppm Arsenic, 1,910 ppm Lead

(18-24") - 2,060 ppm Lead

February 1991 Sampling Event

BG-1 (0-1') - 204 ppm Arsenic

BG-3 (0-2') - 89 ppm Arsenic

BG-4 (0-2') - 30 ppm Arsenic, 1,120 ppm Lead

MW-4 (0-2') - 63 ppm Arsenic, 4,160 ppm Zinc

MW-5 (0-2') - 28 ppm Arsenic, 1,080 ppm Lead

91I-SB-7 (0-2') - 52 ppm Arsenic, 1,810 ppm Lead

At a minimum, the base neutral contamination detected at sample locations B-1 (Area B) and I-1, I-3, and I-4 (Area I) shall be remediated. This contamination appears to be related to previous site operations.

Due to the apparent sporadic distribution of the Arsenic and Lead contamination across the site, active remediation for these contaminants may not be required. However, before the Department can make a final decision, Allied shall evaluate the feasibility of the remedial technologies available to address this contamination. While the cost of a remedial option may be a factor in Allied's evaluation, it should not be the primary factor in eliminating a remedial technology.

If the active remediation of the metal contamination is determined to be infeasible, then, at a minimum, institutional controls (i.e. paving, capping with clean fill) across the site would be required to eliminate exposure pathways, such as direct contact or dust emissions. In order to avoid the requirement for capping the site with asphalt or clean fill, the contaminants in the top two feet of the soil column must be remediated to non-residential surface standards.

Within thirty calendar days of receipt of this letter, Allied shall submit a Cleanup Plan to address the base neutral contamination in Area I and the results of their evaluation of available technologies to address the metals contamination. The Cleanup Plan shall also include Allied's conclusions for this site and their proposal to address the metals contamination. Based on the above information, it is necessary for Allied to re-evaluate the site conditions using the proposed Cleanup Standards for Contaminated Sites as guidance.

If you have any questions, please contact the Case Manager, Bryan Moore, at (609) 633-7141.

Sincerely,

Douglas Stuart, Chief
Bureau of Environmental Evaluation
and Cleanup Responsibility Assessment

enclosure
c: Frank Camera, BEERA
Renee Bancroft, BGWDC
Henry McCafferty, Passaic City Health Dept.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 2
290 BROADWAY
NEW YORK, NY 10007-1866

JUN - 8 2006

GENERAL NOTICE LETTER
URGENT LEGAL MATTER
PROMPT REPLY NECESSARY
CERTIFIED MAIL-RETURN RECEIPT REQUESTED

Kenneth E. Stroup, Jr.
Deputy General Counsel, Environmental Law Department
Honeywell International, Inc.
PO Box 2245
Morristown, NJ 07962

Re: Diamond Alkali Superfund Site
Notice of Potential Liability for
Response Actions in the Lower Passaic River Study Area, New Jersey

Dear Mr. Stroup:

The United States Environmental Protection Agency ("EPA") is charged with responding to the release and/or threatened release of hazardous substances, pollutants, and contaminants into the environment and with enforcement responsibilities under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended ("CERCLA"), 42 U.S.C. § 9601 et seq. EPA is seeking your cooperation in an innovative approach to environmental remediation and restoration activities for the Lower Passaic River.

EPA has documented the release or threatened release of hazardous substances, pollutants and contaminants into the six-mile stretch of the river known as the Passaic River Study Area, which is part of the Diamond Alkali Superfund Site ("Site") located in Newark, New Jersey. Based on the results of previous CERCLA remedial investigation activities and other environmental studies, including a reconnaissance study of the Passaic River conducted by the United States Army Corps of Engineers ("USACE"), EPA has further determined that contaminated sediments and other potential sources of hazardous substances exist along the entire 17-mile tidal reach of the Lower Passaic River. Thus, EPA has decided to expand the area of study to include the entire Lower Passaic River and its tributaries from Dundee Dam to Newark Bay ("Lower Passaic River Study Area").

Internet Address (URL) • http://www.epa.gov
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By this letter, EPA is notifying Honeywell International, Inc. of its potential liability relating to the Site pursuant to Section 107(a) of CERCLA, 42 U.S.C. § 9607(a). Under CERCLA, potentially responsible parties ("PRPs") include current and past owners and operators of a facility, as well as persons who arranged for the disposal or treatment of hazardous substances at the Site, or the transport of hazardous substances to the Site.

In recognition of our complementary roles, EPA has formed a partnership with USACE and the New Jersey Department of Transportation-Office of Maritime Resources ("OMR") ["the governmental partnership"] to identify and address water quality improvement, remediation, and restoration opportunities in the 17-mile Lower Passaic River Study Area. This governmental partnership is consistent with a national Memorandum of Understanding ("MOU") executed on July 2, 2002 between EPA and USACE. This MOU calls for the two agencies to cooperate, where appropriate, on environmental remediation and restoration of degraded urban rivers and related resources. In agreeing to implement the MOU, the EPA and USACE will use their existing statutory and regulatory authorities in a coordinated manner. These authorities for EPA include CERCLA, the Clean Water Act, and the Resource Conservation and Recovery Act. The USACE's authority stems from the Water Resources Development Act ("WRDA"). WRDA allows for the use of some federal funds to pay for a portion of the USACE's approved projects related to ecosystem restoration.

For the first phase of the Lower Passaic River Restoration Project, the governmental partners are proceeding with an integrated five-to-seven-year study to determine an appropriate remediation and restoration plan for the river. The study will involve investigation of environmental impacts and pollution sources, as well as evaluation of alternative actions, leading to recommendations of environmental remediation and restoration activities. The study is being conducted pursuant to CERCLA and WRDA.

Based on information that EPA evaluated during the course of its investigation of the Site, EPA believes that hazardous substances were released from the General Chemical Company facility located at 65 Lodi Street/8th Street in Passaic, New Jersey, into the Lower Passaic River Study Area. Hazardous substances, pollutants and contaminants released from the facility into the river present a risk to the environment and the humans who may ingest contaminated fish and shellfish. Therefore, Honeywell International, Inc. as successor to General Chemical Company may be potentially liable for response costs which the government may incur relating to the study of the Lower Passaic River. In addition, responsible parties may be required to pay damages for injury to, destruction of, or loss of natural resources, including the cost of assessing such damages.

EPA is aware that the financial ability of some PRPs to contribute toward the payment of response costs at the Site may be substantially limited. If you believe, and can document, that you fall within that category, please inform Sarah Flanagan and William Hyatt in writing at the addresses identified below in this letter. You will be asked to submit financial records including federal income tax returns as well as audited financial statements to substantiate such a claim.

Please note that, because EPA has a potential claim against you, you must include EPA as a creditor if you file for bankruptcy. You are also requested to preserve and retain any documents now in the possession or control of your Company or its agents that relate in any manner to your facility or the Site or to the liability of any person under CERCLA for response actions or response costs at or in connection with the facility or the Site, regardless of any corporate document retention policy to the contrary.

Enclosed is a list of the other PRPs who have received notices of potential liability. This list represents EPA's findings on the identities of PRPs to date. We are continuing efforts to locate additional PRPs who have released hazardous substances, directly or indirectly, into the Lower Passaic River Study Area. Exclusion from the list does not constitute a final determination by EPA concerning the liability of any party for the release or threat of release of hazardous substances at the Site. Please be advised that notice of your potential liability at the Site may be forwarded to all parties on this list as well as to the Natural Resource Trustees.

We request that you become a "cooperating party" for the Lower Passaic River Restoration Project. As a cooperating party, you, along with many other such parties, will be expected to fund the CERCLA study. Upon completion of the study, it is expected that CERCLA and WRDA processes will be used to identify the required remediation and restoration programs, as well as the assignment of remediation and restoration costs. At this time, the commitments of the cooperating parties will apply only to the study. For those who choose not to cooperate, EPA may apply the CERCLA enforcement process, pursuant to Sections 106(a) and 107(a) of CERCLA, 42 U.S.C. § 9606(a) and § 9607(a) and other laws.

You may become a cooperating party by participating in the Cooperating Parties Group ("Group") that has already formed to fund the CERCLA study portion of the Lower Passaic River Restoration Project.

We strongly encourage you to contact the Group to discuss your participation. You may do so by contacting:

William H. Hyatt, Esq.
Common Counsel for the Lower Passaic River Study Area Cooperating Parties Group
Kirkpatrick & Lockhart LLP
One Newark Center, 10th Floor
Newark, New Jersey 07102
(973) 848-4045
whyatt@kl.com

Written notification should be provided to EPA and Mr. Hyatt documenting your intention to join the Group and settle with EPA no later than 30 calendar days from your receipt of this letter. The result of any agreement between EPA and your Company as part of the Group will need to be memorialized in an Administrative Order on Consent. Your written notification to EPA should be mailed to:

Sarah Flanagan, Assistant Regional Counsel
Office of Regional Counsel
U.S. Environmental Protection Agency
290 Broadway - 17th Floor
New York, New York 10007-1866

Pursuant to CERCLA Section 113(k), EPA must establish an administrative record that contains documents that form the basis of EPA's decision on the selection of a response action for a site. The administrative record file and the Site file are located at EPA's Region 2 Superfund Records Center, at 290 Broadway, New York, NY on the 18th floor. You may call the Records Center at (212) 637-4308 to make an appointment to view the administrative record and/or the Site file for the Diamond Alkali Site, Passaic River.

As you may be aware, the Superfund Small Business Liability Relief and Brownfields Revitalization Act became effective on January 11, 2002. This Act contains several exemptions and defenses to CERCLA liability, which we suggest that all parties evaluate. You may obtain a copy of the law via the Internet at **http://www.epa.gov/swerosps/bf/sblrbra.htm** and review EPA guidances regarding these exemptions at **http://www.epa.gov/compliance/resources/policies/cleanup/superfund.**

Inquiries by counsel or inquiries of a legal nature should be directed to Ms. Flanagan at (212) 637-3136. Questions of a technical nature should be directed to Elizabeth Butler, Remedial Project Manager, at (212) 637-4396.

Sincerely yours,

R. Basso

Ray Basso, Strategic Integration Manager
Emergency and Remedial Response Division

Enclosure